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Financial Law and Technology: Book Reviews on Mobile Payments and Digital Innovation

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BOOK REVIEWS

Financial Law and Technology: Book Reviews on Mobile Payments and Digital Innovation

Law and Regulation of Mobile Payment Systems:
Issues Arsing "Post" Financial Inclusion in Kenya

Joy Malala

(London and New York: Routledge, 2018)

272pp.

C$145

and

Digital Innovation in Financial Services – Legal Challenges and Regulatory Policy Issues

Phoebus L. Athanassiou

(Alphen aan den Rijn, the Netherlands: Kluwer, 2018)

261pp.

C$168

Benjamin Geva[*]

1. INTRODUCTION

Emerging new technologies have brought about innovation in financial and payment services that affect both the poor and the rich. Each reviewed book below addresses the legal challenges in providing such services to these respective parts of the population.

2. JOY MALALA, *Law and Regulation of Mobile Payment Systems*

This book is traced back to a thesis submitted by the author to Warwick University. According to Chapter 1, against the background of an underbanked population, mobile payment systems have become commonplace in Kenya through the introduction of M-Pesa by Safaricom Ltd. acting as a Mobile Network Operator (MNO). To a large extent, mobile payments achieve the policy objectives of financial access and inclusion. The book is designed to address legal and regulatory issues arising in the course of "the delivery of

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financial services at affordable costs to disadvantaged and low-income segments of society," specifically "as they pertain to Kenya, post-financial inclusion."[1]

The fundamental policy question identified by the author is the protection of users from the risk posed by the new technology involved. Secondary questions address the importance to Kenya of a study of mobile payments, risks created by mobile payments to the financial system of Kenya and to consumers, and reforms needed in the current regulatory framework.

The work consists of six chapters. Chapter 1 is the introduction. Chapter 2 offers background information on Kenya's payment systems. The author identifies Chapters 3 to 5 as reflecting the originality and contribution of the work. To that end, Chapter 3 addresses post-inclusion financial stability and integrity through mobile payments. Chapter 4 covers the legal and regulatory challenges in the current regulatory framework. For its part, Chapter 5 identifies themes around the appropriate regulatory framework for mobile payment systems. Following these three key chapters, Chapter 6 presents the conclusion.

Chapter 2 presents the emergence of the mobile payment system in Kenya in the broader context of the overall development of payment systems in Kenya. Basically, a payment transaction in which a mobile device is required to execute it is categorized as a mobile payment. For its part, mobile financial services are financial services accessible through mobile phones. Finally, "electronic payments through mobile devices" is often used in place of mobile payments. Such services are mobile banking (web-based banking services accessible through a mobile phone such as balance enquiries), mobile money transfers, and mobile payments. The distinction between mobile money transfers and mobile payments is however neither clear nor explained. Presumably, transfers are from one mobile device to another while payments are concluded in cash.

Safaricom facilitates mobile payments as value added services under its telecommunication licence. The operation of such services is premised on the replacement of a bankcard by a SIM card storing the user's PIN and account information. Transactions are executed completely within Safaricom's network so that neither a bank account by a subscriber nor a banking licence by the MNO (Safaricom) is required.

In transitioning to the next chapter, the author concludes[2] that:

> The success of M-Pesa has become a key driver in lifting people out of poverty, and therefore, it has become an important feature in Kenya's financial system. This potential has been recognised by governments, experts, and donor organisations. Central banks in emerging economies have recognised the potential economic benefit of financial inclusion and have included it in their developmental agendas. *However, after integration and inclusion the challenge is how to harness this success while ensuring that the stability of the financial system is not affected.* [Emphasis added]

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1 *Law and Regulation of Mobile Payment Systems* at 2. Another definition (to the same effect) appears at 38.

2 *Ibid.* at 41.

Chapter 3 endeavours to address financial stability and integrity after the implementation of financial inclusion through mobile payments. The chapter considers the ramifications of financial inclusion through mobile payments by highlighting the unique risks introduced by mobile payments in the broader context of risks inherent in payment systems in general. Inherent risks are systemic, integrity, liquidity, and operational risks.

The discussion on risks at the mobile network operator level commences by pointing out the separate role of the MNO and bank. The former is a telecommunication company providing wireless network messaging functionality. Individual payment transactions occur entirely within the MNO and do not require service users to have bank accounts. Prior to their collection by the payee, funds remitted by the payer are on "deposit" in a segregated trust account at a bank. For its part, the MNO does not carry out banking services. Those are offered by the bank via the mobile device.

"Banking" is premised on fractional reserves. Hence mobile payment customers bear the risk of bank failure. To diversify risk, MNOs hold trust funds deposits in different banks. The author proposes to require MNOs to ring-fence assets to protect them from bankruptcy and shareholder claims.

Particularly noteworthy are risks at the agent level. As set out by the author,[3] "the agent is the MNO's interface between the cash flow and the customer" whose network "enlarges the MNO's reach to rural areas " In more in detail,

> mobile payment agents are nonbank entities such as retailers (either the MNO's own retail centre or a retailer such as a small store) that manage customer registration and liquidity requirements for the mobile money users on behalf of the MNO. They offer services such as disbursements of loans or micro-loans approved by banks or by microfinance institutions. Agents also facilitate bill payments and transfers; take deposits and loan payments; allow inquiries on account balances or recent movement of funds; and open saving accounts; loans and debit cards (all with approvals from the bank). MNO may also contact them for additional outsourcing functions. In all, the agent may offer frontline customer service; facilitate bank transactions through its balance sheet; transform cash in-the-till into money-in-the-bank and vice versa; and need to go to the bank from time to time to rebalance its cash in the till versus its money in collateral or trust bank accounts.

Various models exist through which agent networks operate. Particularly, there may be master agents, a sort of aggregator, who deal directly with the MNO. In terms of its functionality, the agent network for the MNO is tantamount to an outsourced branch network of a bank. The difference is that each agent operates on its own (or in conjunction with a master agent) and not under the effective control of the MNO. Inventory management and security are risks for each agent individually. In the final analysis, the author admits, "[m]obile payments agents ... cannot guarantee the same integrity assurance that bank branches have."[4]

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3 *Ibid.* at 93.

Users incur liquidity risk where an agent who owes funds is unable to meet its payment obligation on time. The author concludes by pointing at the existence of gaps in the legal and regulatory frameworks that adversely affect users.

Chapter 4 discusses the legal and regulatory challenges in the current regulatory framework in Kenya. The chapter opens by pointing out that "[f]inancial regulators have the mandate to preserve the stability of the financial system, to ensure financial integrity and resilience, while encouraging innovation and financial inclusion."[5]

Part I of the chapter examines the current regulatory framework for mobile payment systems. The author juxtaposes the mandate of the central bank with that of the communications commission. The former is charged with responsibilities relating to stability and supervision in relation to payment and settlement systems. At the same time the latter classifies mobile payment systems as value added services in the context of telecommunication. Obviously, such a scheme is bound to generate duplications and overlaps as well as gaps.

One key question is whether the MNO activity is tantamount to deposit taking, so as to require a banking licence. The author describes the exchange between the MNO and a user as a transaction in which "the stored value payment, or float, is taken from the public and converted into a stored value account." She poses the question as to "[w]hether value received and exchanged for the 'store of value' could amount to a deposit and therefore trigger a prudential deposit regime" even as funds are not taken by the MNO "for intermediation purposes, but primarily and narrowly for payments ..."[6] While pointing out that customers do not have a banking relationship with the bank where the MNO deposits the funds in trust, she does not discuss this question extensively. Regardless she recommends that the central bank promulgates minimum business practice standards particularly with the view of anticipating entry by new MNOs.

Part II of the chapter explores the overall regulatory challenges for regulatory authorities in regulating mobile payments. In effect it is a high-level overview of such challenges. In the author's view, the main objective in regulating MNOs is achieving consumer protection from operators reducing output and increasing prices on low-quality services. In her view, authorities "should also protect the unbanked and under banked and ensure that the money pooled in the in the mobile money system does not introduce systemic risk."[7] At the same time she argues for the existence of inconsistencies in regulation resulting from multiple regulatory authorities, regulatory overlap, regulatory

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4 *Ibid.* at 95.

5 *Ibid.* at 134.

6 *Ibid.* at 151.

7 *Ibid.* at 155.

arbitrage, regulatory inertia, and political interference with the collective will to regulate.

Part III of the chapter discusses the impact of the regulatory challenges on consumers. The author appears to adopt the economists' rationalization for the need for consumer protection as premised on inadequate knowledge by consumers on products and contracts, compared to that of professionals, "an asymmetry that applies to mobile payments."[8] In her view, while the Central Bank of Kenya "has been watchful it has seemingly offer[ed] a piecemeal approach in its oversight and guidance since the inception of mobile payments."[9] She commends the direct consumer protection provisions in the central bank's Agent's Guidelines but points out that they relate more to formalities in the transaction process than to dispute resolution. In her view, "Kenya's inherent problem is a lack of coherence in consumer protection and market oversight [which] is related to the split in responsibility between the [communications commission] and the [central bank]."[10] Unfortunately, she does not come up with a rigorous policy analysis as to whom the principal responsibility should be assigned.

Particularly the author points at the lack of full protections for consumer funds. In the case of an insolvency of a bank holding an MNO's funds in trust for consumers, the consumers, not being the depositors, are not the direct beneficiaries of the insurance. As well, upon the insolvency of the MNO, she argues, there is no clarity as to its effect on consumers. Regrettably she does not elaborate on this point which is in fact quite central to her overall position as to inadequate consumer protections, particularly relating to their funds. In conclusion the author opines that the need for tightening regulatory requirements does not diminish M-Pesa's success in Kenya.

Chapter 5 discusses themes around the appropriate regulatory framework for mobile payment systems. The author rationalizes the need for special regulation on the basis of the specific system design of mobile payment systems and the potential to be systematically important. To the same end she also argues that MNOs may be considered institutions that are too big to fail.

From the perspective of the developed world, claims that mobile payment systems are systematically important seem to be exaggerated. Using Canadian terminology, the risk posed by a mobile payment system would be classified as the lower "payment system risk", rather than the higher "systemic risk."[11] This however does not undermine the author's call for regulation covering both prudential and consumer protection perspectives.

Relevant regulatory principles to guide reform are stated to be proportionality, accountability, transparency, and consistency. The author

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8 *Ibid.* at 159.

9 *Ibid.* at 160.

10 *Ibid.* at 163.

11 See definitions in s. 2 of the *Payment Clearing and Settlement Act*, SC 1996, c. 6, Sch.

goes on to argue that appropriate regulation should be able to balance the objectives of the state and the need for regulation "where the objectives include protecting consumers and safeguarding payments systems."[12] It is however not all that clear to this reviewer what additional state objectives are. Other regulation themes addressed by the author are a risk-based approach; self-regulation vs. enforced regulation; command and control; incentive-based regimes; market discipline and direct action; rights and liabilities to encourage socially desirable behaviour; procedural dimension, and competition laws. The reader may find the discussion of these themes to be too general.

The author goes on to propose a Memorandum of Understanding (MoU) to be established between the central bank and the telecommunication commission to delineate their responsibilities with the view of ensuring a harmonized regulation of mobile payments. On this point this reviewer takes issue. It is not that harmonization and a MoU is not welcome. What is overlooked is that the regulation of payment systems is a matter that should fall under the exclusive jurisdiction of the central bank and a financial regulator even where the system is operated by a communication carrier. By definition, every electronic funds transfer consists of a series of messages and movement of funds. A mobile payment system differs only in the fact that the mover of funds is the communication carrier, not carrying out a function outsourced by a bank, but rather acting in its own name. Nevertheless, in the view of this reviewer, once it moves funds, the communication carrier becomes a payment institution or transmitter; as such it ought to fall under regulation that governs other payment institutions or transmitters.

Chapter 6 is the conclusion of the book. It first narrates the motivation for the study. It then proceeds to the summation of each chapter, something this reviewer would have preferred to see at the opening of the book and not at its conclusion. The chapter goes on to identify two topics for future research: interoperability and the implementation of the *National Payment Systems Act*.

According to the author, "interconnection" merely "allows users of one MNO to communicate with users of another MNO to allow access to services provide[d] by either MNO." She goes on to contrast it with "interoperability" by quoting Jeremy Okonjo[13] to say that interoperability allows "the ability of communication systems, units or elements, to provide services and to accept services from other systems, units or forces, and to use the services exchanged to enable them operate effectively together." She argues that interoperability is not only a technological issue but also a regulatory one. Particularly, "[t]his is because interoperability provides a consumer benefit by offering a better competitive network."[14]

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[12] *Law and Regulation of Mobile Payment Systems* at 215.

[13] Jeremy Okonjo, "Convergence of Mobile and Financial Services Implications for Regulation of Mobile Telecoms in Kenya" (2014) at slide 13, online: <https://www.slideshare.net/JeremmyOkonjo/convergence-of-mobile-and-financial-services-implications-for-regulation-of-mobile-telecoms> accessed 10 July 2019.

In the final analysis, the author concludes, having been limited to "the regulatory challenges arising [from] post-financial inclusion," this study created "a baseline framework for future explorations of the multidimensional nature of mobile payments" She predicts that "a series of law and policy implications" addressing "issues surrounding inclusive financial services" will follow.[15]

To conclude this review, a few observations will be made. The book is well written and thoroughly researched. Each chapter concludes with an extensive bibliographic list. The use of endnotes for each chapter rather than footnotes is however quite awkward and stands in the way of a smooth reading.

Two factors led to the spread of mobile payments operated by a telecommunication system. The first is the network advantage of a telecommunication carrier. The second is the outsourcing of banking functions to a cheaper agent operating a predominantly retail network. The benefits realized from taking advantage of these factors are not cost-free to the public. The former has to do with competition law. The latter undermines public protection. While the author is cognizant to all this, she avoids the following fundamental question: will the cost of remedying these drawbacks eliminate the savings and advantages achieved by this form of payment system. If not, will mobile payments remain the best way to achieve financial inclusion?

In expanding a thesis to a textbook, additional work could have benefited the study. Thus, in this reviewer's opinion, the addition of a discussion on the mechanics of the mobile funds transfer and the rules that govern it would have been useful. Questions that come to mind include the irrevocability of the instructions, mistaken and fraudulent payments, and finality of payments. The book could have also benefited from some comparative discussion on the treatment of mobile payments in developed nations such as the EU and the US.

In developed countries, mobile devices are mostly used to securely store card information and not as an initiation device for electronic money payments as is the case in Kenya. At the same time, the model emerging from Kenya, that of P2P payments through the use of mobile devices, has spread to other developing countries and may come to be present in developed nations. Hence, the work is a significant contribution to the regulation of payment law beyond the borders of Kenya. It is informative, analytical and highly recommended as a basis for ongoing policy discussion and legal research on new technologies and new entrants in the payment space throughout the world.

3. PHOEBUS L. ATHANASSIOU, *Digital Innovation in Financial Services*

This is a short monograph packed with information and dense analysis aiming to expolore "the contours of the key legal and regulatory issues that policy makers may wish to take into account in assessing the merits and risks at

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[14] All cites from *Law and Regulation of Mobile Payment Systems* at in this paragraph are from page 260.

[15] *Ibid.* at 261.

digital innovation" in financial services.[16] It is written from a primarily European perspective albeit accompanied by a substantial comparative American point of view. For that reason, the overall analysis should be of great interest in Canada and elsewhere.

An introductory Chapter 1 provides an overview of risks, benefits and use cases of digital innovation in financial services. It addresses FinTech and its promises, as well as the perspectives of consumers, financial institutions, service providers, regulators and supervising government agencies. The author observes that there is "something of a paradox in financial intermediaries seeking to harvest the benefit of technologies, which have the potential to profoundly affect their business model or render those very intermediaries obsolete".[17] This reviewer does not share this perspective. Rather, this reviewer finds the adaptation as predictable and constructive. Use cases of FinTech are payments, clearing and settlements for payments; securities issuance, trading and post trading; and information sharing. At the conclusion of the chapter, the author stresses that while the book focuses on "core legal issues associated with the application of decentralised transactions to the fields of payments, securities trading and post trading" a complementary discussion on the "core features of those technologies" is an inherent part of the work.[18]

Arguing that the blockchain "is the most prominent example of the use of DLT in a purely financial context,"[19] Chapter 2 discusses the scope, definitions and principal regulatory issues concerning DLTs, blockchain and distributed ledgers. Arguing[20] "that future regulation in this area cannot be 'technology agnostic'", the author nevertheless points at "neutral" legal and regulatory issues. These include optimal regulation, the impact on legal aspects of payment and securities transactions, protection against confidentiality breaches and external attacks, and the legal limits of the benefits distributed ledger and DLTs' decentralisation[21] provide. Subsequently,[22] the author addresses the probabilistic nature of processed transactions' finality in distributed ledger environments. The author revisits this topic elsewhere[23] but unfortunately nowhere gives it the thorough attention it deserves.

Chapter 3 provides an overview of established payment media for retail transactions. It further discusses their principal advantages and disadvantages

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[16] *Digital Innovation*, Preface at xvii.

[17] *Digital Innovation* at 5.

[18] *Ibid.* at 16.

[19] *Ibid.* at 21.

[20] *Ibid.* at 33.

[21] This reviewer thinks that in *ibid.* at 34, fourth word in the second line from the bottom of the carryover top paragraph, should be "decentralisation" (used in this context at 51) and not "intermediation".

[22] *Digital Innovation* at 45.

[23] See e.g. *ibid.* at 106, 170, 206-07, as well as 82-84.

with the view of identifying their continuing appeal to consumers. The chapter covers cash, account-linked credit and debit cards, electronic fund transfers (credit transfers and direct debits), E-money, and online payment platforms. Coverage is thorough and meticulous and yet this reviewer has a couple of critical comments on his treatment of E-money. First, the author does not distinguish between E-money and "digital cash". Second, he does not distinguish between devices on which the value is loaded electronically and those that access an external bank account, albeit not of the cardholder but rather of the scheme operator. The chapter goes on to discuss alternative payment services such as Apple Pay, Google Wallet and Venmo. Unfortunately, the author does not adequately highlight the fact that these are more transmission vehicles for making payments of the legacy systems discussed earlier in the chapter. Legal issues addressed are deposits, discharge, and data confidentiality & consumer protection. The chapter concludes that "[t]he shortcomings of cash, established alternative thereto and of [Alternative Payment Providers] currently in use in the context of retail and other commercial transactions create scope for innovation . . ."[24]

Chapter 4 explores the main features of virtual currencies together with core legal and regulatory issues arising in the course of their use as settlement media for retail payments. It also examines the impact of the use of virtual currencies on the relationship between debtors and creditors and the legal as well as regulatory adaptations necessary to address resulting challenges. At the beginning of the chapter the author points out that virtual currencies are not currencies. Rather, they may be used not only in payment but also as objects of trading and investment. He then goes on[25] to define "virtual currencies" as

> digital representations of value, which despite not being issued by a central bank or another public authority, nor 'attached' to a fiat currency (subject to notable exceptions) are voluntarily accepted by natural or legal persons, as means of exchange, and which are stored, transferred and traded electronically, without a tangible, real-world representation.

While this is a fair description of the predominant features, this falls short as an effective definition. It would have been more effective to start from "digital currencies" and then carve out "cryptocurrencies" and "virtual currencies".

The chapter goes on to discuss Bitcoin and its network, virtual currency networks and validation/consensus protocol, as well as user benefits and risks of virtual currencies and the underlying technologies. It then moves on to provide an overview addressing virtual currency regulation in the EU and the US, following which the author discusses miscellaneous core legal and regulatory issues regarding virtual currencies such as their fundamental legal nature, compliance with accepted definitions of "money" or "currency," property rights, and characterization as mere contractual rights or securities. Finally, the chapter

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[24] *Ibid.* at 74.

[25] *Ibid.* at 77.

addresses questions such as whether virtual currency networks and exchanges qualify as Financial Market Infrastructures (FMIs), and issues relating to identifying a competent regulator and other areas of substantive law. The author points out five of the latter: authenticity of payment messages; allocating risk for fraudulent payments; protecting stakeholders in insolvency; finality of payment and discharge; and, effective remedies.

Chapter 5 examines core legal issues relating to "smart contracts" and "instant (faster) payments." The author defines the former as "computer codes that allow agreements to execute themselves once certain real-life conditions have been met."[26] Among the concerns that the former raise, the author enumerates loss of control over contractual outcomes, stability and operational risks. Regarding instant payments, he submits "that there are at least two principal paths to be taken towards instant payments: one that embraces FinTech ... and another one that relies, by and large, on existing infrastructures ... and existing market intermediaries..."[27] The overall thorough discussion nevertheless does not adequately distinguish between the two paths. As well the author concludes[28] that instant payments can aspire to "better synchronise the delivery of funds with the delivery of goods" but does not explain well how this can be achieved both legally and operationally.

Chapter 6 addresses DLTs' application in securities issuance, as well as in clearing and settlement. In fact, as the author clarifies,[29] his "main emphasis ... is on the use of DLTs for the trading and post-trading of book entry, registered, publicly listed, intermediated transferable securities credited to a securities account maintained with an intermediary." He nevertheless goes on to address DLT use in the initial issuance of public securities, an aspect where he identifies legal issues relating to the replication by distributed ledgers of the core features of securities accounts. Having thus identified as such governing law, the legal effect of entries, the legal characterization (status) of assets recorded in them, and the *locus* of performance of notary functions, the author concludes that "it is difficult to see how a distributed ledger operating independently of the control of either the securities issuer or a trusted intermediary and which is serviced and governed by anonymous nodes, could substitute centralized ledgers in the performance of the notary function."

In addressing DLT potential to simplify and accelerate post-trading stage, the author points at several aspects:

(a) The automation of clearing processes upon trade completion;

(b) The elimination of the need for data reconciliations,

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26 *Ibid.* at 122.

27 *Ibid.* at 141.

28 CPMI, *Fast Payments - Enhancing the speed and reliability of retail payments* (Basle: BIS, November 2016).

29 *Digital Innovation* at 147.

(c) The significant reduction in the settlement cycle of securities transactions (and with it, settlement and counterparty risks), and

(d) The merger of clearing and settlement into a single step upon the completion of trading.

On several occasions[30] the author raises the question as to whether DLTs are "systems" to which settlement finality safeguards are to be applied. His concluding remarks are[31] that:

1. Un-permissioned distributed ledgers cannot meaningfully be used for the initial issuance of securities, unless there is clarity on their governing law, on the legal effect of entries in them, on legal characterization (or status) of the assets recorded in them and the *locus* of the performance of the notary function;

2. There are considerable, mostly *technological* but also *functional* obstacles to be negotiated before DLTs can be used for the processing of multilateral public securities trading activities;

3. CCP clearing is unlikely to lose much of its relevance even in case of large-scale adoption of DLT in the securities space;

4. DLTs could at best be deployed to achieve flexible settlement cycles rather than as a means through which to introduce instant settlement in the securities space.

5. The ability of DLT platforms to achieve real-time DvP securities settlement will largely depend on whether they can synchronize the securities and the cash leg of the ledger, without which counterparty risk will remain, even in a DLT environment;

6. Subject to regulatory guidance, regarding finality, DLTs may qualify as "systems", so that their rules could deliver deterministic finality; and

7. DLTs will need to interoperate with existing FMIs.

Chapter 7 addresses central bank digital currencies (CBDC) as a forthcoming digital innovation. It purports to cover the motivation for central banks to engage with CBDC, concrete features, and the identification of principal legal issues. The author distinguishes between CBDCs and virtual currencies in terms of the identity of the issuer as well as being centrally vs. de-centrally issued. He goes on to observe[32] that "in contrast to banknotes, but in common with virtual currencies (and bank deposits), CBDC would be *intangible*" so that altogether

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[30] *Ibid.* at 150.

[31] See *ibid.* at 163-64, 166, 172.

[32] *Ibid.* at 177.

they would "combine the two main features of banknotes and virtual currencies (and bank deposits) as they would be central bank liabilities but in electronic form." However, "unlike banknotes but in common with virtual currencies, CBDCs would presumably serve *some* but not all the functions of money as they would normally not be denominated in a new unit of account." Finally, the author points out, "CBDCs could facilitate the settlement of digital (long-distance) payments." He thus generically defines CBDCs as "centrally issued digital equivalents of *fiat* money that are not intended as parallel units of account, which fulfill some of the functions of money (namely as means of payment and stores of value), and which can facilitate proximity and long-distant payments alike."

Most of these observations are valid and thoughtful. However:

1. As mentioned in connection with Chapter 4, virtual currencies need not be decentralized;

2. It is not clear to this reviewer why CBDC "would presumably serve *some* but not all the functions of money." Certainly, adherence to the official unit of account cannot be the reason and quite frankly, this reviewer cannot think of any reason for this qualification.

3. There are examples for proposed de-centrally issued CBDCs.[33, 34]

4. Conceptually, albeit impractically in normal conditions, there is no inherent obstacle in using banknotes for long distant payments e.g. when envelopes stuffed with cash are sent through reliable messengers.[35]

Three more comments are in place. First, the author distinguishes between wholesale (interbank) and retail CBDCs only in passing. Second, albeit on this one he follows the (unfortunately) prevailing thinking,[36] he does not distinguish between digital coins and value expressed digitally, in either a bank account or of e-money formats.[37] It is only where money is digitally expressed not only in the "generic value", namely, in a sum or account balance, but also where "both the face value and the identity of the money are carried digitally," that we have digital currency.[38] Access to the public to money either deposited at the central

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33 *Ibid.* at 185.

34 See e.g. Wendy McElroy, "Fedcoin: The U.S. Will Issue E-Currency That You Will Use" (12 January 2017), online: <https://news.bitcoin.com/fedcoin-u-s-issue-e-currency/>.

35 For the prevalence of physically transporting cash in Kenya prior to the introduction of mobile payments see *Law and Regulation of Mobile Payment Systems* at 30.

36 Most recently confirmed by Christian Barontini and Henry Holden, *Proceeding with caution - a survey on central bank digital currency* (BIS Papers No 101, January 2019).

37 For e-money in the form of monetary balance or value recorded electronically on and available from a stored-value product (SVP), as a decentralized bank account see e.g. Alan L. Tyree, "The Legal Nature of Electronic Money" 10 JBFLP 273 at 276 (1999).

bank or fully backed by it may more easily be implemented in the digital age but is by far not a new idea.[39] Finally, while discussing (at 203-04) issues relating to A CBDC as "legal tender," the author overlooks the impact of 'technological inaccessibility' to some members of the society.

Chapter 8 concludes by highlighting the transforming potential of technological innovation which nevertheless poses legal and regulatory challenges. At the same time, the author emphasises that it is premature to talk about a complete overhaul of the operation of the financial system, and by implication, its legal and regulatory framework, as opposed to introducing improvements. Considering the quickening pace of developments, the author already anticipates a future edition of the book possibly to coincide with the accumulation of more experience and practice.

Appended to the 223-paged text are a glossary, bibliography, tables and index. The glossary is quite helpful. For its part, the bibliography is detailed but being divided into various categories is not user friendly. It would have been better to have the bibliography divided by books and other publications. The index is too short and inadequate.

What may be missing from the book is a comprehensive vision on law and finance in the digital age. However, this can be the theme for a separate standalone book. The book reviewed here focuses on adjustments to the law, regulation and financial infrastructure relating to the various facets of the digital evolution progressing. As such, it is detailed and comprehensive except that the author does not give adequate attention to digital innovation outside DLTs and blockchain, namely, in centralized systems. But even from this perspective the discussion lacks a pointed evaluation of the blockchain as bypassing intermediation; currently characterized (at least so far) by slow processing, an absence of clearly identified authority, and limited transparency. Certainly these points are raised and addressed; what is however missing is a concluding discussion on this so as to evaluate the future impact of the DLT and the blockchain.

As indicated the book is quite analytical and dense so as to be read slowly and with great care. It is an excellent pioneering scholarly work of great interest to academics, policy makers and students in endeavouring to fill the gap between innovation and statutory and regulatory frameworks that do not foresee it coming. The author's venture to formulate a cohesive framework for dealing with fast moving developments of disruptive technological innovations is sincere and valuable. The book is an invaluable contribution in the study of legal and regulatory aspects of digital innovation in financial services.

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38 Gideon Samid, *Tethered Money: Managing Digital Currency Transactions* (Elsevier, 2015) at 25.

39 See e.g. William R. Allen, "Irving Fisher and the 100 Percent Reserve Proposal" (1993) 36:2 JL & Econ 703.