

# THE IMPLEMENTATION OF SMART GOVERNANCE IN LOCAL GOVERNMENT

**Tomas Martinaitis**

## Abstract

Over recent decades, urban areas have expanded in number, population and complexity, intensifying governance challenges. In response, local governments have turned to smart governance. This article introduces a new theoretical model of smart governance and applies it to empirical data from 18 Lithuanian municipalities. Using a quantitative survey of local government representatives, the study explores how smart governance dimensions manifest at the local level, and how officials' tenure influences this. Statistical tools reveal both commonalities and differences across municipalities. The research broadens the concept of smart governance beyond its technological focus, positioning it as a comprehensive analytical tool in municipal studies.

KEY WORDS: local government, smart cities, smart governance, smart municipalities.

## Anotacija

Pastaraisiais dešimtmečiais urbanizuotų teritorijų ir gyventojų skaičius bei valdymo sudėtingumas gerokai išaugo, todėl ryškėja vis sudėtingesni valdymo iššūkiai. Atsakydamos į juos, savivaldybės ėmėsi diegti sumanųjį valdymą. Šiame straipsnyje pristatomas naujas teorinis sumaniojo valdymo modelis, pritaikytas analizuojant 18-kos Lietuvos savivaldybių duomenis. Remiantis kiekybine apklausa, kurioje dalyvavo savivaldybių atstovai, tyrime nagrinėjama, kaip vietos lygmeniu pasireiškia sumaniojo valdymo dimensijos ir kokią įtaką atstovų darbo stažas daro jų raiškai. Taikant statistinės analizės priemones, atskleidžiami savivaldybių panašumai ir skirtumai. Šio tyrimo naujumas slypi platesniame požiūryje į sumanųjį valdymą – jis traktuojamas ne tik kaip technologijų taikymas, bet ir kaip išsamus analitinis įrankis vykdant savivaldybių tyrimus.

PAGRINDINIAI ŽODŽIAI: vietos valdžia, išmanieji miestai, išmanusis valdymas, išmaniosios savivaldybės.

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## Introduction

In recent decades, urban areas have expanded rapidly in both size and complexity, placing unprecedented pressure on traditional municipal functions such as public service delivery, law enforcement, economic support, and the maintenance of quality living conditions. These core responsibilities have grown increasingly

Tomas Martinaitis – PhD student of Political science at Vytautas Magnus University, Kaunas, K. Donelaičio 58, Lithuania. E-mail: [tomas.martinaitis@vdu.lt](mailto:tomas.martinaitis@vdu.lt)

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difficult to fulfil effectively. Simultaneously, cities face a wave of emerging demands, including environmental sustainability, inclusive citizen participation and resilient healthcare systems, that challenge existing governance models. Incremental adjustments are no longer sufficient: cities must undergo comprehensive and agile transformations (U4SSC, 2021). As Corelia Baibarac-Duignan and Michiel de Lange (2021) argue, the exponential growth of urban data is fundamentally reshaping how cities are developed, maintained and governed. This explosion of information compels policymakers to rethink conventional governance practices and embrace innovative, data-driven approaches, commonly framed today as ‘smart’ solutions. In this context, the concept of smart governance is not merely a technological trend, but a necessary evolution for local governments aiming to remain effective, equitable and responsive in an increasingly complex world.

While the shift towards smart governance offers a promising pathway to navigate the growing complexities of urban life, it is not without its contradictions. Smart governance is increasingly viewed as essential for addressing pressing sustainability issues, enabling a gradual yet profound transformation across all domains of local government, from employment and healthcare to education, energy, transport, waste management and urban planning (Buškevičiūtė, 2014). Yet here lies the central tension explored in this research: *although smart governance is often framed as a progressive and necessary goal, its practical implementation poses significant challenges for local governments. On one hand, it fosters participatory decision-making, encourages adaptive resource use, and calls for more open and collaborative policymaking. On the other, it disrupts established governance structures and political routines. Local authorities, driven by imperatives of political continuity, institutional stability and electoral success, may be reluctant to embrace the risks and uncertainties that come with such a transformation. This ambivalence, between innovation and inertia, forms the critical focus of this study.*

This tension between the ideal of smart governance and the practical limitations of its implementation is further complicated by conceptual ambiguity. The term *smart* has become increasingly prevalent in both academic and policy discourse, particularly within the Lithuanian and European Union contexts, where it is commonly paired with concepts denoting societal structures and functions: *smart state* (Gil-Garcia et al., 2016), *smart region* (Eger, 2009), *smart city* (Caragliu and Del Bo, 2017), and *smart community* (Ciasullo et al., 2020). While this linguistic trend reflects the growing recognition of the need for innovation in governance, it often lacks analytical precision. In the Lithuanian academic sphere, for example, Buškevičiūtė (2014), drawing on the work of Jucevičienė and Jucevičius, emphasises the governance aspect of the concept, defining smart governance as ‘the ability to

quickly and resourcefully adapt to changing environmental conditions by making appropriate decisions and using them to achieve the ultimate goal’.

Nonetheless, even as smart governance emerges as a strategic priority in response to complex and evolving challenges, its conceptual content remains under-defined. Contemporary discourse tends to emphasise technological applications and the symbolic appeal of *smartness*, often at the expense of critical engagement with its normative foundations and governance implications. This has led to fragmented understandings and inconsistent applications of the concept. In response, this article *aims to contribute both conceptual clarity and empirical grounding by presenting a coherent theoretical model of smart governance and evaluating its practical applicability within the Lithuanian local government system.*

Building on the earlier discussion of the conceptual ambiguities surrounding smart governance, several key works have attempted to provide more structured frameworks for understanding the relationship between governance and the growing role of *smart* entities, such as cities, regions and states. One of the more successful conceptualisations in academic literature comes from Pereira et al. (2018), who offer a comprehensive overview of smart governance by categorising it in relation to smart cities, regions and countries, while also outlining key challenges and operational guidelines. Their review draws on significant contributions from scholars such as Lee and Lee (2014), Albino et al. (2015), and Anthopoulos et al. (2016), among others.

However, Pereira et al. (2014) raise a critical point in their conclusions: while smart governance is often discussed in the context of technological advancements, this focus tends to overshadow the governance aspect itself, namely, the necessary collaboration between smart governments, citizens and other stakeholders. They emphasise that smart governance is intrinsically linked to smart government, and that the tools and policies associated with it must be understood in light of the values, experiences and capabilities of the government implementing them. Moreover, they argue that contemporary governance challenges, characterised by their complexity, demand a flexible, adaptable and responsive government capable of navigating them effectively.

Within the Lithuanian academic context, a similar gap in the research on smart governance can be observed. While interest in this field is growing, much of the existing scholarship still lacks a comprehensive exploration of the governance dimensions. One of the notable contributions in this area comes from Jucevičienė and Jucevičius (2014), who, drawing on the works of Giddens, Duneler, Appelbaum (2007), Lee and Broszlewski (2009), and Luhmann (1997), identified nine key characteristics of a smart social system. They identify these characteristics as crucial for understanding governance systems, but their application to local go-

vernment structures has not been fully explored. This gap in research is what the current article seeks to address, as it applies these foundational ideas specifically to local governance systems in Lithuania, offering a more nuanced perspective on smart governance at the local level. For this article, the works of Jucevičienė and Jucevičius, and their framework for a smart social system, provide a foundational starting point, offering key insights into the theoretical underpinnings of smart governance and its application to local governance systems in Lithuania.

This is where the novelty of this article lies: *it seeks to fill this gap by proposing a model specifically tailored to the unique characteristics and challenges of smart governance at the local level. By refining and adapting existing frameworks, this study aims to develop a practical and theoretically grounded model for assessing smart governance within the context of local government, taking into account both conceptual foundations and the complexities encountered in practice.* In addition to the Lithuanian academic discourse, international scholarship also highlights the need for a focused exploration of governance in smart city development. Notably, Castelnovo et al. (2016) conducted a systematic review of smart city governance, and emphasised that evaluations of smart cities must pay particular attention to governance structures and decision-making processes. Extending this line of inquiry, the present article introduces a new analytical model that foregrounds these dimensions, incorporating a set of distinct variables specifically designed to assess smart governance within the context of local government. This framework is further supported by original empirical research conducted at the end of 2024, contributing to a more nuanced, context-sensitive understanding of how smart governance can be both conceptualised and operationalised at the local level.

The aim of this article is to design and empirically validate a novel framework for assessing smart governance within local government contexts. To achieve this, the study undertakes three main tasks: *(1) to construct a conceptual model of smart governance grounded in both the Lithuanian and the international academic discourse; (2) to apply this model through a quantitative survey of local government representatives in Lithuania; and (3) to analyse the empirical data using a range of statistical methods in order to identify patterns, challenges and opportunities in the expression of smart governance at the local level.* The article is structured accordingly: the first section introduces the newly developed conceptual model; the second presents the methods and results of the empirical survey made; and the final section offers a discussion of the results, highlighting key insights and their implications. This study not only advances the understanding of smart governance within the Lithuanian context, but also contributes to the broader international discourse on local government governance and policy development.

In order to present a smart governance model of local governance, it is necessary to make a proper literature review. As noted by Scholl and Scholl (2014), the earliest attempts to combine the terms *smart* and *government* can be traced back to a brief World Bank report analysing the computerisation of government operations in an Indian province in 1997. However, at that time, these terms were used without a clear definition. Tomas Martinaitis (2024) provides a comprehensive analysis of various definitions of smart governance (see Table 1), demonstrating clearly that there is no universally accepted academic consensus on the precise meaning of smart governance, or how it should be defined.

Table 1. Different definitions of smart governance

Definition	Author
Smart governance is an acknowledged governance model that emphasises the extensive use of information technologies to empower citizens by involving them in public administration.	R.G. Hollands (2008)
Smart governance involves political participation, the provision of public services to citizens, and transparent governance.	R. Giffinger et al. (2011)
Smart governance involves the approval of smart city development plans and the promotion of smart initiatives, with a focus on the development of higher education centres.	T. Nam and T.A. Pardo (2011); J. Winters (2011)
Smart governance is a new form of e-governance that uses ICT to connect information, processes, institutions and infrastructure, thereby helping to better represent and manage citizens and society.	J. R. Gil-Garcia (2012)
Smart governance is a governance model characterised by stakeholder participation and network-based activities, where rational decisions are made based on timely and complex information, and appropriate implementation structures, processes, technologies and tools are selected. Capacities and resources are mobilised and strengthened to create sustainable public value.	E. Gaulé (2014)
Smart governance involves the creation of sustainable public value with citizen engagement.	W. Castelnovo et al. (2016)
Smart governance is a form of governance in which authorities engage in the creation of collective value within their competence, enabling the public administration system and its subjects to operate effectively under rapidly changing environmental conditions, using the resources of the system and its environment efficiently, and making and implementing decisions that are appropriate to the given conditions.	J. Stanislovaitienė (2016)
Smart governance is an important part of smart city initiatives, requiring the complex involvement of the government sector, citizens and stakeholders.	G. Pereira et al. (2018)

Definition	Author
Smart governance regulates smart city governance, aiming to provide public services as quickly and efficiently as possible, responding faster, communicating better, and improving bureaucratic functioning through innovation and the application of technology. Smart governance integrates services, bureaucracy and policy implementation.	J. Batmetan, Q. Kainde (2022)

Source: Compiled by Martinaitis, 2024, based on works by different authors

Therefore, to define smart governance in local government, and to develop an evaluation model for smart governance with unique variables in this context, it is first necessary to examine how the concept of a smart social system is defined more broadly. Jucevičienė and Jucevičius (2017), having analysed the concept of smartness not only in the context of individuals but also within social systems, provided the following definition: ‘Smartness is the ability to discern critical features or their system and to respond quickly and creatively to the significant factors they determine – challenges, opportunities, trends, or symptoms – leveraging them to achieve one’s goals while basing decisions on social responsibility.’ The authors identified fundamental dimensions of smartness that any smart social system must exhibit (intelligence, agility, networking, sustainability, knowledge-based, innovative, digital, learning), regardless of its size (e.g. an organisation, city, region or country), the nature and scope of activities, objectives, and other characteristics.

Stanislovaitienė (2016) referred to the dimensions of a smart social system as characteristics providing a more detailed description of them and presenting them in a somewhat different manner (see Table 2).

Table 2. Characteristics of a smart social system

Characteristics of a smart social system	Summary of characteristics
Intelligent	The system is capable of scanning and using information (from both external sources and within the system) to achieve its goals
Knowledge-based	The system generates knowledge from the information gathered, which is used to make decisions and gain a competitive advantage
Learning	The system fosters continuous learning among individuals, groups and networks, relying not only on experience but also on the ability to anticipate and foresee future scenarios
Networked	Members of the system can take advantage of various types of network, communicate with other social systems and individuals, acquire important resources for the system, and work towards their goals
Innovative	The system encourages creativity and the development of new, unconventional solutions for both internal and external processes.

<b>Characteristics of a smart social system</b>	<b>Summary of characteristics</b>
Agile	The system can quickly respond to changes in both the external and internal environment to achieve its goals
Sustainable	The system balances environmental, economic and socio-cultural dimensions when making decisions and implementing them
Digital	Information gathering, communication, networking and decision-making are all widely supported by information and communication technologies
Socially responsible	The system takes responsibility for its decisions, contributes to sustainable development, and adheres to societal values

*Source:* Stanislovaitienė, 2016.

Therefore, it can be concluded that a smart social system, in pursuit of its goals and the implementation of its strategy, should respond quickly and creatively to significant environmental factors (challenges, opportunities, trends and symptoms) while aligning these responses with social responsibility.

Building on the foundation of the smart social system, the discussion can progress towards smart governance in local government. Based on the characteristics of a smart social system identified, Stanislovaitienė et al. (2017) developed a model for smart public governance at the national level. In their further analysis of smart governance on the national level, they identified four dimensions of smart public governance: (1) strategic dynamism; (2) interinstitutional collaboration; (3) empowered citizenship; and (4) networking. Using these dimensions, Šiugždinienė et al. (2017) conducted a study that revealed smart governance at the national level to be overly fragmented and unsystematic. The authors noted that the main barriers to implementing smart governance at the national government level are the persistence of institutional silos, the lack of a collaborative culture, and insufficient efforts to involve and trust citizens in governance. In response to this critique, Martinaitis (2024) proposed his model for smart governance in local government. According to the author, this was driven by several factors: first, more recent research has provided a deeper understanding of the expression of proposed dimensions; second, recent challenges, such as the Covid-19 pandemic, accelerating digitisation and the adoption of new tools, as well as crises in migration and pricing in Lithuania, demand changes and greater adaptability within the public governance system.

In his approach to smart governance in local government, Tomas Martinaitis built on the model of Stanislovaitienė et al. (2017). However, he expanded the dimension of strategic dynamism at the local level, merged and restructured the previously identified dimension of inter-institutional collaboration under the broader

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category of networking, and stressed that empowered citizenship manifests even more strongly at the local level, thereby enhancing the understanding of smart governance. Additionally, to effectively adapt smart governance to the local level, Martinaitis introduced a new, specific dimension of social and environmental sustainability. Through an analysis of literature relevant to local government, Martinaitis (2024) identified the key features of the dimensions of smart governance at the local level.

Table 3. Indicators of smart governance in local government dimensions

<b>Dimensions of smart governance in local government</b>	<b>Indicators</b>
Strategic dynamism	The ability to assess threats and react flexibly to changing environments Accountability for decisions made Learning from the environment Implementing strategic changes Strategic sensitivity, insight and responsiveness Trust within the team Flexible and efficient allocation and redistribution of resources Evidence-based strategic decision-making using the benefits of technology
Networking	Interaction between public, private and non-governmental sectors Alignment of goals among partners and sharing resources Ensuring transparency in the cooperation process and towards the desired results Clear distribution of collaboration roles, governance structures and processes Availability and protection of data among partners in the collaboration Legal basis for collaboration Managing bureaucratic processes Flexibility and openness in governance structures Leadership in coordinating collaboration and involving stakeholders Innovative public service delivery methods Leadership coordination among civil servants, including digital competence

Dimensions of smart governance in local government	Indicators
Empowered citizenship	Clear collaboration goals and values between government and citizens The quantity and quality of public data collected by citizens Citizen involvement in evaluating public service quality Government transparency, openness and accountability Clear communication channels and tools between government and citizens, with established collaboration traditions Active citizenship skills, motivation, community-oriented principles and values Political leadership and collaboration skills Adequate IT literacy among both government and citizens for ensuring collaboration Ensuring data protection and confidentiality
Social and environmental sustainability	Government focus on environmental initiatives Community focus on solving environmental issues Strategic approach to sustainability and environmental protection Management of bureaucracy in implementing environmental initiatives Transparency and accountability in implementing environmental initiatives Ensuring equality, privacy and data protection Quality data monitoring and information flow management

Source: The author, based on Martinaitis, 2024.

The model of smart governance in local government was created accordingly:

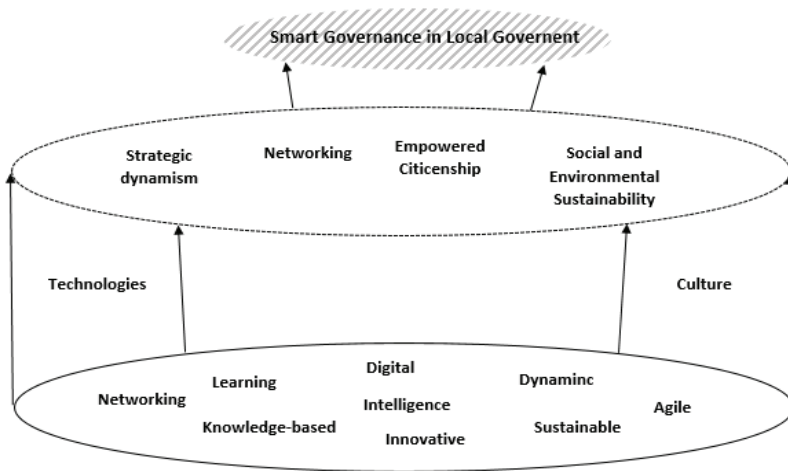


Figure 1. Model of smart governance in local government

Source: The author.

## 1. Methods

An empirical study was conducted based on the identified key features of the dimensions of smart governance in local government. Empirical research was conducted in November and December 2024. A questionnaire was developed based on the key features of the dimensions of smart governance in local government proposed by Martinaitis. This questionnaire was distributed to representatives of local government and individuals working or operating in local government in Lithuania (the anonymity of respondents was maintained throughout the study), with the aim of covering at least half of the municipalities where mayors were re-elected in the 2023 local government elections. The inclusion of the re-election factor in the evaluation of municipalities was intended to emphasise a certain degree of policy continuity, the realisation of governance norms and values by the ruling municipal majority, and the implementation of strategies by municipal leaders in operational processes. This approach aimed to assess the dynamics of the conceptualisation and implementation of smart governance in Lithuanian local government.

The survey included responses from representatives of 18 municipalities, totalling 85 participants. The number of municipalities was chosen to represent at least half of the municipalities, 18 in total, where the ruling majority remained largely unchanged after the re-election of the mayor. There were 37 municipalities in Lithuania after the 2023 local government elections. Of those 18 municipalities, 11 mayor/administration director advisors, five administration directors or deputies, one mayor, 11 vice-mayors, 37 members of the municipal council's majority, 16 representatives of the municipal council's minority or opposition, and four municipal council secretariat heads participated in the survey. Therefore, it can be stated that no single group was overly dominant among the respondents, ensuring the representativeness of the responses from both majority and minority representatives.

In terms of the respondents' experience in the local government system, representativeness was also well-maintained: 28 participants had less than one year of experience, 30 had between one and five years, and 27 had more than five years of experience. The survey included the highest number of representatives (six) from Prienai district municipality, the lowest number (three) from Plungė district municipality, and four representatives each from Birštonas, Joniškis district, Kaunas district and Varėna district municipalities. Five representatives participated from each of the other municipalities.

Table 4. Job titles of respondents

Job title	Quantity	Per cent
Mayor/director's advisor	11	12.9
Municipality administration director/deputy director	5	5.9
Mayor of the municipality	1	1.2
Deputy mayor of the municipality	11	12.9
Member of the municipal council, majority representative	37	43.5
Member of the municipal council, minority representative	16	18.8
Head of the council secretariat	4	4.7
Overall	85	100.0

Source: The author, based on the survey results

Table 5. Work experience

	Quantity	Per cent
Up to 1 year	28	32.9
1 to 5 years	30	35.3
More than 5 years	27	31.8
Overall	85	100.0

Source: The author, based on the survey results

In the quantitative questionnaire survey, the Likert measurement scale was employed to assess respondents' opinions. According to Joshi et al. (2015), the Likert measurement scale method enables a scientifically valid measurement of opinions, and has been academically recognised since 1932. This method can reveal how respondents are inclined to behave in certain situations or under specific circumstances, guided by norms and values accepted in the organisation. The Likert method allows for understanding people's thoughts, emotions and actions under unique conditions. Respondents are presented with specific statements relevant to the research, and are required to express their agreement or disagreement on a predefined scale.

## 2. Results

In this study, after conducting a quantitative survey of municipal representatives and experts, the overall evaluation of smart governance in Lithuanian local government was found to be 5.47 on a 7-point scale. The scale ranged from 1 ('very weak') to 7 ('very good'), with the intermediate values representing varying levels of strength (e.g. 4 = 'average', 5 = 'stronger than average'). Assuming equal weight for all dimensions, the score of 5.47 suggests that smart governance

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in Lithuanian municipalities is rated significantly above average. In general, the dimensions are:

- Strategic dynamism: 5.72 (highest-rated dimension).
- Enabled citizenship: 5.35 (lowest-rated dimension).
- Networking: 5.37.
- Social and environmental sustainability: 5.50.

The highest-rated statement was: *'Personal data protection and confidentiality are properly ensured in the municipality'* with a score of 5.96. Similarly, the statement *'Municipal leaders responsibly analyse the current situation and seek prospective operational opportunities'* gained 5.94. On the other hand, the lowest-rated statement was: *'Citizens are frequently involved in the decision-making process in municipalities'* with a score of 5.09. Municipality-Level Observations:

- Lowest overall rating:
  - ✓ Akmenė district: 4.08, with the lowest-rated dimension being networking at 3.6
  - ✓ Kelmė district: 4.12, where strategic dynamism was rated lowest at 3.71
- Highest overall rating:
  - ✓ Birštonas municipality: 6.5, with strategic dynamism rated highest at 6.58

Highlights of dimensions across municipalities:

- Strategic dynamism:
  - ✓ Lowest in Kelmė district: 3.71
  - ✓ Highest in Pakruojis district: 6.63
- Networking:
  - ✓ Lowest in Akmenė district: 3.6
  - ✓ Highest in Birštonas municipality: 6.55
- Enabled citizenship:
  - ✓ Lowest in Palanga municipality: 4.0
  - ✓ Highest in Birštonas municipality: 6.47
- Social and environmental sustainability:
  - ✓ Lowest in Kelmė district: 4.1
  - ✓ Highest in Pakruojis district: 6.43

The survey results illustrate a significant variation in the implementation of smart governance across Lithuanian municipalities. While some, such as Birštonas and Pakruojis districts, excel in specific dimensions, others, such as Akmenė and Kelmė districts, demonstrate areas requiring substantial improvement. Overall, Lithuanian local governance demonstrates a solid foundation in smart governance, with room for enhanced citizen involvement and further integration of innovative practices.

Table 6. Expressions of smart governance

Municipality	Strategic dynamism	Networking	Empowered citizenship	Social and environmental sustainability	The Expression of smart governance
Akmenė district	4.49	3.6	4.2	4.18	4,08
Alytus	5.29	4.9	4.71	5.28	5,01
Birštonas	6.57	6.55	6.47	6.38	6,5
Jonava district	6.11	5.14	5.27	5.75	5,52
Joniškis district	6.21	5.35	5.31	5.91	5,65
Kaunas district	6.5	6.03	5.97	6.06	6,12
Kelmė district	3.71	4.2	4.38	4.1	4,12
Klaipėda district	5.34	5.16	5.4	5.35	5,31
Marijampolė	6.28	5.92	5.73	5.8	5,92
Pakruojis district	6.63	6.3	6.22	6.43	6,38
Palanga	4.78	4.18	4	4.3	4,29
Plungė district	5.67	5.64	5.7	5.71	5,68
Prienai district	6.5	5.83	5.67	5.79	5,92
Rokiškis district	6.48	6.08	5.73	6.13	6,08
Šiauliai	5.54	5.42	5.38	5.28	5,4
Šilutė district	5.48	5.34	5.29	5.68	5,42
Trakai district	6.09	5.92	5.96	6.03	5,99
Varėna district	5.54	5.58	5.36	5.25	5,44

Source: The author, based on the survey results

## Discussion

The results of the survey were analysed using various statistical tools and measurements, with a particular focus on Cramér's V coefficient. As noted by Kearney (2017), identifying clear relationships between different variables is central to all social research. Cramér's V coefficient, developed by Harald Cramér in 1946, measures the strength of association between two categorical variables. In this study, the Cramér's V statistic was employed to explore whether respondents' length of service in municipal structures significantly influenced their answers regarding the expression of smart governance. Specifically, it helped assess the strength of the relationship between respondents' tenure in local government and their survey responses.

Key findings from Cramér's V analysis:

1. Moderately strong associations:

- ✓ The strongest association was found for the statement: *'Sufficient transparency and clarity in processes are ensured when involving citizens in decision-making processes.'* Cramér's  $V = 0.404$  (with the  $p$  value ,006 [therefore statistically significant]), indicating a moderately strong relationship between respondents' tenure and their perceptions on this issue.
- ✓ Another significant association was observed for the statement: *'Trust is felt during cooperation between various institutions operating within local government.'* Cramér's  $V = 0.319$  (with the  $p$  value ,005 [therefore statistically significant]), reflecting a similar moderately strong relationship.

2. Weaker associations:

- ✓ The weakest association was noted for the statement: *'Municipal leaders properly take responsibility for the decisions made.'* Cramér's  $V = 0.183319$  (with the  $p$  value ,006 [therefore statistically significant]), suggesting a weak relationship. Interestingly, the graphic analysis of the responses revealed that individuals with longer service in local government tended to give lower scores to this statement.

While most questions showed weaker or non-significant associations, the above-mentioned statements demonstrated notable differences in responses based on the tenure of respondents in municipal structures. Respondents with longer periods of service tended to rate transparency and trust-related issues slightly lower, indicating a potential disparity in perceptions based on experience.

The evaluations of representatives from different municipalities were also analysed using Cramér's  $V$  coefficient. On average, each municipality was represented by approximately five individuals (mean = 4.72). The average Cramér's  $V$  value for each question exceeded 0.4, indicating a **moderately strong association**, with no instances of weaker associations. This suggests that, according to Cramér's  $V$ , representatives from different municipalities provided relatively similar assessments of the questions.

Notably, the highest level of agreement among municipal representatives was observed in the following statements:

- 'Various interest groups are frequently involved in addressing municipal issues' (Cramér's  $V = 0.588$ , App. Significance  $<0,001$ ).
- 'Citizen feedback is taken into account when making certain decisions in local governance' (Cramér's  $V = 0.6$ , App. Significance  $<0,001$ ).

Thus, it can be concluded that representatives from different municipalities most consistently agree on how diverse interest groups are involved in problem-

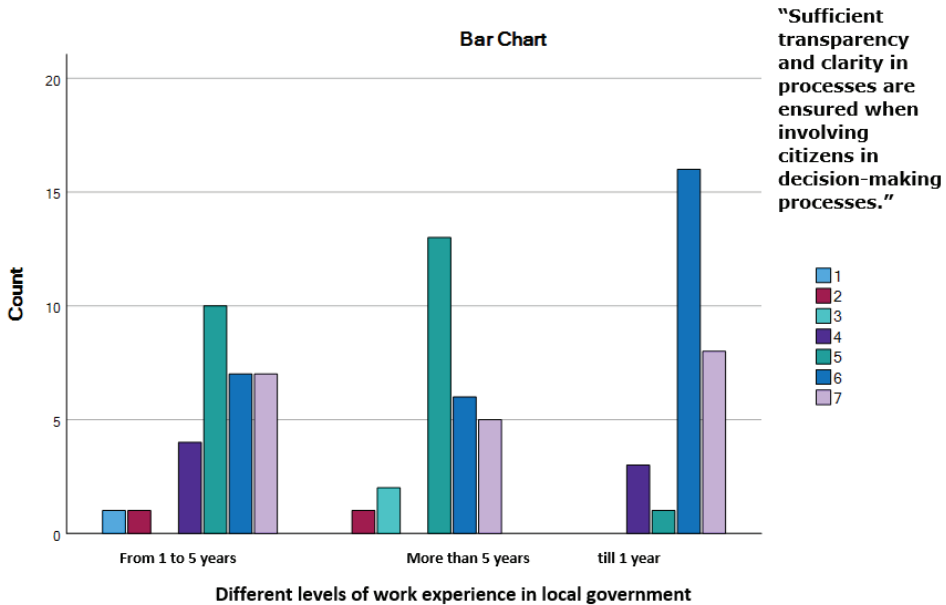


Figure 2. Responses to the question ‘Sufficient transparency and clarity in processes are ensured when involving citizens in decision-making processes’ by different levels of work experience

Source: The author, based on the survey results

solving processes, and how citizen feedback is considered in decision-making in their municipalities.

The analysis of this trend was further supported by the **ANOVA (analysis of variance) statistic**. According to T.K. Kim (2017), ANOVA is one of the most widely used statistical methods in research. The author emphasises that this method is instrumental in identifying relationships both between different variable groups and within individual groups. In the context of this research, ANOVA was applied to determine whether the survey respondents’ answers to different questions varied significantly. Since the F-value in ANOVA indicates the extent to which responses differ between groups compared to the within-group variance, this measure provides a clearer understanding of the differences across municipalities. In this study, the highest ANOVA score, indicating the greatest difference in responses across municipalities, was observed for the statement:

- ‘The municipality frequently participates in inter-institutional cooperation networks’ (ANOVA score = 6.36).

Nevertheless, as noted by Nanda et al. (2021), managing large datasets is a common challenge in social science research. Various statistical testing tools pro-

vide a structured framework, reducing the likelihood of error and enabling more reliable conclusions. One of the most commonly used and reliable methods in this process is the Tukey HSD (Honestly Significant Difference) test. When applying the Tukey HSD test alongside ANOVA, the most statistically significant differences in responses to the statement ‘The municipality frequently participates in inter-institutional cooperation networks’ were observed between the Akmenė district and the Kelmė district, and the Pakruojis district and the Plungė district.

A statistically significant similarity was also observed in the highly rated question ‘*Municipal leaders responsibly analyse the current situation and seek prospective opportunities for development.*’ The ANOVA score for this question was 5.64, and the Tukey HSD analysis indicated that the most notable differences in responses were found between Palanga, the Kelmė district, and the Akmenė district, as well as between the Kaunas district, the Prienai district, and the Rokiškis district.

Similarly, a statistically significant similarity was observed in responses to the question: ‘*Decisions in local governance are made based on knowledge and fact-based information.*’ This question received an ANOVA score of 5.4. According to the Tukey HSD analysis, the greatest differences in responses were identified between the Kelmė district and the Akmenė district, and the Prienai district, Birštonas, and the Pakruojis district.

Further analysis using the Tukey HSD test revealed that the most pronounced differences were observed between the Akmenė district, the Kelmė district, the Pakruojis district, the Plungė district, Palanga, the Kaunas district, the Prienai district, the Rokiškis district, and Birštonas.

The table below (Table 7) presents the survey questions for which responses vary most across different dimensions of smart governance. The results indicate the following:

Table 7. Key ANOVA analysis results for different dimensions

Dimension and question	ANOVA F value	Statistical Significance
Strategic dynamism: <i>Municipal leaders responsibly analyse the current situation and seek prospective opportunities for development.</i>	5.643	<0.001
Networking: <i>The municipality frequently participates in inter-institutional cooperation networks.</i>	6.362	<0.001

Dimension and question	ANOVA F value	Statistical Significance
Empowered citizenship: <i>Citizens can easily and quickly find all the necessary information on the municipality's website.</i>	5.162	<0.001
Social and environmental sustainability: <i>Local government adequately addresses environmental initiatives and sustainability.</i>	3.154	<0.001

Source: The author, based on the analysis

Since the statistical significance for all the highlighted questions is below 0.001, these differences are considered statistically significant. Therefore, the ANOVA results help identify which municipalities exhibit the greatest variation in the expression of different smart governance dimensions.

For the in-depth analysis of the survey data, the **Pearson correlation** coefficient was employed. This statistical measure is commonly used to assess the strength and direction of the linear relationship between two distinct variables. It is particularly suitable for analysing data that follow a normal distribution (Schober et al., 2018). In the context of the article, the Pearson correlation coefficient facilitated the identification of significant associations between survey responses provided by municipalities.

The results indicate that the most significant correlations, those exceeding a coefficient value of 0.8, highlight strong interdependencies between certain questionnaire items. A total of seven such pairs were identified. The highest correlation coefficient, 0.855, was observed between the statements: *'The implementation of environmental initiatives adequately addresses the diverse needs of the local community'* and *'The implementation of environmental initiatives ensures sufficient transparency and publicity.'* A slightly lower correlation of 0.845 was found between the first of these statements and *'The local government is able to effectively cooperate with the public in the implementation of environmental initiatives.'*

Among the correlations between items from different dimensions, particularly noteworthy are the following: the correlation of 0.805 between *'Decisions at the local government level are made based on knowledge and evidence-based information'* and *'There is a strategic approach to environmental protection and sustainability in the municipality'* as well as the correlation of 0.797 between *'There is a smooth distribution of tasks and responsibilities when the municipality collaborates with various partners'* and *'The local government has sufficient capacity to involve different groups of stakeholders in the decision-making process.'*

Thus, the application of the Pearson correlation coefficient reveals that, from the perspective of smart governance, municipalities that prioritise knowledge and

evidence-based decision-making tend to adopt a more strategic approach in addressing environmental and sustainability challenges. Furthermore, municipalities that demonstrate effective collaboration with diverse partners and exhibit smooth responsibility sharing are more likely to involve relevant stakeholder groups in their decision-making processes.

## Conclusions

This article introduces a new theoretical model for assessing smart governance in local government, developed by synthesising existing frameworks. The model comprises four dimensions: strategic dynamism, networking, empowered citizenship, and social and environmental sustainability. It fills conceptual gaps and provides a practical tool for evaluating governance practices at the municipal level, with each dimension defined by specific indicators. Empirical validation was conducted in 18 Lithuanian municipalities at the end of 2024. Results show above-average levels of smart governance overall, with strategic dynamism rated the highest (5.72) and empowered citizenship the lowest (5.35). Birštonas scored highest in strategic dynamism (6.5), while the Akmenė district had the lowest overall score (4.08), notably underperforming in networking.

The study also explored how the length of professional experience among local government officials who participated in the survey influences their perception of smart governance dimensions. In addition, several statistical analysis tools were also employed (Cramer's V, ANOVA, Tukey HSD, Pearson Correlation). The results revealed notable patterns among municipalities: those that emphasise evidence-based decision-making tend to demonstrate greater strategic responsiveness to sustainability challenges, while those that foster effective multi-sector collaboration are more likely to engage a broader range of stakeholders in decision-making processes.

In terms of practical recommendations, municipalities that are already performing well in areas such as strategic dynamism could focus on strengthening networking and empowered citizenship by fostering more inclusive and transparent decision-making processes. This could involve improving public engagement mechanisms, integrating more digital tools for participation, and encouraging cross-sectoral collaboration. On the other hand, municipalities with lower scores, such as the Akmenė district, might benefit from focusing on enhancing institutional collaboration and creating more flexible, evidence-based approaches to address sustainability challenges.

While the study provides important insights into the current state of smart governance in Lithuanian municipalities, it also reveals certain limitations regarding

the model's applicability and suggests directions for its further refinement. Specifically, the model could benefit from being tested in a broader range of local government contexts, including municipalities with varying sizes and socio-economic profiles, to assess its universality. Further longitudinal studies could provide a deeper understanding of how smart governance evolves over time in response to changing environmental and political factors. Additionally, qualitative or mixed-method approaches could help to explore the subjective experiences of local government representatives, providing better insights into the practical implementation of smart governance.

This article contributes both conceptually and methodologically to the growing field of smart governance research, offering a scalable model that has potential relevance not only in Lithuania but also in broader international contexts.

### Conflict of interest

The author Tomas Martinaitis declares that there is no conflict of interest.

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