LEARNING MADE EASY

Smart Cities

for dummies®

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Learn how to create a smart city strategy

Understand the role of data in urban innovation

Explore ideas for improving quality of life

Jonathan Reichental, PhD

Smart Cities

by Jonathan Reichental

for dummies®
A Wiley Brand

Smart Cities For Dummies®

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Smart Cities For Dummies®

To view this book's Cheat Sheet, simply go to www.dummies.com and search for “Smart Cities For Dummies Cheat Sheet” in the Search box.

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Introduction

Welcome to *Smart Cities For Dummies!*

This is a book about people. At its heart, it's about improving the quality of life for urban communities all over the world. Though the popular term *smart cities* is used, this book focuses on the future of all cities.

To succeed at elevating the human condition for billions of people, cities need to adopt new ideas, new approaches, and new technologies for how they're operated and delivered. That's the definition of a smart city.

Note, however, that this isn't a book primarily about technology, although technology does play a large role. Neither does the book suggest that cities need to create a surveillance society or erode privacy in order to succeed. At their core, smart cities aren't about sensors or algorithms or virtual town halls — they're about a better future for humanity. After all, to quote Shakespeare, "What is the city but the people?" (*Coriolanus,* Act III, Scene 1).

Earth is already a majority urban planet and it's estimated that, by midcentury, 70 percent of all humans will live in an urban area. Put another way, our human future belongs to cities. Most people will spend their days living, working, and playing in a metropolis. If we want to enjoy career opportunities, clean air and water, efficient transportation, low-cost energy, safety, convenient city services, and inclusion while all the time saving the planet from a climate crisis, we have a lot of city work ahead of us.

The city is already the center of the human experience. It is the most complicated and successful of all inventions. Urban areas have lifted billions of people out of extreme poverty, and they continue to shape and define our future.

REMEMBER The challenges ahead for cities aren't trivial. Cities have come a long way, but they have a long way to go. Building better and smarter cities may be the biggest challenge that humanity now faces.

I wrote this book as the definitive reference guide for anyone who has an interest in creating safer and more prosperous communities. It's also for anyone who wants to understand the opportunities and challenges in the world's cities. When I discovered that cities would be central to our human future, I was compelled to become a part of positive change. I've spent several years helping to build smarter communities and educate city leaders on almost every continent. The realization that, done right, cities were capable of offering the best solutions for a better tomorrow was the moment my passion for cities emerged. This book is my attempt to share the city planning-and-development lessons and ideas I've discovered and executed along the way.

Smart Cities For Dummies is the first comprehensive reference and how-to book that gives you the knowledge and tools to build smarter cities and improve the quality of life for the greatest number of people.

About This Book

This is a practical, action-oriented book about building smarter cities. It doesn't dwell on theory and abstract

concepts. The entire text is about how to achieve results, build real solutions, and explore actual examples.

The subject and study of cities is deep, wide, and complex. A comprehensive approach would require multiple books of this size. Few would ever read that much. Who has the time these days? Instead, I have taken the approach to identify and condense only what really matters. This book is thorough, but it has no verbose or unnecessary content. You get everything you need in order to be successful in creating and implementing a smart city strategy.

My hope is that this book inspires and intrigues you about the possibilities ahead for cities. Unlike some topics, the urban world has many dimensions and layers. Everyone can find an area that's compelling to them. Cities involve subjects as diverse as energy, water, climate change, housing, artificial intelligence, digital transformation, policy development, and so much more. This book is focused on people and cities, but it covers hundreds of interrelated and diverse topics.

REMEMBER Human destiny is tied to cities. If we're going to have a happy and prosperous future, we need new ideas, skilled talent, and informed leaders to build the cities of tomorrow. Everyone deserves a good quality of life. This book can help make that happen.

Whether your job is directly linked to the future of a city or you're a service provider, professor, or teacher — or if you're simply someone who is fascinated by cities — you'll find *Smart Cities For Dummies* a fun, inspiring, and useful guide.

Foolish Assumptions

To get the most from this book, I assume that you

- Are seeking a comprehensive yet condensed and easy-to-follow guide for planning and implementing a smart city strategy
- Have little patience for unnecessary jargon and complexity and want to know only the essential knowledge to get stuff done
- Recognize that the goal of smarter cities is to continuously improve the quality of life for their residents and that the term *smart cities* is far less important than the desired outcomes
- Recognize that the subject of smart cities is largely still an emerging topic and that the playing field will continue to change in the months and years ahead
- Keep an open mind to the possibilities and challenges of emerging technologies
- Know that mitigating the risks of smart city technologies, such as potential impacts to privacy, is a priority for everyone who is passionate about this subject
- Acknowledge that getting results in government requires strategy and determination and that, for example, simply implementing technology may achieve nothing
- Understand that this is a book about people and the future of the planet

Icons Used in This Book

Throughout this book, you see these little graphical icons to identify useful paragraphs:

TIP The Tip icon marks tips and shortcuts that you can take to make a specific task easier.

REMEMBER The Remember icon marks the information that's especially important to know. To siphon off the most important information in each chapter, just skim these paragraphs.

WARNING The Warning icon tells you to watch out! It marks important information that may save you headaches. ***Warning:*** Don't skip over these warnings!

How This Book Is Organized

The book is arranged into six self-contained parts, each composed of several self-contained topics. By *self-contained,* I mean that I do my best to tell you everything you need to know about a single topic inside each chapter, other than when I have to reference other parts of the book to connect parts that are legitimately linked.

Here's an overview:

Part 1: Making Cities Our Home

These early chapters build the context for smart cities. They begin with a short history of cities that takes you from the origins of dense, human settlements right up to the current megacities. Then you'll learn about the role of the industrial revolutions and population growth in shaping the story of cities. You'll recognize what a smart city is and what it is not. Finally, you get a detailed overview of the current needs and challenges of cities that all become the motivation for building smarter communities.

Part 2: Building a Smarter City

In this part, you're quickly introduced to the steps to begin the planning of a smart city. You'll understand the importance of creating a vision and identifying the team to make your goals a reality. After you have agreed on a vision and have the right people in place, you'll want to create a strategy. This is some of the most substantive early work that the smart city team will complete.

This part concludes with guidance on enabling your strategy to succeed. After digesting this section, you'll

discover that implementing technology will probably be the easiest part of the journey.

Part 3: Using Smart City Technologies

In these chapters, you dive deep into the innovation processes and technologies that comprise the platform and solutions for your smart city. You'll learn about the different forms of urban innovation that can be implemented.

You'll find a comprehensive list of smart city technologies that includes detailed descriptions of what they are, how they work, and how they can be applied in the real world.

The final chapter in Part 3 explores the essential role of data in cities and how data can be used to solve problems and create solutions.

Part 4: Planning for an Urban Future

Smart cities are secure cities. In this part, you'll find out about cybersecurity and privacy in the age of digital communities. The role of public safety and the ability for cities to bounce back after a crisis is also explored.

Cities continue to evolve as they have throughout history. Local government leaders are now prioritizing for their cities to be greener, more inclusive, and healthier. You'll learn about each of these different focus areas. You'll also discover some of the big ideas that may be part of the cities of tomorrow, such as Hyperloop and flying cars.

This part wraps up with lots of ideas for you to get engaged in your community and become an agent of

change. You'll get suggestions for things you can do immediately to make a positive change in your city.

Part 5: The Part of Tens

If you have ever read another book in the *For Dummies* series, this part of the book is like seeing an old friend again — the friend might be wearing a different outfit, but you will recognize the person right away. The Part of Tens is a collection of important advice and suggestions about smart cities, broken into ten easy-to-digest chunks. Part 5 offers guidance on how to avoid some of the most common pitfalls in smart cities. It concludes with a list of ten ways that cities will define our future.

Part 6: Appendixes

This is a practical book. It provides clear guidance on how to develop and implement a vision for a smarter city. Because it's also a relatively new topic, being able to leverage the work of other cities is an important aspect of this subject. In this part, you'll discover lots of examples of work being done in cities all over the world. These examples will support the guidance given throughout the book and will further reinforce what you've learned. Look at what others are doing — you'll be inspired and enlightened by how other cities are implementing their smart city work.

Beyond the Book

Although this book broadly covers the essentials of smart cities, there's only so much that can be covered in a set number of pages! If you reach the end of this book and find yourself thinking, "This was an amazing book — where can I learn more about smart cities and related topics?" head over to www.dummies.com for more resources.

Cheat Sheet: If you're looking for the traditional *For Dummies* Cheat Sheet, visit www.dummies.com and type **Smart Cities For Dummies Cheat Sheet** in the Search box.

The subject of smart cities is quickly evolving. As soon as this book is printed, new items will emerge. I'll include those in later revisions. Updates for this book may also be occasionally available online at the *For Dummies* website.

Fortunately, other books are available that go deep on some of the individual topics in this book. For example, you might want to learn more about solar energy or smart waste management. Experts who specialize in these areas comprehensively cover all the subject details.

If you enjoy my style of writing and presenting knowledge and guidance, I have a lot of complementary material online in written, audio, and video formats. You can find many of my popular video courses on LinkedIn Learning, at www.linkedin.com/learning.

I also speak regularly on the topic of smart cities at events online and in person all over the world. I hope that I'll see you at one of these. Please do come up to me and say hello. I'd love to meet you and hear about your smart city interest and work.

You can keep up with my work and ideas, and contact me, on Twitter (@Reichental), on LinkedIn, or at my personal website: www.reichental.com.

As for you, if you ever end up citing this book or your own smart city experiences on social media, be sure to add the hashtag #smartcitiesfordummies. I'll read them all and will share the ones I like.

Where to Go from Here

You don’t need to read this book from cover to cover. You can, if that strategy appeals to you, but it’s set up as a reference guide, so you can jump in wherever you need to. Looking for something in particular? Take a peek at the table of contents or index, find the section you need, and then flip to the page to resolve your problem.

Part 1

Making Cities Our Home

IN THIS PART ...

Explore the origins and history of urbanization.

Understand the definition and motivation for building smart cities.

Identify the core challenges that cities face today and tomorrow.

Chapter 1

Comprehending the Past, Present, and Future of Cities

IN THIS CHAPTER

- **» Examining the origin of cities**
- **» Exploring the impacts of the industrial revolutions**
- **» Looking at population changes**
- **» Introducing megacities**

For thousands of years, humans were wanderers, existing only in small groups and consumed primarily with daily survival. Then everything changed. The story of why humans went on to eventually build cities is essential for understanding the future of humankind. In this chapter, I briefly describe the origin of cities, including the important impact and role of the industrial revolutions in defining the world today. I also explore how urbanization continues to change the planet, and I introduce the next stop for many major urban areas: megacities.

Discovering the Origin of Cities

The writer and philosopher George Santayana is reported to have said, “Those who cannot remember the past are condemned to repeat it." In other words, ignoring, or being blind to, the lessons of the past puts you at a disadvantage. It makes sense to me: I believe that if you’re going to create better and smarter cities, you need to understand a little about their origin. Figuring out why we humans started living in ever-growing urban centers and have now decisively made them our future home helps you understand the present and — even more importantly — what it means for the future of cities.

I don’t bore you with an extensive history lesson on the origin of cities, but I do provide you with enough information to give you a sense of the key milestones that have resulted in the urban planet humans now inhabit.

I also help you explore the consequences of urbanization and look at trends that are contributing to today’s rapid city growth, and I begin to tease out the impact and challenges to be solved in a future of *megacities* (cities with a population of more than 10 million inhabitants).

What is a city?

But wait — first, what is a *city?* It’s a physical location that is permanently settled by a large number of people and has defined boundaries. It has formal systems for supporting areas such as land use, housing, sanitation, energy, and transportation. Most occupants in a city work on nonagricultural activities. A city has some recognized form of governance that facilitates the operations of the area and interactions between the community, businesses, and government.

Charles–Édouard Jeanneret, the internationally influential Swiss architect and city planner, said that cities are “a machine for living in.”

Today, most people live in a city. You know, cities are quite popular now. Opportunities that range from employment to entertainment and from education to healthcare all tend to be better in an urban context. For most of human history, as you can read later in this chapter, it wasn’t this way at all.

Do you know the origin of the city where you're living now? I’d bet that some people do, but I’m also confident that many don’t. After all, for most people, there’s little utility in this knowledge.

REMEMBER If you find yourself in a role today that’s directly related to the function and success of your city, historical context is golden. It can inform all manner of future decision-making, by highlighting strengths and challenges, ensuring alignment to culture, and exploring untapped opportunities.

For everyone else, wouldn’t it be fascinating to know how your community came to be? I’m a naturally curious person, so this type of detail fascinates me. Learning about your city might surprise you. It may make you happy or perhaps even make you sad. Whatever the emotional response, my guess is that you’ll become enlightened and likely curious to go deeper into the areas that spark your curiosity.

TIP Go online and search for your city’s website. (Let’s assume it has one.) Then find out the answers to

these questions about your city:

- When was it established?
- Why was it started?
- What are the current challenges of the community?
- What are the current priorities of the city?
- Oh, and does your city have a smart city strategy or something similarly named?

There’s no grade for doing this assignment, but isn’t it interesting? Talk about it with your family. I’d bet that the discussion is fascinating and enlightening for everyone.

For extra credit, you might repeat this exercise for another city somewhere else in the world that you’re curious about.

Okay, let’s move on.

Why each of the world’s cities came to be is a big part of the broader narrative of the human story. Humans can’t change the past, so we’re stuck with the current outcome of a myriad of decisions and their consequences — some good and, frankly, many not-so-good. Some of the past humans have been able to control, but there’s a fairly good chunk that we haven’t been able to. For example, being invaded probably wasn’t something the residents of any city welcomed. Natural disasters are acts that humans have no role in creating but must deal with the aftermath of (although the role of human behavior in climate change apparently is making many of these disasters much worse).

On the positive side, getting lucky and establishing a human presence in places that had abundant, in-demand resources like oil or coal created what some could

consider unfair advantages, and being strategically located in the supply chain for products that humans fell in love with also helped. The human thirst for coffee and tea, their love of silk, and an addiction to tobacco are all examples of the development of certain urban areas over others. This is because all sorts of intermediaries and services were required along the complex global supply-and-trade routes. An exchange of ideas resulted from diverse traders from different geographic areas meeting at the urban centers of these trade routes. This was a catalyst for innovation. Cities became engines for a whole new generation of creative solutions.

(Hang on. Writing that last paragraph made me thirsty. I'm going to make a cup of tea.)

The origin of cities, like so much of the human story, is the result of a series of unpredictable and surprising events. Human history certainly didn't progress in a straight line — and any change along the way would have resulted in a world far different from the one we live in today. But this is simply a thought experiment. It doesn't help much to wonder what the world would look like, for example, if there hadn't been colonialism by European nations. What matters is understanding what did happen and what that means for you today and for the future.

Building the first cities

Humans living in cities is a relatively new phenomenon. For most of human history — around 200,000 years of that history, by our best guesses — members of *homo sapiens* lived and wandered together in relatively small groups, tending to their crops and hunting for animals and fish. It was a basic and crude existence. Life span barely ever reached 40 years. Nothing much changed for