

Proposta de Projeto de Doutoramento a Desenvolver no Âmbito do 1º Concurso para Atribuição de Bolsas de Investigação na Área de Engenharia Informática

1. Título do projeto

Título: Regulation for blockchain-based cryptocurrencies in developing countries

Palavras-chave: Cryptocurrency, regulation, finance inclusion, developing countries

Referência: CEE_EI_IST2

2. Instituições envolvidas

Instituição onde o doutoramento será realizado: Instituto Superior Técnico (IST)

Outras instituições participantes no projeto de investigação: Ministério das Finanças de Cabo Verde, Banco Central de Cabo Verde, Bancos Centrais dos PALOP

3. Equipa de Orientação

Orientador: Prof. Miguel Mira da Silva

Coorientador: (especialista em Cabo Verde, se aplicável)

4. Descrição do Projeto

Cryptocurrencies may pose risks to central banks' monopoly over issuing base money, to price stability, to the smooth operation of payment systems, (Nabilou, 2019), because they are being used by corrupt firms and criminal organizations in illegal trafficking of drugs, terrorist activities and further cybercrime, (Albrecht et al., 2019),(Khan et al., 2019). In this scenarios, the mechanisms for using innovative financial technologies need to be refined and the regulatory experience of different countries needs to be integrated, (Azarenkova et al., 2018).

Consensus has emerged among national regulators and global standard setting bodies that blockchain technology brings to the society and economy tremendous new opportunities. However, uncontrolled use of blockchain(Nakamoto, 2008) technology threatens to accelerate socio-economic problems, especially money laundering, fraud, cybercrime, and market instability, (Unal et al., 2020). Otherwise, the impact of the COVID19 pandemic will redefine the lifestyle of people with more use of digital currency and e-commerce in the informal sector of economy to improve disintermediation between small business and consumers.

The research methodology that will be used is the Kitchenham methodology for performing Systematic Literature Reviews in Software Engineering (Keele, 2007) as well as the Design Science Research Methodology (Ken Peffers , Tuure Tuunanen, 2007) for proposing and evaluating artefacts in information systems research.

We propose investigating how Central Banks and researchers are addressing regulation, legislation, frameworks and standards for governing and managing blockchain-based cryptocurrencies, taking into account the Digital financial inclusion, financial stability, cybercrime and innovation. The research objective is to identify all the main concepts, design a reference ontology, and then model a regulation for blockchain-based cryptocurrencies that

can be implemented by Central Banks to regulate cryptocurrency and other financial participants of financial system to improve their digital transformation with massive use of cryptocurrency.

In this thesis we will be propose an ontology of regulation for blockchain-based cryptocurrencies that can enable intersection and interactions between conventional law (code of law) to executable software code and cryptographic algorithms operating across a distributed computing network (code as law). The ontology proposed can be used by Central Banks to regulate cryptocurrency and other financial participants to improve their adoption of cryptocurrency. As a result, this proposal will improve the regulation of innovative technology and digital financial inclusion of unbanked people.

Miguel Mira da Silva is Associate Professor of information systems at Instituto Superior Técnico and research group leader at INOV. He has many years of research experience in digital governance (including regulation) and several research papers in top international journals and conferences in this research area. He has also graduated a PhD student in IT governance. <https://scholar.google.com/citations?user=8Lmbw5kAAAAJ>

5. Referências Bibliográficas

- Albrecht, C., Duffin, K. M. K., Hawkins, S., & Morales Rocha, V. M. (2019). The use of cryptocurrencies in the money laundering process. *Journal of Money Laundering Control*, 22(2), 210–216. <https://doi.org/10.1108/JMLC-12-2017-0074>
- Azarenkova, G., Shkodina, I., Samorodov, B., Babenko, M., & Onishchenko, I. (2018). The influence of financial technologies on the global financial system stability. *Investment Management and Financial Innovations*, 15(4), 229–238. [https://doi.org/10.21511/imfi.15\(4\).2018.19](https://doi.org/10.21511/imfi.15(4).2018.19)
- Keele, S. (2007). Guidelines for performing systematic literature reviews in software engineering. In *Technical report, Ver. 2.3 EBSE Technical Report. EBSE*.
- Ken Peffers , Tuure Tuunanen, M. A. R. & S. C. (2007). A Design Science Research Methodology for Information Systems Research. *Journal of Management Information Systems*.
- Khan, N., Ahmad, T., & State, R. (2019). Blockchain-based Micropayment Systems: Economic impact. *ACM International Conference Proceeding Series*, 9–11. <https://doi.org/10.1145/3331076.3331096>
- Nabilou, H. (2019). Central Bank Digital Currencies: Preliminary Legal Observations. *SSRN Electronic Journal*, 1–24. <https://doi.org/10.2139/ssrn.3329993>
- Nakamoto, S. (2008). *Bitcoin: A Peer-to-Peer Electronic Cash System*. <https://bitcoin.org/bitcoin.pdf>
- Unal, D., Hammoudeh, M., & Kiraz, M. S. (2020). Policy specification and verification for blockchain and smart contracts in 5G networks. *ICT Express*, 6(1), 43–47. <https://doi.org/10.1016/j.icte.2019.07.002>