SMART CITIES

Further praise for *Smart Cities*:

Smart cities require suitable technologies, sustainable business models, and proper administration processes. This book conveys concrete ways of how cities can become smart cities.

– Oliver Deuschle, SMIGHT at EnBW, Germany

This book succinctly expresses why only one smart city can persist in face of location competition.

– Yvonne Beutler, Vice President of City Council, Switzerland

Digitalization opens up myriad development possibilities in cities. This book expertly delineates various "best practices" as well as core elements of a systematic and strategic approach.

– Prof. Thomas Schildhauer, Humboldt Institute for Internet and Society, Germany

Municipal utilities not only construct and operate essential digital infrastructure, but also new services for a smart city – from waste disposal "on demand" to electromobility. This book can especially assist small public utility companies in their efforts to develop and realize a strategy for their smart city.

– Katherina Reiche, Verband kommunaler Unternehmen e.V., Germany

The realization of smart city projects presupposes a uniform understanding of their relevant dimensions. This book and its smart city management model offer the ideal foundation for this crucial unification.

– Orlando Gehrig, Swisspower Innovation, Switzerland

SMART CITIES

Introducing Digital Innovation to Cities

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PREFACE

The concept of the "smart city" promises to solve many of the urgent issues that accompany progressive urbanization – overwhelming traffic congestion, strains on energy and water systems, delinquency, inadequate housing, and the lack of social inclusion – through digitalization. Smart cities are therefore highly relevant for political decision makers in municipalities, administrative agencies, and nonprofit and civic organizations. Moreover, smart or "ecosystem" cities offer great potential for countless corporations in the fields of information technology, real estate, telecommunications, energy supply, auto-mobility, sensor systems, and data analytics. Accordingly, it is not surprising that numerous highly innovative companies, including IBM, Cisco, Telekom, Siemens, Toshiba, and Google, along with public utilities around the world, are actively investing in smart city development. Additionally, many startups are concurrently entering the Internet of Things (IoT) and energy fields, placing competitive pressure on established firms.

The social and political demands of the energy revolution, combined with the auspicious possibilities of an interconnected yet decentralized world within the framework of IoT, are accelerating the transformation of urban centers toward becoming smart cities. Despite the exploitation of existing potentials by "lighthouse" (i.e., pilot) cities, such as Barcelona, Munich, Lyon, and Vienna, most municipalities have pursued smart city opportunities only to a limited extent thus far. As a result, the discrepancies between leading smart cities and less ambitious cities are widening. The need for action is frequently discerned, yet the most appropriate path of action often remains unclear.

Various important questions about smart city development are still unanswered. What are the core elements of smart cities? What steps should be followed in building them? Where does the greatest potential lie? What is the ideal starting point? What procedures have other cities applied? What can be learned from pioneers in the field? Are the successes of the greenfield approaches applied by Asian smart cities transferable to other parts of the

world? What methods and tools can be usefully implemented? What business models have participating firms used? How can diverse stakeholders be effectively integrated?

This book answers these questions in the form of solution paths, accompanied by design concepts and success factors. It covers the following main topics:

- the future of cities;
- an overview of smart cities;
- smart city management model;
- smart city lighthouses;
- guidelines for smart city transformation; and
- tools for making your city a smart city.

Cities today face tremendous challenges concerning livability, mobility, energy, and communication. These challenges are forcing them to reconsider their former self-conception, their functionality, and their service offerings. However, cities that focus actively on their objectives and on the requisite digital transformation can imagine and realize entirely new living spaces. To help them achieve this goal, they should learn from the experiences of pioneers in the field, which we call lighthouse cities. Urban centers can orient their strategies around the solutions and experiences of these role model cities, so as to design and execute their own situation-specific, customized transformation. These smart city management models serve as reference frames that provide basic fundamentals, offer recommendations for action, and contribute to the synchronization of the transformation process. The models are especially valuable as orientation tools introducing all stakeholders in a city or region to the smart city concept.

This book is based on ongoing research undertaken by the Institute of Technology Management (ITEM) and the Center for Energy Innovation, Governance, and Investment at the University of St. Gallen. Worthy of particular mention are the European Union project "Smarter Together," the national energy research program comprising eight Swiss Competence Centers for Energy Research (SCCERs), and numerous projects of the ITEM with partners from the spheres of politics, administration, and the economy.

The target audience for this book includes all stakeholders involved in a smart city transformation:

- Mayors, council members, administrators, and managers who must understand the impact of a smart city transformation and wish to be informed about promising paths of action.
- Decision makers in corporate settings (e.g., executives, innovation and R&D leaders, project directors, product managers, and startup entrepreneurs) who are involved in the realization of smart cities.
- Citizens who want to have a better understanding of future conceptions of their living environment.

A book is always a collaborative learning process.[1] We thank our partners in Smarter Together, which we were able to assist in the development of business models for the lighthouse projects and that in return gave us great insights in the process of developing a smart city. The concrete implementation example in the city of St. Gallen was developed in close collaboration with the municipal utility of St. Gallen (sgsw). We are particularly grateful to Marco Huwiler and Céline Hähni as well as the mayor of St. Gallen, Thomas Scheitlin who gave great insights and wrote the case study on St. Gallen. Very special thanks further go to Karin Klöti, Adrian Joas, and Laura Caviezel for their detailed research on the case studies, Simon Kuster for the elaboration of smart city business models, and Matthias Sulzer, Andrea Perl, and Kilian Schmück for their assistance with the sections on smart energy, smart mobility, and smart government. Lastly, we especially thank Pete Baker, Katy Mathers, and the entire Emerald team for making this book possible.

The urban challenges of the future require more intelligent concepts at all levels. The tools, processes, checklists, tips, and general experiences that have arisen from our research and practice-related work and are presented in this book can facilitate the development of such key concepts by decision makers. They provide a solid foundation for a diverse range of smart city transformation projects.

We hope that these concepts will spread, and we wish all individuals responsible for the realization of smart city elements much success in the development of sustainable environmental, social, and economic solutions.

NOTE

1. For a full and detailed description of all the contributions, see the acknowledgements.