

Insights from the Swiss Smart City Survey on cities' priorities and needs

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Abstract

Smart cities have been gaining increasing importance in local administrations and cities in Switzerland over the past years. Across Switzerland, cities have taken various steps towards becoming smart cities by developing strategies, testing different technologies and project designs, and rolling out new services that aim to make cities and municipalities more sustainable and livable spaces. In the current state, however, the development status of (smart) cities has not been systematically assessed and joint approaches to cities' needs and priorities have not been identified. The Swiss Smart City Survey was developed to measure progress of cities over time and provide information on the state of the smart city landscape in Switzerland as a whole. This paper will first introduce the survey's design and the intentions behind it. Then, the main results of the survey will be presented, highlighting where cities priorities and needs lie. Lastly, the paper will draw lessons learned and discuss how these results can best be put to practice.

Keywords

smart city strategy; smart city development; smart city index; smart city capacity building

1. Introduction

The Swiss Smart City Survey was designed to follow and assess smart city status and developments across Switzerland over time. The survey was first carried out in 2020 and is planned to take place on a biennial basis. The periodic repetition of the survey is intended to track needs and trends in the smart city field over a longer period and to record changes over time.

The survey results are particularly useful for diverse groups: cities and municipalities, innovators working on urban sustainability solutions, and independent organizations, political parties, and foundations. Cities and municipalities who participate in the survey may find it a useful instrument for assessing and visualizing their own development over time, which through the survey can be benchmarked to municipalities of the same reference group. Beyond their own development, the results also offer cities an understanding of how other places have set goals and pursued smart city strategies. The qualitative results show an array of associations to the smart city concept and give cities an insight into the sort of projects that have been pursued in other cities. For public research & innovation institutions, private innovators, independent organizations and different levels of government, the survey provides insights into how cities and municipalities can best be supported by identifying their priorities in terms of focus areas as well as the kind of support they wish for, from different players in the field.

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2. Methodology

The survey was standardized to allow for the highest possible intertemporal comparability. The survey consisted of 24 blocks of questions which included closed questions with (yes/no questions, point-scale questions, and multiple choice), as well as open questions (e.g. “Please list the ten most important smart city projects in your city”). This survey design allowed for both a quantitative analysis as well as a qualitative analysis through the open questions. The questions asked cities about their organizational structures and the existing capacities for smart city development within these (i.e. whether cities have a smart city strategy, a specific budget, etc.), topics and project types that cities found most important, what their greatest challenges were, and the type of support and cooperation cities wished for. Of the 171 invited Swiss cities and municipalities, 84 participated. Beyond descriptive statistics, the analysis consisted of assigning cities to different maturity phases. In a second step, a smart city index was calculated, in order to gain an overview of where cities currently stand in their smart city development and to measure how cities will grow their activities and capacities over time. The maturity phases and the smart city index are explained below.

2.1. The maturity phases

To show where cities are at in their journey to becoming a smart city regarding their organizational development, we rely on the maturity phases developed in the ZHAW Smart City Guide [1]. The guide divides the transformation process into three phases: 1) the pilot project phase, 2) the institutionalization phase, 3) the establishment phase. Cities typically pass through the pilot projects phase, the institutionalization phase and the establishment phase consecutively. The cities were assigned to the respective phases based on the key activities presented in the guide. The criteria for assignment to the establishment phase are very strict and must all be met; for the institutionalization phase the criteria must be partially met, and for the pilot project phase active engagement with the topic of smart city is enough. Thus, the transition in the first phases tends to be softer and more permeable, while the requirements for advanced smart cities are higher.

2.2. The Smart City Index

To explore the smart city development status in general as well as in different thematic areas, a smart city index was specifically developed for Switzerland. The dimensions were identified relying on the Smart City Wheel and the Smart City Architecture from the Smart City Hub Switzerland. The index consisted of nine dimensions, each composed of four to nine individual indicators. The following dimensions were used:

- Smart mobility
- Smart environment
- Smart economy
- Smart people
- Smart governance
- Smart living
- Smart data
- Smart infrastructure
- Enabler

The indicators for these were set and weighted according to their importance through a Delphi procedure with independent experts who work on smart city topics extensively but do not have vested interests in a specific city or company offering smart city solutions. A maximum of 100 points can be

achieved per dimension. Following the same procedure, the dimensions were weighted to compute the total smart city index.

3. Results

From our analysis, we see that the organizational development of formal smart cities, that is, the capacities built within the city administration, is still rather low. Currently, 34% of the cities are actively working on the topic. At the time of the survey, only 17% of the cities reported having a smart city strategy. It is however expected that this number will increase over the coming years, as 20% of the cities reported having a strategy under development. In addition, the number of cities and municipalities that have a responsible office dedicated to smart city issues is expected to increase over the years (Figure 1)

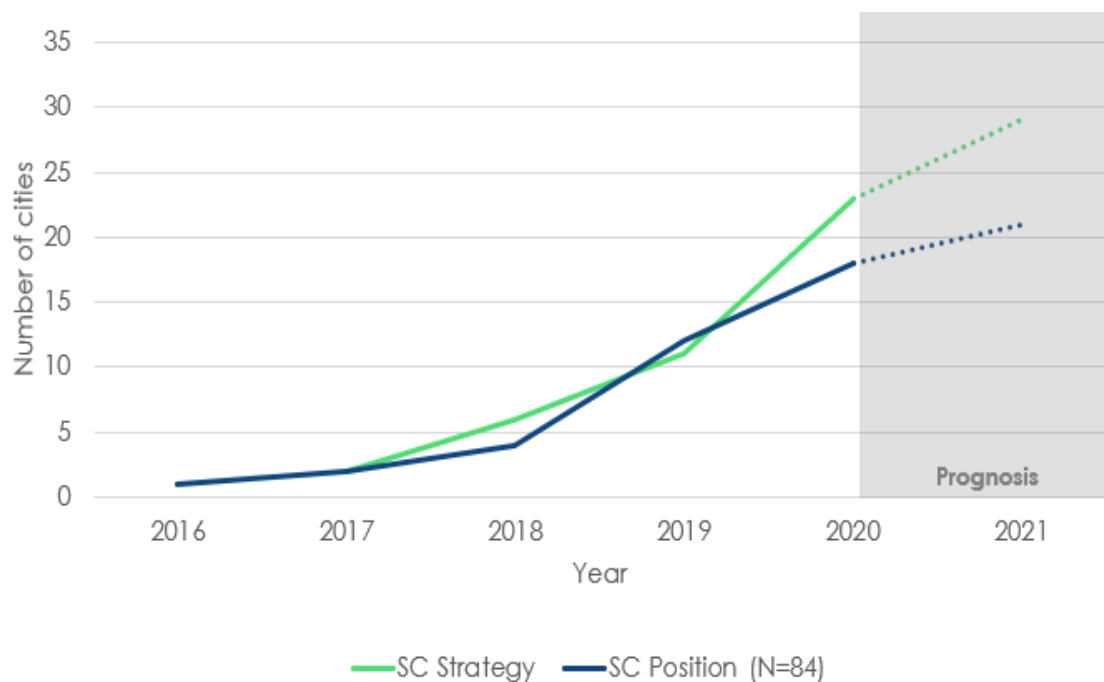


Figure 1: Number of SC strategies and SC bodies

3.1. Allocation to maturity phases

In the allocation of cities to phases, 36 cities could not yet be assigned to any phase, i.e. they have not yet actively initiated the process of becoming a smart city. 34 cities are in the pilot project phase, 11 in the institutionalization phase and only 3 in the establishment phase (Figure 2). These results are in line with our expectations and correspond to the understanding of how smart cities develop in Switzerland, based on the Smart City Guide [1].

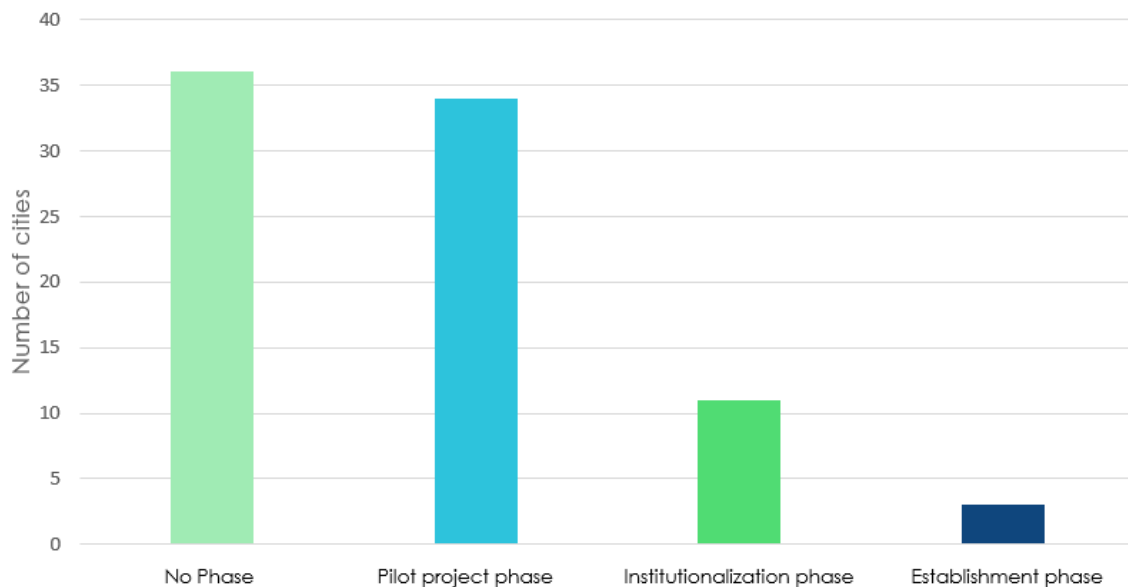


Figure 2: Distribution of cities by maturity phase

However, as “smart city” was rated as a very important topic and an upward trend can be expected in the publishing of smart city strategies in the coming years, it is expected that the number of cities in the institutionalization phase in particular will be increasing steadily over the coming years.

3.2. The Smart City Index

As mentioned, the smart city index considered nine dimensions with weighted indicators, with an overall maximum 100 achievable points. The (overall) smart city index is 30.7. The green line in Figure 3 represents the actual average achieved by all participating cities. The results show that the main focus in smart city development lies in the dimensions “environment” (46.4),”living” (43.7) and “people” (42.9).

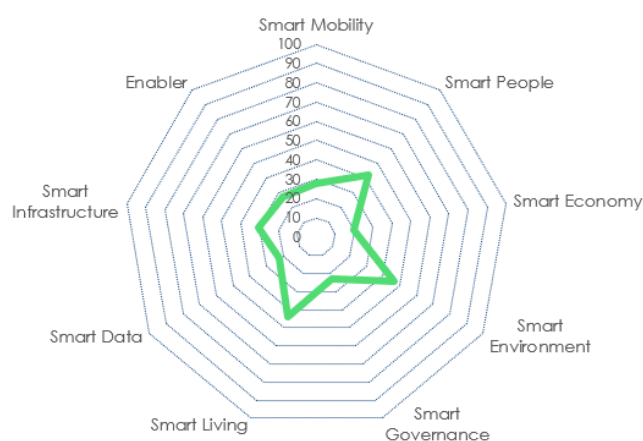


Figure 3: Swiss Smart City Index

3.3. Breakdown of SC projects based on SC Wheel

Participants were asked how important they perceive the six dimensions of the Smart City Wheel to be in their own smart city development. The figure below (Figure 4) shows that all dimensions were perceived as important, with “smart environment” and “smart governance” being rated as particularly important.

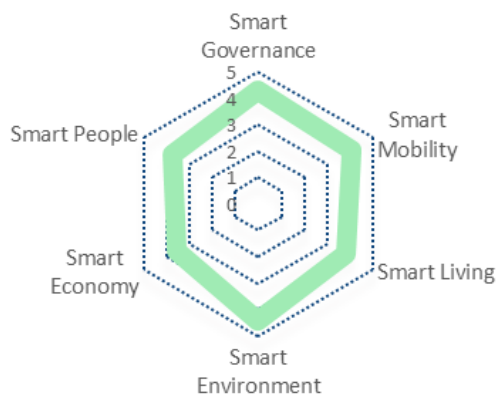


Figure 4: Importance of the SC Wheel dimensions

An open-ended question gave cities the opportunity to list ten projects that highlight their specific smart city efforts and assign them to one of the six dimensions. Overall, a total of 329 projects were listed and classified according to sub-area. Although the dimensions were rated similarly in importance (Figure 4), there are significant differences in the breakdown of the number of projects that were in fact implemented per dimension (Figure 5).

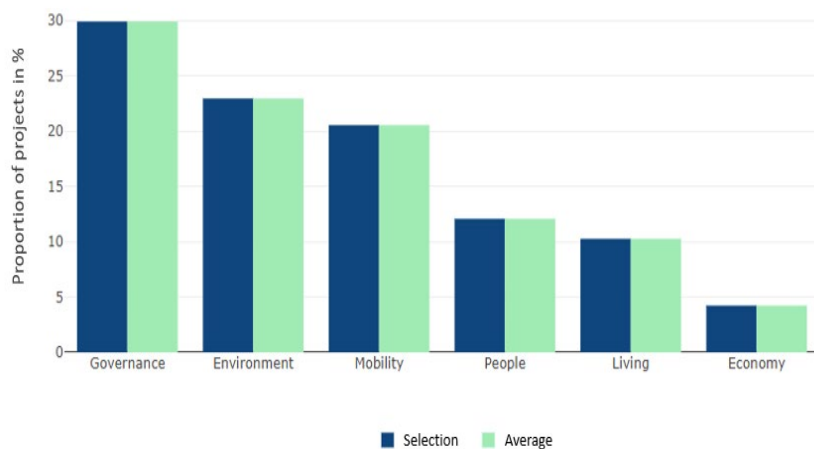


Figure 5: Number of projects by dimension

3.4. City priorities in smart city development

Smart City projects are predominantly initiated within the city administration/energy utilities or by politics and are oriented primarily to other municipalities and cities as well as to certifications/labels, such as the EnergieStadt label. 66% of the cities are guided by other municipalities and cities in the definition of development or strategy goals. As Fig. 5 shows, cities have expressed that they particularly wish for more financial support as well as a regulatory framework from cantons (82%) and the federal government (79%). For technical solutions, they wish to receive more assistance from private actors like companies and startups (43%). Lastly, the data shows that cities and municipalities wish for more

exchange of ideas and know-how with a wide variety of actors, expressing the desire and potential necessity for an inclusive platform that fosters knowledge exchange.

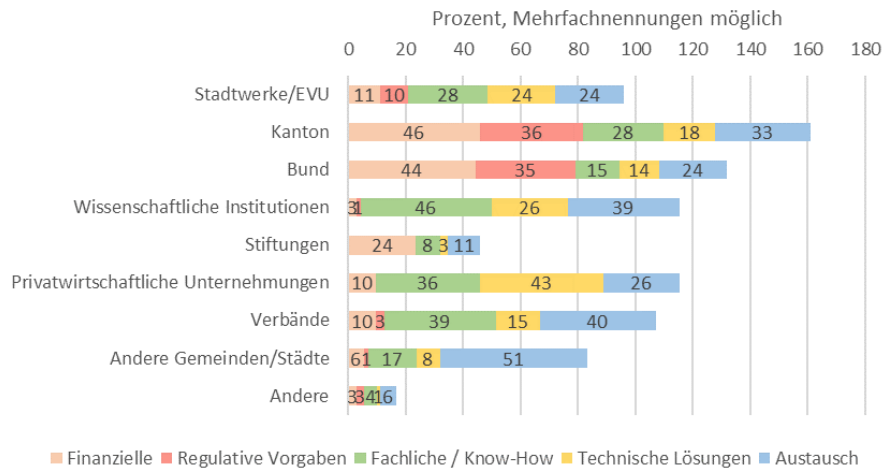


Figure 6: Desired assistance by type of assistance and actor group

4. Discussions & Recommendations

With this, this paper explores the different trends in smart city development across municipalities in Switzerland. It provides in depth insight into what the existing capacities in local administrations are and will provide concise recommendations for municipalities and interested private and public organizations. More results, as well as an interactive Dashboard have been developed as a result of this survey, where different actor groups can gain tailored insight into smart city development and how best to support cities and municipalities.

Recommendations:

- **Cantons and Federal Government:** Cantonal and Federal Governments are advised to create the necessary structures to enable and facilitate the development of smart city structures through a regulatory framework
- **Private companies:** Private companies are encouraged to use the published data on sc-survey.ch to gain a better understanding of the needs of particular municipalities. This can be useful in identifying specific needs and create tailored solutions for local administrations.
- **Cities and Municipalities:** Local administrations are advised to use the insights published on the SSCS website to learn from experiences from other cities and position themselves accordingly. Additionally, cities are encouraged to participate in the next round of the survey, in order to obtain a tailored Factsheet that summarizes the analyses based on their individual data.

5. References

- [1] Musiolik, J., Kohler, A., Vögeli, P., Lobsiger-Kägi, E., & Carabias-Hütter, V. (2019). Smart City: Leitfaden zur Umsetzung von Smart-City-Initiativen in der Schweiz.