ISSN 2723-9195

CERIDAP

Rivista Interdisciplinare sul Diritto delle Amministrazioni Pubbliche

Estratto

Fascicolo Speciale n. 4 (2025)

Charting the Course Towards a New Legal Framework for Smart Cities

Smart cities in Switzerland: local autonomy versus centralisation

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DOI: 10.13130/2723-9195/2025-2-31

Le città intelligenti in Svizzera fanno parte della tendenza alla trasformazione digitale delle amministrazioni pubbliche. Questi processi sono guidati dai Comuni. Quasi tutti gli aspetti della governance pubblica e dei servizi pubblici possono essere considerati parte di questi sforzi di digitalizzazione. Poiché i programmi per le Smart City sono progettati da autorità guidate democraticamente, e poiché questi programmi sono orientati agli obiettivi e incentrati sui clienti, si sostiene, nel presente contributo, che l'autonomia locale sia necessaria per una "buona" implementazione di una Smart City. Tuttavia, l'implementazione di processi digitali è per lo più giustificata da guadagni di efficienza ed efficacia. Sia la tecnologia come strumento, sia il ragionamento per l'implementazione di queste tecnologie potrebbero portare a processi di centralizzazione e, paradossalmente, a una perdita di autonomia locale. L'interesse delle autorità cantonali e federali a trasformare digitalmente l'amministrazione pubblica sta già portando alla perdita di autonomia dei comuni in numerosi settori. Sosteniamo che questa tensione, tra autonomia locale e ricerca di servizi pubblici efficaci ed efficienti, sia già presente nella Costituzione federale e che il sistema manchi di garanzie costituzionali. Sebbene siano necessarie ulteriori ricerche per meglio coniare le possibili soluzioni, il presente scritto vuole suggerire alcune soluzioni che potrebbero aiutare a preservare l'autonomia locale.

Smart cities in Switzerland are a part of the trend of digital transformation of public administration. These processes are led by local authorities in the municipalities (communes). Almost all aspects of public governance and public services can be considered as part of these digitisation efforts. Since Smart city programmes are designed by democratically led authorities, and because these programmes are goal-oriented and customer-centred in nature, we argue that local autonomy is necessary for a "good" implementation of a Smart city. However, the implementation of digital processes is mostly justified by gains of efficiency and effectiveness. Both technology as a

tool, and the reasoning for implementing technologies might lead to centralisation processes and paradoxically, to a loss of local autonomy. The interests of cantonal and federal authorities to digitally transform public administration are already on the way to strip away the autonomy of municipalities in numerous areas. We argue that this tension, between local autonomy and a search for effective and efficient public services, is already present in the federal constitution and that the system lacks constitutional safeguards. Although further research is needed to better coin possible solutions, we suggest a few solutions that could help preserve local autonomy.

Summary: 1. Smart cities in Switzerland.- 1.1. The Federal level.- 1.2. The regional level.- 1.3. The local level.- 2. Swiss smart cities are a product of, and in need of local autonomy.- 3. The pursuit of technology is a vector for centralisation.- 3.1 The expectations from the authorities towards technology.- 3.2 The consequences these expectations might have on local autonomy.- 4. The tension between Technology and local autonomy is also present in the constitution.- 5. Outlook and possible solutions.

1. Smart cities in Switzerland

1.1. The Federal level

There is no unified definition of smart cities in Switzerland[1]. The Swiss Confederation in their strategy "digital Switzerland" in 2018 wished to encourage the implementation of «*intelligent cities and municipalities*»[2]. The goal was in particular to «*have real "intelligent data" at all levels of government*» at the service of smart cities[3]. This objective sadly vanished from later strategies on the federal level[4]. The scope of the "digital Switzerland strategy" broadened to lead to a «*sustainable digital transformation that is ecologically, economically and socially responsible*»[5]. This strategy is mandatory only for the federal authorities but is conceived as a source of inspiration for other levels of the federal state[6]. The cooperation between the central state, the cantons and the cities and municipalities, is also a key part of the Swiss digital public services strategy[7]. In both strategies, the need for a data driven policymaking and a

capacity development are present[8]. These objectives are then implemented in "projects" that the Digital Public Services Switzerland organisation is promoting and coordinating, some of which are oriented toward municipalities[9] and could be described, in a broader sense as being part of Smart City's initiatives. For example, one of the projects tried to encourage the «*[c]reation, distribution and delivery of municipal services to any cantonal portal and municipal websites*»[10].
In parallel and apparently with little links with the precedent organisation, the Swiss Confederation is funding the programme "Swiss Energy" that develops a "Smart city program"[11]. For them, «*[a] Smart City offers its residents a high quality of life with minimal consumption of resources, thanks to networking, closer collaboration, participation and innovation*»[12] they support local projects from a broad nature[13], ranging from citizens' participation[14] to the implementation of nudging to encourage the installation of solar panels[15]. In other documents they explain that they chose not to have a fixed definition of what a smart city should be to leave the decision to the local authorities[16].
Beside the federal authorities' actions, specialised organisations are also active on a federal level to sustain the development of smart cities in Switzerland. They have adopted their own definition of what a smart city is or should be. The "Smart city hub Switzerland"[17], an association of cities and interested enterprises[18] uses a broader definition: «*Smart City stands for holistic, future-oriented development concepts that aim to make cities more efficient, technologically advanced, greener and more socially inclusive*»[19]. Contrary to the federal state's program, the focuses seem here less about collaboration between actors and the gain in energetic efficiency and more about the area of public action or the different programmes that makes a smart city. The SwissDigital association for communication networks[20] is also supporting smart city initiatives. Although they also consider that no unified definition has made consensus, they describe the phenomenon as trying to achieve a «*more efficient city capable of adapting constantly as part of an overall concept based on digital technology*»[21]. The interconnection being a key piece of infrastructure to transfer and interpret the data collected, data which is at the centre of the cities of the future[22].

1.2. The regional level

The cantons don't seem to be particularly active in the field of smart cities. Some cantons have decided to name their cantonal strategies "Smart"[23]. If all cantons have adopted an eGovernment strategy or a digitisation strategy for their public services[24], some of them even have a common strategy shared between cantons and municipalities. For those that don't have a common strategy, the cantonal strategy generally contains a chapter about the collaboration with the municipalities, few strategies integrate the terminology of "smart city" explicitly[25]. The canton of Geneva offers one of the few definitions of the term of Smart cities we could really find in an official document in Switzerland: «*Smart city refers to a city that uses information and communication technologies, particularly sensors, to improve the quality of life of its inhabitants and increase energy efficiency*»[26].

1.3. The local level

It is difficult to determine the exact number of smart cities present in Switzerland[27]. We argue that the relatively vague definition of smart city[28] is partly responsible for this analytic difficulty. Some definitions suggested in the literature could almost encompass any "modern" local administration programme, for example smart city: «*Urban development that integrates information and communication technology (ICT) and Internet of things (IoT) technology in a secure fashion to manage a city's assets, deliver city services effectively, efficiently, and equitably. Smart city uses information and communications technology (ICT) to enhance liveability, workability, and sustainability*»[29]. We argue that the inclusion of a programme into a Smart city ideal might be a question of threshold as well as of political will or even of analytical approach[30]. If we consider the implementation of one eGovernment project as a proof for a city to be future-oriented and thus to be on the path to become a smart city, every municipality in Switzerland might fit into this denomination[31].

In 2019, only one third of the municipalities and cities of Switzerland had a smart city strategy in place while another third of the municipalities and cities were

developing one[32]. Numerous smart city strategies and projects are developed and publicised by the organizations active around smart cities[33] or by the municipalities themselves[34]. Depending on the municipality, almost every area of public services and public policy making might have been digitised. The smart city wheel[35] encourages municipalities to digitise and apply the smart city concept to very diverse areas[36].

2. Swiss smart cities are a product of, and in need of local autonomy

However we choose to define them, Smart cities in Switzerland are a product of their communities[37]. The projects are implemented by authorities that try to answer to local problems to answer to the needs of their citizens[38]. The projects currently implemented are very different, as they touch every aspect of the authorities' responsibility. Even more, similar problems aren't always resolved in the same manner[39], and very different problems might also sometimes have similar solutions[40].

Since cities aren't identical, because of their geography, their history, their demographics, their infrastructure, they face different challenges that a "one fit's all solution" will most likely not be able to solve. This consideration is also present from the idea of Smart cities as processes that should be both "goal oriented"[41] and "customer oriented"[42] and based on "citizen participation"[43].

Moreover, the municipalities in the Swiss tradition are conceived and built as democratic vessels, possessing their own elected officials, own legislative body and their own sets of direct or semi-direct democratic tools[44]. These tools are used relatively often, and the communities are used to be consulted to choose between different priorities, they will fix different sets of preferences in the way public policy should be conducted[45], and which technological solution should be implemented.

The projects attached to Smart cities in Switzerland today are mainly a product of the local autonomy, granted to the municipalities to regulate their own projects and priorities[46]. The federal and cantonal programmes supporting smart cities are mainly active to support and to fund local initiatives[47]. In order to have as many projects falling under the scope of smart cities, the organisations

promoting smart cities programme present these as an “holistic approach” with a very broad list of aspects that can be included in these projects[48].
Although more research is needed on the impact of the federal and cantonal state’s strategies on the municipality’s actions[49], Smart cities programmes don’t operate in a vacuum. The municipalities are tasked with executing cantonal and federal laws and see their autonomy limited in multiple domains[50].

3. The pursuit of technology is a vector for centralisation

3.1 The expectations from the authorities towards technology

If we consider the reasons that justify the implementation of smart cities strategies, we see that most programmes are in search of effectiveness and efficiency of public policy through the collection of data and the delivery of public services[51].
To increase the effectiveness[52] of public policy it is necessary to increase data collected in the communities, to adopt a “data based” policy making[53]. This is made possible with the augmentation of the number of captors and indicators on physical infrastructure as well as the increase in the amount of data processed electronically by eGovernment forms and platforms[54]. It is also necessary to improve the public services provided, which these technologies are providing through an easier and quicker bureaucratic experience electronically, but also by automating certain tasks in the physical as well as the digital sphere[55]. The rapid development of AI in the public sector[56] seems to promise an increase in the automation of administrative tasks as a mean to provide even quicker and “better” service. In addition, these technologies allow for a better communication with the citizens and should provide more transparency into the administration’s inner functions[57].
If efficiency, as a search for the best cost-benefit solution[58], is central, then cost reduction and saving might be a key factor in the choice of a technology[59]. The development of platforms and software being very expensive, the authorities might be encouraged to reuse existing software, they might even prefer to adapt their processes rather than to develop or adapt existing software to their need[60].

On a larger scale, there might be a push for the adoption of unified solutions rather than decentralised ones. See for example this call for «*the introduction of a standardised legal form for binding cooperative between municipalities and cantons simplify collaboration and speed up the implementation of joint digital projects*»[61].

3.2 The consequences these expectations might have on local autonomy

We argue that the implementation of informatics and of technologies as a mean to gather information and data and to provide for public service is a vector of centralisation. Both a philosophical point of view and a practical necessity will lead to a shift in power over the technology that could result in a loss of autonomy for the municipalities and cities. In this sense, these pursuits, of effectiveness and efficiency of public services, present some risks for the local autonomy. Indeed, some municipality "fear for their autonomy and are reluctant to participate in common projects"[62].

The quest for more and better data, as a mean for decision making at all levels of government[63], means that the cantonal and federal authorities might in the future need the data created by the smart cities[64]. To be used at a higher level of government, this data will likely need to be centralised. In general, for the data to be useful, to be able to interpret the data and to use it, it needs to be structured and presented in an organised way, it needs to be connected to the systems of the supervising entity[65]. The national data management programme (NaDB)[66] will most probably bring the most changes in the matter in the future as it envisions to «*ensure simpler and more efficient management of government data through the multiple use of data. To this end, the public authorities concerned must make uniform use of data catalogues and metadata*»[67].

This has for consequence that standards, in the structure of data as well as for the different steps in their internal processes and the technical conception of the software and platforms might need to be followed by the municipalities when they decide to informative a public policy. The Federal government and the representatives of the cantonal administrations decided to consider that norms developed by eCH, the Swiss eGovernment standardisation association[68], as

«*generally declared to be binding*» in the conception of eGovernment systems[69]. These standards are generally considered necessary to attain the goals of digitisation as an overreaching process[70], but they might also limit the autonomy of each municipality taken individually to organise and to create their own digital platforms and services.

The search for effectiveness and efficiency also means that the cantonal or federal authorities might be tempted to force the municipalities to adapt their processes to collect the data they need[71]. This push for the adoption of common software might then be explained by the need to limit the public spending needed for such developments[72].

The digitisation of some processes, which can now be considered part of what makes smart cities, follow such a path. In 1999, most municipalities had local inhabitants' registers[73], which justified the federal government to adopt a law to uniformise the data collection toward the federal statistical agency[74], thus limiting their autonomy. The Federal government has begun work discussing a project to centralise and uniformise the registry for underground pipes partly based on data collected and managed by the municipalities[75], although debates about the need for centralisation might hinder the development of this project[76]. The risk also exists that, once a solution is developed and tested, the higher levels of government would want to have influence on this new piece of technology, to be able to use it at their level, in their environment, to serve their goals. The example of traffic lights is in this sense very exemplative, traffic lights have the capacity to be put on a network to react intelligently with one another or even to be controlled remotely[77]. Some municipalities have seen mandates from a regional authority to give away their regulatory power to serve broader interests[78].

4. The tension between Technology and local autonomy is also present in the constitution

The search for an efficient and effective government and public policy action is present in the federal constitution (art. 43a al. 5 Cst.[79]) that «*[s]tate tasks must be fulfilled economically and in accordance with demand*»[80]. The Constitution also provides for an evaluation of the effectiveness and effectivity of the federal

legislation (art. 170 Cst.)[81].

On the other hand, you have notably[82] the need of communal autonomy as part of a democratic system, which is also enshrined in the Federal Constitution at the article 50 al. 1 Cst.[83]. This article states that the autonomy of municipalities and cities protected «*in accordance with cantonal law*». The tribunals and the doctrines consider this protection not to be absolute, the doctrinal opinions are divided on the possibility for the cantons to totally suppress municipalities or to transform them into mere decentralised administrative entities[84]. To know if a municipality is autonomous, it is «*sufficient to determine whether it is free to make choices under its own responsibility, and according to options that it defines itself*»[85].

For the implementation of its legislation, the Federal state should, as much as possible, rely on the cantons and delegate them the implementation of said policies (art. 46 al. 1 Cst.)[86]. The cantons are, in turn, free to delegate certain tasks to the municipalities in their cantonal laws[87]. The communal autonomy protected by the federal constitution is in this sense mainly used to forbid the cantons to exceed their own powers or to misuse their statutory powers as defined by cantonal laws[88].

The Confederation is merely supposed to «*take account in its activities of the possible consequences for the municipalities*» (art. 50 al. 2 Cst.) as well as the «*special position of the cities and urban areas*» (art. 50 al. 3 Cst.). These provisions have been interpreted in several ways by the authorities. First, the organisation representing the municipalities are systematically consulted before a law is presented to the federal assembly[89]. Secondly, special organisations uniting municipalities, cantons and the Confederation were created to spark dialog between these instances, in particular in order to support the implementation of "urban areas"[90]. Thirdly, the Confederation adopted internal guidelines concerning the contact between the Confederation and the municipalities[91] in which the Confederation decided that «*[d]irect contacts between the Confederation and the municipalities are of an exceptional nature. Exceptions are justified where federal legislation directly entrusts the municipalities with implementation tasks, or when measures taken by the Confederation affect certain municipalities in particular. The cantons must be informed of such direct contacts*»[92].

The municipalities have the right to defend their autonomy in front of courts[93], but only the cantonal norms are open to a full review[94]. The same isn't true in for federal laws that are "protected" by the Constitution (art. 190 Cst.) that forces the federal court to apply federal and international laws[95]. On a federal level, the arbitration between constitutional norms, between effectiveness, efficiency and local autonomy, is in the hands of Parliament. The judicial review is limited and when cases arise where a choice is left to the court, they favour a consistent interpretation of the constitution[96].
Since many centralisation processes are led by the federal government, we argue that the risk posed by the digital transformation to local autonomy might not be sufficiently protected.

5. Outlook and possible solutions

If the risk exist that the implementation of Smart cities programmes will participate in a broader tendency towards centralisation, we are of the opinion that this situation is not a necessity. The implementation of said technologies and the normative apparatus allowing these implementations will have the most impact on the future of local autonomy, and thus on the future of semi-direct democracy at a local level. We hope to see further research in this field to evaluate and promote effective provisions in a highly interconnected world. Here are a few positive outlooks on the possible ways to solve this tension between technology-based centralisation and local autonomy.
First, in accordance with the Constitutional responsibility to respect the municipality's autonomy, there is a need for a stronger political will, at all levels of Government, to defend the local autonomy. Since the discourse surrounding smart cities and the entire digitisation from the state also contain a push for more local participation and democracy[97], we consider that both the cantons and the Confederation should be proactive to guarantee for such participation to exist. It means that certain decisions need to stay "open" for public debate. Future regulations on a cantonal or federal level should contain provisions to such processes, a certain degree of "liberty". When deciding at a higher level of government to "force" the interconnection of systems or processes, we argue that it is also necessary to determine explicitly the level of freedom guaranteed for the

lower levels. It is in this sense necessary to voluntarily decide not to regulate the entirety of the process and of the technological solutions to leave a margin of choice to the "lower" political bodies for them to exercise their democratic rights. Moreover, the specialised organisations accompanying public authority's digitalisation effort should support these efforts from the political authorities and should restrain the advocacy for centralising solutions.

As discussed in the first part of this paper, there is to date, no unified definition of what a Smart city is, nor real limits to what it can encompass. We fear that defining Smart cities in a legal text on the federal or on the cantonal level could have adverse effects on the autonomy of municipalities. Such a definition would necessarily limit the autonomy and creativity of the municipalities in their implementation of technologies. Allowing Municipalities to decide which project is or isn't part of their Smart city programmes and how they want to prioritise their projects is in our view a competency that should stay at a Municipal level. More than a definition of Smart cities, regulations should focus on directing principles for the digital transformation as a phenomenon that includes Smart cities. These principles should in our opinion be oriented towards "digital sovereignty"[98] and resilience of all levels of government in the sense that they should participate in safeguarding the local autonomy and define interdependencies, collaboration and coordination between the different state's actors to maintain their innovation and adaptability capacities.

In this sense, changes on a constitutional and legal level are in our opinion warranted to define specific provisions for local autonomy in the digital transformation processes. Innovations in terms of judicial review powers granted to the federal courts could help arbitrate the conflict between the different constitutional principles. The question of democratic and participation rights granted to citizens should also be examined more closely. Indeed, Smart cities would profit to have official legitimate democratic support early in the process. Moreover, when intergovernmental authorities are created to lead specific projects, democratic rights and provisions for democratic procedures should in our opinion be implemented for the system to stay "customer oriented".

1. Notably, Termdat, the terminology database of the Federal Administration has no entry for "smart city" and it's declinations.

2. The Swiss official terminology is “commune” or “Gemeinde” in German. In order to simplify the wording, we chose to use “municipality” to describe local authorities; *Stratégie «Suisse numérique»*, of the 5 September 2018, FF 2018 6007, p. 6024 (free translation from the author).
3. *Idem*.
4. See for example the *Stratégie Suisse numérique 2025*, of the 13 December 2024, FF 2025 31.
5. *Idem*., art. 1, p. 2.
6. *Ibidem*.
7. *Stratégie Administration numérique suisse 2024–2027*, of the 8 Décember 2023, FF 2024 45, p. 21.
8. In particular through the implementation of the “digital first principle”, see art. 3 FF 2025 31, p. 4 and art. 3 FF 2024 45, p. 7.
9. https://www.digital-public-services-switzerland.ch/en/implementation/projects.
10. https://www.digital-public-services-switzerland.ch/en/implementation/agenda-dvs/digital-channel-between-the-public-and-the-administration.
11. https://www.local-energy.swiss/fr/programme/smart-city#/
12. Free translation from their website: https://www.local-energy.swiss/fr/programme/smart-city/was-ist-eine-smart-city.html#/.
13. They publish a database of projects on their website, see https://www.local-energy.swiss/fr/arbeitsbereich/projektdatenbank.html#/q/tPr=63ce32ac-e51e-4538-b100-3383bec20beb.
14. https://www.local-energy.swiss/fr/beispiele/projekt/Projekte/2024/ParticipoNs.html#/.
15. https://www.local-energy.swiss/fr/beispiele/projekt/Projekte/2024/solarize-schaffhausen.html#/
16. J. Musiolik et. al., *Smart City - Guide de mise en œuvre des initiatives Smart City en Suisse*, SuisseEnergie pour les communes, 2019, p. 9.
17. https://www.smartcityhub.ch.
18. https://www.smartcityhub.ch/members.159en.html.
19. https://www.smartcityhub.ch/goals.14en.html.
20. https://www.suissedigital.ch.
21. P. Stennhauser, *Smart city – une introduction*, SuisseDigital et HWZ, 2018 , see *Que signifie vraimaiment le terme «Smart»?*, p. 6 (16), free translation from the author.
22. *Idem*, p. 8 (18).
23. For example in canton Aarau, *SmartAargau: Strategie Digitale Transformation*, 2019; the canton of Geneva also has a “smart Geneva” programme in parallel to their “digital transformation” program, see https://www.ge.ch/dossier/smart-city.
24. For an overview and the links to each canton’s strategies, see https://www.administration-numerique-suisse.ch/fr/publications/sondages/012023-strategies-de-numerisation-des-cantons.

25. Canton Basel-city decided to use the definition smart cities to define the expectations from their digital transformation strategy, see https://digital-basel.ch/grundsaetze/.
26. Rapport, *une politique numérique pour Genève*, Conseil d'état, Genève, 20.06.2018, p. 84 ss. - free translation from the author.
27. In 2022, only 87 municipalities accepted to answer a survey on the matter on the 2121 municipalities of Switzerland as of jan. 2025, see B. Sütterlin et al., *Swiss Smart City Survey 2022 - Final Report*, Winterthur, ZHAW, 2023, p. 2.
28. See for example the very different meanings of what a smart city can be in J.C. Augusto (ed.), *Handbook of Smart Cities,* Springer, Cham, 2021, https://doi.org/10.1007/978-3-030-69698-6.
29. P. James et al., *Smart cities: Fundamental Concepts* in *Handbook of Smart Cities,* Springer, Cham, 2021, p. 30.
30. Some author prefer to describe local projects as part of a more global digitalisation movement, see T. Mettler, *The Road to Digital and Smart Government in Switzerland* in A. Ladner et al. éd., *Swiss Public Administration: Making the State Work Successfully*, Palgrave Macmillan Cham, 2019, p. 183 ss., https://doi.org/10.1007/978-3-319-92381-9_10.
31. We couldn't find statistics about the availability of municipal services online, but we are yet to find a municipality without a website. In 2022, about 70% of the user interrogated communicated via e-mails with their municipal authorities while ~60% used electronic platforms, see M. Buess, *Nationale E-Government-Studie 2022*, Bern, p. 20.
32. S. Wiederkehr et al., *Stakeholderanalyse Smart City Switzerland*, AWK, Bern, 2019, p. 4.
33. See for example the repository proposed by the smart cities compass: https://www.swiss-smart-city-compass.com/en/cities-regions.html or the list proposed by the smart city hub: https://www.smartcityhub.ch/fact_sheets.506en.html.
34. For cities that are pushing smart city programs without really being referenced on a broader level, see for example https://smart.pully.ch/en/home/.
35. https://www.smartcityhub.ch/smart_city_wheel.120en.html.
36. A large variety of projects are digitized some more "trivial" than others, for example some municipalities decided to implement process to allow the mobile buying of pool access https://smart.pully.ch/en/projects/id-1428-e-ticket/.
37. For a study of Swiss municipalities goals see S. Wiederkehr et al., cit., p. 4.
38. For an analytic study see F. Wäspi, et al., *On the Way to Smarter Cities: What Goals and Values Swiss Municipalities Prioritize*, in M. Janssen et al., *Electronic Government*, EGOV 2022, Lecture Notes in Computer Science, vol. 13391, Springer, Cham, https://doi.org/10.1007/978-3-031-15086-9_29.
39. In order to allow for more dialog between the citizens and the authorities, the cities of Lenzburg, St-Gallen, Luzern have decided to implement different systems of participation: see the search for participation (in German) on the smart-city compass, https://www.swiss-smart-city-compass.com/de/use-cases.html?tx_solr%5Bq%5D=partizipation.

40. For example, the installation of sensor to regulate public lights might be interesting for factors ranging from ecology to safety concern.
41. In a Swiss context, see S. Haller, *Monitoring-Konzept für Gemeinden*, v. 2.0, Innoville, Bern 2021, in particular p. 4 ss.
42. eGovernment projects follow in this sense the principles developed by New Public Management principles, see J. Chappelet, *The New Model of Swiss Public Management* in A. Ladner et al. (ed.), *Swiss Public Administration*, 2019*,* p. 169 ss.
43. In a Swiss context, see for example J. Musiolik et al., *Smart City - Guide de mise en œuvre des initiatives Smart City en Suisse*, cit., p. 33.
44. For an in depth study of the different democratic tools implemented by the municipalities see for example S. Micotti, M. Bützer, *La démocratie communale en Suisse : vue générale, institutions et expériences dans les villes 1990-2000*, Genève, 2003*,* in particular p. 31 ss.
45. For a global overview of the influence of local autonomy for Swiss municipalities, see K.W. Debela, *Local governance in Switzerland: Adequate municipal autonomy cum intergovernmental cooperation?,* in *Cogent Social Sciences, 6:1,1763889, DOI: 10.1080/23311886.2020.1763889.*
46. Protected by art. 50 Cst., see *infra*.
47. The swiss energy smart city programme is funding different type of projects, for example the "innovative city project" grants up to 40% of the price of a project led by certain municipalities, see https://www.local-energy.swiss/fr/programme/projektfoerderung/fortschrittliche.html#.
48. The smart cities wheel and their very large scope of action are in this sense exemplative, see for example https://www.smartcityhub.ch/smart_city_wheel.120en.html.
49. Among the few exceptions, see A. Marmier, *The Impact of Data Governance on OGD Publication – An Ethnographic Odyssey*, in Loni Hagen et al. (ed), *dg.o 2022: The 23st Annual International Conference on Digital Government Research,* 2022, https://doi.org/10.1145/3543434.3543438.
50. For a rapid overview of the repartition of tasks between the tree level of government, see A. Ladner, *The Organization and Provision of Public Services,* in A. Ladner et al. (ed.), 2019, p. 26.
51. The same reasoning apply in every digital transformation programme *Res Publica Digitalis*, Digital Switzerland, Berne, 2024, p. 6.
52. A. Flückiger, *(Re)faire la loi: traité de légistique à l'ère du droit souple*, Berne, Stämpfli, 2019, p. 462.
53. V.B. Clarissa, *Public Sector Data Openness in the Crafting of the data-driven Society: The Co-constitutive role of regulation and innovation*, Thesis Université de Lausanne, 2024, p. 113.
54. *Idem* p. 22 ss.
55. *Stratégie Administration numérique suisse 2024–2027*, FF 2024 24, p. 18.
56. On the federal level see *Conseil federal, «Intelligence artificielle» – lignes directrices pour la Confédération,* 2020, and the specialised website : https://cnai.swiss/fr/.

57. On the federal level, see *Stratégie en matière de libre accès aux données publiques en Suisse pour les années 2019 à 2023 (Stratégie Open government data, OGD)* du 30 novembre 2018, FF 2019 855, p. 856.
58. A. Flückiger, *(Re)faire la loi: traité de légistique à l'ère du droit souple*, cit., p. 465.
59. J. Musiolik et al., *Smart City - Guide de mise en œuvre des initiatives Smart City en Suiss Smart City - Guide de mise en œuvre des initiatives Smart City en Suisse*, cit., p. 36.
60. The specialised organisations recommend such practices, J. Musiolik et al., *Smart City - Guide de mise en œuvre des initiatives Smart City en Suisse*, cit., p. 17 which explain the repositories of experience provided online, see for example https://www.zhaw.ch/index.php?id=11283.
61. Res Publica Digitalis, cit., p. 7, free translation from the author. The study references a cantonal position advocating for mandatory standards and infrastructure : Kantonsrat St.Gallen, *Digitale Transformation schweizweit mit gebündelten Kräften angehen,* vom 2 april 2024 KSG 41.21.01.
62. Res Publica Digitalis, cit., p. 49.
63. V.B. Clarissa, *Public Sector Data Openness in the Crafting of the data-driven Society: The Co-constitutive role of regulation and innovation*, cit., p. 22 ss.
64. It is in particular true for geo-data and sensors data, see for example the project MODI about mobility data: https://www.bav.admin.ch/bav/fr/home/themes-generaux/modi.html. The law proposal submitted to public consultation creates a new obligation for municipalities to transfer their geo-data (art. 8 al. 3) see *Procédure de consultation du 2 février 2022 - Loi fédérale concernant l'infrastructure de données sur la mobilité* (AP-LIDMo)*,* FF 2022 294.
65. On a theoretical level, see for example R. Sandoval Almazán et al. *Building Digital Government: Strategies Principles and Practices*, Springer, Cham, 2017, DOI 10.1007/978-3-319-60348-3, p. 60.
66. Programme of the federal statistical office: https://www.bfs.admin.ch/bfs/fr/home/nadb/nadb.html.
67. *Programme national de gestion des données: En route pour l'avenir avec la gestion nationale des données*, Berne, Repport of the 23 août 2023, p. 3.
68. https://ech.ch/fr.
69. Art. 1.4 al. 2 *Convention-cadre de droit public concernant la collaboration en matière de cyberadministration en Suisse 2020*, of 20 December 2019, FF 2019 8257.
70. For example, see Res Publica Digitalis, cit., p. 63.
71. The Federal Government proposed at some point to give itself the power to «*impose the use of online administrative services*» (art. 12 AP-LMeta) and norms (art. 13 AP-LMeta) to cantons and other entities tasked to apply federal laws, *Avant-projet de Loi fédérale sur l'utilisation des moyens électroniques pour l'exécution des tâches des autorités (AP-LMETA)* abandoned before the project was submitted to Parliament; see *Message concernant la loi fédérale sur l'utilisation des moyens électroniques pour l'exécution des tâches des autorités*, of 4 march 2022, FF 2022 804, p. 44 s.

72. FF 2022 804, p. 48.
73. *Message concernant l'harmonisation de registres officiels de personnes*, of the 23 November 2005, FF 2006 439, p. 450.
74. *Federal Act on the Harmonisation of the Register of Residents and of other Official Registers of Persons (Register Harmonisation Act, RHA)*, of 23 June 2006 RS 431.02.
75. See the report referenced by the FF 2024 69 for the opening of a public consultation, *Modification de la loi sur la géoinformation - Introduction d'un cadastre des conduites Suisse (CCCH),* 12.2023, in particular p. 13 ss.
76. The Federal Assembly is currently debating a previous change to the same law about the geology of the country and the constitutionality of such a project is highly debated. See object 23.060, modification to the GeoInformation Law, in particular the intervention of M. Kolly Nicolas about the constitutionality of the change in BO 2024 N 1728.
77. C. Rhodes, S. Djahel, *TRADER: Traffic Light Phases Aware Driving for Reduced Traffic Congestion in Smart Cities, International Smart Cities Conference (ISC2)*, 2017, DOI**:** 10.1109/ISC2.2017.8090783.
78. For a local example, in the commune of Morges, canton of Vaud, see the credit proposal N° 44/11.20 of the 26.10.2020 for the implementation of captors and traffic control central that was refused by the legislative body in part for fear to loose it's autonomy, see the point of M. Thuler in procès-verbal du 31.03.2021, N° 44/ 2016-2021, p. 1179.
79. Constitution of the Swiss confederation of the 18 April 1999 (Cst.), RS 101.
80. For a commentary see F. Bellanger art. 43a Cst., n. 34 ss., in V. Martenet, J. Dubey (ed.), *Commentaire Romand – Constution fédérale*, Helbing Lichtenhahn, Bâle, 2021.
81. For a commentary see A. Lienhard, F.M. Locher, art. 170 BV, in B. Waldmann et al., *BSK Bundesverfassung*, St-Gallen, 2015, in particular n. 18 ss., for the evaluation of public policies.
82. Other problems can also be caused by a strong orientation towards efficiency and effectiveness see T. Mettler, *Transformation digitale,* in N. Soguel et al. (ed.), *Comprendre et concevoir l'administration publique – Le modèle IDHEAP*, EPFL Press, Lausanne, pp. 210 s.
83. For a commentary see: A. Thévenaz, art. 50 Cst., n. 20, in V. Martenet, J. Dubey (ed.), *Commentaire Romand – Constution fédérale*, cit.
84. A. Thévenaz, art. 50 Cst, n. 13, and references in note 48, in V. Martenet, J. Dubey (ed.), *Commentaire Romand – Constution fédérale*, cit.
85. G. Malinverni et al., *Droit constitutionnel Suisse - volume 1 L'État*, 4e ed., Stämpfli, Berne, 2021, pp. 279, free translation from the author.
86. See O. Bigler-de Mooij, art. 46 Cst. n. 31 ss in particular, in V. Martenet, J. Dubey (ed.), *Commentaire Romand – Constution fédérale*, cit.
87. Malinverni et al., *Droit constitutionnel Suisse - volume 1 L'État*, cit., pp. 293 ss.
88. A. Thévenaz, art. 50 Cst., n. 15 ss., in V. Martenet, J. Dubey (ed.), *Commentaire Romand – Constution fédérale*, cit.
89. Art. 7 al. 1 *Lignes directrices à l'attention de l'administration fédérale concernant la*

collaboration entre la Confédération, les cantons et les communes, 16 octobre 2002, FF 2002 7795.

90. The tripartite conference was instituted to encourage the collaboration between these three instances (art. 1 let. a CT) and "participates in the development of a common policy for agglomerations" (art. 1 let. c CT). *Convention entre la Confédération, les cantons, les villes et les communes sur la Conférence tripartite (CT)* du 28 octobre 2020, RS 701.
91. FF 2002 7795.
92. *Idem*, art. 8 al. 3, FF 2002 7795 p. 7797, free translation.
93. G. Malinverni et al., *Droit constitutionnel Suisse - volume 1 L'État*, cit., p. 2213 ss.
94. G. Malinverni et al., *Droit constitutionnel Suisse - volume 1 L'État*, cit., p. 299 ss.
95. For a commentary see for example V. Martenet, art. 190 Cst, in V. Martenet, J. Dubey (ed.), *Commentaire Romand – Constution fédérale*, cit.
96. For a commentary on constitutional jurisdiction in Switzerland, see for example M. Hottelier, *La justice constitutionnelle en Suisse*, in *Fédéralisme Régionalisme,* Volume 17, 2017, *Les juridictions constitutionnelles suprêmes dans les États fédéraux : créatures et créateurs de fédéralisme*, DOI: 10.25518/1374-3864.1718, chapter 4.3.
97. See for a "global orientation" the study *Res Publica Digitalis*, cit., p. 56. For a more specific study of the phenomenon, see for example Timon Sengewald et al., *Influence of Digital Open Innovation Platforms on Power Differentials within Municipalities* in SIGMIS-CPR '24: 2024 *Computers and People Research Conference,* Murfreesboro TN USA, 2024, https://doi.org/10.1145/3632634.3655877.
98. For an analysis on all level of government, see for example Y. Benhamou et al., *Souveraineté numérique: étude pluridisciplinaire pour la Suisse,* Geneva, 2023, https://archive-ouverte.unige.ch//unige:168718.