Chapter 1
Introduction—Why to Pay Attention on Blockchain-Driven Supply Chain Finance?

> We should think about the blockchain as another class of thing like the internet—a comprehensive information technology with tiered technical levels and multiple classes of application for any form of registry, inventory, and exchange. M. Swan, author of Blockchain—Blueprint for a New Economy, 2015, preface

Bitcoin[1] introduced blockchain technology (BCT) as the first solution for transferring value and ownership of digital assets without the use of any trusted third party. In its simplest form, the blockchain is a shared database where all transactions of a given asset are registered in cryptographically chained blocks of data in order to become immutable. The system does not require any central authority or any single trusted third party in order to eliminate the related counterparty risk. Further improvements of this technology have allowed the running of small programmes (i.e. smart contracts), which potentially enable trusted automation of contractual relations between trading parties. If the Internet permitted the exchange of information between peers, BCT has made it possible to exchange value. The consequences of this technical revolution are difficult to foresee and will probably generate great opportunities for all industries and human activities.

All the largest financial services firms, for example, are planning to use BCT as a record of ownership and transaction in order to avoid the time-consuming reconciliation of each internal ledger in order to create a faster and safer system. Analysis suggests that this new technology could reduce banks' infrastructure costs attributable to cross-border payments, securities trading and regulatory compliance by \$15–20 billion per annum by 2022 (Santander InnoVenture 2015). Currently, the two most prominent companies in this sphere are R3 CEV (www.r3cev.com), a New York-based blockchain fin-tech that is already supported by more than 50 financial institutions, and Ripple Labs (https://ripple.com), which is looking to establish secure, instant and nearly free global financial transactions.

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[1]The largest transaction processed by the network is 150 million US dollars (Antonopoulos 2014, p. 4). On December 14, 2015, coidesk.com registered a peak of 216'251 daily transactions (coindesk.com 2016).

In addition to the discussed uses in the financial space, the open and distributed nature of blockchain seems perfectly positioned to enable new levels of collaboration across supply chain actors and enhance the integration of products and money flows (Saigal 2016). Camerinelli (2016), for example, suggests that at least one-third of the most common supply chain processes could strongly benefit from the features offered by BCT. These great prospects are therefore the motivator for the exploration of this technology. Particularly, as being located at the intersection of logistics, supply chain management, collaboration and finance (Hofmann 2005), supply chain finance (SCF) solutions could particularly benefit from the possible blockchain use cases and applications.

1.1   Purpose

The main purpose of this book is to identify possible opportunities for specific SCF solutions—i.e. approved payables financing (or buyer-led) techniques—triggered by the use cases offered by BCT. To reach this goal, it is fundamental to first present and describe all the different SCF techniques and processes in order to identify the current barriers, bottlenecks and pain points. At that point, two questions are posed

1. How can the application of BCT help to overcome the barriers of SCF?
2. What are the opportunities offered by possible applications of BCT in SCF processes?

By answering these questions, this book aims to identify which blockchain applications ('use cases') could create opportunities for approved payables financing solutions. SCF providers, investors and corporations involved in such financing programmes could be better positioned to make strategic decisions related to the adoption of BCT or the integration of any valuable application.

1.2   Structure

After a brief introduction to describe the purpose and the objectives of this work, this chapter provides a short literature review on the topics of blockchain and distributed ledgers and approved payables financing. Given that the technology is still relatively young and has only become prominent in recent years, there are limited reliable research papers and literature sources to reference. The informational sources needed for research will also include an analysis of documents beyond academic publishing (i.e. 'grey' literature). The literature review intends to give an account of what has been published so far, as well as an overview of the current status of the research relevant to the book at hand.

Chapters 2 and 3 provide a theoretical background on SCF with a focus on the different approved payables financing solutions and models (e.g. dynamic

discounting and reverse factoring). As it is not discussed in the literature, the reverse securitisation instrument is described separately. In these chapters, the important terms, structures and processes are explained in order to identify the principal barriers and pain points in delivering and setting up a financing programme.

Chapter 4 gives an overview of the technical aspects of blockchain and distributed ledgers technologies in order to discuss the relevant use cases.

After having developed a theoretical framework, Chap. 5 provides an analysis of the existing and potential uses of the technology for approved payables solutions and the ability to deal with the barriers and pain points underlined in previous chapters. There, we aim to analyse other possible opportunities for SCF providers related to the mainstream adoption of the technology in the capital markets and supply chain communities.

The discussion in Chap. 6 will deal with the practical implications of the findings and the limitations of the research, and it will suggest directions for future research.

The findings are then summarised together in Chap. 7, where a brief conclusion will complete this work.

Figure 1.1 offers a graphical representation of the structure of this book.
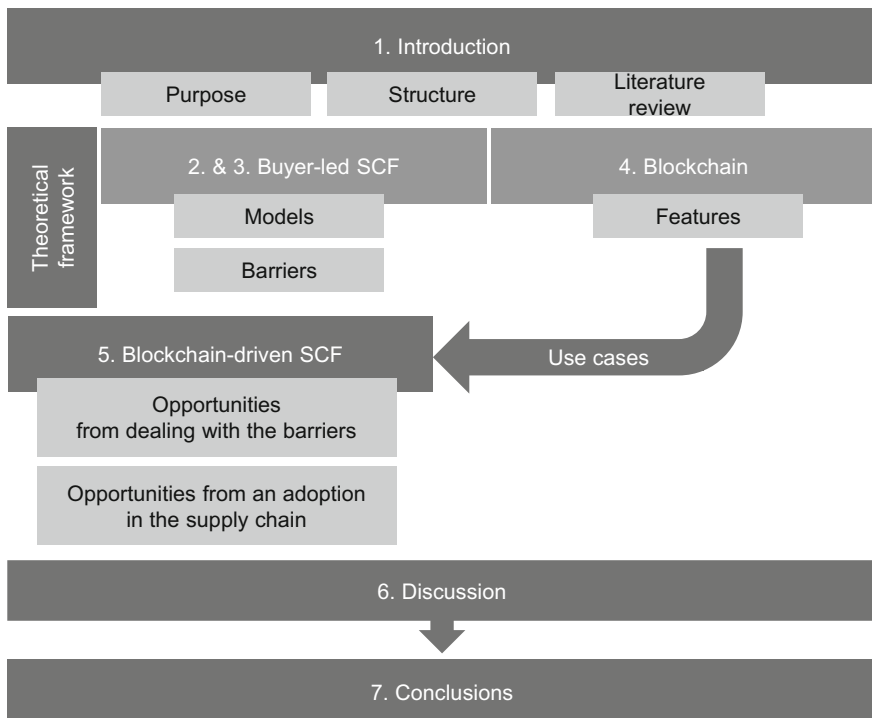
Fig. 1.1 'Line of argumentation'—outline of the book

1.3   Brief Look at the Literature

Because of the limited amount of available research that combines SCF and BCT, it was necessary to refer to the literature on the general topics of SCF, securitisation and BCT, which included industry related working papers, reports and online resources such as blogs and websites.

The seminal work that first presented the technical features of the technology is the white paper written under the alias of Nakamoto (2009). After Bitcoin gained popularity, research began to examine the discussions related to the technical features of this technology (Antonopoulos 2014) and its limitations (e.g. Dwyer and Malone 2014; Greenspan 2015; Sams 2015). Following the success of Bitcoin and the increased interest in this new technology, new solutions and blockchain 'designs' were presented in various technical papers that described the new features (e.g. Buterin 2013, 2015; Vasin n.a; Schwartzer et al. 2014). Later, the new Turing-complete blockchain feature fostered discussions on 'smart contracts', of which the principles were first described by Szabo (1994) and discussed in relation to blockchain solutions in research papers and blog articles (e.g. Flood and Goodenough 2015; Gendal 2015; Greenspan 2016). A broad understanding of the different blockchain designs, applications and use cases can be found in Swanson (2015). Once an overview of the technology's features and limitations was attained, a large group of research and working papers began to examine the different uses of this technology and its potential applications in a wide range of services and activities. Particularly relevant for our book are various working papers and industry reports that discuss the application of the technology in financial markets (e.g. ESMA 2016; Oliver Wyman and Euroclear 2016; Mainelli and Milne 2016; McKinsey & Co 2015; GBST 2016), for identity database management (e.g. Mainelli and Smith 2015; Biella and Zinetti 2016; Deloitte 2016) and for supply chain management (e.g. Bauerle 2016; Camerinelli 2016). Because of the pace with which developments around this topic occur and the topic's nature, the use of online resources such as websites (e.g. blockchain.info, bitcoin. it or coindesk.com) and blogs (e.g. 'gendal.me' or 'bits on blocks') were helpful in ascertaining awareness of the current status of this technology and obtaining some helpful thoughts and insights. Particularly challenging was the effort to not confuse the literature concerning Bitcoin with that examining the underlying technology (i.e. the blockchain).

Useful inputs for defining and describing approved payables financing (or buyer-centric) techniques were gathered from industry papers that describe the general SCF ecosystem and the key categories of SCF instruments (e.g. Aite Group 2014; GSCFF 2015; Templar et al. 2016) and from research analysing the SCF market and the financial drivers of companies engaged in such solutions (Hofmann and Belin 2011). Other contributions were made by Seifert and Seifert (2009), who underlined the principal differences between supplier- and buyer-centric reverse factoring models; contributions were also made by papers and articles that discussed the role of technology platforms as key enablers of such financing

programmes (e.g. Leonard 2015; Zakai 2015). Key challenges for SCF are discussed in Camerinelli and Bryant (2014) and in an APEC working paper (2015), with the latter only specifically addressing regulatory issues.

Defining the reverse securitisation technique was particularly challenging because no literature was found for this specific SCF instrument. In order to define it, it was necessary to find support in research and papers that broadly cover the asset backed securities (ABS) instruments (e.g. Pfaue 2003; Fabozzi 2006) and, to further detail, the receivable securitisation technique (e.g. Mevissen 2005; Jobst 2008; Lussi 2009; Katz 2011).

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