

Special Issue on
Blockchain, Cryptocurrencies and Distributed Organizations

Editorial

Blockchain, Cryptocurrencies, and Distributed Organizations

Jorge Renato Verschoore¹
Eduardo Henrique Diniz²
Ricardo Colomo-Palacios³

¹ Universidade do Vale do Rio dos Sinos, Porto Alegre, RS, Brazil

² Fundação Getúlio Vargas, EAESP, São Paulo, SP, Brazil

³ Østfold University College, Halden, Norway

One panel in the International Conference of Information Systems (ICIS), held in December 2016 in Dublin, attracted attention that surpassed the hundreds of seats of the auditorium and forced the security to close the doors when the stairs became completely occupied. The audience, eager to join the debate on the research perspectives on the topic of blockchain in the information systems (IS) field, represented one of the first academic manifestations of the great expectations placed on this emergent topic in this research community. One year later, the organizers of this panel (Avital, Beck, King, Rossi, & Teigland, 2016) were the editors of what was probably the first special issue on blockchain in a relevant IS journal (Beck, Avital, Rossi, & Thatcher, 2017). Although these events indicate milestones for the IS field, the blockchain started to shake the world almost a decade before.

Initially made public in a paper launched by an unknown author (or authors, as some believe) and signed with a pseudonymous (Nakamoto, 2008), blockchain is a topic that has challenged the academic community since its appearance. First, because it did not come up through the traditional academic channels, since this seminal paper was not published in journals or conferences, defying the sacred belief on journals rankings that academic institutions worship.

Second, because the anonymous authorship somehow represents an uncommon altruist position in the academia, since who created such striking concept will never reap the laurels of his creation. Third, because blockchain crosses the academic barriers created by many segregated disciplines, driving new research fronts in areas such computer science, law, social sciences, public governance, medicine, and, of course, business management and information systems, besides many others.

First seen as something related only to payment systems, the word ‘blockchain’ is not present in Nakamoto’s paper, which just mentions the expression “chain of blocks,” and only once (Nakamoto, 2008, p. 7). But the most of the logic concerning blockchain was already present in the paper, which proposed Bitcoin as a new peer-to-peer digital payment system. The only relevant element related to the concept that was not proposed by Nakamoto was the idea of smart contracts, consolidated with the launching of the Ethereum platform in 2014 and helped to expand blockchain applications beyond the digital payments universe. Soon after, the expression distributed ledger technologies (DLTs) also become inseparable part of the concept of blockchain.

Searching the AIS (Association of Information Systems) library, which congregates some of the most relevant conferences and journals of the field, we found that the first study considering Bitcoin came up in one paper of the European Conference of the Information Systems (ECIS), in 2012 (Hjelholt & Damsgaard, 2012). The first explicit reference to blockchain came two years later, also in the ECIS (Glaser, Zimmermann, Haferkorn, Weber, & Siering, 2014). Smart contracts appeared later on, in 2015 (Glaser & Bezenberger, 2015). In this same year, 2015, six new mentions to blockchain in the AIS related conferences discussed blockchain, although only within the context of cryptocurrencies. In 2016, year of the panel cited in the beginning of this paper, there has been an explosion of interest in the blockchain, with 21 papers in proceedings of the AIS conferences approaching the subject. In other relevant conferences for the community, such as the Hawaii International Conference on System Sciences (HICSS) and the Academy of Management (AoM), the first studies covering blockchain came only in 2017.

BRAZILIAN RESEARCHERS JUMP IN THE BLOCKCHAIN BANDWAGON

The EnAnpad is the main reference for the academic community in Brazil, and the first paper to mention blockchain was presented in 2016 within the ADI division, where the IS community is organized. This same paper was published in the following year with the same title in an auditing technology journal (Simoyama, Grigg, Bueno, & Oliveira, 2017). It was also in 2017 that the first paper mentioning Bitcoin appeared in the EnAnpad conference, later published in the finance field (Yaohao-peng, Padula, Montenegro, & Sá, 2017). In the same year, 2017, the first study focusing on blockchain was published in a Brazilian journal (Ferreira, Pinto, & Santos, 2017), while other semi-academic sources were calling for more research in the field (Diniz, 2017).

A more systematic search on the Brazilian researchers’ production about blockchain reveals the evolution of the topic in our community. To know better about the Brazilian research on the

blockchain topic, we searched for the words ‘blockchain’ and ‘Brazil’ on the following bases: EnAnpad, SPELL, Scielo, AIS, Portal Capes, and Google Scholar. Our search covered until August 2021. Initially we found 115 papers; however, when excluding the papers that were present in more than one base, the total number fell to 99 papers. In a second filter, we eliminated papers that were not from the business and management field (such as engineering, for example) and those that cited blockchain but it was not the topic of the study. This way we eliminated 22 papers, reaching a number of 77 papers to be analyzed. In a third filter, we eliminated teaching cases, book reviews, papers that were not authored by any researcher from Brazilian institutions and also papers based in a single study that were first presented in a conference and later published in a journal. From this last filter, we found 58 papers (Appendix A) that represent the evolution of the research on blockchain produced by researchers in Brazilian institutions.

From the analysis of these 58 papers, we noticed that 36 were published in journals and 22 in conferences. Coincidentally, 22 were published in English while 36 were in Portuguese, although 34 were published in Brazilian journals or conferences, while 24 in international academic spaces. Reflecting the newness of the topic, 11 papers were based on literature review and six were essays, while only six were based on case studies. Not surprisingly, design science research (DSR) was the approach taken in eight other papers, confirming Treiblmaier (2020) recommendations for writing blockchain studies, since it is a nascent research topic.

If in 2016 and 2017 only one paper was published per year, with the pioneers mentioned above, it seems that 2018 marks the year when Brazilian researchers really jumped on the blockchain wave, with six papers published. The years to come showed how the topic grew in importance for Brazilian researchers: 16 papers in 2019, 21 papers in 2020, and 13 papers published in 2021, up to August. From the analysis of this academic production, we could also notice Fundação Getulio Vargas (FGV), with researchers from that institution participating in nine papers, followed by researchers from Universidade Federal do Rio Grande do Sul (UFRGS), who participated in six papers. Researchers from Ceará State have also engaged in the blockchain wave, with four of them affiliated to Universidade Federal do Ceará (UFC) and other four from the Universidade Estadual do Ceará (UECE). The other researcher centers involved with research on blockchain are Universidade Federal de Santa Catarina (UFSC), Universidade Estadual de Campinas (Unicamp), and Universidade do Vale dos Sinos (Unisinos), each of them with three researchers authoring papers about blockchain.

Although blockchain is becoming a well-established topic for Brazilian researchers, there are still clear signs of lack in the maturity. First of all, more than half (30) of the papers have co-authors from a single institution, what represents a low level of articulation of the researchers around the topic. If 19 papers have authors from different academic Brazilian institutions, only four have brought together some level of international collaboration among academic institutions. On the other hand, six papers include authors from non-academic institutions, which can be a sign of the collaboration between academia and industry, with authors from IBM being present in three papers.

This literature production by researchers in Brazilian institutions covers a variety of subjects. Since there is a significant number (11) of literature reviews in this sample, nine of the papers were proposing some type of mapping of the general academic production of the field (four papers) or focusing on specific areas, such as accounting, agro-business, or the public sector, including one review of the Brazilian production about blockchain from the analysis of 25 papers. Not surprisingly, nine papers discuss cryptocurrencies; however, five of them present studies on social and environmental applications, highlighting the potential of blockchain in expanding the traditional concept of currency. Studies in the financial sector bring five papers on how blockchain influences the technology use in the field, as well as the production and offer of derivatives, credit, and bonds. Supply chain is another topic of interest for blockchain researchers, with seven papers in the sample, with two papers covering the particular subset of supply chain in the agro-sector. Studies in different formats focus on the public sector (nine papers), including corruption and transparency (four papers). Other topics identified in this sample are energy (three papers), in particular applications on renewable energy, health (three papers), in particular medical records, and production of certificates (three papers), in particular digital diplomas. Applications in accounting, security services, water dams, and notaries were also identified, besides one proposal of privatization of the Brazilian Postal Service using blockchain.

OVERVIEW OF CONTRIBUTIONS IN THIS SPECIAL ISSUE

The burgeoning literature reveals blockchain technology's potential to transform economic relationships, changing and even disrupting business models. Closely following the recent evolution of the subject, we proposed a special issue addressing the transformative potential of blockchain technology from broad approaches. In response, we received a set of theoretical and empirical manuscripts focused on the environmental, economic, social, and political issues of blockchain. After careful curatorship and fruitful dialogues with dedicated reviewers, we feature in this special issue five complementary articles that represent cutting-edge research of Brazilian scholars.

The first article, by Momo and Behr, analyzes the effects of blockchain adoption on transaction costs and information governance. The study sought to gather quantitative and qualitative data and shows how blockchain technology creates new mechanisms and governance structures, reducing transaction costs of economic activities. The authors examined the specific characteristics of this technology, such as information security and transparency, and postulated that blockchain affects the relationship between economic agents by simplifying decision-making and enhancing transactional security.

Rodrigues, Lourenzani, and Satolo seek to integrate blockchain technology and supply chain management. They carried out a systematic literature review and deeply examined 31 papers from 2017 to 2019. The study reports that transparency, reliability, information decentralization, and information security are the main benefits of blockchain adoption in supply chain management. Though the literature on the adoption of blockchain technology is still at its infancy, the authors

argue that blockchain can improve production chains, potentializing their characteristics and making them more integrated for the benefit of society as a whole.

The third article, by Yamaguchi, Santos, and Carvalho, offers valuable insights into exploring the relationships between renewable energy certificates and blockchain technology. This case study, guided by design science research, breaks new ground by shedding light on the benefits and barriers to blockchain implementation. The authors found out that blockchain-based applications (a) are affected by the position of the organization in relation to other stakeholders, (b) are implemented without a clear sense of what kind of problems organizations face, and (c) are presented in different representations of the artifact to persuade stakeholders of its effectiveness.

The article by Prux, Momo, and Melati aims to identify the challenges and opportunities of blockchain technology in government accounting. Based on a sample of 94 professionals, they analyzed seven categories: technology, government accounting, security, transparency, control, change, and knowledge. They found out that blockchain adoption can improve government accounting by improving trust, information security, and control against fraud. They also pointed out that the main challenges for adoption are legal regulation, cultural resistance, and the lack of knowledge and training for civil servants. Although their findings are restricted to the Brazilian context, they can help develop blockchain-based solutions for government accounting worldwide.

The fifth article, by Souza, Freitas, Souza, and Câmara, presents a cryptocurrency model to support microfinance in developing countries. The authors highlight the potential that cryptocurrencies have to benefit an entire system of microfinance that is already in operation. The model proposed brings together microfinance institutions, borrowers, and educational institutions. Microfinance institutions can better track borrowers at no additional costs, educational institutions can help borrowers develop professionally, and borrowers can achieve improvements in their business. Furthermore, the authors suggest creating a new market in which borrowers can be rewarded for helping and buying from each other, emphasizing the social and collaborative role of cryptocurrencies.

WHAT IS MISSING AND WHAT ARE THE RESEARCH OPPORTUNITIES

Blockchain as a foundational technology (Iansiti & Lakhani 2017) offers transformative potential for shaping new business models within a wide range of economic and social applications. Nevertheless, this technology is in its early stages and some research challenges have not yet been addressed. Business research is yet to explore blockchain technology to its fullest. This special issue brings some issues to the discussion. It gives blockchain business researchers a convenient starting point for future studies.

In the Brazilian context, challenges remain to bring the theoretical issues of blockchain technology closer to social initiatives and businesses ventures. Blockchain is an interesting technology to manage and monitor transactions, reducing their costs. However, relevant

governance issues such as transparency, immutability, and traceability of agreements have not been studied in practice yet. Considering blockchain adoption, new questions emerge about the kind of business problems this technology can help solve and how the organization's relationship with stakeholders influences the implemented solutions.

Blockchain-based supply chains may enhance transparency in transactions and increase trust between parties, but more empirical research is needed to follow up on how these promises become reality. Therefore, we encourage researchers and practitioners to undertake applied research on industries such as healthcare, government, real estate, hospitality, retail, and logistics. Applied studies can focus on the main challenges of adopting blockchain technology, such as the existing organizational structures and the lack of technical knowledge about distributed approaches. Other challenges to be studied include compliance with legal regulations and the protection of sensitive information in shared databases.

Blockchain research has focused on technical and instrumental matters. Organizational issues were relatively neglected. Therefore, there are still many opportunities for connecting technology and management. Blockchain research can be useful to advance the theory of organizations, raising new questions and new approaches more in line with the digital age. We hope that future studies will bridge this gap by integrating knowledge drawn from technical and managerial areas. In such wise, business and society will benefit from the full potential of blockchain technology.

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Authors

Jorge Renato Verschoore*

Universidade do Vale do Rio dos Sinos, Programa de Pós-Graduação em Administração
Av. Dr. Nilo Peçanha, n. 1600, Boa Vista, 91330-002, Porto Alegre, RS, Brazil
jorgevf@unisinos.br

 <https://orcid.org/0000-0001-7588-7871>

Eduardo Henrique Diniz

Fundação Getúlio Vargas, Escola de Administração de Empresas de São Paulo
Av. 9 de Julho, n. 2029, Bela Vista, 01313-902, São Paulo, SP, Brazil
eduardo.diniz@fgv.br

 <https://orcid.org/0000-0002-7950-9146>

Ricardo Colomo-Palacios

Østfold University College, Computer Science Department
Høgskolen i Østfold, P.O.Box 700, NO-1757, Halden, Norway
ricardo.colomo-palacios@hiof.no

 <https://orcid.org/0000-0002-1555-9726>

* Corresponding author

APPENDIX A

58 papers on Blockchain published by authors from Brazilian institutions

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