

VIRTUAL CURRENCIES

VIRTUAL CURRENCIES

A Legal Framework

Niels VANDEZANDE



intersentia

Cambridge – Antwerp – Portland

KU LEUVEN

CITIP

CENTRE FOR IT & IP LAW

Intersentia Ltd
Sheraton House | Castle Park
Cambridge | CB3 0AX | United Kingdom
Tel.: +44 1223 370 170 | Fax: +44 1223 370 169
Email: mail@intersentia.co.uk
www.intersentia.com | www.intersentia.co.uk

Distribution for the UK and Ireland:

NBN International
Airport Business Centre, 10 Thornbury Road
Plymouth, PL6 7 PP
United Kingdom
Tel.: +44 1752 202 301 | Fax: +44 1752 202 331
Email: orders@nbninternational.com

Distribution for Europe and all other countries:

Intersentia Publishing nv
Groenstraat 31
2640 Mortsel
Belgium
Tel.: +32 3 680 15 50 | Fax: +32 3 658 71 21
Email: mail@intersentia.be

Distribution for the USA and Canada:

International Specialized Book Services
920 NE 58th Ave. Suite 300
Portland, OR 97213
USA
Tel.: +1 800 944 6190 (toll free) | Fax: +1 503 280 8832
Email: info@isbs.com

Virtual Currencies: A Legal Framework

© Niels Vandezande 2018

The author has asserted the right under the Copyright, Designs and Patents Act 1988, to be identified as author of this work.

No part of this book may be reproduced, stored in a retrieval system, or transmitted, in any form, or by any means, without prior written permission from Intersentia, or as expressly permitted by law or under the terms agreed with the appropriate reprographic rights organisation. Enquiries concerning reproduction which may not be covered by the above should be addressed to Intersentia at the address above.

Cover © Andrey Maslakov/Alamy Stock Photo

ISBN 978-1-78068-675-2
ISBN 978-1-78068-696-7 (pdf)
D/2018/7849/48
NUR 827



British Library Cataloguing in Publication Data. A catalogue record for this book is available from the British Library.

FOREWORD

Dear Reader,

This book could not have been published at a better moment. Basically every day, newspapers report about bitcoin and other cryptocurrencies. Earlier this year, the Guardian labeled ‘blockchain’ – the open-source ledger behind bitcoin – as the buzzword of 2018.¹

Also policymakers and industry seem to be gearing up for the FinTech future. End of February 2018, the European Commission organized a roundtable in Brussels on “Cryptocurrencies – Opportunities and Risks” with key authorities, industry representatives and experts.² In his speech following the roundtable, Valdis Dombrovskis, Commission Vice-President in charge of Financial Stability, Financial Services and Capital Markets Union, pointed to the opportunities of cryptocurrencies, but also – and perhaps mainly – to the substantial risks for consumers and investors associated with their use. Not only is the value of most cryptocurrencies extremely volatile,³ crypto-assets also present risks relating to money laundering and the financing of illicit activities, and Initial Coin Offerings expose investors to substantial risk because of the lack of transparency regarding the identity of the issuers and underlying business plans.⁴ Mr. Dombrovskis also pointed out that they “*need to assess further under what circumstances cryptocurrencies and related services are covered by existing regulation*”.

The need for a better understanding of the risks and opportunities that go with the use of crypto-assets, and a better understanding of the applicability of EU

¹ M. Busby, “Blockchain is this year’s buzzword – but can it outlive the hype?”, The Guardian, 30 January 2018, <https://www.theguardian.com/technology/2018/jan/30/blockchain-buzzword-hype-open-source-ledger-bitcoin>.

² https://ec.europa.eu/commission/news/roundtable-cryptocurrencies-2018-feb-26_en

³ As John Oliver (the presenter of HBO’s popular show “Last Week Tonight with John Oliver”) phrased it recently in an episode dedicated to cryptocurrencies and bitcoin: “*if you choose to invest in the cryptocurrency space, just know that you’re not investing, you’re gambling...*” <https://www.youtube.com/watch?v=g6iDZspbRMg>.

⁴ Recent reports show that on average USD 9 million per day is lost to crypto-scams – and that is without taking into account larger incidents such as the hacking of an exchange such as the Japanese Coincheck (<https://www.bloomberg.com/news/articles/2018-03-08/coincheck-to-start-paying-back-victims-of-500-million-heist>).

regulation – such as the rules on anti-money laundering and on e-money – was equally stressed in the European Commission’s FinTech Action Plan that was released shortly after the roundtable, on March 8th of this year: “*An assessment of the suitability of the current EU regulatory framework with regard to Initial Coin Offerings and crypto-assets more generally is necessary*”.⁵ Indeed, a fair and transparent framework that can appropriately address the associated risks seems a *sine qua non* in order to ensure that EU firms, investors and consumers can take advantage of the technical innovations in the financial sector, while also appropriately addressing the risks.

This book offers an important contribution to that objective. It explores the concept of virtual currencies and guides you through the maze of European financial law. Starting with a conceptual analysis of virtual currencies in light of traditional notions like ‘money’ and ‘trust’, and looking at useful typologies to classify a wide range of virtual currencies, it continues with an in-depth legal analysis of the applicability of the current EU frameworks for e-money, payment services, anti-money laundering and financial instruments to virtual currencies. It also offers a normative perspective by formulating recommendations for revision, taking inspiration – where relevant – from experiences outside the EU (in particular the United States). It is therefore not only relevant for the academic community, but also for policy makers and industry.

Despite the highly specialized nature of the topic (and its typical jargon), the book reads fluently and is also accessible to non-experts in the field. It contains the results of the doctoral research that the author carried out at the Centre for IT & IP Law (CiTiP) at KU Leuven in the period 2014–2018. Throughout the text, though, it becomes clear that he masters the topic not only from a theoretical perspective, but that he also understands the practical implications of his findings. Undoubtedly, this is to a large extent due to the fact that the author could carry out his research in the context of interdisciplinary and industry-driven iMinds (now imec) projects dealing with mobile payment platforms and blockchain (like CoMobile, SoLoMIDEM, TRU-BLISS, and BoSS). In these projects, he frequently interacted with technical and economic experts, as well as industry representatives and practitioners.

Combining various projects and tasks at our research group, which he joined in 2009 (at that time called ‘ICRI’), the author has shown to be a very tech-savvy and versatile researcher. He has acquired a very broad but also deep knowledge of many areas where new technologies pose challenges for existing legal frameworks (including also digital archiving, identity management,

⁵ https://ec.europa.eu/info/publications/180308-action-plan-fintech_en and http://europa.eu/rapid/press-release_IP-18-1403_en.htm.

eGovernment, eHealth, privacy & data protection, security and trust in the Internet of Things, and public information availability). With his research, he gained international visibility and won important prizes, such as the SWIFT Institute research grant and a ticket to present at the prestigious SIBOS conference in Singapore in 2015.

This book lays the foundation for a promising new research track at KU Leuven that brings together the expertise of CiTiP and the Jan Ronse Institute for Company and Financial Law. For me personally, it has been a rewarding experience and a true pleasure to serve, together with Prof. Veerle Colaert, as the promoter of this research. We have confidence in our trustworthy guide, Niels, that he will show us the way through this fascinating emerging field of FinTech and help us distinguish between hype and reality.

In the meantime, we wish you, dear Reader, a rewarding intellectual journey through this book!

Prof. Dr. Peggy Valcke
imec – KU Leuven – CiTiP
16 May 2018

ACKNOWLEDGMENTS

This book marks the publication of my doctoral thesis, which I defended on 13 March 2018. Having arrived at the end of my PhD journey, I can only confirm what those who went before me already said: a PhD thesis is in the first place an individual work, but it can never be done without the help of others. Here, I would like to express my gratitude to at least some of those others.

First of all, I would like to thank my promotor, prof. dr. Peggy Valcke, for immediately believing in my project to conduct research on ‘this bitcoin-thing’, for her inspiring guidance and feedback throughout the journey, and for always keeping faith in that I would one day finish it. It is her careful balancing between giving me the freedom to pursue my own research interests and guiding me towards the finish line that resulted in this thesis.

Second, I would like to thank my co-promotor, prof. dr. Veerle Colaert, for accepting the co-promotorship of a ‘CiTiP PhD’, for reminding me to take the necessary time away from other projects to focus on my PhD research, and for sharing her invaluable knowledge in the often highly technical domain of financial law.

Third, I would like to thank the members of my doctoral guidance committee, prof. dr. Leo Van Hove, prof. dr. Matthias Edward Storme, and prof. dr. Wim Decock, for their feedback throughout the writing process and at the occasion of my doctoral seminars. I also thank prof. dr. Antonella Sciarrone Alibrandi, for joining the examination committee, and em. prof. dr. Frans Vanistendael, for chairing the examination committee.

I have the pleasure to be working at the KU Leuven Centre for IT & IP Law (CiTiP) – formerly the Interdisciplinary Centre for Law & IT (ICRI) – since 2009. The centre’s broad variety of research projects has enabled me to learn about so many of the issues encountered at the crossroads between law and technology, and has allowed me to have a taste of several of these issues before settling on the topic of my PhD research. Its highly interdisciplinary outlook can only serve as an example for the legal professional of the future. The centre’s unique culture is of course only made possible by the work and dedication of its members, with whom I have had the pleasure to collaborate and discuss throughout the years.

Throughout my project research, I have had the pleasure to meet and collaborate with many inspiring people from several disciplines. In particular, I would like to thank our close colleagues at the COSIC and DistriNet research groups, as well as the CoMobile project team – as it is that project which first set me on the path that eventually resulted in this thesis.

Writing a PhD thesis is not a purely professional endeavor, as it tends to invade all aspects of life. I am therefore indebted to my parents, for providing me with the opportunities to undertake my studies, and for listening to my talking about practically nothing else these past few years. Last, but certainly not least, I owe my eternal gratitude to Nathalie, for putting up with me at all times – and not just during the course of my doctoral research. Without her love and support, this thesis or any of my other endeavors could not have been possible.

Niels Vandezande

CONTENTS

<i>Foreword</i>	v
<i>Acknowledgments</i>	ix
<i>Acronyms</i>	xxi
Introduction	1
1 Background of the research	1
2 Problem statement and state of the art	2
2.1 Legal uncertainty	2
2.2 Regulatory inaction	4
2.3 Stakeholder risks	5
3 Research objective	6
4 Research questions	7
5 Relevance of the research	10
6 Methodology and structure	12
6.1 Typology, terminology, and interdisciplinary research	12
6.2 Supportive trust analysis	14
6.3 Money and virtual currencies	16
6.4 Fundamental analysis and critical assessment	17
6.5 Functional comparison	19
6.6 Integration, final assessment and recommendations	20
PART I CONCEPTUAL ANALYSIS	23
Chapter I	
Typology and Terminology of Virtual Currencies	25
1 Introduction	25
2 Terminology of virtual currencies	26
2.1 Virtual currencies in the EU	26
2.2 Why ‘virtual currencies’?	29
2.2.1 ‘Digital’, ‘electronic’, or ‘virtual’?	29
2.2.2 ‘Cash’, ‘currency’, ‘money’, or none of the above?	32
2.3 Defining virtual currencies	35
3 Practical examples	38
3.1 Loyalty programs	38
3.1.1 Classic loyalty point programs	39

3.1.2	Mobile platforms	40
3.1.3	Frequent-flyer programs.....	41
3.2	In-game currencies.....	42
3.2.1	Pay-to-play	42
3.2.2	Free-to-play	45
3.2.3	Second Life.....	47
3.3	Prepaid value currencies.....	49
3.4	Cryptocurrencies	50
3.4.1	Background	51
3.4.2	Technical aspects.....	54
3.4.2.1.	Wallets and addresses	54
3.4.2.2.	Transactions	55
3.4.2.3.	Confirmation and blockchain	56
3.4.2.4.	Mining.....	59
3.4.2.5.	Other applications	61
3.4.3	Economic aspects	63
3.4.3.1.	Economics of cryptocurrencies.....	63
3.4.3.2.	Cryptocurrencies and fractional-reserve banking	66
3.4.3.3.	Mining risk.....	68
4	Typology	70
4.1	The ECB's typology of virtual currencies.....	70
4.1.1	Closed schemes	70
4.1.2	Unidirectional schemes	71
4.1.3	Bidirectional schemes.....	72
4.2	Application of typology to practical examples	73
4.2.1	Loyalty programs.....	73
4.2.2	In-game currencies	74
4.2.3	Prepaid value currencies	75
4.2.4	Cryptocurrencies.....	75
4.3	Alternative typology	76
5	Risk analysis	78
5.1	User risks.....	79
5.2	Market risks.....	81
5.3	Investor risks.....	82
5.4	Service provider risks	83
5.5	Risks and typology.....	84
6	Interim conclusions	85
Chapter II		
Elements of Trust		89
1	Introduction	89

2	The abstract notion of ‘trust’	90
2.1	Philosophy	91
2.2	Psychology	93
2.3	Sociology	93
2.4	Economy	96
2.5	Computer science and engineering	98
2.6	Law	103
2.7	Synthesis	109
2.8	Trust in modern society	110
3	Trust operationalization through law	112
3.1	Trust services in the EU	112
3.1.1	E-Signatures Directive	113
3.1.2	eIDAS Regulation	118
3.1.3	Synthesis	122
3.2	Other forms of trust operationalization through law	123
3.2.1	Trusted service providers at the EU Member States’ level	123
3.2.2	Trusted custodian	125
3.2.3	Trust through consumer law	128
3.2.4	Trust through financial law	131
3.2.5	Synthesis	132
4	Interim conclusions	133

Chapter III

	Perspectives of Money	137
--	------------------------------	-----

1	Introduction	137
2	Money as a legal concept	138
3	Theories on money	141
3.1	The credit theory and the origins of money	141
3.2	State theory	143
3.3	Role of the state in money creation	146
3.4	Functional theories	150
3.5	Amended state theory	152
4	Functions of money	154
4.1	Medium of exchange	154
4.2	Unit of account	155
4.3	Store of value	156
5	Virtual currencies as money	157
5.1	Virtual currencies and theories on money	157
5.2	Virtual currencies and functions of money	160
6	Interim conclusions	162

2.3	E-money and virtual currencies	222
2.3.1	Closed scheme virtual currencies	222
2.3.2	Unidirectional scheme virtual currencies	222
2.3.3	Bidirectional scheme virtual currencies	224
2.3.4	Evaluation	225
3	Payment services	226
3.1	Regulatory background	226
3.1.1	Before 2007	227
3.1.1.1	Early stages	227
3.1.1.2	Proposal PSD1	228
3.1.1.3	European Central Bank Opinion	230
3.1.1.4	European Economic and Social Committee Opinion	231
3.1.1.5	Council negotiations	232
3.1.1.6	European Parliament adoption	233
3.1.2	First Payment Services Directive	234
3.1.3	Review	237
3.1.3.1	Implementation, green paper, and consultation	237
3.1.3.2	Proposal PSD2	239
3.1.3.3	European Economic and Social Committee Opinion	242
3.1.3.4	European Central Bank Opinion	243
3.1.3.5	European Parliament Committee Stage – First attempt	243
3.1.3.6	Council General Approach	244
3.1.3.7	European Parliament Committee Stage – Second attempt and adoption	245
3.1.4	Second Payment Services Directive	245
3.1.5	Evaluation	248
3.2	Payment services scope	249
3.2.1	Positive scope	249
3.2.2	Scope exemptions	256
3.2.2.1	Added value exemption	256
3.2.2.2	Limited network exemption	258
3.2.2.3	Money exchange exemption	260
3.3	Payment services and virtual currencies	261
3.3.1	Closed scheme virtual currencies	261
3.3.2	Unidirectional scheme virtual currencies	261
3.3.3	Bidirectional scheme virtual currencies	262
3.3.3.1	General remarks	262
3.3.3.2	Member States’ opinions	263
3.3.3.3	European Commission’s opinion	265

3.3.3.4	Exemptions	266
3.3.3.5	Additional remark	266
3.3.4	Evaluation	267
4	Toward a unified framework?	267
5	Interim conclusions	271
5.1	Findings	272
5.2	Normative assessment	274

Chapter V

	Anti-Money Laundering in the EU	277
1	Introduction	277
2	Money laundering and the EU directives	278
2.1	The concept of money laundering	278
2.2	Road to Anti-Money Laundering Directive 4	279
3	Fourth Anti-Money Laundering Directive	281
3.1	Proposal Fourth Anti-Money Laundering Directive	281
3.2	Fourth Anti-Money Laundering Directive	284
4	Amendments to Fourth Anti-Money Laundering Directive	286
4.1	Commission proposal and legislative procedure	286
4.2	Virtual currencies	289
4.3	Virtual currency service providers	292
5	Virtual currencies under anti-money laundering rules	294
5.1	Virtual currencies as money laundering tool	294
5.2	Virtual currency service providers until AMLD4	298
5.3	Virtual currency service providers after AMLD4 amendments	303
6	Interim conclusions	307
6.1	Findings	307
6.2	Normative assessment	308

Chapter VI

	Financial Instruments in the EU	311
1	Introduction	311
2	Regulatory background	313
2.1	Before 2004	313
2.2	First Markets in Financial Instruments Directive	315
2.3	Markets in Financial Instruments Regulation and Second Directive	316
3	Financial instruments scope	317
3.1	Personal scope of MiFID1 and 2	317
3.2	Material scope of MiFID1 and 2 – investment services	318
3.3	Material scope of MiFID1 and 2 – financial instruments	318

4	Markets in financial instruments and virtual currencies	321
4.1	Closed scheme virtual currencies	321
4.2	Unidirectional scheme virtual currencies	322
4.3	Bidirectional scheme virtual currencies	323
4.3.1	Cryptocurrencies intended as means of payment	323
4.3.1.1	EU perspective	323
4.3.1.2	Member State deviation: Germany	326
4.3.2	Cryptocurrencies intended as means of investment	329
4.3.2.1	EU perspective	329
4.3.2.2	Member State case: Belgium	332
A.	Investment instruments	332
B.	Crowdfunding	334
5	Interim conclusions	336
5.1	Findings	336
5.2	Normative assessment	337

Chapter VII

Virtual Currencies and Service Providers in the US 341

1	Introduction	341
2	Methodology	342
3	US regulatory frameworks	343
3.1	Money	343
3.1.1	Constitution	343
3.1.2	Stamp Payments Act 1862	344
3.1.3	Counterfeiting statutes	346
3.1.4	Application to virtual currencies	347
3.2	Payments	349
3.2.1	Electronic Fund Transfer Act 1978	349
3.2.2	Uniform Commercial Code	351
3.2.3	Application to virtual currencies	353
3.3	Anti-money laundering	354
3.3.1	Bank Secrecy Act 1970	355
3.3.2	Money Laundering Control Act 1986	362
3.3.3	State regulation	364
3.3.3.1	Uniform Money Services Act	364
3.3.3.2	California	366
3.3.3.3	Virginia	367
3.3.4	Application to virtual currencies	367
3.4	Investments	368
3.4.1	Securities regulation	369
3.4.1.1	Overview	369
3.4.1.2	Notes	370

3.4.1.3	Stock	372
3.4.1.4	Investment contracts	373
3.4.1.5	Currency	379
3.4.2	Derivatives regulation	380
3.4.3	State regulation	384
3.4.3.1	Blue sky laws and federal preemption	384
3.4.3.2	Uniform Securities Act	385
3.4.3.3	State commodity laws	386
3.4.4	Application to virtual currencies	387
4	Legislative developments	390
4.1	Federal level	390
4.2	Uniform Regulation of Virtual Currency Businesses Act	392
4.3	California	396
4.4	Delaware	400
4.5	New Hampshire	401
4.6	New York	403
5	Interim conclusions	407
5.1	Findings	407
5.2	Normative assessment	410

PART III CONCLUSION 413

Chapter VIII

Integration, assessment, conclusions, and recommendations 415

1	Integration of research findings	415
1.1	Virtual currencies as money	416
1.2	Virtual currencies under e-money and payment services	417
1.3	Virtual currencies under anti-money laundering	419
1.4	Virtual currencies and investment services	420
1.5	Findings	421
2	In need of regulation?	422
2.1	Preliminary assessments	423
2.1.1	E-money and payment services	423
2.1.2	Anti-money laundering	424
2.1.3	Investment services	424
2.1.4	Findings	425
2.2	Regulatory need	426
2.2.1	Risk pertinence	427
2.2.2	Changing virtual currency landscape	427
2.2.3	Objectives of financial law frameworks	431
2.2.4	Desirability of regulation	433
3	Conclusion	437

4	Recommendations	441
4.1	Merchants and users of virtual currencies.....	441
4.2	Virtual currency service providers and issuers.....	441
4.3	Legislators and regulators.....	442
	<i>Bibliography</i>	445

ACRONYMS

AML	Anti-Money Laundering
AMLD1	First Anti-Money Laundering Directive
AMLD2	Second Anti-Money Laundering Directive
AMLD3	Third Anti-Money Laundering Directive
AMLD4	Fourth Anti-Money Laundering Directive
ATM	Automated Teller Machine
BaFin	Bundesamt für Finanzdienstleistungen
BCDR	Business Continuity and Disaster Recovery
CA	Certificate Authority
CDD	Customer Due Diligence
CEPS	Common Electronic Purse Specifications
CESR	Committee of European Securities Regulators
CFTC	Commodity Futures Trading Commission
CFPB	Consumer Financial Protection Bureau
CJEU	Court of Justice of the European Union
COREPER II	Committee of Permanent Representatives
DAO	Decentralized Autonomous Organization
DNS	Domain Name System
DRM	Digital Rights Management
EBA	European Banking Authority
ECB	European Central Bank
EFT	Electronic Funds Transfers
EFTPOS	Electronic Funds Transfer at Point of Sale
EMD1	First E-money Directive
EMD2	Second E-money Directive
EMI	European Monetary Institute
EMU	Economic and Monetary Union
EPC	European Payments Council
ESMA	European Securities and Markets Authority
ETF	Exchange-Traded Fund
EU	European Union
EULA	End-User License Agreement
FATF	Financial Action Task Force on Money Laundering
FinCEN	Financial Crimes Enforcement Network
FIU	Financial Intelligence Unit

FSMA	Financial Services and Markets Authority
GDP	Gross Domestic Product
ICO	Initial Coin Offering
IRS	Internal Revenue Service
ISD	Investment Services Directive
KYC	Know-Your-Customer
LETS	Local Exchange Trading System
MiFID1	First Markets in Financial Instruments Directive
MiFID2	Second Markets in Financial Instruments Directive
MiFiR	Markets in Financial Instruments Regulation
MMORPG	Massively Multiplayer Online Role-Playing Games
MTF	Multilateral Trading Facility
MVNO	Mobile Virtual Network Operator
NASAA	North American Securities Administrators Association
NIS	Network and Information Security
NFC	Near Field Communication
OCSP	Online Certificate Status Protocol
OJ	Official Journal of the European Union
OTF	Organized Trading Facility
P2P	Peer-to-peer
PKI	Public Key Infrastructure
PSD1	First Payment Services Directive
PSD2	Second Payment Services Directive
PSP	Payment Service Provider
RFID	Radio-Frequency Identification
SEC	Securities and Exchange Commission
SegWit	Segregated Witness
SEPA	Single Euro Payments Area
TFEU	Treaty on the Functioning of the European Union
TLD	Top-level domain
TTP	Trusted Third Party
UCC	Uniform Commercial Code
VAT	Value added tax