Governance in Smart Cities – Example of the Capital City of Prague

Lípa, J.; Hájek, M. and Kubová, P.
Czech University of Life Sciences, 165 00 Prague, Czech Republic
E-mail: kubova@fld.czu.cz

Extended abstract: **A key moment in the implementation of environmental policy is the setting of priorities based on local knowledge and technical expertise to demonstrate the objective state of the environment in the locality. The aim of this paper is to define prerequisites for optimizing state administration in the environmental field as an important part of smart city concept. The main aim is achieved by analysing the current situation of environmental organizations in Prague (institutional organization of fundamental organizational units of environment protection). The research reveals inconsistencies in the organizational structure of environmental departments in Prague impeding effective control and even operation of the authority, but also a need for establishing unified organizational structure of the departments. Environmental management in municipal districts lacks experience and some favourable results are primarily due to the great interest of some leading district representatives and possibly to public pressure on the implementation of specific measures to address environment protection.**

I. INTRODUCTION

Cities are becoming smart not only as to the way by which routine functions can be automated, but also as to the way of increasing the efficiency and quality of services provided to various entities and businesses within the city area [1]. Cities play a significant role in social and economic activities, but they perform poorly in terms of environment conservation [2]. That is why sustainability is very often focused on the state of the environment. Sustainable development cannot be achieved without governance because of its nature: it is normative and requires the collective action [3].

State administration is one of the key stages of the policy cycle [4], being essential for solving environmental problems and meeting the objectives of environmental policy. State administration also addresses practical issues of environment protection. These include environment management systems that are deployed in cities and municipal districts [5], and that have an impact not only on our own workplace governance, but also on the level of the entire management system of the government in protecting the environment [6]. State administration of environmental care and protection fulfils an important function. Its activities are to prevent threats and disturbances to the environment, to act to eliminate such phenomena and to minimize harm to the environment. They are performed as state administration by competent administrative authorities. In this section, they carry out activities within their delegated and separate powers of the local government entities as well [7]. The aim of this paper is to define prerequisites for optimizing the state administration in the environmental field as an important part of the smart city concept. The main aim will be achieved by analysing the current situation of environmental organizations in Prague.

II. MATERIAL AND METHODS

Data collection and the subsequent analysis relate mainly to the period from 2001–2016 and to the vertical division of the organization, with the support of the horizontal, and mainly factual and local (territorial) division, which is subject to relatively frequent changes that have been long considered a path leading to the successful reform of public administration in Prague. The research is based on the analysis of environmental organizations in Prague.

Data collection was conducted through the quantitative and qualitative research. The combination of both approaches can clarify the validity and reliability of results. Basic data on the performance of state administration in the field of environment in the capital city of Prague were identified from publicly available information sources in the first phase. In the second phase, a questionnaire was used for the purpose of quantitative research. All 57 municipal districts were addressed (i.e. 22 and 35 administrative districts called small municipal districts). Efficacy of the institutional provision of environment protection was assessed by using monocriterial methods [8] to ensure efficiency.

A correlation analysis was performed to assess the current method of state administration in the municipal districts. This method was chosen and used as a suitable indicator of the dependence of two variables.

At first, the dependence was compared between the number of staff dealing with the state administration in the environmental field and the population and area size of the given administrative district. The dependence of the staff on the population and area size was assessed by using the formula (1) to calculate the Pearson correlation coefficient [9]:

$$r = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2 \sum_{i=1}^{n}(y_i - \bar{y})^2}} \quad (1)$$

The formula (1) was also used to determine the relative number of staff and the number of annual submissions.

III. RESULTS AND DISCUSSION

Results of the analysis of the current state revealed a dismal situation in the organization of environmental departments in the municipal districts, especially in urban areas. Some specific problems identified in the area of state administration are e.g. the risk of influencing the

state administration by municipal authorities reasoned by insufficient redistribution of funds on the performance of transferred state administration and subsidizing from the part of municipal authorities, the execution of both administrations by one department and often by just one person, in extreme cases by a councillor, insufficient staff expertise (see Table 1) or their existence at lower levels of public administration in general, the worsening and ongoing decentralization of state administration with the continuous transfer of competences onto lower levels of state administration and de facto also into the competence of municipal authorities (decentralisation is very important for the concept of smart cities), wanton "expansion" to three- or even multi-track state administration, inefficient use of public funds and directly related   -now virtually uncontrolled, the uncontrollable- power of municipal authorities with their "quality", or the frequent misuse of the fiction of negative decision pursuant to the law on the free access to information...etc. Impartiality as a parallel legitimatizing principle for the "output" side can also encompass various administrative practices [11]. The application of minimum standards for staff qualification by the regulator is a sensitive issue in the field that has only recently developed autonomously and is closed to professional practice [10].

Often there is a refusal to cooperate and a failure to provide information from the addressed authorities. This also implies the need for creating and submitting a theoretical model of the optimal structure of department that could help in practical terms increase the efficiency of state administration in the field of environment protection in Prague.

TABLE 1: EXPERTISE OF EMPLOYEES IN SMALL MUNICIPAL DISTRICTS

	Quantity	%
Number of evaluated municipal districts	35	100
District with the department	5	14.3
District with the unit	1	2.9
District with the expert staff	11	31.4
• with university education	9	25.7
District without the professional staff	16	45.7
Not stated	2	5.7

The amount of obtained data also allows comparing the number of employees and population in the region and the number of annual submissions as an effect of administrative activities. Mathematical dependence on the outcome of population is 0.73, for an area 0.26 and 0.11 for the number of submissions. Critical value for the 14 data files that could be used, since only so many administrative districts supplied the information (at a significance level of $\alpha = 0.05$) is 0.5324. Thus, dependence holds that the lesser is the number of assessed files, the higher is the value of the correlation coefficient required to confirm the dependence. Figure 1 expresses the obvious dependence of population on the number of employees. The dependence of population greatly exceeds the value of 0.5324, which confirms the

dependence. The dependence of area on the number of workers is not provable. Figure 2 shows the dependence of the number of submissions on the number of staff – the dependence is not proven.
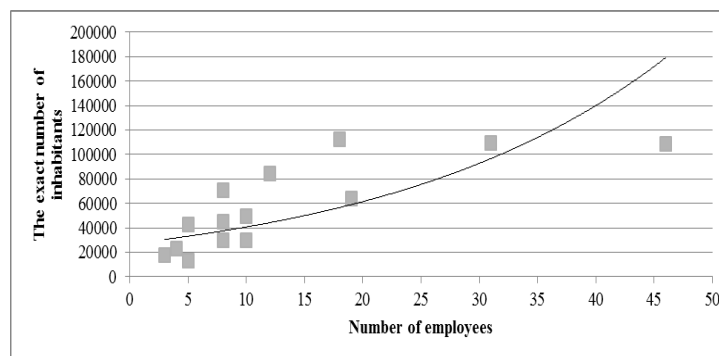

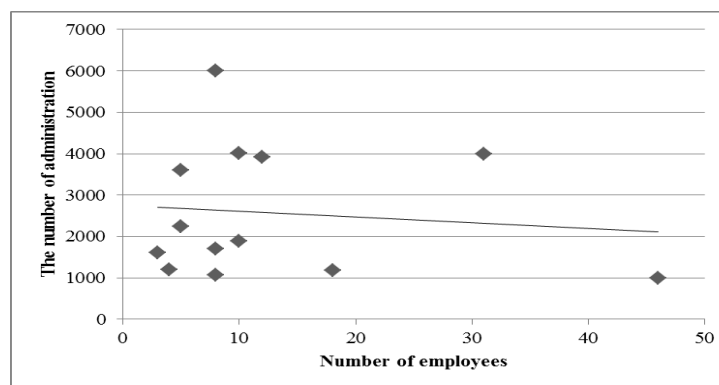FIGURE 1: DEPENDENCE OF POPULATION ON THE NUMBER OF EMPLOYEES

FIGURE 2: DEPENDENCE OF THE NUMBER OF SUBMISSIONS ON THE NUMBER OF WORKERS

The results were used to formulate policies for the organizational structure of government, which would constitute an appropriate basis for the concept of smart cities.

Based on our research, we divided the environmental departments into seven groups by their structure and institutional provision. The authors emphasize the following important characteristics: independent department, strict separation of state and self-governments, net performance in environment protection, adequate staffing, competitive financial incentives and sufficient staff qualifications. The classification is from the optimal to the least suitable:

1) Optimal department
2) Optimal department with reserve
3) Department with the unit of municipal authority
4) Compromise department
5) Independent undifferentiated department
6) Consolidated department
   a. Department consolidated with the unit of municipal authority
   b. Consolidated compromise department
   c. Consolidated undifferentiated department
7) Consolidated unrelated department
   a. Consolidated unrelated department with the unit of municipal authority

b. Consolidated, unrelated compromise department
c. Consolidated, unrelated undifferentiated department

Optimal department would meet the above prerequisites. Such a department would be independent and would lack both other areas of state administration such as transport, and self-government execution. At the same time, however, it would also lack the agenda of state administration of water management.. It would have a sufficient number of staff including necessary qualifications and financial incentives. Optimal department with a reserve –although meeting the requirements set by us- would also include state administration of water management. Department with the unit of municipal authority would be divided by the execution of state administration and self-government. Compromise department is a rather realistic and used form of department with the unit of municipal authority and state administration unit with a reserve – a part of the state administration unit could be also water management. Although it is a source outside Prague, recorded for other reasons, and, although being of an older data, it may well serve for imagination about the described. Independent undifferentiated department does not distinguish between the execution of state administration and self-government. It is characterized by a low number of staff and sometimes by a low number of experts too. Consolidated department is linked with another department, with another area of state administration. In such a case, the area of transport can be recommended because it has a major impact on the condition of the environment. Conversely, the area of building cannot be recommended because at merging with the building, the environment inevitably becomes inferior, and in cases when this constellation is used, it says enough about founder's intentions. It is to be added that in the Czech Republic, environmental departments with their growing importance have been separated from building departments in many municipalities. The consolidated department should not exercise self-government. The consolidated and compromise department, i.e. department with the unit of self-government and water management agenda is most common in Prague and in the Czech Republic. The consolidated and undifferentiated department does not have the execution of state administration and local self-government separated. The consolidated unrelated department indicates a connection with a completely irrelevant department. Even here, there are some alternatives: The consolidated unrelated department with the department of self-government, the consolidated unrelated compromise department (with the department of local self-government and water management agenda), and the consolidated unrelated and undifferentiated department. Such a form of department is the least desirable in terms of quality, effectiveness and institutional provision; however, it is far from occurring sporadically. It is characterized by a low number of persons who are in charge of both state administration (even of its different components) and self-government within one work position. The classification of departments characterized in this paper may find more applications in the theory of institutional economy and more general use in practice rather than the model of the optimal environmental department; nevertheless, even that can be applied also outside the explored territory, i.e. Prague.

IV. CONCLUSION

Issues such as the rigidity and excessive formal and procedural bureaucratic requirements of public administration, inadequate choice of personnel and their training, lack of efficient performance evaluation mechanisms and others have caused increasing concern and discussion [12], [13], [14]. Based on our research, we have divided the environmental departments, in their structure and institutional provision into seven groups. These groups were characterized in detail. Based on the research results, preconditions for the optimal organizational structure were set (specifically, the characteristics of the Administrative Department).

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