Oil, Food, Corruption and Blockchains — A Retrospective Examination of Iraq's Oil for Food Programme

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Abstract

Blockchain technology is touted to be a cure for many of the world's ills. It is said the technology can decentralise government power, increase security and guarantee privacy. In the context of this article, blockchain technology is also said to improve the distribution of foreign aid from wealthy countries to those nations less fortunate. The thesis of this article is that foreign aid programs should approach claims about the benefits of blockchain technology with some caution. In establishing this thesis, we explain what the technology involves, and then retrospectively consider how this technology could have assisted (or not assisted) the Iraq Food for Oil Programme. This thesis examines the shortcomings of blockchains, including the difficulty of tracing convertible goods (like wheat) through a single blockchain, and their dependence upon human and organisational cooperation to achieve anti-corruption outcomes. We perform our analysis primarily through a hypothetical application of blockchain to the Programme. Hindsight informs us that traditional anti-corruption tools were ineffective against the exploitation that occurred within the Programme. Our conclusion is that in most instances, blockchain anti-corruption tools would have been equally ineffective. We suggest that the use of blockchain technology be matched with additional measures to address the shortcomings of the technology in the distribution of foreign aid. It is only a combination of appropriate governance together with the technology that can deliver the outcomes that foreign aid providers seek.

1 Introduction

The hype surrounding blockchain technology is large, noisy, and increasing.[1] While there is no doubt that this emerging technology has many advantages and

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1 Michael Pisa and Matt Juden, 'Blockchain and Economic Development: Hype vs. Reality' (Policy Paper No 107, Center for Global Development, July 2017) 33.

possible applications, its use in the delivery and distribution of foreign aid is inadequately examined. This article fills that void. Currently, two schools of thought exist. The first view promotes an optimistic understanding of the potential of blockchains. It suggests that blockchain can address the issue of systemic corruption which occurs in foreign aid delivery,[2] and which is often cited as the reason for reducing the amount of aid given by countries.[3] There is evidence for this optimism. For example, managing cash-based transactions in Syrian refugee camps using blockchains has significantly reduced transaction costs and increased the monitoring of some aspects of food distribution supply chains.[4] Similarly, a successful electronic voucher system which matches aid allocations with blockchain stored identities has increased transparency in a Lebanese Syrian refugee camp.[5] Using blockchains has also been suggested as a way to improve health and education outcomes in Pacific Island nations.[6] But for enthusiastic advocates, this is not enough: for them, blockchain presents transformational possibilities for vulnerable people globally.[7] But for present purposes, its traction as a functional tool for foreign aid delivery is well-documented.[8]

The second approach suggests a more cautious attitude towards adopting blockchains in the context of foreign aid delivery. It rallies against the causal

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2 Brandon Cheliak, 'Blockchain: Defender of Foreign Aid – Fighter of Famine and Government Corruption', *Digital Currency Executive Brief* (3 April 2017) <https://dcebrief.com/blockchain-defender-of-foreign-aid-fighter-of-famine-and-government-corruption/>.

3 Joe Wolverston, 'Rand Paul Calls for Investigation of Foreign Aid Fraud', *The New American* (online, 2 May 2013) <https://www.thenewamerican.com/usnews/foreign-policy/item/15276-rand-paul-calls-for-investigation-of-foreign-aid-fraud>.

4 Pisa and Juden (n 1) 33.

5 'Blockchain Tech Partnership Could Boost Australian Aid Programs', *news.com.au* (online, 30 March 2017) <http://www.news.com.au/technology/innovation/blockchain-tech-partnership-could-boost-australian-aid-programs/news-story/951b46b8c9f49a307fe7bcd0d08ce254>.

6 Ibid.

7 Matthew De Silva, 'United Nations World Food Programme Uses Ethereum to Aid Syrian Refugees', *EthNews* (online, 14 June 2017) <https://www.ethnews.com/united-nations-world-food-programme-uses-ethereum-to-aid-syrian-refugees>.

8 Chris Dixon, 'Using a Blockchain Infrastructure to Distribute Foreign Aid', *paconsulting.com* (2018) <https://www.paconsulting.com/insights/using-a-blockchain-infrastructure-to-distribute-foreign-aid/#>; Rik Kirkland, 'How Blockchains Could Change the World', *mckinsey.com* (May 2016) <https://www.mckinsey.com/industries/high-tech/our-insights/how-blockchains-could-change-the-world>; Nir Kshetri, 'Can Blockchain Technology Help Poor People around the World?', *The Conversation* (1 May 2017) <https://theconversation.com/can-blockchain-technology-help-poor-people-around-the-world-76059>.

linkage from small-scale successes to wider adoption.[9] This more risk-averse attitude considers that in order for blockchain technology to be effective, 'a supportive regulatory environment' must also be established.[10] In the absence of this regulatory environment, the cautious advocates see blockchains as part of the remedial matrix, but not the panacea.[11]

It is our view that this more cautious approach is correct, and to provide evidence for this thesis, we examine how blockchain technology would (or would not) have lessened the opportunity for systemic corruption that occurred in the Iraq Oil for Food Programme. The scale of this program provides an appropriate means of testing the claims that small scale blockchain applications are also suitable for significantly larger programs.[12] A retrospective analysis also allows for a more comprehensive examination of an aid program since such larger scale foreign aid programs which use blockchains are yet to be implemented. In doing this, we first provide a primer on blockchain technology (Part 2). After that, we use the Iraq Oil for Food Programme (a Programme operating from 1996 to 2003 to provide the Iraqi regime with means to provide humanitarian goods to their people) as a vehicle to outline the possibilities and limitations of using blockchain technology to ensure the appropriate delivery of the foreign aid (Part 3). We then examine the challenges of improving distribution and quality control. Here we make the thesis that the successful use of this technology is only possible if the program design includes appropriate regulatory oversight (Part 4). We conclude by suggesting that blockchain technology is not the panacea for corruption and abuse within foreign aid delivery and distribution, but that it can provide a critical piece of the armoury to ensure that foreign aid is delivered to the person to whom it was intended (Part 5).

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9 Transparency International, 'Promise and Peril: Blockchain, Bitcoin and the Fight against Corruption' (31 January 2018) <https://www.transparency.org/news/feature/blockchain_bitcoin_and_the_fight_against_corruption>; Pisa and Juden (n 1); Gareth W Peters and Efstathios Panayi, 'Understanding Modern Banking Ledgers Through Blockchain Technologies: Future of Transaction Processing and Smart Contracts on the Internet of Money' in Paolo Tasca et al (eds), *Banking Beyond Banks and Money: A Guide to Banking Services in the Twenty-First Century* (Springer, 2016).

10 Pisa and Juden (n 1) 35.

11 Kibum Kim and Taewon Kang, 'Does Technology against Corruption Always Lead to Benefit? The Potential Risks and Challenges of the Blockchain Technology' (Conference Paper, OECD Global Anti-Corruption and Integrity Forum, 2017) 1.

12 Matthew De Silva, 'United Nations World Food Programme Uses Ethereum to Aid Syrian Refugees', *EthNews* (online, 14 June 2017) <https://www.ethnews.com/united-nations-world-food-programme-uses-ethereum-to-aid-syrian-refugees>; World Food Programme, 'Blockchain against Hunger: Harnessing Technology in Support of Syrian Refugees' (30 May 2017) <https://www.wfp.org/news/news-release/blockchain-against-hunger-harnessing-technology-support-syrian-refugees>.

2 *Overview of Blockchains*

Blockchains are essentially digital ledgers used to facilitate transactions between individuals without the need for a trusted third party.[13] Transactions are authenticated using computer algorithms and then grouped into blocks.[14] These blocks form the blockchain (the term blockchain is designed to give a visual image as to what is occurring), which is distributed to users who can view all transactions within the blockchain.[15] Individual users cannot alter transactions once they have been authenticated; they can only add new transactions. This ensures the ledger's veracity while avoiding multiple entries of a unique transaction. Double spending or double counting is eliminated: the computer algorithms replace the function of the trusted government entity (such as a Reserve Bank or a Registry Office) or the trusted third party (such as a notary), in validating the transaction that has occurred. By removing the person in the middle and trusting the world of binary computation, we move from single point dependency of a human agent to one where the dependency rests on irrefutable, incorruptible, and irreversible mathematical formulas.

Blockchains can be categorised in two different ways. First, they may be permissionless, whereby any person can participate in the verification process, or permissioned, which would involve a verification requirement that would only be given to some people. Blockchains might also be categorised as public, whereby anyone can submit a transaction to the blockchain, or private, whereby only certain users can do this. The reality is that most permissionless blockchains are public (eg Bitcoins) whereas permissioned blockchains will often be private (eg a warehouse operator that stores the goods would not need to have access to the buying and selling price of the goods). Accordingly, the more significant categorisation is whether the blockchain is permissioned or permissionless.[16]

When the reliance on mathematical irrefutability is combined with the access to blockchains,[17] the decentralised storage (i.e. what is known as the distributed ledger) can operate to benefit foreign aid programs which involve multiple stakeholders. It can potentially guard against systemic corruption enabled by the behaviour of rogue agents of the state by requiring multiple stakeholder verifications for a distribution or delivery of aid. Unless there is collusion between disparate entities, the opportunities for fraud should lessen. But as we will show, there are certain tangibles within the context of foreign aid that prevent blockchains alone from achieving these ends. These tangibles concern the

[13] Peters and Panayi (n 9) 242.

[14] Luis Gallego, 'Blockchains and Title Registration' (2017) 1 *International Review – International Property Registries Association* 26, 36.

[15] Ibid 28.

[16] Peters and Panayi (n 9) 241.

[17] Ibid 243.

delivery of the goods, their quality, and access to the funds of the sale or purchase.

For most people, the area where blockchain technology is most recognisable is the area of cryptocurrencies, such as Bitcoins. These cryptocurrencies are exchanged through blockchains deriving their value from traditional currencies, other cryptocurrencies,[18] or physical assets.[19] In the context of foreign aid, they can also be used in place of traditional escrow accounts (which is discussed further in Part 3).[20] A further emerging area of blockchain technology involves so-called 'smart contracts.' Smart contracts involve the storage of contractual agreements within a blockchain.[21] These agreements are written into a computer program that automatically executes when certain parameters are met.[22] An illustration of a foreign aid application of smart contracts involves funds being programmed to transfer from donors to specific projects or organisations upon the commencement or completion of predetermined stages.[23] The use of smart contracts to reduce administrative burdens and limit illicit payments is explored in Part IV. It is these two applications of the blockchain technology (cryptocurrencies and smart contracts) that are seen as having the most potential in assisting foreign aid delivery and distribution. They are the focus of this article.

3 Overview of the Iraq Food for Oil Programme, and its Problems

In the early 1990s, economic sanctions were imposed on Iraq by the UN Security Council. Done to promote or coerce Iraq into disarming,[24] the desire was fuelled by the perceived need to reduce Iraq's arsenal following the First Gulf War of the early 1990s. These sanctions produced significant suffering for the Iraqi people

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[18] Ethereum, 'Ether: The Crypto-Fuel for the Ethereum Network' (Web Page, 2017) <https://ethereum.org/ether>.

[19] Ethereum, 'Create Your Own Cryptocurrency' (Web Page, 2017) <https://ethereum.org/token>.

[20] A recent illustration of the use of cryptocurrencies can be seen in the use by the Venezuelan government of the petro currency: Kirk Semple and Nathanial Popper, 'Venezuela Launches Virtual Currency, Hoping to Resuscitate Economy', *New York Times* (online, 20 February 2018) <https://www.nytimes.com/2018/02/20/world/americas/venezuela-petro-currency.html>.

[21] Gallego (n 14) 47.

[22] Adriana Jacoto Unger, Joao Marcos M Barguil and Flavio S Correa da Silva, 'Blockchain Technology: The Last Mile for Electronic Land Registry Systems' (2017) 1 *International Review – International Property Registries Association* 52, 54; Peter and Panayi (n 9) 245.

[23] Kevin Werbach and Nicolas Cornell, 'Contracts *Ex Machina*' (2017) 67 *Duke Law Review* 313, 336.

[24] *Report from Susan S Westin United States General Accounting Office International Affairs and Trade to Tom Harkin US Senate* (23 May 2002) 1 <http://www.gao.gov/new.items/d02625.pdf> ('*GAO Report*').

when the government was unable to purchase food due to a lack of hard currency and depletion of its gold reserves.[25] Security Council resolutions proposed the Programme to end the humanitarian cost borne by the Iraqi people.[26] Saddam Hussein, then President of Iraq, opposed these resolutions from 1991 to 1995[27] as he was not willing to accept significant UN control of the Programme nor the in-country oversight of the humanitarian goods distribution.[28] After lengthy negotiations, Iraq agreed to the Programme in 1996.[29] Iraq was given discretion over the issuing of oil allotments as well as determining who could sell goods under the Programme.[30] There were also significant restrictions on in-country oversight of the distribution of goods.[31] The Programme was implemented for six months and renewed in six-month intervals via Security Council resolutions until 2003 when the United States invaded Iraq.[32]

The premise of the Programme was relatively straightforward. Oil allotments were purchased with the proceeds going into a UN escrow account.[33] Humanitarian and other non-military goods would then be purchased from the proceeds of the oil sales.[34] The Programme was intended to provide countries with access to Iraqi oil while preventing the Iraqi government from using the receipts for military purposes.

Committee 661, named after the Security Council resolution that first implemented sanctions against Iraq, was tasked with reviewing and approving the Programme's transactions and contracts.[35] It consisted of representatives from the Security Council who determined that any decision made by the

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25 John Agius, 'The Cole Inquiry into Certain Australian Companies and the UN Oil for Food Programme: Lessons for Government' (2008) 57 *Australian Institute of Administrative Law Forum* 1, 1.

26 SC Res 706, UNSCOR, 46th sess, 3004th mtg, UN Doc S/RES/706 (15 August 1991); SC Res 706, UNSCOR, 46th sess, 3008th mtg, UN Doc S/RES/712 (19 September 1991).

27 *GAO Report* (n 24) 4.

28 Jeffry A Meyer, Mark G Califano and Paul A Volcker, *Good Intentions Corrupted: The Oil-for-Food Scandal and the Threat to the UN* (Public Affairs, 2006) 215–16.

29 Linda Courtenay Botterill and Anne McNaughton, 'Laying the Foundations for the Wheat Scandal: UN Sanctions, Private Actors and the Cole Inquiry' (2008) 43(8) *Australian Journal of Political Science* 583, 585.

30 Meyer, Califano and Volcker (n 28) 27.

31 Ibid 215–16.

32 Ibid 131; 'War on Iraq Begins', *BBC* (online, 20 March 2003) <http://news.bbc.co.uk/2/hi/middle_east/2866109.stm>.

33 SC Res 706, UNSCOR, 46th sess, 3004th mtg, UN Doc S/RES/706 (15 August 1991), [1].

34 Ibid [2].

35 Ibid 23.

Committee required the unanimous consent of all 15 members.[36] The Secretary-General and Secretariat had powers to:

- select the bank to manage the escrow account;
- appoint inspections companies to monitor exports and imports;
- review and approve the distribution of humanitarian goods;
- provide a preliminary review of goods contracts;
- observe and monitor in-country goods entering Iraq; and,
- report to the Security Council on the program's implementation.[37]

Countries and individuals Iraq deemed to be acting in its best interests received the majority of the allocation and supply contracts.[38] In total, Iraq sold $64.2 billion worth of oil to 248 companies and 3624 companies sold $34.5 billion in goods to Iraq.[39] This Programme had an Australian dimension. The Australian company AWB Ltd ('AWB'), a wheat supplier, provided goods worth some $2.3 billion.[40]

In 1999, Iraq began charging kickbacks to its goods suppliers under the guise of in-land transportation fees as well as port costs. [41] These fees were not part of the Programme's design.[42] After-sales service fees were also collected from goods suppliers.[43] The following year, surcharges were applied to oil allotments.[44] The tendering process of goods contracts also incurred additional fees. [45] These payments were made to third parties and banks operating outside the Programme [46] or directly to Iraqi embassies. [47] The costs of kickbacks were

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36 Ibid 24.

37 Ibid 26.

38 Independent Inquiry Committee, *Manipulation of the Oil-for-Food Programme by the Iraqi Regime* (Report, 27 October 2005) 261–2 ('*Volcker Report*').

39 Ibid 1.

40 Ibid 262.

41 Ibid 263–4.

42 Meyer, Califano and Volcker (n 28) 136.

43 *Volcker Report* (n 38) 277.

44 Ibid 623.

45 Ibid.

46 Ibid.

47 Meyer, Califano and Volcker (n 28) 86–7.

reimbursed to goods companies from the UN escrow account.[48] A total of $1.8 billion in illicit payments were made to Iraq throughout the programs.[49] AWB was a recipient of revenue kickback.[50] Its $221 million in illicit payments almost matched the $228 million generated from the entire oil surcharge scheme.[51]

These illicit payments undermined the intentions of the Programme to restrict Saddam Hussein's access to hard currency which he was using to bolster his military. However, the Programme's failure to restrict illicit payments does not mean the entire program failed. Significant humanitarian gains were made for Iraqis from the increased flow of goods[52] in the areas of agriculture, food, health, and nutrition.[53] Childhood malnutrition, which was prevalent during the early 1990s, was alleviated through the Programme.[54] By 2001, the average daily food intake increased calorically to levels above the standard food aid requirement recommended by the World Health Organisation. [55] These improvements occurred in spite of systemic corruption within the Programme which allowed illicit funds to flow to the Iraqi regime and which impeded appropriate monitoring. It is these systemic barriers to which we now turn.

3.1 Acceptance of Illicit Payments

Benon Sevan, the UN's representative and chief coordinator for the Programme, saw his purpose as getting food and medicine to Iraqis and not to report kickbacks which he believed were simply part of the Iraqi culture.[56] The UN, primarily a political organisation,[57] had to weigh the political concerns of 192 member nations against the administrative concerns of the Programme.[58] Private companies, like AWB, wanted access to a market which accounted for 12 per cent of Australia's wheat exports prior to the sanctions.[59] AWB was not prepared to bear the cost of losing renewed access to the Iraqi market simply because the

48 Ibid 112.

49 Ibid xxxvi.

50 Botterill and McNaughton (n 29) 586.

51 Meyer, Califano and Volcker (n 28) 118.

52 Russel P McAleavey, 'Pressuring Sudan: The Prospect of an Oil-for-Food Program for Darfur' (2008) 31 *Fordham International Law Journal* 1058, 1083.

53 *GAO Report* (n 24) 9.

54 McAleavey (n 52).

55 *GAO Report* (n 24) 8.

56 Meyer, Califano and Volcker (n 28) 202.

57 Ibid xxiv.

58 Ibid xxix.

59 Botterill and McNaughton (n 29) 584.

Australian government had agreed to the Programme's sanctions.[60] All of these factors were influenced by a genuine belief that constraining the Programme in any way could create 'potentially adverse humanitarian consequences'. [61] Undoubtedly, the challenge of identifying and combatting corruption within the Programme was significant given its scale.[68]

3.2 Iraq's Interests

The Iraqi regime, by rejecting the UN's initial Oil for Food offers, ensured they would have significant discretion about the Programme's operation. This discretion allowed Saddam Hussein to concentrate oil allocations and supply contracts to countries, companies, and individuals whom he considered to be political allies. [62] Within a few years, Saddam Hussein began enforcing his discretion in order to manipulate the Programme to favour not only political allies but those who were prepared to make illicit payments in exchange for allocations and contracts.[63] Saddam Hussein understood the UN's reluctance to challenge his corruption because the UN wanted to see the continuation of the Programme as well as seek to promote peace in the Middle East.[64] Simply put, Iraq's interests prevailed over any attempts to adequately administer the Programme.

3.3 Security Council's Interests

Over the discretion provided to the Iraqi regime, the political machinations of the UN Security Council also prevented any appropriate oversight. The significance of political interests within the Programme is well expressed by the chairman of its steering committee who said, 'everything about [the Programme's] implementation was political, and no aspect could be assessed purely on its merits.'[65] Implementation and administration were further politicised when the 661 Committee determined that all decisions required the consensus of all 15 representatives from the UNSC. The resulting paralysis inhibited effective decision making and perpetuated an environment where illicit payments could flourish. By way of illustration, there was no requirement for the 661 Committee to report any violation of the Programme, beyond arms trafficking, to the UN.[66] Suspicions of illicit payments, or actual proof thereof, were therefore not

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60 Ibid 583.

61 Meyer, Califano and Volcker (n 28) 177.

68 Ibid 210.

62 *Volcker Report* (n 38) 261.

63 McAleavey (n 52) 1077.

64 Ibid 1081.

65 Myer, Califano and Volcker (n 28) 43.

66 Ibid 25.

investigated.[67] For instance, ports fees had not been included in the original design of the program so purchasers were left in a legal dilemma.[68] They could abide by the sanctions and not pay the fees, but then as a consequence, they would not receive oil.[69] The alternative was to breach the sanctions and pay the Iraq government the port fees in order to access the oil.[70] In response, the British representative on the 661 Committee proposed port fees be added to the contracts paid into the escrow account so they could be monitored.[71] The Committee ignored the suggestion and instead accepted advice from the UN's Office of Legal Affairs ('OLA') that it was permissible to pay the fees in Iraqi dinars which could only be exchanged in Iraq.[72] The OLA provided no legal rationale for this.[73]

In addition to these problems, the UN did not have the staff needed to monitor the Programme. At the start of the Programme, when oil allocations were relatively small, three overseers existed.[74] For the remainder of the Programme, which grew significantly, only three, and for a time, one overseer, were in place.[75] Programme auditing experienced similar constraints. UN practices would have routinely required 160 auditors be used for a Programme this large, but only five to six were assigned at any one time.[76] When a limited audit was conducted in 2003, it was suppressed by Benon Sevan because he thought it would 'hurt the United Nations.'[77]

3.4 Escrow Account and Conflicts of Interest

The problems provided by the political machinations were not the only issue. BNP, the bank approved by the UNSC to provide the escrow account, was required to provide security for the purchasers of oil allocations through letters of credit financing.[78] Initially, BNP was to provide letters of credit covering purchasers' banks in the event the bank failed to provide the payment for oil

67 Ibid.

68 Ibid 136.

69 Ibid.

70 Ibid.

71 Ibid.

72 *Volcker Report* (n 38) 623.

73 Meyer, Califano and Volcker (n 28) 136.

74 Ibid 133–5.

75 Ibid.

76 Ibid 227.

77 Ibid 228.

78 Ibid 101.

allocations.[79] Over time, BNP began directly providing letters of credit to purchasers, not their banks. When the Programme ended, 72 per cent of all letters of credit for oil transactions had been provided by BNP.[80] Providing this financing created a situation where BNP's loyalties could be divided between two groups of customers: the United Nations and the companies purchasing oil.[81] The UN's transparency requirements regarding the identity of purchasers inevitably conflicted with the interests of third-party companies purchasing oil.[82] The bank was in an intolerable position; it was a servant to two masters.

3.5 Third Parties and Surcharges

As previously noted, three years after the Programme commenced, Saddam Hussein began using the discretion in relation to oil allocations to leverage surcharges from existing purchasers.[83] Many existing purchasers were not willing to pay surcharges, resulting in their allocations being given to those willing to pay.[84] Oil traders and individuals operated shell companies financially backed by larger corporations who paid the surcharges in order to be assigned the oil allocations.[85] Assignment of allocations required approval from the 661 Committee[86] but this approval was not generally sought. These third parties were customers of BNP and disclosing their financial arrangements in favour of UN disclosure requirements would violate the confidentiality the parties requested from BNP.[87] BNP's failure to disclose the assignments violated the agreement BNP had with the UN.[88]

These examples demonstrate the lack of political will within the UNSC and key Programme personnel to address illicit payments, conflicts of interest, the difficulties with the financial arrangements and the inherent political discretion given to a nation-state and its leader. But it is this need for political will in a Programme of this nature, and not unnaturally, often needed in foreign aid distribution, that can render mute the singular advantage of blockchain technology: immutability. They demonstrate how a purely technical solution to a Programme this large was never likely to succeed. The discretion given to the

79 Ibid.

80 Ibid.

81 *Volcker Report* (n 38) 6.

82 Myer, Califano and Volcker (n 28) 102.

83 Ibid 84.

84 Ibid.

85 *Volcker Report* (n 38) 6.

86 Meyer, Califano and Volcker (n 28) 104.

87 *Volcker Report* (n 38) 6.

88 Ibid.

Iraqi regime that allowed the introduction of the Programme prevented the wholesale adoption of the benefits of blockchain technology. Having said this though, this failure should not be used to discount the potential benefits blockchains can bring to foreign aid. These benefits will be discussed in response to specific issues within the Programme. When these issues are isolated, the utility of blockchains can then be evaluated.

4 A Blockchain Response

In this section, we examine the efficacy of blockchain technology as a means to address the problems that occurred in the Iraq Food for Oil Programme. Two possibilities exist. The first lies in the use of cryptocurrencies, and in this context we will specifically consider the most well-known cryptocurrency, Bitcoin. The second possibility involves the use of smart contracts, automatically preconditioned to function as a result of conditions being met. In this context we will consider the role of Ethereum, with its underlying currency, the Ether, being used to buy computational power to execute smart contracts.

4.1 Bitcoins

Would Bitcoin be a suitable alternative to the financing arrangements previously outlined? Bitcoin allows for peer-to-peer transactions without the need for a third party to record or administer that transfer of funds.[89] The Bitcoin's ledger is simultaneously pseudonymous yet public. Parties trading on the Bitcoin ledger are not identified by their name but by a pseudonym which links their Bitcoin address with a specific transaction.[90] Bitcoin's blockchain ledger is distributed to every user, making them nodes of the blockchain.[91] Each node can view all transactions on the ledger.[92] Bitcoin transactions are completely public to all Bitcoin users, yet virtual anonymity remains a key component of Bitcoin's blockchain through its use of pseudonymity. Bitcoin users are not required to provide any personal information, allowing for Bitcoin addresses to be created by simply providing an email address.[93] The use of this address could be limited to registering a Bitcoin account, concealing the identity of the user. Using the Bitcoin's ledger to trace specific transaction amounts also does not guarantee identification of specific users. Individual users can attribute transactions to multiple accounts and even divide the transactions across accounts.[94]

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89 Gallego (n 14) 28.

90 Bitcoin, 'FAQ' (Web Page, 2018) 12 <https://www.bitcoin.com/faq>.

91 Gallego (n 14) 28.

92 Ibid.

93 Ibid 30.

94 Ibid 31.

In a sense, the blockchain that underlies the Bitcoin provides the role of the trusted regulator or notary — the obligation to which the United Nations failed in the Iraq Oil for Food Programme. Given that Bitcoin has no ongoing commercial relationships with those using its blockchain beyond the recording and facilitating of transactions,[95] it undoubtedly had the potential to redress the conflict of interest that bedevilled the affairs of BNP. There would be no need to maintain the confidentiality of companies or individuals purchasing or financing the purchase of oil allocations. The public nature of Bitcoin's blockchain ledger could render the confidentiality issues of the Programme moot, but for the complexity of tracing Bitcoin transactions. On its face, therefore, Bitcoins would have alleviated some of the problems that were outlined.

Having said this though, Bitcoin's use of pseudonymity makes it a questionable alternative to the escrow account used in the Programme. Assignment of oil allocations to third parties would not be subject to any greater scrutiny if Bitcoin was used instead of the escrow account even though BNP's conflict of interest would be eliminated. The pseudonymous nature of the blockchain that represents the heart of the decentralised currency model would have simply allowed the illegal payments to be made under a different disguise. It is difficult to think that such payments are not currently being made to support the financing of operations of states currently subject to economic sanctions.[96] What is more likely to be beneficial is some form of permissioned blockchain[97] supporting the smart contracts that govern aid delivery. It is this to which we now turn.

4.2 Smart Contracts and Ethereum

Suppliers of foreign aid through the Programme negotiated with Iraq on the price of each commodity, transportation costs, insurance, and other expenses.[98] Negotiations regarding these expenses were conducted outside the Programme's

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[95] Ibid 28.

[96] For example, it has been suggested that Iran and North Korea are both looking at developing their own cryptocurrencies: James MacSmith, 'North Korean Hackers are Secretly Mining a Cryptocurrency Rival to Bitcoin', *News Ltd* (online, 11 January 2018). See also 'Iran Cryptocurrency Project on Track Despite Cenbank Ban, Minister Says', *Reuters* (online, 29 April 2018) <https://www.reuters.com/article/uk-crypto-currency-iran/iran-cryptocurrency-project-on-track-despite-cenbank-ban-minister-says-idUSKBN1HZ0O6>.

[97] Whereas a public blockchain allows access to anyone with sufficient computational power, a permissioned blockchain (and a private blockchain) will restrict access to certain people for certain reasons, with specific privileges. So the shipment of wheat from Australia to Iraq may involve land transportation arrangements in Australia, sea transportation to Iraq, custom arrangements, warehousing, distribution arrangements on land in Iraq — all of these parties may be given access to the blockchain but only for specific purposes.

[98] *Volcker Report* (n 38) 263.

framework as UN approval was not sought by suppliers. Payments were made to suppliers and then reimbursed from the escrow account.[99] As the size of these payments increased — due to the rise in illicit payments — the gap between the amount paid for commodities, and their price on the international commodity markets, including transportation costs, also increased.[100] This gap was not addressed for a variety of reasons including a substantial increase in the number of contracts, their complexity, under-resourcing of customs officials, and the failure to employ officials with expertise in commodity markets.[101] Simply said, the issues resulting from the UN's failure to adequately resource the inspection of goods and their related contracts cannot be comprehensively addressed through blockchains. Smart contracts, however, have the capacity to reduce the inspection burden. Though, as we will show, their irreversible nature may still result in unforeseen negative consequences. Smart contracts are supported by permissioned blockchains, and for our purposes, we will focus on Ethereum to illustrate the possibilities it allows for.[102]

Ethereum moves beyond the public, pseudonymous blockchain technology exemplified by Bitcoins. As a platform that permits the management of smart contracts without any possibility of fraud or third-party interference, Ethereum focuses on generating tokens which are only narrowly accessible within a private permissioned system (by contrast Bitcoin has broad applicability).[103] These tokens can only be exchanged by those within the permissioned blockchain for traditional currencies, cryptocurrencies,[104] and physical assets.[105] A permissioned blockchain differs from Bitcoin as it limits the number of potential users through a central authority.[106] The use of such an application in place of an escrow account may, hypothetically, increase the transparency in the assignment of oil allocations. And this is what Ethereum permits: the creation of a sui generis cryptocurrency embedded within the regulation of a smart contract. We now examine how this may have assisted in reducing the systemic corruption noted in Part 3.

99 Meyer, Califano and Volcker (n 28) 110.

100 Ibid 213.

101 Ibid 210.

102 *Ethereum* (Web Page) <https://www.ethereum.org/>. Ethereum is run by a Swiss nonprofit organisation ('The Ethereum Foundation').

103 Ethereum, 'Ether: The Crypto-Fuel for the Ethereum Network' (Web Page, 2017) <https://ethereum.org/ether>.

104 Ibid.

105 Ethereum, 'Create Your Own Cryptocurrency' (Web Page, 2017) <https://ethereum.org/token>.

106 Peters and Panayi (n 9) 245.

4.2.1 A Hypothetical Cryptocurrency

The application of a permissioned cryptocurrency system would require oil allocations to be restricted via the regime's discretion or by a pre-existing number of purchasers.[107] These purchasers would pay for oil allocations using the application-specific cryptocurrency. The cryptocurrency's value could be determined by the amount of traditional currency needed to purchase it for use in the system. For example, the current price of crude oil could be used to establish a par value for the cryptocurrency. If the price, at the time of purchase, of a barrel of crude oil was $50USD on the appropriate commodity market, then 50 units of the cryptocurrency would be purchased for $50USD per barrel. Determining the number of tokens used in this blockchain application could be based on an estimation of the total value of the oil allocated under the Programme. If the oil allocations increase, new tokens could be generated on a bi-annual basis following the time-frames set for review of the Programme.[108]

Once the cryptocurrency units enter the permissioned system they could then be traded with foreign aid suppliers. The cryptocurrency would need to be exchangeable with other currencies in order for suppliers to receive real value for their goods and services. Those needing to convert the cryptocurrency need not be limited to suppliers but could include costs associated with the blockchain, administration, oil production, and domestic recovery projects.[109] The real value for these expenses could be achieved through the ongoing payments for oil. After the initial payments, the cryptocurrency could be bought from suppliers allocated units for their goods and services.[110]

4.2.2 An Illustration: AWB Payments through Cryptocurrency

AWB's provision of wheat to Iraq provides an example of how real value could be derived from a permissioned cryptocurrency. For example, a 40,000 metric tonne shipment of wheat valued at $8 million USD[111] might entitle AWB to 8

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[107] McAleavey (n 52) 1091.

[108] Meyer, Califano and Volcker (n 28) 131.

[109] McAleavey (n 52) 1091.

[110] $64.2 billion was raised from oil purchases during the Programme and only $34.5 billion was spent on humanitarian goods in Iraq. The remaining approximate $29.7 billion was used for a variety of expenses including administration, weapons inspections and provision of goods to Northern Iraq. Approximately, $1.55 billion of the oil revenue was used to reimburse suppliers for illicit payments. *Volcker Report* (n 38) 1; Meyer, Califano and Volcker (n 28) 21.

[111] Amounts are merely intended to provide an example and should not be regarded as accurately reflecting the cost of individual wheat shipments during the Programme. Prices for individual shipments were determined by negotiation and included expenses beyond the wheat purchased: *Volcker Report* (n 38) 270.

million cryptocurrency units. These units would have limited value until they were exchanged for other currencies or goods.

A permissioned cryptocurrency, like the one proposed, is not intended to operate beyond the longevity of the Programme. At the conclusion of the Programme, any cryptocurrency held by suppliers would have to be exchanged from the funds initially paid for the first allotments of the cryptocurrency.

4.2.3 Prevention of Illicit Payments through the Cryptocurrency

AWB's illicit payments were not an isolated occurrence. A sampling of $3 billion worth of contracts by the US Department of Defence estimated over-pricing amounting to $600 million.[112] This over-pricing was often a way of ensuring the costs of illicit payments were recouped via the BNP escrow account.[113] Application of a cryptocurrency on its own, like the one proposed here, would, however, be unable to prevent the recouping of illicit payments. A shipment valued at $8 million could include $7 million worth of wheat and $1 million in additional fees and illicit payments. The cryptocurrency system would only concern itself with the amounts being transacted, not the substance of the transactions. A supplier's ability to hide illicit payments in the cryptocurrency as they did with the BNP escrow account demonstrates that a permissioned blockchain-based cryptocurrency is only part of the solution in preventing illicit payments. Additional measures need to be part of the matrix.

4.2.4 The Additional Factors Needed to Ensure Compliance

A smart contract could include contract terms for a delivery of wheat including in-land freight, port, and insurance costs. Upon the arrival of the ship and acceptance of the delivery by the appropriate authorities the contract would be executed. This execution could involve payment to the supplier's account as well as payments to the port and in-land shipping companies via the UN escrow account or permissioned cryptocurrency equivalent. Execution of a smart contract would help ensure funds are only sent to an approved supplier. Funds, however, could still be diverted to unintended parties if smart contracts were designed to allow payment to suppliers acting as fronts, as occurred with in-land freight costs.[114]

Inappropriate payments, while not being eliminated by smart contracts, would have their size limited. An in-land shipping expense contracted to be $1.2 million could not be amended to a larger amount since smart contracts cannot be amended once they enter a blockchain.[115] The onerous task of auditing the many

[112] Meyer, Califano and Volcker (n 28) 109.

[113] Ibid 112.

[114] *Volcker Report* (n 38) 5.

[115] Peters and Panayi (n 9) 256.

contracts associated with a large program such as this could also be reduced by smart contracts. Programming within smart contracts could eliminate the need to review the many repetitive details needed to manage large-scale cross-country transactions.[116] The cost of auditing and monitoring would be reduced, but the political dimension in this context becomes critical. Lack of trust between Saddam Hussein's regime and the United Nations was at the very heart of the difficulties. If blockchains are to be effective in this scenario, then this underlying sense of distrust between foreign aid providers and recipients would need to be addressed. In this sense, governance arrangements that reflect a true consensus based on what is to occur are paramount. Once this trust is established, then the smart contract can be coded to ensure that the preconditions that support that trust are binarily embedded within the contract. The trust is established at the human level, the verification at the mathematical. Both parties need to have the incentives to compromise in that initial garnering of trust.

A number of variables could also be included in foreign aid supply smart contracts[117] to restrict suppliers' ability to hide illicit payments. Commodity prices could be linked in real-time to commodity markets. Port costs, in-land freight and shipping costs could be negotiated bi-annually and applied to all suppliers. Smart contracts would eliminate the need for each supplier to negotiate every term of the contract. A blockchain-based standard form contract could apply to all suppliers only requiring variations regarding the type and quantity of the commodity supplied. Payment terms of a smart contract can be rigidly linked to actual expenses.

4.2.5 Why It's Impossible to Solely Rely On Smart Contracts

Reconciling the number of goods received or sold with the terms of a smart contract requires on-site monitoring. Persons given monitoring responsibilities can be subject to corruption. For example, oil purchases under the Programme frequently involved the topping up of barrels. In 2001, one purchaser paid for more than 200 000 barrels per shipment in hard currency directly to Iraqi accounts, bypassing the BNP escrow account.[118] These illicit purchases were facilitated by an on-site inspector who received $100 000 in bribes.[119] Smart contracts would execute without having knowledge of this illegal payment.

Ensuring the quality of goods received under the Programme was also problematic. Saddam Hussein's preferred suppliers often produced inferior goods or failed to ensure the quality of the goods.[120] The use of the BNP escrow

[116] Kim and Kang (n 11) 11.

[117] Peters and Panayi (n 9) 240.

[118] Meyer, Califano and Volcker (n 28) 98.

[119] Ibid.

[120] Ibid 107.

accounts meant Iraq could not require suppliers to post bonds that could be retained if substandard goods were supplied.[121] Smart contracts would execute regardless of the quality of goods once the terms of the contract have been fulfilled. Execution of smart contracts could only be prevented if those monitoring the receipt of goods rejected the goods at the point of delivery or at some other specified point in the transaction. The smart contract would remain unexecuted so long as the goods were not recorded as received. Delaying the execution of smart contracts would have been unlikely to occur in the Iraq Programme due to the inadequate level of monitoring and political incentives to accept substandard goods.

The intention to restrict the Iraqi military from receiving any benefits from the goods suppliers was fundamental to the Programme. The receipt of finances through illicit payment schemes and the smuggling of oil has already been discussed. There was genuine concern from the UNSC that that Iraqi military would access foreign aid intended to benefit Iraq's civilian population. Dual-use materials — material that could have a civilian or military purpose — were of particular concern.[122] Foreign aid often ended up being used by Iraq's military due to the lack of international consensus regarding the monitoring of dual-use items and the lack of adequate internal monitoring of the distribution of foreign aid.[123] On the rare occasions that monitors discovered the apparent use of foreign aid by Iraq's military, inter-departmental loans were used to justify any anomalies. [124] Iraq's Ministry of Agriculture also frequently fronted as a purchaser for the Ministry of Defence. [125] Hypothetically, execution of smart contracts could require a variable that the designated end-user of foreign aid physically receives the goods. This solution is problematic because the goods could be seized by a military force after verification by the smart contract. Even if the goods remain with the appropriate end-user, private companies may be unwilling to accept the resulting indefinite payment terms.

The use of smart contracts within a permissioned cryptocurrency system could reduce the size of illicit payments and the complexity of monitoring large foreign aid programs. However, they would not be able to counteract monitoring failures due to corruption. Incorrect quantities, substandard quality and inappropriate distribution of foreign aid cannot be eradicated by smart contracts. Smart contracts have the potential to assist foreign aid programs but must be implemented in combination with adequate monitoring and auditing procedures to ensure that physical quantities match smart contract details (i.e. that 10,000

[121] Ibid.

[122] *GAO Report* (n 24) 22.

[123] Kenneth Katzman, *Iraq: Oil-For-Food Program, International Sanctions, and Illicit Trade* (Congressional Research Service, Library of Congress, 2003) 3.

[124] *Volcker Report* (n 38) 294.

[125] Meyer, Califano and Volcker (n 28) 108.

units are in fact delivered as ordered); that quality is rejected if substandard; and, finally, that monies are forwarded and accessed only by the trusted parties within the process.

5 Conclusion

The scale of the Iraq Oil for Food Programme is unlikely to be seen in the majority of other foreign aid programs. Its complexity in terms of stakeholder relationships and distribution networks is, however, not unique, as this level of complexity is indicative of most foreign aid programs. Even bilateral aid programs involve a complex arrangement of stakeholders when all the organisations and individuals involved in the distribution process are considered. For example, Australia's provision of aid to Papua New Guinea ('PNG') to establish 'well maintained transport infrastructure' demonstrates this inherent complexity. [126] This program was designed to encourage the procurement of goods and services from a range of national and international companies using Australian and PNG procurement practices.[127] The differing procurement standards between Australia and PNG highlighted the need for improved contracts and monitoring as the program progressed. [128] Varying procurement practices is only one example of the complexities experienced in foreign aid. Complexity is further increased when multiple donors and non-governmental organisations ('NGOs') are added to the mix of government departments and logistical networks within a recipient country. In many respects the Iraq Food for Oil Programme was probably the most complex UN humanitarian project ever attempted.

What we suggest is that the application of blockchains to foreign aid programs requires program-specific objective analysis. Accepting overly optimistic viewpoints about the potential of this technology may result in adopting blockchain applications that are not fit-for-purpose or entirely unsuitable. The effectiveness of blockchains as anti-corruption tools depends upon a variety of factors including the regulatory environment into which they are being placed.

The Iraq Oil for Food Programme provides a hypothetical retrospective example of how blockchain anti-corruption tools can be undermined by poorly designed aid programs. Political interests within nations and the UN can create ineffective governance systems that cannot be overcome by blockchain applications. The

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[126] Australian Government Department of Foreign Affairs and Trade, 'Papua New Guinea — Australia Transport Sector Support Program (Phase 2) Design and Implementation Framework' (January 2013) iv <http://dfat.gov.au/about-us/publications/Documents/png-transport-sector-design-and-implementation-framework.pdf>.

[127] Ibid 75.

[128] Ibid.

blockchain on its own is not enough: more is needed. What is needed is the physical presence of trusted human agents on the ground to ensure that products requested are delivered, that quality is of the expected standard, and that the delivery is undertaken as proposed. Blockchain applications, particularly the Ethereum smart contract applications, assist but do not solve these issues. They guide the solution, but do not provide the answer. These conclusions should be carefully considered by organisations advocating for the use of blockchains in large-scale humanitarian programs.

Cryptocurrencies can reduce the ease with which illicit payments are made and can provide a control mechanism to limit access to foreign aid funding. Monitoring foreign aid supply contracts can become less onerous through the use of smart contracts. But it is the two in combination together with the trusted officials on the ground that will deliver the best response for the people in need. Blockchain applications should be regarded as pieces of a larger anti-corruption puzzle, not a panacea for all corruption. Individual foreign aid projects should be carefully analysed to determine where and how blockchain applications can be effectively added to their anti-corruption processes. This prompts a higher level research question: what is the framework that will determine whether the benefits of the blockchain application are worth the cost of implementation? Automation is irresistible and will occur. But how we respond to the difficulty is what defines people as a part of humanity, and for that, we need the creativity of the natural agent together with the precision and specificity of the technological wizardry. We must remember, after all, that foreign aid is about the delivery of resources to people desperately in need. Our principal obligation is never to forget this.