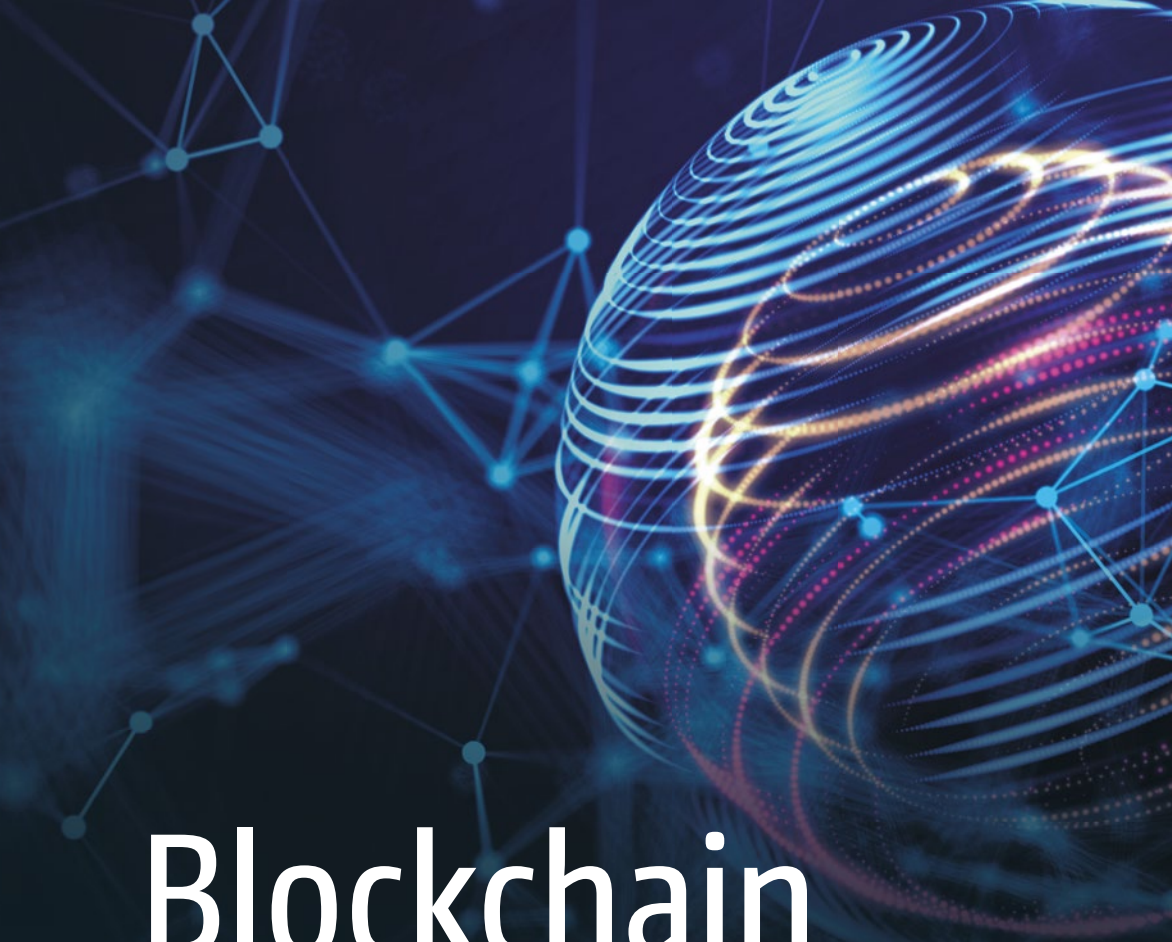

# Blockchain for Hospitality and Tourism

## A Guide to the Future

Dominika Duziak

Apress®

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# About the Author

**Dominika Duziak** is a blockchain and Metaverse enthusiast, passionate about innovations that happen at the crossroads of industries. She boasts an interesting and varied background, weaving together a Master's in Law and an MBA in International Hospitality Management with over 15 years of experience driving fintech evolution within the banking sector. This unique blend of knowledge and experiences forms the foundation of her expertise, seamlessly merging her fervor for transformative technologies with the captivating realm of hospitality and a deep passion for sustainability. Currently at the helm of product strategy at OneStep Financial, Dominika spearheads advancements in AI and DLT-powered payment paradigms, exemplifying her commitment to pushing the boundaries of possibility while maintaining a strong focus on sustainability and delivering value for clients.

# About the Technical Reviewer

**Dr. Sanjay Nadkarni`s** domain interests are in the convergence space of analytics, digital, and sustainability in the services sector. His portfolio comprises applied research, advisory, and consultancy assignments for corporate, government, and multilateral agencies, in addition to his pedagogic practice, which includes visiting professorships at premier academic institutions in Asia and Europe. He is also a verified Dubai Future Research Contributor.

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Sanjay, your expertise and insight have opened my eyes to the exciting synergy between banking, technology, and hospitality. Your willingness to share your knowledge and experiences has allowed me to unlock new potentials and bring a fresh perspective to both industries. Your mentorship and guidance have been invaluable in helping me navigate uncharted territories, and I am deeply grateful for the opportunities you have presented me.

Together, both of you have taught me the importance of embracing new challenges and seeking growth outside of familiar domains. Your combined influence has shown me that true innovation often emerges from unexpected connections and interdisciplinary collaboration.

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Dominika Duziak

# Introduction

This book is like a *Hitchhiker's guide to the galaxy*. A guide to the universe built on blockchain. This universe is vast and unknown and can be tricky or unwelcoming to new visitors. For a newcomer, especially with no technical background, it can be difficult to navigate.

You'll see a lot of unusual things and unconventional approaches. You'll see people investing millions of dollars in funny digital images and big brands buying virtual land that exists only somewhere in the cloud. You'll hear a completely different language, full of abbreviations and nonsense terms that may mean nothing to you. You'll be asked to create avatars, open digital wallets, and share your keys. Some will tempt you to invest in their projects and get their coins, and they'll throw in a lot of promises. They will say that their blockchain is the best, the most secure, and the most sustainable. That their project has the best ROI. You'll hear that the old world is coming to an end and the only way to survive is to move with the blockchain and Web3 tide. But then there will be others, screaming that it's all a fad, a gimmick or a Ponzi scheme. How do you make sense of it? As your guide, I'm going to help you navigate this world and show you where to go and how to get there.

As a tourism or hospitality professional, you may wonder how all of this is relevant to you. Why would you even want to enter this new galaxy? This book will hopefully make it very clear. We're going to walk through different aspects and dimensions of blockchain and learn how it can be leveraged in your business. We will cover different applications and capabilities to ensure you have a full picture of the landscape. I will show you examples of different applications of blockchain – from crypto payments to provenance tracking and cause-driven NFTs. You will discover solutions implemented by some of the biggest brands, including your competitors, and explore ideas that may prove to be game changers for the hospitality and tourism business.

Hospitality especially is not perceived as the most innovative industry. Technology is becoming an important and strategic asset for hospitality organizations, especially after the COVID-19 pandemic; however, the industry is perceived as a slow adopter of innovations.

Research[1] suggests that the main challenges lie in inadequate education and training, limited technological skills, lack of strategic planning, and lack of economies of scale.

The reliance on closed IT architectures and proprietary, specialized technological solutions is a major contributor to these issues. As a result, there is an even greater need for uniform technological practices. A lack of technical knowledge and insufficient ROI analysis are other common obstacles to the widespread adoption of innovative technologies.

Many hotels and other hospitality businesses run on an IT system consisting of numerous, independently installed programs from a variety of vendors. These programs are often incompatible with one another since they use various platforms and databases.

New technology adoption is one of the biggest management challenges that requires a complex decision-making process. My academic study of perceptions of hospitality managers in Dubai, UAE, on blockchain technology confirmed these observations and inspired me to write this book. The goal is to equip you with the knowledge that will support your strategic business decisions. After reading this book, you will have enough data to create and analyze different use cases and proposals and to discuss the topics of blockchain, NFT projects, or the Metaverse within your organization and with your vendors and suppliers.

## Who Is This Book For?

- Hospitality leaders and professionals: Hotel managers, general managers, revenue management directors, operations directors, hotel IT managers, asset managers, brand and strategy managers, marketing managers.
- Hospitality vendors, proptech companies, consulting, metaverse, and blockchain startups that want to understand the blockchain opportunity in the hospitality and tourism space.
- Hospitality students: This book aims to showcase the potential of blockchain technology and its impact on various aspects of the service organization. If you're a hospitality student, you need to understand how different

[1] The future of innovation in hospitality: success factors & challenges (ehl.edu); Carlos Martin-Rios, Teofil Ciobanu, "Hospitality innovation strategies: An analysis of success factors and challenges," Tourism Management, Volume 70, 2019, pages 218–229, ISSN 0261-5177, https://doi.org/10.1016/j.tourman.2018.08.018

trends, including emerging technologies, are going to impact the industry you will be working in. Learning about blockchain at this stage should be, in my view, one of your priorities if you want to develop an innovative mindset that will help you excel in your future roles.

## What Are You Going to Learn?

- Blockchain: Foundations, features, benefits, types of blockchain, platforms, smart contracts
- Blockchain-based innovations: Cryptocurrencies, NFTs, Web3, Metaverse
- Applications of blockchain in selected industries
- Blockchain use cases in hospitality and tourism: Payments acceptance, disintermediation of OTAs, customer loyalty programs, supply chain management, identity services, guest preferences tracking, IoT/smart hotel applications, Metaverse
- How to start a blockchain project

## How the Book Is Structured

As mentioned, this book aims to be your guide to the blockchain world; therefore, we will take a walk together through different areas and aspects of this technology, starting with its origins in Chapter 1.

Chapter 2 will take you through the foundations of blockchain. Here, terms like "consensus mechanism" or "smart contracts" are demystified. I promise, we're not going to go very deep into the technicalities but cover the most important elements that will help you grasp the concept of distributed ledger platforms and the inner workings of the blockchain world.

In the next chapter (Chapter 3), we'll get acquainted with the blockchain ecosystem and its participants. You will read about the miners, developers, apps, and top blockchain platforms that are used by the biggest enterprises in the world. To give you an understanding of the blockchain adoption status globally, we'll also inspect the technology usage among both corporate entities and individuals.

With Chapter 4, we start our journey into the fascinating world of blockchain-based innovations, starting with the concept of Web3. Taking a broader perspective, we will explore how Web3 can be utilized within the hospitality and tourism sectors. By adopting a helicopter view, we will survey the landscape

and identify the various ways in which Web3 technologies can bring about benefits and opportunities. This introductory overview will set the stage for further exploration of specific Web3 elements in subsequent chapters, providing a comprehensive understanding of how these technologies can transform the industry.

Next, we'll dive into the world of cryptocurrencies, focusing on their significance and impact on the hospitality industry. This chapter (Chapter 5) will explore popular use cases and the challenges and opportunities cryptocurrencies present for businesses.

In Chapter 6, we shift our focus to decentralized booking platforms and explore how blockchain technology can disrupt traditional booking systems, enhance transparency, and empower both travelers and service providers.

The NFT Revolution chapter (Chapter 7) explores the topic of non-fungible tokens (NFTs) and their impact on the hospitality industry. We delve here into a couple of emerging use cases and applications, such as digital ownership and tokenization of assets. We also discuss the potential of creating unique experiences and value propositions through NFTs.

Chapter 8 focuses on the concept of the metaverse and examines the convergence of virtual and physical worlds and its implications for the hospitality industry. We explore how blockchain technology can facilitate the development of immersive experiences, enhance training, reimagine MICE business, and support the creation of new forms of customer engagement.

In Chapter 9, we discuss how blockchain enables Industry 4.0 applications and facilitates the realization of the smart hotel concept. We will explore the impact of integrating blockchain with the Internet of Things and artificial intelligence on different areas of the hospitality back-office operations, including supply chain management, preventive maintenance, and inventory management. We explore how these technologies can promote resource optimization and sustainable practices as well as enhance personalization of hospitality services.

Chapter 10 addresses the risks and challenges associated with blockchain adoption in the hospitality industry. We discuss factors that hinder blockchain implementation, such as a lack of public trust and the perceived complexity of blockchain applications. In this part, we also analyze cost and resource implications and provide ideas and recommendations to help tackle some of the challenges that organizations may face in their implementation journeys.

Chapter 11 provides a summary of the key takeaways from the book. It reflects on the future outlook of blockchain technology in the hospitality industry, highlighting emerging trends, potential disruptions, and areas that hospitality managers should keep an eye on.

CHAPTER

1

# The Blockchain Promise

By now, you have probably heard of blockchain. People say it's one of the new, most innovative technologies, but it's not new. In fact, it was developed nearly 15 years ago.

Bitcoin, the most famous cryptocurrency with the highest market capitalization (as of the time of writing), was the first practical application of blockchain. Created in 2008 by the mysterious Satoshi Nakamoto, Bitcoin was designed to disrupt and reshape financial institutions.[1] It's no coincidence that Bitcoin was brought to life at this time. The international financial crisis, which started with the fall of Lehman Brothers, created a global lack of trust in the traditional banking system.

Bitcoin was positioned as a safe and secure digital currency that can be transferred between peers without a central authority and intermediaries, such as banks. All transactions were verified and secured by cryptography on the public distributed ledger – blockchain. We will cover the blockchain architecture and all its features in the next chapter.

In the beginning, Bitcoin (BTC) had little value. The first time it was actually used to buy something tangible was on May 22, 2010. On that day, now celebrated in the crypto world as *Bitcoin Pizza Day*, one crypto-enthusiast

[1] Satoshi Nakamoto 2009 Bitcoin P2P e-cash.


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spent 10,000 Bitcoins on two pizzas worth 30 USD. Obviously, no one at that time knew that one day, 12 years later, Bitcoin will reach 65,000 USD per 1 BTC, or that it will crash later.

The price of Bitcoin was slowly rising. Press articles, especially stories alerting of the cryptocurrency appeal in the illegal online activity, put a match to its growing popularity. Controversies started arising. Anonymous money transfers with no central supervision could be used to facilitate money laundering, drug and human trafficking, and other criminal activities.

The theme was picked up by movie script writers. We've all seen movies with hackers, arms dealers, and other villains being paid in Bitcoin or another cryptocurrency for their services.

New digital coins started popping out, more controversies and scams followed, the first exchanges collapsed, and embezzlement charges were filed. But the crypto-market growth continued.

In 2015, Ethereum entered the market with a new blockchain project that introduced smart contracts and created foundations for various use cases beyond cryptocurrencies. Ether quickly became the number 2 cryptocurrency, competing successfully with Bitcoin.

Now, this book is not about the history of Bitcoin, but I think it's important to give you this background story and perspective. Blockchain is often perceived through the lens of cryptocurrencies. In fact, many people identify blockchain with Bitcoin. When I interviewed hospitality managers, I heard a lot of statements like this one:

> *"Have I heard about blockchain? Yes, everybody talks about Bitcoin, you've seen what's happening in the news, right? People are losing money. It's scary."*

Crypto-market volatility drew a lot of attention over the last two years. In 2021, Tesla invested 1.5 billion USD in Bitcoin, which attracted a lot of investors, and the price skyrocketed to 69,000 USD per coin in November 2021. By now, it has dropped by around 70%. Other cryptocurrencies are not doing well either. Most of them are worth next to nothing today, and only investors with strong nerves (and deep pockets) are staying in the game.

The vision of crypto-market crash attracted a lot of media attention in 2022. Horror stories about scams, "get-rich-quick" schemes, hacker attacks, and evaporating life savings made headlines. Sadly, few stories of how blockchain technology works in other capacities, beyond infamous cryptocurrencies, have been published. They're just not very media worthy, I guess. But over the last ten years, the vision of what blockchain may bring to enterprises has grown and evolved. While it's undoubtedly driving a change in the financial ecosystem, its applications go way beyond payments and deposits.

PWC names blockchain a "trillion-dollar opportunity" for global economy and estimates that by 2025 majority of businesses will be using this technology in some form.[2]

Blockchain's potential is compared to the impact that the creation of the Internet had on the economy. Dan Tapscott[3] even calls it the second generation of the Internet, which enables not only transfer but also the creation of value. As a secure, tamper-proof distributed ledger, it is poised to revolutionize supply chains, identity services, accounting, and essentially any industry that relies on the authentication of documents.

Experts, researchers, and consulting firms have compiled a long list of industries that could benefit from blockchain technology. This includes anything from infrastructure and waste management to environmental monitoring, emergency services, healthcare, and even agriculture. In fact, according to some, the use cases for a transparent, verifiable register of transaction data are practically endless – especially since blockchains operate through a decentralized platform that doesn't require central supervision and is resistant to fraud.[4]

Now, you may wonder – if it's such a fantastic tool, with so many business applications, why has it not been popularized yet? Why am I hearing only about cryptocurrencies?

Well, there are a few key reasons, such as complexity, scalability, and performance issues and regulatory uncertainty, that hindered the progress of this technology adoption.

Blockchain, like many emerging technologies, has gone through various stages of development and only now is gradually approaching a maturity stage that will lead to mass adoption.

The first generation of Blockchain was focusing solely on cryptocurrencies with Bitcoin being the original one. Blockchain was used as a decentralized ledger for recording and verifying transactions. In this stage, fundamental concepts of consensus, cryptographic security, and immutability were established.

Smart contracts and emergence of Ethereum marked the second generation of blockchain. People realized that the potential of blockchain goes beyond financial transactions.

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[2] PWC 2020 Time for Trust: How blockchain will transform business and the economy – PwC.

[3] Tapscott, D., and Tapscott, A. (2016). Blockchain Revolution: How the Technology Behind Bitcoin Is Changing Money, Business, and the World. New York: Penguin.

[4] CB Insights (2022), Banking is only the beginning: 65 big industries blockchain could transform. www.cbinsights.com/research/industries-disrupted-blockchain/

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**Note** A smart contract is essentially a self-executing and self-enforcing digital agreement between two or more parties based on a blockchain platform. Because it's programmed within the blockchain platform, it can be available to any interested party but cannot be changed, amended, or edited.

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Smart contracts found traction in insurance and supply chain management, for instance, enabling automation of payments to claimants and suppliers based on pre-agreed conditions coded in the agreement. Ethereum also allowed developers to use their platform to build their own projects and applications – the so-called dApps. dApps are decentralized applications, which means they run on decentralized system – that is, blockchain. They can operate autonomously, based on smart contracts, without human intervention. What's more, they're not owned by a single, central entity.

This concept was leveraged in many areas, from decentralized finance (DeFi) to gaming, insurance, energy, and healthcare. First, NFTs came to life. The user base started to grow and with it – scalability became a challenge. Transaction speed and fees increased with the user traffic.

The third generation of blockchain is addressing these issues. Blockchain 3.0 projects are introducing scalability, fast processing, lower fees, interoperability, and what's extremely important in today's world – lower energy consumption.

We're seeing new use cases, many of them focusing on the notion of tokenizing everything – from art to real estate.

The fourth generation of blockchain incorporates hybrid and enterprise blockchains that cater to the needs of specific businesses and provide scalability, permissioned access, and specialized consensus mechanisms. This phase brings a promise of mainstream adoption and laying foundations for Web3 and the Metaverse and enabling Industry 4.0 developments. We're going to dig deeper into these topics in the next chapters.

Figure 1-1 summarizes the evolution of blockchain and main developments in each stage.