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Article

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EXPLANATORY FACTORS OF LOCAL WASTE MANAGEMENT IN MOROCCO: A TERRITORIAL AND ORGANIZATIONAL APPROACH

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Abstract. *Purpose* – The aim of this article is to specify the determining factors behind the decision to adopt either an internal or external means of the household waste management service in Moroccan local authorities (LAs), particularly in the “communes”.

Research methodology – The methodology applied is quantitative, based on a questionnaire addressed by e-mail to 115 “Communes”. The SPSS 25 software was used to analyze the result of the logistic regression.

Results – Our findings show that socio-territorial factors do not have a significant influence upon the choice of a local waste management service delivery mode, while organizational and institutional factors, particularly financial resources, do influence this choice. Local authorities with better financial resources tend to rely less on in-house solid waste management services.

Research limitations – Methodological limitations such as sample size and a lack of reliable data on public service delivery, may be overcome in an exploratory study by using a qualitative method (interviews, case studies).

Practical implications – Our study sheds light on the factors explaining the development of public service management methods as well as testing proposals favoring the effective use of management techniques in the local context.

Originality/Value – The originality of our study lies in its quantitative investigation of waste management service delivery mode in Moroccan local authorities emphasizing the role of financial resources and distinguishing itself from previous research by finding that socio-territorial factors do not significantly affect this choice.

Keywords: waste management, public services, determinants, local authorities.

JEL Classification: D73, H72, H83.

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Introduction

The question as to the factors which influence the choice of the way public services are provided is increasingly more important to address within territorial public services whose specificities are confined to the contexts in which these organizations operate (Guenoun & Turc, 2009). This imposes choices which respond not only to demands made over the continuity of the services but also to the need to obtain an optimal use of available financial and budgetary resources.

Morocco is a country where public services, especially at the local level, are subject to ever-increasing demographic, socio-economic and urbanistic pressures which places these local services in a crossfire between these deep changes and incessantly higher demands.

In Morocco, the juridical responsibility for the production and organization of municipal public services (potable water, electricity, sewer systems, lighting, transportation, household waste collection) and public infrastructures (wholesale markets, fish markets, bus stations...) falls upon the Local authorities. This article will focus on the household waste collection services provided by the “communes”, municipal governments. Here, the central question will be presented both as a conceptual and as an empirical analysis: which are the main determining factors in the arbitrage between internal and external management in waste removal services in the context of Moroccan Local authorities? In this sense, we will reflect in general on the elements which influence the decisions these territorial entities make as to how local services are to be provided.

The aim of this study is therefore to formulate and test a certain number of hypotheses and proposals over contextual and environmental factors, whether they be endogenous and/or exogenous, which have a bearing over the way waste collection is carried out in such authorities.

In the first part, we introduce the literature which allows us to draw a distinction between three categories of factors which may potentially lead to a decision as to the management of local services either internally or through outsourcing.

In the second part, the proposals related to the respective influence of these factors are tested and then discussed.

There are two orders of expected implications in this work. First, our research takes on a theoretical interest by clarifying the explanatory factors behind the development of modes of public service administration at a local level. Secondly, this work is also of practical and administrative interest by testing the proposals over the factors which favor a more effective use of managerial techniques by local authorities.

1. Literature review and situational statement

Over the course of the last two decades, the public sector has become more and more interested in the quality of the services provided to users. The aim to provide a service of higher quality forces numerous countries to undertake administrative reforms inspired by New Public Management (NPM). These reforms have extended the tools and principles of private sector management to central and local administrations. Nowadays, concepts such as effectiveness, efficiency and economy are no longer a monopoly of the private sector since the public sector is also increasingly interested in them (Andrews & Van de Walle, 2013; Dunleavy & Hood, 1994; Hood, 2011).

The managerial reforms set forth in the NPM approach have been accompanied by institutional reforms in an effort to reduce the role of central governments in order to share powers and responsibilities with decentralized governmental bodies as well as through diverse means of privatization (Verdier et al., 2004; Torres & Pina, 2002). Consequently, these restructuring processes have brought about changes in the procedures through which local public entities provide services (Argento et al., 2010). These changes have adopted distinct forms according to the historical, institutional, political and cultural context of each individual country (Wollmann, 2004; Pollitt & Bouckaert, 2004; Lüder, 2002).

A literature review shows that the delivery of local public services is an object of research which has made considerable amounts of ink flow in various contexts. Argento et al. (2010) addressed institutional changes in the providing of local public services by drawing comparisons between two European countries – Italy and Sweden – through an empirical study based on secondary data. The authors sought to describe and explain the evolution in the delivery of local public services, particularly stressing the tendency towards corporization and its impact on local governance.

In the Spanish context, upon observing the increase in the amount of public services offered at the local level and the growing financial and budget constraints weighing on local authorities thereby further complicating the allocation of resources, Pérez-López et al. (2015) carried out a study whose main objective was to determine whether NPM, namely in the creation of agencies, outsourcing and inter-municipal cooperation effectively improve the efficiency of Spanish local authorities, especially in times of economic crisis.

In the Netherlands, Elrabaya and Marchenko (2022) carried out a study in which the most usual organizational methods of domestic solid waste disposal were examined along with the establishing of tariffs for the service. Their aim was to enable local entities to choose either one or a combination of methods to simultaneously manage the volume, the fees and the structure of the production and treatment of solid home waste. The results of the study led researchers to conclude that any further tariff reduction would depend on user involvement and consciousness-raising. Such user involvement reminds us to the important article by Osborne and Stokosch (2013), entitled "It takes Two to Tango", an interesting contribution to the development of a theoretical evaluation of the co-production of public services which is becoming an ever more important part of the current agenda of reform of public services worldwide. A study done in the UK examined how elements of the administration of services stemming from the general management theory and market-based thought could be incorporated into perspectives of public administration of the co-production of central or local services. Based on this same article, Sønderskov and Rønning (2021) tried to combine the theory of general administration with the theory of public administration in order to come up with an improved model for the logic of public service administration and to aid the sector in the development of services through user co-creation. This study deals with the pertinence of public service logic to improve the quality of services provided in the sector by examining the question through a review of the literature pertaining to the main elements of service management on which public service logic is based. The authors point out the importance of considering users as citizens' collectives instead of as individuals. Following up on the idea of the collective co-production of public services as a topic of investigation, Bovaird et al. (2016) did a study over the local authorities of England and Wales backed up by the results of previous studies which suggested that citizen participation in the production of public services is more likely to be produced when the actions involved are simple and can be carried out either individually or in groups. Their idea consisted of determining which people are more likely to take part in individual or collective co-production and how to influence people, reinforce their efforts of production and encourage further participation in collective activities.

The choice of means for managing local public services is a topic of that has also interested investigators in other contexts. Local governments have been progressively leaving behind

forms of direct management in favor of more indirect ones which imply diverse modalities such as outsourcing, namely corporization, public-public collaboration and public-private partnerships, etc. (Reichard, 2006; Walsh, 1995; Wettenhall, 2001; Hefetz & Warner, 2004; Rodrigues et al., 2012; Warner & Hefetz, 2003). According to Divay and Charbonneau (2019a), this choice follows the research logic of the strategic combination of internal and external resources to produce desired outcomes. The work by Guirou (2016) for instance, addresses the most ideal means of administration for the management of public services, particularly in the case of municipal nursery schools. In his exploratory work, the author examined two opposing cases of municipalities, one of which delegated the child care service while the other municipalized it. The study focused on the motives and the beliefs of the respective decision-makers in order to better understand what determined their choice between either internal or external means of management. Still within the French context, Bouba-Olga et al. (2008), in their work entitled *Cognitive constraints, essential determinants in the choice of ways of water management* examined the economic factors which moved a local entity to decide upon one means of administration over another for its water service. The results of this study show that the administration of responsibilities remains well at the heart of the choice of ways of determining the way the water supply is managed in local authorities in France.

In the above section, we try to present the research topics in a set of studies where the question of the administration of local public services is addressed. For higher visibility, we include a table that provides a summary of relevant studies related to our topic of interest in the Appendix.

We can thereby observe that despite the growing interest in the subject, quantitative empirical investigative works over the factors that determine how the means of management of public services are chosen remain uncommon and insufficient, even more so in the case of Morocco.

2. The explanatory factors behind the choice of means of management of local services

The examination of the question related to the motivations which explain the decisions taken by local authorities (LAs) as to their choice of the means of providing local public services, namely the service of waste collection, is based on various theories. Several theoretical and empirical approaches can be mobilized to study the determining factors behind the decision to provide public services either internally by the LA themselves or by resorting to new means.

The literature reveals that previous works dealing with the choice as to how local public services are to be provided often appeal to the NPM paradigm which recommends governmental decentralization (Hood, 1991, 2014; Osborne et al., 2016) and the promotion of private sector participation in the delivery of public services through public-private agreements or through cooperation with local authorities (Currie et al., 2011) and/or via outsourcing of these services (Bel et al., 2010; Bel & Gradus, 2018; Niskanen, 1979).

However, in recent years, other studies have sought to expand the theoretical framework by adopting approaches such as neo-institutional theories (DiMaggio & Powell, 1983; Weitz & Shenhaav, 2000), resource dependence (Pfeffer & Salancik, 2003), transactional costs

(Williamson, 1985) and more generally, the contingency theory (Burns & Stalker, 1961) to point out the factors which could influence the decisions enacted by local public organizations.

In this work, we will follow the “multi-theoretical” approach (Johansson & Siverbo, 2009) in order to reduce the risk associated with the lack of important aspects in the organizational reality (Malmi, 1997). We wish to complete the literature pertaining to local public services, namely in relation to waste collection (Dreyfus et al., 2010; McEldowney, 2016) and for this, we deal with the factors which condition the decisions adopted by territorial public organizations in Morocco as to whether the management of waste disposal is to be handled internally or through alternative modern means such as outsourcing.

In our theoretical framework, we distinguish between two types of factors. On one hand, we stress the role that exogenous factors of a territorial, demographic or socio-political nature may play (Favoreu et al., 2019). We then focus on endogenous and organizational determinants which more often than not, deal with a lack of resources or the search for higher performance (Damanpour & Schneider, 2009). We thus agree with other authors who have found that the decisions made by organizations pertaining to the means of providing public services to users can more likely be attributed to external, environmental and institutional pressures rather than to an internal desire for a more efficient use of resources within the logic of a search for an enhanced performance (Bel et al., 2010; Hefetz & Warner, 2004; Warner & Hefetz, 2003).

2.1. Social-territorial determinants

Exogenous determinants are founded on a range of theories such as those that reveal institutional approaches (DiMaggio & Powell, 1983) and of contingency theory. Damanpour and Schneider (2006, 2009) for example, found that environmental factors such as economic expansion, population growth and territorial size have a positive influence over the decisions taken by public organizations by incentivizing them to undertake organizational changes. According to these studies, resorting to alternative means of providing services may be qualified as organizational innovation which shows the will to react and adapt structurally to changes imposed by circumstances.

Under an organizational plan, the adoption of outsourcing or inter-municipal cooperation often involves structural changes within the LA and can also be considered a managerial innovation which translates into a response to a change insofar as opportunities or as constraints to development (Andrews et al., 2006). Bel and Warner (2016) maintain that point of view and state that highly-fragmented local government systems face the challenge of efficiently providing services of proximity as well as overcoming the problem of overextended services.

For other authors, environmental constraints such as urbanization (Boyne & Walker, 2005), the economic situation of the territory (Kearney et al., 2000; Moon & DeLeon, 2001) and population growth (Rivera et al., 2000) are also decisive factors. Bel and Warner (2016) demonstrated that high-income American suburban territories in relation to rural areas more often tend towards the use of new means of management such as mixed administration than rural areas (Warner & Hefetz, 2003). For certain authors, population growth provides local governments a growing tax base which helps attract further investment (Damanpour &

Schneider, 2009) while a greater size gives higher-scale economies for organizations to work with (Hitt et al., 1990; Nord & Tucker, 1987).

Through the same logic, Bel and Warner (2016) confirmed that a larger population size is one of the main determining factors behind the choice of alternative means of management such as outsourcing and mixed administration among American local administrations. According to these two authors, the larger and more sophisticated an entity is, the more likely it is to adopt new ways of providing public services to its population. In smaller territories, social and institutional constraints are less pressing and so, LA in this category are therefore less likely to resort to outsourcing and more reticent to the adoption of other newer administrative practices (Choudhury, 2007).

On the other hand, certain authors point out the influence of the heterogeneity of users in terms of age, employment, ethnicity and social class. Various studies state that these factors impose different demands on public organizations and may therefore lead to different ways to provide public services (Bel et al., 2010; Bel & Warner, 2016; Hefetz & Warner, 2004; Warner & Hefetz, 2003). Indeed, as a population becomes more heterogeneous, the environment also becomes more complex and authorities are faced with multiple needs which makes the delivery of a standard basket of services more difficult and so, LA may have to diversify their means of production of these services.

In our study, we suppose that the heterogeneity of the population is influenced by the degree of dispersion of users. This factor is likely to have an influence over the decisions enacted by local governments in the providing of public services (Warner & Hefetz, 2003). The notion of dispersion refers to the geographic distribution of users who need services. Local authorities whose population is widely spread out over vast geographical areas often face restrictions due to the high costs related to the delivery of new services whenever new installations have to be built. Therefore, a high degree of heterogeneity calls for more specific investments and increases internal uncertainty, thus forcing LA to resort to subcontracting or outsourcing of services (Ghertman, 2003).

In this perspective, we formulate our first hypothesis as follows:

H1 – The management processes associated with waste collection are influenced by the characteristics of the territory.

However, Warner and Hefetz (2008) emphasized the rôle of socio-political factors in the adoption of mixed administration in an American context. This author found that citizen satisfaction also affected the level of acceptance of alternative mixed means of providing services. Numerous authors point out that citizen involvement and participation lie at the heart of the delivery of public services (DeLeon & Denhardt, 2000; Denhardt & Denhardt, 2003; Mintrom, 2003). At a local level, citizen proximity is one of the specificities in the territorial public sphere in comparison to central governmental entities (Divay, 2019a, 2019b; Divay & Caron, 2019; Divay & Charbonneau, 2019a, 2019b). As a consequence, local government accountability is higher because citizens can actually sense the impact of externalization over the quality of a public service and thus demand a more pragmatic behavior by municipal authorities (Warner & Hefetz, 2003).

We consider that the level of citizen involvement in the management of local affairs tends to influence how public services are administered by territorial entities. Our second hypothesis is formulated as follows:

H2 – The level of citizen involvement in a local community influences the waste collection management process.

2.2. Organizational and institutional factors

Besides the contingency theory, the resource dependence theory (Pfeffer & Salancik, 2003; Wernerfelt, 1984) also constitutes an appropriate theoretical framework to explain the motivations local authorities have in relation to the means of providing local services. This approach suggests that organizations depend on resources from their surroundings in order to meet their objectives (Pfeffer & Salancik, 2003).

In the sector of LA for example, resorting to partnerships with the private sector could be explained by budgetary restraints. Indeed, poor state financing and the weight of local public debt, the availability and the adequacy of human, financial or technical resources may obligate LA to seek out contractual arrangements with the private sector in order to come up with additional funds in order to finance necessary investments to provide public services (Campagnac, 2009; Campagnac & Deffontaines, 2012; El kouhen & Benchekara, 2021; Saussier & Tirole, 2015).

Bel and Warner (2016) consider that fiscal factors represent one of the main motors behind the reform of local authorities over the last few decades. For the authors, LA have had to externalize their service due to ever-increasing fiscal restrictions since the decade of the 2000s. Warner and Clifton (2014) point out that budgetary cutbacks brought about by debt, reduction of expenses or a drop in local tax income could be offset by the fiscal capacity related to the wealth of the community. Over the last few years, local authorities have been faced by growing constraints due to austerity policies, the effects of the Covid-19 health crisis along with taxation and spending ceilings adopted by upper levels of government.

Our third hypotheses therefore is the following:

H3 – The level of available resources influences the management processes of a LA regarding waste collection.

The literature over local authorities is interested in the most appropriate size for the services provided (Mirrlees, 1972; Oates, 1972; Olson, 1969). Earlier works over the externalization of services provided by local administrations is focused mainly on the characteristics of the services in relation to economies and to transactional costs (Bel & Fageda, 2008; Brown & Potoski, 2003; Gradus et al., 2014; Hefetz & Warner, 2004; Levin & Tadelis, 2010; Wassenaar et al., 2013).

Along this line, Bel and Warner (2015) affirms that one of the challenges local governments face is that size and fragmentation make obtaining profit difficult in economies of scale. The means of providing local services could thereby be affected by cost-based concerns which are presented as an essential component in the efficiency dimension of organizational performance (Fliegel & Kivlin, 1966; Lorino, 1999; Tornatzky & Klein, 1982; Wolfe, 1994).

From this perspective, the transactional cost theory suggests that arbitrage between an internal mode of governance and resorting to market mechanisms is influenced by factors such as the specificity of assets, the degree of uncertainty and complexity in the execution of contracts (Coase, 1995; Williamson, 1989).

In the local public sector, transactional costs are highly important when choosing an arrangement for the delivery of services and could be applied to decisions adopted by local

authorities. Some authors affirm that before signing and enforcing contracts, institutional arrangements tend to become increasingly complex due to the costs arising from follow-up and control (Bel et al., 2014). Divay and Charbonneau (2019a) state that the decisions whether to make or to have something made should end up in arbitrage, not only in terms of the cost of the service, but also to transactional costs (Bel et al., 2014) related to the degree of uncertainty brought about by the information, negotiation and surveillance of the volume and quality of the public service. For example, the choice to provide a service through public-public or even private-public partnerships remains preferable to lucrative contracts when these services generate high transactional costs due to concurrence (Hefetz & Warner, 2004; Levin & Tadelis, 2010). For some authors, the specificity of assets is decisive in an arbitrage between internal or externalized management. Stein (1990) states that the least specific services and those that are easier to measure are the most likely to be outsourced. Along that same line, Brown and Potoski (2003) observe that follow-up is common when the specificity of assets is higher. For these authors, an on-the-spot follow-up of the services would be less frequent as these become more difficult to measure. On the other hand, a loose follow-up in difficult conditions for measurement is a recipe for failure (Poister & Streib, 1999), and therefore, local governments resort to internal management instead of to an adequate follow-up system via external contracts.

Our fourth hypotheses is as follows:

H4 – The level of uncertainty associated with the monitoring of the public waste collection service influences the LA's waste collection decision and management process.

Based on the underlying hypothesis, the conceptual model is presented in (Figure 1), offering a visual representation that illustrates the relationships and key elements involved in the context under study.

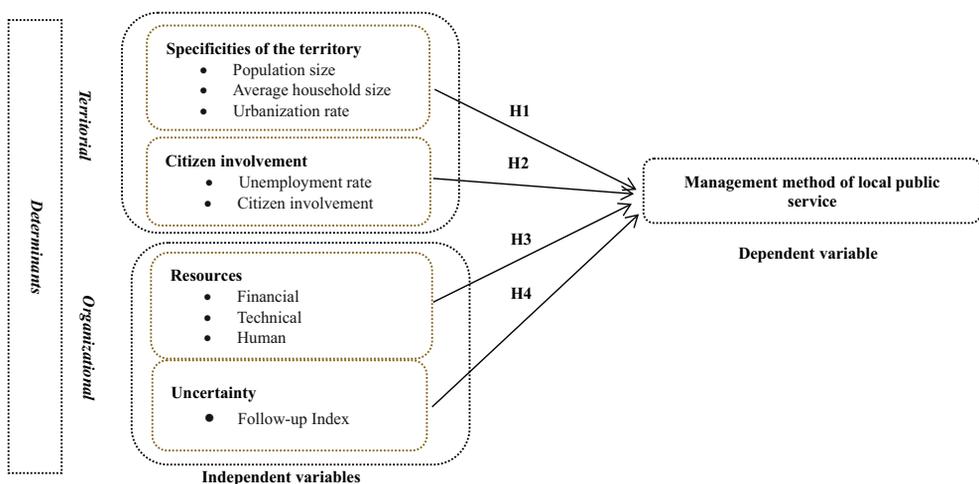


Figure 1. Conceptual model (source: author conception)

3. Data and methods

In this section, we will present the scope of our research along with the design of the method employed to measure and analyze dependent and independent variables that arise in our conceptual model.

3.1. Field of research and the process of collection and treatment of data

In Morocco, there is no text defining what a local authority is since constitutional or regulatory provisions have merely set the bases of the legal regime that is common to it and make it a legal category distinct from other sub-national state organizations. Generally speaking, a territorial authority is “an administrative district with a legal personality that constitutes part of the territory of a state and has a certain legal and patrimonial autonomy” (Azon, 2012; Zahed, 2017).

The notion of territorial authority was first used by the Moroccan constitution of 29 July 2011, which since then, is being increasingly replaced by that of the local authority in various legal texts. In Morocco, territorial authorities are decentralized legal entities under public law that manage their affairs democratically and enjoy the right to local autonomy as well as a relatively strong constitutional position thanks to the decentralization process that led to the constitutional reform of March 2011. In this sense, Article 135 of the Moroccan Constitution recognizes the existence of three categories of territorial authorities: *regions*, *prefectures* and *provinces*, and *communes*, which makes the Moroccan territorial organization a relatively fragmented system.

According to the constitutional text, power-sharing among these three levels of LA in Morocco is based on the principle of subsidiarity where each level carries out their responsibilities within specific domains (Amrani et al., 2021, 2022; Sadik et al., 2021). In this cadre, the lowest level of LA is made up of “communes”, that is, municipalities, which are in charge of providing services of proximity such as public lighting, garbage treatment, street maintenance, etc. At the second level, there are the provincial counsels and prefectures whose role is social development, the reinforcement of efficiency and cooperation in rural areas. The largest level of LA are the regions which are in charge of promotion of integrated development, namely in the enhancement of the attractiveness of the territory of the region as well as its economic competitiveness and the preservation of its natural resources.

In Morocco, the absence of a viable system able to give out exhaustive data is one of the major difficulties we face in our research into how public services are provided at the local level. This complicates the follow-up and investigation of explanatory models which could give a greater insight into these processes and their evolution over time. This lack of information is especially important in the case of more than 1500 territories.

In Morocco, various differing management models are used for a wide range of services such as garbage collection, potable water, electricity, sewerage and public illumination. These categories of services are those which have the greatest impact over the general population (see Table 1).

Table 1. State of means of providing local public services with greater impact on the Moroccan population in 2022 (source: General Directorate of local authorities in Morocco, 2022)

Public Service	Delegated management		National Office water and electricity ¹		Internal management		Commissioning		Society for local development ²
	Number of <i>communes</i> (N)	%	(N)	%	(N)	%	(N)	%	(N)
Solid Waste	204	14	–	–	1299	86	–	–	–
Electricity	41	2.3	1684	95.7			34	2	–
Water	52	2.95	731	41.49	876	49.71	103	5.84	–
Sewerage	51	2.89	144	8.17	1509	85.64	58	3.29	–
Lighting	03	0.19	–	–	1498	99.68	–	–	02

In the case of Morocco, the data given by the DGCL in 2022 as to the means of providing local public services reveals that internal management is the most common way to manage most services, namely in public illumination (99%), solid waste collection (86%), sewerage (85%) followed by the potable water supply (49%). Among other alternative ways to provide public services, we find the ONEE, in the case of electricity (95%) and potable water production (41%). Delegated management remains limited except in the case of solid waste (14%).

Upon reading these figures, we can conclude that in the case of Morocco, the emergence of NPM principles still remains scarce while in other neighboring countries such as Spain (Ferran & Puey, 2016), the general adoption of NPM doctrines has been followed by an increase in the use of NPM tools without that necessarily leading to changes in the underlying logic of how such services are actually provided, as supposed by the NPM narrative.

As mentioned above, we delve into the explanatory factors behind the adoption of alternative means of providing local services. As to the data shown in the above table, we focus on mainly on garbage management, a choice justified for various reasons. First, LA in Morocco use two ways for the administration of solid waste disposal: delegated management and a classic or internal mode of administration which goes along with our research question of understanding the explanatory factors behind the choice of either a modern or a classical means of management. Secondly, the existence of two modes facilitates the setting up of the binary logistic regression method we seek to pursue in our study.

To look into the use of these explanatory factors, we turned to two sources of data. First, it was necessary to collect responses as to several of our latent variables by sending a questionnaire by e-mail to the Moroccan association of general directors of LC during the second semester of the year 2022. Before proceeding definitively and in order to guarantee the success of our questionnaire by correspondence, however, we carried out a prior test to verify the reliability of our tool and to see if the protocol of the study was realistic, especially as to the pertinence of the measuring scales and their comprehensibility by the respondents

¹ Office National d'Eau et d'Electricité (ONEE) is a public organism in charge of infrastructures of production, transportation and distribution of electricity and water as well as sewerage treatment.

² Local development societies are companies (SA or SARL) created at the initiative of local authorities to undertake economic activities within municipal field of competence.

(Baumard et al., 2014). The pre-test period was undertaken in two stages: first, face-to-face with a group of territorial functionaries and later via e-mail with the heads of four relevant territorial administrations through our personal networks.

In total, we received 115 responses, a reply rate of 8%, out of all the LA, 48% of these used externalized means for the management of solid waste collection. All responses were confidential and anonymous.

Secondly, we employed data furnished by open-source data bases of the High-Commissariat of the Plan in order to obtain additional information such as indexes of urbanization, mean household size and unemployment rates. It's worth pointing out that this information is generally gathered by surveys carried out by that governmental agency.

Within the framework of this research, our sample includes 115 local authorities, i.e. a response rate of 8% of all Moroccan local authorities. Although this rate seems low, our sample represents 57% of the local authorities that use external management as a mode of solid waste management, which represents an acceptable rate for the purposes of our research. All responses were anonymous and confidential. The data was treated with the aide of the SPSS 25 © program.

3.2. Measure of variables

3.2.1. Dependent variables

Within the framework of our study, our dependent variable is the means of management of garbage collection adopted by Moroccan municipalities. Respondents are asked to address the question with a (1) in case the municipality uses an internal means of administration or with a (0) if an externalized means of administration is used.

As to the dichotomous character of our dependent variable, we resort to the binary logistic regression method in order to evaluate what distinct explanatory variables bring to the probability of the appearance of a random event: the mode of management of local waste collection service. The model of this relation takes the following form:

$$P(Y = 1) = \frac{1}{1 + e^{-\left(C_0 + \sum_{i=1}^n C_i X_i\right)}}$$

In this equation, Y represents the endogenous variable (mode of management), C_0 , a constant, C_i the estimators and X_i the variables exogenous to the model.

3.2.2. Independent variables

The literature review we carried out allow us to classify the explanatory factors behind the means of administration for garbage collection into two categories: the social and territorial factors on one side and organizational and institutional factors on the other. The first category are operationalized through five sub-variables while second is made up of four.

3.2.3. Socio-territorial variables

- *Rate of urbanization*

The index of urbanization represents the proportion of population living in urban areas over the total population of a LA. We expected to find that high urbanization would have a

certain influence over the choice of an externalized management given the constraints these municipalities face.

- *Population size*

We expected to find that the effective legal population of a LA plays a determinant role in the choice of a means of handling the solid waste disposal service. Indeed, population size could have a double effect since LA in a overpopulated area are confronted with greater needs as to the amount of waste to be treated. On the other hand, a more sizable population may enable a LA to benefit from greater fiscal resources which could also influence the mode of administration enacted. We would like to point out that for this variable we have taken into consideration the decimal logarithm of the population, in order to reduce the strong dispersion between the values in large and small LA, and to make the values more readable, relevant and easier to interpret.

- *Average household size*

This is the average number of people residing in a single dwelling, whether they are related or not. A household, for example, could be made up of only one person.

The data pertaining to these first three variables come from the open-source data base of the High-Commissariat of the Plan (Haut Commissariat aux Plans, 2022).

- *Unemployment rate*

Generally, the literature does not provide enough information as to the link which could exist between the economic situation of a territory and how local public services are administered (Kearney et al., 2000; Moon & DeLeon, 2001). In our study, the state of economic health of a territory is measured by the unemployment rate. We anticipated the existence of a link between this variable and the way municipalities handle garbage collection, supposing that low unemployment would translate into a higher standard of living which would thereby have a positive influence over household income and consumption levels.

- *Citizen satisfaction index*

According to various authors, the choice of means of providing basic local services could be considered as a response to external concerns of the citizens as to their participation in the process of how these services are managed. At a local level, some authors state the hypotheses that it is highly convenient to not only take citizen concerns over technical efficiency into account but their level of political involvement in the process as well (Box et al., 2001; Feldman & Khademian, 2001).

To measure the degree of citizen involvement, we used the index developed by Warner and Hefetz (2008) which poses the following questions: (1) an evaluation of citizen satisfaction with the management of the garbage collection service; (2) conducting surveys among the citizens; (3) the degree of the presence of mechanisms to handle user complaints and suggestions related to the service and (4) the regular treatment of user input.

Our respondents were asked to answer according to the five-point Likert scale, from “totally disagree” (1) to “totally agree” (5) and from there, calculate the replies on an index that ranged from 4 to 20. A Cronbach alpha of 0.837 indicates a high reliability.

3.2.4. Organizational variables

- *Resources*

Earlier works show how the state of health of an organization’s resources is reflected in its financial, human and technical plans (Damanpour & Schneider, 2009). Since the literature

does not talk about this variable on a measurable scale, we asked our respondents to answer eight questions using the five-point Likert scale:

- 1) the quantitative availability of equipment: trucks, processing equipment, etc., for waste collection;
- 2) the qualitative adequacy and pertinence of this equipment to the furnishing of the service (capacity for specific treatment, recycling and recovery, respect for the environment, etc.);
- 3) the level of the capacity of the municipal landfill to handle the collected waste;
- 4) the adequacy of the landfill: distance, ease of use...;
- 5) the availability and adequacy of the collection personnel;
- 6) the level of skill and qualification of human resources;
- 7) the capacity of the municipality to mobilize the financial resources for the service;
- 8) the adequacy of budgetary resources of the municipality.

We then proceeded to verify the usefulness of this scale in two times. First, we examined the reliability of the scale of measurement by calculating the Crobach index ($\alpha = 0.873$) which shows a high reliability. We then performed a "Principal Component Analysis" of the scale in order to verify the structure and quality of the information. The results show the existence of three components which is in agreement with the literature. The first of these is called "Technical resources", the second is "Human resources" while the third is "Financial resources" (see Table 2).

Table 2. Results of the principal component analysis (source: author's conception)

	Components		
	Technical Resources	Human Resources	Financial resources
Quantitative availability of equipment	.846		
Qualitative adequacy and pertinence of equipment	.839		
Adequacy of the landfill	.938		
Capacity of the landfill	.837		
Sufficient HR		.913	
Adequate HR		.811	
Availability of financial resources			.840
Sufficient fiscal Resources			.802
KMO = 0.791 Bartlett test 0.000			

■ *Follow-up Index of the service*

According to Poister and Streib (1999), a reliable follow-up of the conditions of measuring how a service is provided may be a decisive factor in the increase of certain means of providing local public services such as mixed management, for example. Likewise, Warner and Hefetz (2008) proceeded to the construction of a follow-up index for municipal services which we adapted and contextualized. We asked our respondents to indicate on the Likert

scale from 1 to 5, the degree to which the management of the service of waste collection is followed-up and evaluated according to these four items:

- A regular evaluation of the administrative costs of the service.
- A regular examination of the reglementary clauses and dispositions relative to the administration of the service.
- An on-the-spot follow-up of the performance of the management of the garbage collection service.
- An examination and analysis of all relevant data pertaining to the management of the service.

We proceeded to gather and count up the responses through the “Follow-up Index of Services” on a score from 4 to 20. The Cronbach reliability for this index is 0.919.

4. Results

In our study, we carried out an analysis by using two complementary approaches:

The first of these was a descriptive approach in order to test the relationship among explanatory variables and the variables to be explained by the model by using the chi-squared test, a method which is likely to point out the sense of such a relationship.

The second, within the explanatory approach, was an analysis of the importance of the relations based on the study of regression coefficients. The binary logistic regression method allows for the Odds Ratio to be estimated and thus easily interpreted. Also, the coefficient pointed out by the model translates the random relationship between the individuals presenting the characteristic which links it with the other individuals in the sample. The interpretation of the regression models was done by using pseudo-R² and the capacity of the logistic regression model which takes reality into account (the % of classification accuracy is shown). For our study, we relied on the hierarchical logistic regression method upon entering first the socio-territorial variables (model 1) then the organizational variables (model 2) and finally, both categories of variables (model 3).

The descriptive statistics and correlation coefficients for all the variables are presented in the appendix. An examination of the effects of multicollinearity aided by variance inflation factors (VIF), enabled us to reach the conclusion that the factors of all the variables are situated between 1.117 and 2.971, that is, below the floor value of 10 (See appendix), thereby indicating that multicollinearity is negligible (Neter et al., 1985).

Correlation tests

In our starting conceptual model, we drew a distinction among four hypotheses related to variables exogenous to the choice of the means of management of local garbage collection service made by Moroccan municipalities. Based on our sample, only the size of the LA, measured by its effective population, is positively associated to the adoption of a municipal management of performance (See Appendix).

Based on our sample, the variables relative to territorial factors: the size of the population of the territory, the average household size and the index of urbanization, are positively associated to the adoption of an internal type of management of local garbage collection. However, as to social factors, only the index of citizen involvement seems to be associated

with a dependent variable whereas the level of dependence between unemployment and the endogenous variable of the model is insignificant (p , .0369). As for organizational factors, all the variables in the model seem to bear a correlation with the dependent variable.

Results of the regression

Model 1 (Table 3), which is only made up of socio-territorial variables, indicates that only population size (P , .000) and household size (p , .085) are statistically significant. According to the signs of the regression coefficients, population size negatively influences the choice of an internal management of garbage collection by Moroccan municipalities. However, the results of the regression indicate that average household size has a positive influence over the decision taken by LA to internalize the service. Overall, the model of socio-territorial factors indicates a high prediction accuracy rate (77.6%) and an acceptable explanatory capacity (44.6%).

These results imply that overpopulated municipalities do not resort to internal administration to handle the demographic pressure over the capacity to deal with a greater volume of waste. Therefore, we can state that there exists a positive relation between population size and the volume of waste to be treated.

Table 3. Logistic regression result (source: author's conception)

Independent variables	Model 1	Model 2	Model 3
Population size	-.952***		-.905***
Average household size	1.0165*		1.345 (NS)
Urbanization rate	-.017 (NS)		-.007 (NS)
Unemployment rate	-.006 (NS)		0.009 (NS)
Citizen satisfaction index	-.0050 (NS)		-.026 (NS)
Financial resources		-2.404***	-2.387***
Technical Resources		-.368 (NS)	0.641 (NS)
Human Resources		.177 (NS)	-.224 (NS)
Follow-up Index		.013 (NS)	-.068 (NS)
Classification accuracy rate %	77.6	83.6	89.6
R ² Nagelkerke	0.468	0.581	0.726
Significance level : ***1% *10%			

The model of organizational factors shows that only the variable relative to financial resources seems to have a significant and negative effect over the adoption of a mode of internal management of solid waste disposal in Moroccan LA (p , .000). Nonetheless, the logistic regression results do not allow us to prove the existence of a significant influence over other explanatory variables.

In model 3, we introduced all the explanatory variables. Overall, this model enables us to accurately predict (89.6%) the results with a relatively high total explanatory capacity of variance (72.6%). As in the case of the previous two models, only two variables have a significant and negative effect over the installment of an internal management of garbage disposal by LA in the sample under study, namely, population size (p , .000) and financial resources (p , .000).

The Table 4 summarizes the synthesis of the results of the hypotheses.

Table 4. Synthesis of hypotheses results (source: author's conception)

Hypotheses			Results
Socio-territorial factors	Territorial Factors	Population size	Confirmed
		Average household size	discarded*
		Urbanization rate	discarded
	Social Factors	Unemployment rate	discarded
		Citizen involvement	discarded
Organizational Factors	Resources	Financial	Confirmed
		Technical	discarded
		Human	discarded
	Uncertainty Level	Follow-up Index	discarded

Note: *Confirmed by model 1.

Discussion and conclusions

The aim of our study consists of testing hypotheses over the determining socio-territorial and organizational factors, whether they be endogenous or exogenous, which may influence the way garbage collection services are managed by local authorities in Morocco. The literature suggests that the decision to adopt either an internal or an external means of administering local public services by municipalities can be the result of a complex process which must take into account numerous factors such as legislation and regulations, available financial resources, technical capacities, citizen involvement, environmental considerations as well as the availability of infrastructure and equipment.

However, in the Moroccan context, it appears that the choice of a means of local waste disposal often falls under the influence of territorial factors. Indeed, from our results and from the literature examined in the first part, two of our hypotheses (H1 and H3) were confirmed and the existence of a significant influence of several different variables over the choice of how this service of proximity

was to be provided was established whereas, two other hypotheses (H2 and H4) where specific aspects which went against the theories set forth were discarded.

The significant role of size and influence mitigated by other socio-territorial factors.

Aside from the factor of the size of the territory, our results were unable to show a significant influence of other variables such as urbanization, mean household size, unemployment or levels of citizen involvement over the choice of how local garbage collection services are to be managed. As was to be expected, the element of size seemed to have a significant and negative effect over any decision to adopt an internal waste-management system. The larger and more disperse a territory is has an influence over numerous other factors such as population density, infrastructures, available resources and environmental constraints. Densely populated urban areas generally have a greater need for waste management systems different from those of more sparsely populated rural areas. For example, urban zones may require more frequent collection infrastructure and more intensive waste treatment due to

the higher number of households and businesses while on the hand, rural zones may have higher collection costs due to the greater dispersion of dwellings.

Nonetheless, our results run counter to those neo-institutional theories which suggest that organizational decisions are often a reaction to pressure from contextual factors (Carasus et al., 2014; Powell & DiMaggio, 2012; Walker et al., 2011). Variables linked to specificities of the population should be expected to have a negative effect over the adoption of an internal administration of waste disposal yet, with the exception of population size, results point to a negligible impact of other factor like household size, urbanization and unemployment. Theoretically, the geographical characteristics of the municipalities, such as their population density, localization or surface area, may influence their choice of a particular means of waste disposal. For example, a densely urbanized municipality situated in a geographically complex territory could opt for innovative solutions, a more frequent and specialized system of waste collection and treatment. Likewise, since a greater population would also have the positive effect of a more robust tax base, local governments would also be motivated to adopter novel approaches in order to extend and improve the quality of their services (Damanpour & Schneider, 2009). A weak fiscal balance along with high unemployment, on the other hand, could lead local administrations to adopt innovative systems to bring about a greater internal efficiency in their way of providing services (Damanpour & Schneider, 2006). Municipalities could therefore be moved to set up more or less costly waste management policies according to their budgetary capacity. Faced by high unemployment, they may be compelled to cut expenses and to adopt a cheaper way to manage waste disposal. Unemployment could also influence the demand for certain waste disposal services since households would resort to economical solutions like composting of garbage and reusing objects. If a municipality seeks to create local jobs, it might put in place policies which would favor local recycling enterprises and cooperatives. At this level, we can state that in the Moroccan context, the lack of a significant influence of the unemployment rate over the way waste disposal services are managed shows to what extent these links are complex, thus making it difficult to generalize and pointing to other local and contextual factors. Still in the area of socio-territorial factors, contrary to the American context where citizen involvement is central to the choice of means of administration of public services, in Morocco, our results do not enable us to confirm the existence of any such influence, a circumstance which could be attributed to cultural reasons. In other words, even if a commune were to implement solutions and set up platforms to facilitate user participation in the administration of local public services (Amrani et al., 2022), such measures would fall far short of bringing about any meaningful results, due to illiteracy (32%) and a lack of knowledge about new participative approaches in municipal management.

Organizational factors, the preponderant influence of financial resources.

As to organizational and institutional factors, our results indicate that only the availability of financial resources has a significant and negative effect over the adoption of internal means of solid waste management by local administrations while neither human and technical resources nor the level of certainty in the follow-up of how the service is carried out has no real effect, a surprising result in light of earlier works.

Normally, the decision to provide an internal management or to outsource it could be influenced by a lack of qualified human resources or by the unavailability or inadequacy of

technical means such as controlled landfill sites, treatment stations, separation and composting installations, garbage removal vehicles, etc. Municipalities which have a limited technical capacity will naturally turn to outsourcing waste disposal to specialized service providers.

Nevertheless, the results of our study point out the fact that the most financially favored communes resort increasingly less to internal garbage collection systems. This may be attributed to a greater administrative efficiency and a higher quality of services provided by outsourced enterprises which tend to be better equipped, more experienced and better informed. This result coincides with the reality on the terrain where several actors expressed their desire to outsource their waste-management services which, according to them, would allow them to guarantee a better quality of service and consequently, a higher level of user satisfaction as well as reducing the stress linked to the internal management of such a vital service.

As in any investigation work, our study has not been spared certain limits and so, the results obtained should be taken prudently due to its methodological limitations, especially as to sample size with a rate of response of only 8% of the total number of LAs, a limitation which hampers all quantitative studies based on questionnaires. Our study is also focused on two categories of factors: socio-territorial and organizational. It would be recommendable for further studies to explore the influence of environmental, institutional or regulational factors as well.

Besides the quantitative methodology used in our study, other types of research could be employed to give a deeper insight into the factors behind the choice of ways to administer waste-management services. For example, a qualitative case study could provide a more detailed examination of the experience and opinion of local authorities and residents over different ways of handling waste disposal. It would be interesting to include other services such as water and electricity in future studies since these are also influenced by the same organizational and institutional factors. It would also be beneficial to study the capacity a local authority has to develop a means to administer public services and to define appropriate lines of investigation.

The management of public services will continue to be a point of major interest for more and more investigators in the field of public administration since it deals with how to provide services capable of creating added value. There are multiple challenges such as the improvement of the quality of services offered, user satisfaction, the rationalization of public expenditures and the optimization of resources. For this reason, scientific research becomes crucial in order to develop effective methods, tools and strategies for a better administration of public services.

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APPENDIX

Overview of literature sources

Author	Title	Type of study	Sample and Method	Key findings
Argento et al. (2010)	"The 'externalisation' of local public service delivery: experience in Italy and Sweden"	Qualitative	Comparative case study between Italy and Sweden	Italy and Sweden have implemented policies to outsource the delivery of local public services, although they have done so to varying degrees and in different areas of public services.
Pérez-López et al. (2015)	"Rethinking New Public Management Delivery Forms and Efficiency: Long-Term Effects in Spanish Local Government"	Qualitative	Case study in Spanish Local Government	The adoption of (NPM) delivery forms in Spanish local governments has not led to sustained improvements in efficiency and service quality, contrary to their intended goals.
Elrabaya and Marchenko (2022)	"The influence of organizational and economic methods of household waste management on the volumes and structure of its formation: the experience of the Netherlands"	Quantitative	384 Municipalities in the Netherlands	The Netherlands' successful waste management approach involves a mix of economic and organizational factors. Incentives help, but infrastructure, communication, and policy are also important.
Osborne and Stroskosch (2013)	"It Takes Two to Tango? Understanding the Co-Production of Public Services by Integrating the Services" Management and Public Administration Perspectives"	Qualitative	literature review	Successful co-production of public services requires collaboration and communication between service providers and citizens, and that a holistic approach integrating both service management and public administration perspectives is necessary for effective co-production.
Sønder-skov and Rønning (2021)	"Public Service Logic: An Appropriate Recipe for Improving Serviceness in the Public Sector?"	Qualitative	literature review	PSL can improve "serviceness" in the public sector by prioritizing citizens' needs over efficiency or political goals, but its success depends on contextual factors like regulatory frameworks and the adaptability of public organizations to new approaches.
Bovaird et al. (2016)	"Promoting the collective co-production of public services: Encouraging citizens to participate in complex governance mechanisms in the United Kingdom"	Qualitative	case studies in England and Wales	Promoting the collective co-production of public services requires the creation of appropriate conditions and mechanisms for citizen engagement, the building of trust and collaboration between citizens and service providers, and the recognition and valuing of citizens' contributions to the co-production process.

Author	Title	Type of study	Sample and Method	Key findings
Guirou (2016)	"Choosing a management mode: the importance of beliefs"	Qualitative	Case study two municipalities in France	The beliefs of public managers about management effectiveness impact their choices of management mode. These beliefs are influenced by experiences, context, and social networks. Managers should challenge their beliefs and be open to innovation for better results.
Bouba-Olga et al. (2008)	"Cognitive constraints as a key determinant of the choice of water management mode"	Quantitative	25 909 -Com-munes- in France	Cognitive constraints, such as cognitive load, mental habits, and perception of risk, are important determinants of the choice of water management mode. These constraints can limit the range of options considered by decision-makers and should be considered when designing policies and decision-making processes for water management.
Nemec and Soukopová (2016)	"Mixed System: Transformation and Current Trends in the Provision of Local Public Services in the Czech and Slovak Republics"	Quantitative and Qualitative	Comparative analysis between the Czech Republic and Slovakia	The local public services system in the Czech Republic and Slovakia has shifted towards a mixed system of service provision, which involves partial asset privatization and outsourcing in some areas. However, there are ongoing debates and challenges around the effectiveness of this system in meeting the needs of the population.
Mikuła and Walaszek (2016)	"The Evolution of Local Public Service Provision in Poland"	Qualitative	case study in poland	The evolution of local public service in Poland has been influenced by political and economic factors, leading to a shift towards privatization and outsourcing in some areas.

Survey extract

I. Management method adopted

- ◆ In your Commune, what is the form chosen for the management of the household waste management service
 - Internal management
 - External management

II. Determinants

For all the statements below, please indicate your level of agreement (1 – Not at all in agreement; 2 – No agreement; 3 – Neither agree nor disagree; 4 – I agree; 5 – Totally agree)

Item	Level of agreement				
	1	2	3	4	5
1. The Commune evaluates citizens' satisfaction with the household waste management service	1	2	3	4	5
2. The Commune conducts regular surveys of its citizens	1	2	3	4	5
3. The Commune conducts regular surveys of its citizens	1	2	3	4	5
4. The Commune has mechanisms to receive complaints and claims from users regarding the household waste management service	1	2	3	4	5
5. The Commune proceeds to the treatment of the complaints of the users relating to the service management of the household waste	1	2	3	4	5
6. The Commune regularly evaluates the costs of the household waste management service	1	2	3	4	5
7. The Commune regularly reviews compliance with the regulatory clauses and provisions relating to the management of the household waste management service	1	2	3	4	5
8. The Commune regularly monitors the performance of the household waste management service in the field	1	2	3	4	5
9. The Commune regularly reviews and analyzes data related to the household waste management service	1	2	3	4	5
10. The Commune has the necessary and sufficient equipment (trucks, bins, compactors, skips...) to manage the household waste management service	1	2	3	4	5
11. The Commune has the relevant equipment to ensure an efficient and permanent management of the household waste management service	1	2	3	4	5
12. The Commune has a household waste landfill with sufficient capacity	1	2	3	4	5
13. The landfill available to the Commune is relevant (distance, ease of operation)	1	2	3	4	5
14. The Commune has sufficient staff to manage the household waste management service	1	2	3	4	5
15. The Commune has sufficient expertise to ensure the management of the household waste management service	1	2	3	4	5
16. The Commune is able to mobilize financial resources to manage the household waste service	1	2	3	4	5
17. Overall, the Commune's fiscal resources are sufficient	1	2	3	4	5

Operationalization and descriptive statistics

Label	Measurement	Source	Min	Max	Mean	SD
Management method	1 = The commune adopts an internal waste management system; 0 = The municipality adopts an outsourced waste management system;	Survey	0	1	.50	.502
Citizen satisfaction index						
<i>Aggregate index of four questions below to measure the degree of user satisfaction by the commune ($\alpha = 0.837$)</i>						
Satisfaction_Measure	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	2.62	1.357

Label	Measurement	Source	Min	Max	Mean	SD
Surveys	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	2.17	1.288
complaints	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	2.85	1.561
resolution_ claims	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	2.97	1.589
Service Tracking Index						
<i>Aggregate index of four questions to measure the degree of tracking of waste management service ($\alpha = 0.919$)</i>						
Cost measurement	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	2.58	1.493
Respect of the engagements	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	2.70	1.410
Field monitoring	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	3.26	1.499
Data analysis	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	2.72	1.467
Resources						
<i>Degree of availability and adequacy of resources (technical, human and financial) to ensure waste management by the Commune ($\alpha = 0.873$)</i>						
Resource availability	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	2.61	1.326
Adequacy of resources	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	2.46	1.149
Sufficient HR	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	2.65	1.348
Adequate HR	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	2.69	1.323
Adequacy of the landfill	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	2.41	1.427
Capacity of the discharge	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	2.28	1.357
Availability of financial resources	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	3.16	1.371
Sufficient fiscal resources	Likert scale (1 – Totally disagree; 5 – totally agree)	Survey	1	5	2.78	1.183
Urban rate	Percentage of the population living in urban areas in relation to the total population of the local authority	Haut Commissariat aux Plans (2022)	1.1	100.0	79.587	29.5239
Average household size	The average number of occupants per principal residence	Haut Commissariat aux Plans (2022)	3.5	6.6	4.578	.5980

Label	Measurement	Source	Min	Max	Mean	SD
Unemployment rate	The unemployment rate in the labor force aged 15 and over. Obtained by dividing the number of unemployed persons by the number of working people aged 15 and over	Haut Commissariat aux Plans (2022)	4.40	37.80	17.6991	7.14823
Size of the legal population	The logarithm of the legal population of the Commune	Haut Commissariat aux Plans (2022)	7.99	15.03	10.3205	1.45176

Results of the correlation tests

Assumptions		Meaning of the test	Value-added level p	
Socio-territorial factors	Territorial factors	Size of the population	(p, .000)	
			Average household size	(p, .000)
			Urbanization rate	(p, .000)
	Social factors	Unemployment rate	not significant	(p, .369)
		Citizen satisfaction Index	Very significant	(p, .025)
Organizational factors	Resources	Financial	Very significant	(p, .000)
		Techniques		(p, .000)
		Human	Significant	(p, .010)
	Level of uncertainty	Tracking index	Very significant	(p, .002)

Results of the multicollinearity test

Coefficients							
Model	Non-standardized coefficients		Standardized coefficients	t	Sig.	Co-linearity statistics	
	A	Standard error	Beta			Tolerance	VIF
(Constant)	1.936	.521		3.720	.000		
Urban rate	-.002	.001	-.105	-1.192	.236	.542	1.846
Average household size	.066	.072	.079	.916	.362	.570	1.756
Index_satisfaction	-.010	.046	-.025	-.227	.821	.360	2.778
Tracking_index	-.006	.044	-.016	-.143	.886	.336	2.972
Hum_Resources	.024	.037	.059	.632	.529	.476	2.102
Tech_Resources	.043	.048	.091	.901	.370	.418	2.393
Fin_Resources	-.258	.037	-.564	-6.894	.000	.630	1.587
Unemployment rate	.001	.005	.008	.122	.903	.895	1.117
Population size	-.094	.026	-.270	-3.564	.001	.733	1.364

Summary of regression results for the three models

		A	E.S.	Wald	ddl	Sig.	Exp(B)
Model 1	Urban rate	-.017	.012	1.950	1	.163	.983
	Household Size	1.065	.619	2.961	1	.085	2.900
	Index_satisfaction	.050	.203	.062	1	.803	1.052
	Unemployment	-.006	.033	.037	1	.848	.994
	Population size	-.952	.253	14.132	1	.000	.386
	Constant	6.283	4.128	2.317	1	.128	535.467
Model 2	Tracking_index	.013	.268	.002	1	.961	1.013
	Hum_Resources	.177	.351	.253	1	.615	1.193
	Tech_Resources	.368	.388	.902	1	.342	1.445
	Fin_Resources	-2.404	.464	26.794	1	.000	.090
	Constant	5.742	1.336	18.484	1	.000	311.800
Model 3	Tracking_index	-.068	.466	.021	1	.884	.934
	Hum_Resources	-.224	.427	.276	1	.599	.799
	Tech_Resources	.641	.523	1.502	1	.220	1.898
	Fin_Resources	-2.387	.563	17.950	1	.000	.092
	Urban rate	-.007	.014	.259	1	.611	.993
	Household Size	1.345	.871	2.382	1	.123	3.838
	Index_satisfaction	-.026	.455	.003	1	.955	.975
	Unemployment	.009	.042	.050	1	.823	1.009
	Population size	-.905	.313	8.375	1	.004	.404
	Constant	10.143	5.611	3.268	1	.071	25425.080