

Blockchain in the Green Treasure: Different Investment Objectives

Completed Research

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Abstract

Blockchain is a recent certification technology with high transformative power in many business models, having a social impact by offering solutions that involve governance and sustainability. However, most articles in this area address the use of blockchain in the private trading of cryptocurrencies. This paper is a case study on a pioneer blockchain application in the management of the Green Treasure Program, which operates through an online platform for negotiating Forest Credits, a title issued from environmental services. The context of this analysis is the management of the Green Treasure in the State of Amapá, the Amazon region of Brazil, which has a complex and interesting reality for research: on the one hand, this region faces difficulties in attracting resources due to its socioeconomic isolation; in contrast, more than 90% of its territory is totally preserved. The purpose of this study is to discover the different objectives that can come from the perception of value, among the public and the private sector, during environmental services negotiation on a blockchain based platform. For this, we conduct qualitative research on the case study using the theory of public value and an interpretative perspective, seeking the understanding of the different objectives among the actors involved. The main contribution is to present the use of blockchain in government projects that promote sustainability, the main research gap identified. The results suggest that blockchain can provide security, transparency, and traceability in operations, critical factors for the government, and especially for attracting investors with different profiles.

Keywords

Blockchain, government, sustainability, public value theory, Amapá Green Treasure, investment objectives.

1 Introduction

The purpose of this study is to discover the different objectives that can come from the perception of value, between the public and the private sector, during environmental services negotiation on a blockchain based platform. To fulfill our objective, we selected the use of blockchain in the Amapá Green Treasure (AGT), which operates through a platform for trading Forest Credits, or titles generated from the conservation of native forests. It's a kind of carbon pricing initiative at the subnational level that could be classified by the World Bank as results-based climate finance (RBCF), inserted in an international market reinforced by the Paris Agreement. Our analysis unit is the State Government of Amapá, located in the Amazon region of Brazil, which recently adopted the technology to assist in the management of AGT, and has as one of its main objectives to foment business for the construction of a sustainable economic matrix.

Recent research on the use of blockchain has identified a lack of government projects to provide social services (Ølnes, Ubacht, & Janssen, 2017). Other references address the use of this technology for projects that propose sustainability with high transformative power (Kewell, Adams, & Parry, 2017). The articles

selected in our literature review suggest the use of blockchain to provide trust, transparency, and traceability in transactions but also address unresolved issues such as security, privacy, and scalability (Kokina, Mancha, & Pachamanova, 2017; Macrinici, Cartoceanu, & Gao, 2018; Manski, 2017).

We also identified that more than 80% of the articles dealt with the use of blockchain related to cryptocurrencies (mainly Bitcoin) and that few empirical studies adopted a theoretical approach. In addition, most of the articles have been published in the last 2 years, a few of them in the main information systems (IS) journals and the vast majority of conferences, and have made recommendations for studies addressing the value analysis generated by the blockchain for society and the government (Hawlitschek, Notheisen, & Teubner, 2018; Macrinici et al., 2018; Risius & Spohler, 2017; Yli-Huumo, Ko, Choi, Park, & Smolander, 2016).

In this context, we explored a qualitative research with an interpretative perspective based on Stake's case study strategy (Stake 1995 and 2008) and Moore's public value theory (Moore 1995). The research was carried out with the main actors involved in the public sector, the technology and methodology supplier and 3 of the first companies to join the project to obtain the Sustainability Seal. Through semi-structured interviews and document analysis, our proposal is to answer the following research question:

What are the differences in the objectives that can come from the perception of value among suppliers and investors in the negotiation of Forest Credits with blockchain in the Amazon region?

The State of Amapá represents a complex and interesting reality for research: its economic matrix is incipient, it has poor logistical infrastructure, it faces major difficulties in attracting resources, and it experiences socioeconomic isolation. In contrast, what has not yet been accounted for in its GDP is natural wealth: according to the latest Earth Innovation Institute study (Stickler et al., 2018), it is one of the most preserved subnational states in Brazil and the Amazon.

This scenario contributed to the availability of approximately 45 million dollars in Forest Credits for negotiation at the AGT when the program was launched in August 2018. For this reason, our motivation is the analysis of a pioneer blockchain application in the green economy. This study contributes to the literature addressing the use of blockchain in government projects that promote sustainability. For IS scholars and public managers, our study provides insights into sustainable product investors objectives and profiles, helping to design investment solutions based on their perception of value. We also highlight the importance of blockchain solutions connected with United Nations (UN) Sustainable Development Goals (SDG), analyzing an exclusive case from a complex context.

2 Theoretical Background

Since it emerged in 2008 (Nakamoto, 2008), there have been several definitions for the blockchain: a distributed accounting technology (Denny; Paulo, Castro, 2017), a distributed database (Ferreira et al., 2017) or distributed records (Wu & Tran, 2018). Regardless of the definition, all approaches agree that the decentralization is one of the benefits that grants this technology high transformative power in several business models (Diniz, 2017).

Blockchain is a technology that can be used "for any change in ownership and storage of important information and documents such as certificates, licenses, government decisions and legislation" (Ølnes et al. 2017, p.355). It can be transacted in the blockchain operations of the registration of property, identity, copyright, votes and, above all, smart contracts, which "are the performance automation of contracts that only execute when the prespecified conditions are fulfilled, eliminating the need for third party resolution" (Kewell et al., 2017).

Our systematic literature review included articles that addressed the use of blockchain in government or in sustainability projects. We selected 33 articles, among them 10 systematic reviews of literature that confirmed the research gap in relation to the effective applications of this technology in government projects that propose sustainability (Engelenburg, Janssen, Klievink, 2017; Ferreira, Pinto, & Santos, 2017; Hawlitschek et al., 2018; Issa, 2018; Kshetri, 2018; Macrinici et al., 2018; Notheisen, Hawlitschek, & Weinhardt, 2017; Yli-Huumo et al., 2016, Risius & Spohrer, 2017).

In recent years there has been a significant growth in the demand for sustainable products, mainly due to the concern of consumers for more responsible supply chains, such products are produced using inputs

with a lower environmental impact, and require transparency in accountability and certification of origin of resources (Fowler, 2018). Blockchain has the capacity to generate billions in the supply chain of the environment, providing beyond social welfare a more efficient management of natural resources and reaching a win-win relation between the state and society (Saber, Kouhizadeh, & Sarkis, 2018).

In line with the objectives of the UN Agenda 2030, "[...] the adoption of the blockchain has important implications for the goals and targets towards more sustainable development" (Denny, Paulo, Castro, 2017). The platform used by AGT, the IT artifact of our study, aims to make a transparent, traceable and secure management of resources, guaranteeing mainly the distribution of these resources to the main destinations: 15% for the environment, 15% for sustainable development and 30% for the objectives of sustainable development.

2.1 Public Value Theory

When we analyze environmental services negotiation and the technology platforms for these services in the government, it's important to consider the different objectives among the suppliers and the investors. In order to identify these differences, we anchor in Moore's theory of public value (Moore 1995), the first work of relevance in this theme. According to the author, public value is generated mainly through the perception of citizens' benefit, that is, a broader view of government acting in partnership with other stakeholders for the common good.

In more recent publications, Moore (2002) addresses strategies and innovations in government to generate public value, something that is not so clear, since "[...] what public managers need to do to produce value is much more ambiguous; and how to judge whether value has been created is even more difficult." The author adds that "public managers cannot produce the desired results without using resources that would also be valuable if used in other ways," i.e., to make sure public value is generated "they need to be able to show that the results achieved are worth the price paid for them".

Souza, Saad & Faria (2015) conducted a literature review and identified in this theory a need for articulation between the state, the market and civil society to achieve public value. The author observed that this interaction comprises 3 processes that represent the structure known as the strategic triangle, shown in Figure 1 and described as "1) the definition of valuable purposes for citizens; 2) the creation of an authorizing environment, that is, a coalition of key authors capable of legitimizing certain actions and guaranteeing them sustainability; 3) construction of operational capacity to enable the generation of public value"(Souza, Saad & Faria, 2015, p.3).

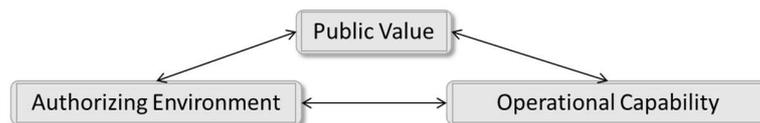


Figure 1: Strategic Triangle of Public Value Generation (Moore, 1995)

The theory has been updated (Bennington and Moore, 2011) to address the rapid change in government management and contemplate more practical issues, such as measuring and assessing public value. It has also been expanded to analyze value in different disciplines (ecology, economics, history and political sciences, among others), different countries (developed, emerging and underdeveloped) and different areas of society (education, health, pension and environment).

Other articles have already used this theoretical lens to analyze phenomena involving the use of technology in government management, including pointing to sustainability as one of the existing public value types. These studies also demonstrate that public value can be optimized through technology (Karunasena & Deng, 2012).

Thus, we understand that public value theory can contribute to elucidating our research question since it allows us to interpret the perceived value as a driver to support the investment objectives, which differs substantially among suppliers and investors of public services. Blockchain as a recent technology still presents problems that are not fully understood, such as attack risks, low levels of maturity, regulation and usability (Ferreira et al., 2017). The main values found in our literature review include trust, security, transparency, traceability, auditability, control, privacy and anonymity (Chen, 2018; Manski, 2017 and Wang & Kogan, 2018).

Public value theory framework may also help us to analyze the function of the technology applied in government services and inspire IS researchers and public managers to design sustainable product solutions for complex contexts. Applying an analytical lens is possible to connect the benefits of a distributed ledger technology (DLT) with the operational capacity dimension in the strategic triangle of public value generation (Figure 1).

3 Methodology

In order to identify the suppliers and investors objectives, which are valued differently, we use the case study strategy with an interpretative perspective (Stake 1995, 2000 and 2008), where we conducted semiopen interviews with the leading public and private sector managers and performed triangulation of data with the main documents (decrees, laws, official journal publications and consultations on government platforms). The interviews were conducted between November 2018 and February 2019 and the treatment and coding of the data were supported by Atlas.ti software.

Further to interviews and documentation triangulation, a personalist observation was carried out by one of the researchers, a current executive of the government and one of those responsible for the AGT project. Government data collection was conducted by him, while interviews in the private sector, transcription and codification of data based on the public value theory were carried out by the other researchers, seeking to maintain the commitment of neutrality, validity and reliability in data interpretation.

Through Moore's theoretical model, we analyzed the interviews and documents in the 3 dimensions proposed: Public Value, Authorizing Environment and Operational Capacity. The selected actors were: 2 executives of the government, the technology supplier and 3 managers of the first companies to join AGT, a solar panel manufacturer in the State of Amapá (company A), an investment and financial education company in the State of Rio de Janeiro (company B) and an autonomous consultant in the State of Tocantins (company C).

Six interviews were conducted with an average of 15 minutes each, all recorded in audio, seeking to identify the different objectives between the public and private sectors in relation to certification technologies. For this, we elaborated 3 pillars of analysis based on the public value theory framework: (1) identify the value perception of certification technology, in this case blockchain, between each of the actors; (2) ensure that the environment for the implementation of the AGT, more precisely the relations between the actors, facilitates the negotiation of Forest Credits between the public and private sectors; (3) verify that the blockchain has operational capacity to generate benefits such as security, transparency and traceability.

4 Analysis and Discussion of Results

In this chapter, we describe in more detail the functioning of the AGT, the analysis and the discussion of the data obtained in the interviews according to the semi-structured script.

4.1 The Case of the Amapá Green Treasure (AGT)

The issue of environmental services - covering the public policy bias - has been addressed internationally since 1972 at the Stockholm Conference, evolving with milestones such as Rio 92 (1992), Kyoto Protocol (1997), 2000 Millennium Development Goals, the Millennium Summit (2010), Rio + 20 (2012), Agenda 2030 (2015), and the Paris Agreement, launched in 2015 and signed between 2016 and 2017 (Kamphof, 2018).

In the current context, two instruments stand out in this international climate finance: the 17 Sustainable Development Objectives - SDG (Agenda 2030) - which guarantee prominence and transversality to the climate agenda in which environmental services are inserted - and the Paris Agreement, which established a climate ceiling maximum of 2°C in relation to the levels of the pre-industrial era, and provides principles, strategies and instruments for the agenda. This commitment - within the framework of the international law - strengthened the market for environmental services, inserted in the carbon market, designed to transpose mitigations and adaptations to the financing of global sustainability.

Currently, this market presents basically four kinds of carbon pricing initiatives: emissions trading systems (ETSs), offset mechanisms, carbon taxes, and RBCF, that generated USD 33 billion in public revenues in 2017, according to the World Bank (2018). Figures that are expected to grow to reach the USD 100 billion per year goal that should be invested in measures to combat climate change, as set out in the Paris

Agreement. A goal reiterated at the last United Nations Climate Change Conference (COP 24, in 2018), which supports this global market for environmental services not yet accessed by Amapá.

On the other hand, according to the latest Earth Innovation Institute study, presented at the Governors' Climate and Forests Task Force meeting in San Francisco (CA) in September 2018, Amapá is one of the most preserved subnational states in Brazil and the Amazon, but this was not recognized in its GDP. Its current economic matrix is clearly unsustainable: the main activity is public administration (more than 50% of the GDP). This is followed by commerce and the construction industry, directly linked to public purchases that is, it is a subsidized unit in a situation of socioeconomic isolation, with precarious logistics and infrastructure, and with a lack of effectively inclusive opportunities for its population.

With more than 90% of its territory preserved, it was excluded from the methodologies available until then. As a solid and effective alternative to get into this market, the Amapá Green Treasure program (AGT) was created, which, based on national and local legislation, was designed to measure the environmental services that have always been provided by the most preserved areas as Amapá, to foster a sustainable economic matrix. This is a solution that enables dignity and inclusion for the communities that protect the forest, making feasible the economic activity of preservation, while financing public policies related to the SDG and other integrated programs exclusively aimed at sustainable development.

The public policy is supported by a collaborative network that starts with a forest inventory in international standards and is registered with the UN and known as the BMV (Brasil Mata Viva) Standard, validated by the Universidade Estadual Paulista (UNESP) and verified by Ernest Young (E.Y.). The result allows the issuance of a Rural Product Certificate, which, after registering with the Central Custody and Financial Settlement of Securities (CETIP) and legal custody at Julian Turnbull, generates Forest Credit, offered through an online platform by BMV. This flow is shown in Figure 2.



Figure 2: Green Treasury operational flow

The Forest Credit can originate in private properties - as has happened for more than 10 years, in the States of Mato Grosso and Amazonas - and public areas, as started in the State of Amapá. But, unlike other methodologies that work with future commitments, the credit is issued based on the environmental services rendered in the last 12 months. Another advantage of the BMV Standard in relation to other methodologies is the real guarantee deposit - native wood is preserved, and the Forest Credit is not subject to risks in the case of deforestation since it is issued based on the service already provided. In addition, concerning valuation, the focus is precisely to value the intact forest, removing the advantage of forest degradation and making other economic activity more attractive.

This online platform aims to provide security, transparency and traceability, through the registration of all transactions in blockchain and allowing exits to the financial system, secondary market, and the Sustainability Seal - the main focus of the program - that is obtained by calculating the footprint access to green economy policies. As an example, loans for public servants to get solar panels that have the seal.

This seal represents the socioenvironmental contribution of the resources used during one year of activity by a particular company or individual and adds an objective criterion to verify the commitment to sustainability. For example, the issuance of green bonds involves a variety of initiatives used to raise funds in the financial market, generally linked to the industrial process (e.g., reduction of toxic gases) or to economic activity itself (e.g., renewable energy and use of waste), towards a sustainable economic matrix.

The Green Treasure now provides an essential criterion, the guarantee of the renewal of natural resources, which can be used as a requirement through bilateral and/or multilateral agreements and internalized through public policies, as carried out by Amapá. It is an objective way of guaranteeing through the calculation of the ecological footprint that the protection of the Amazon rainforest integrates the balance of the companies, adding an environmental prop to the brand.

4.2 Data Analysis

The theoretical perspective chosen allowed us to code the data collected according to the 3 dimensions of the public value (Moore,1995). The results are described in each subsequent subsection, containing the main excerpts from the interviews that contribute to our interpretation.

4.2.1 Public Value

Our interview script contained open questions about what types of contribution the AGT and the embedded certification technology (in this case, blockchain) offered. According to theory, public value is closely related to the common good that is, we seek this specific point, which is directly related to the objectives of sustainability, in the analysis of the discourses. In this requirement, we observe that there is a perceived value difference between the public and private sectors. The private sector has shown more interest in preserving the environment, reducing environmental impact at a "relatively low" financial cost, and a concern for social welfare that must be provided by the state. The company A, of greater size, also observed a value in international marketing that the Sustainability Seal provides.

These findings in the private sector allowed us to identify two different investment profiles: (1) managers with social responsibility and a nature preservation perspective, worried about the future generations; (2) managers seeking an opportunity to bring together environmental impact reduction and global marketing strategy. This argument is supported by the following quotations.

"First that is the following, is a source of revenue for the state, and the state picks up this revenue and will invest in the social, will invest in the maintenance of reserves that it has. (...) logically as an economist and businessman, I also go after a return, but that is not what moves me, what moves me is the idea of a global service of this product. (...) So, I see this, not as just a gain, I see it as a question of the future of the generation."(Consultant from company C)

"Through the Green Treasure we are facing a world scenario (right), we are being seen by everyone(...) it is a wave now that everyone is more aware of nature preservation, environment, all this has a concern, (...) today all our marketing material bears the stamp of the printed Green Treasure, we made a point for that reason (...)." (Businessman from company A)

In a complementary way, the public sector presented a broader vision, in which the economic and environmental conservation objectives were highlighted, as described in the sections below. The government interviewees clearly stated their objective to open a "new source of revenue" in a sustainable way through a platform that allows transparency to attract investors worldwide.

"If we could scale the program, it is a great incentive for forest conservation. (...) The second thing is the economic question (right), you start to collect from a service that we have in the State that is our function, (right) the State is a State of conservation and we have (i.e.), this is another point that helps the state that is a small state that economically contributes little to GDP and that is a way for people to collect and make a collection linked to the environment, even because we export environmental services, right?" (Executive of the government 1)

4.2.2 Authorizing Environment

For the environment, we understand the relations between the organs of public power, organizations and society in general. In the codification of transcriptions, we highlight words such as "integration", "synergy", "alignment", "involvement" and "win-win relationship". It is also important to highlight one of the statements that demonstrates the concern of managers with the cost of implementing the system, so that these expenses reach the final objectives that are the service to the population, a fact that also appears in public value theory. It was possible to identify a greater concern in this dimension on the part of the public sector, which in addition to seeking consensus among the powers, requires that the project be accepted by the market, as follows:

"(...) what is more necessary is the involvement and participation of all the actors in order for it to happen, (right), because it is no use for the Secretariat of Finance to deploy, the Planning Secretariat to bid and pay, to pay the expenses of the contract and the civil society or other actors involved, such as the Public Prosecutor's Office, the State Government, the Environment Department if the entire body of the government does not understand and does not support the initiative so that it reaches the point that the

civil society as well as the State receive the benefits of such a program (...)."(Executive of the government 2)

The private sector understands the authorizing environment as society in general and as commented by some, even takes away the total responsibility of the government for environmental preservation:

"Many people say that forests have to be protected, that forests have to be cared for, that the Amazon is the lung of the world, but what is each one doing to care? (right), what is each one really doing to protect it? Will we just be waiting for the government to do something to achieve our goal?" (Businessman from company B)

4.2.3 Operational Capacity

In this aspect, it was possible to capture the advantages more explicitly for each sector. However, it is important to note that, with the exception of the technology supplier, the other actors showed little knowledge about the technical issues of blockchain. In the private sector, it is worth mentioning excerpts that demonstrate the entrepreneurs' view of the blockchain and the main motivation to invest in this title:

"I'm from the financial market (right), I understand investments and numbers, I do not understand technology so much (right). They explained it to me in a simple way: when you buy one, there is the farmer (hey), he has, let's say, he has a hundred thousand head of cattle, he goes to an institution and he takes an advance, and he will be able to produce it only he could, if this were not marked by a tool like the blockchain, he could visit several institutions and sell the same production he would have with ten different banks, for example (huh). In addition, now with this mark of the blockchain, this gets determined, gets marked. Everyone has access. (...) So that brought much greater security. This has brought the real security of what is really being invested in the Seal, we can follow what is being the destination of this value." (Businessman from company B)

"(...) blockchain brought unlimited access, without frontier, and a total transparency that we call even an open box book, so it is available there, this guarantee of traceability is one of the things that really differentiates and highlights the market that existed before the carbon credit (...)" (Technology supplier)

The same occurs in the public sector, where the adjectives "security", "transparency", "traceability", "reliability" and "auditability" were highlighted in relation to the contribution of the blockchain in AGT. The government also highlighted the accessibility for the users as a competitive advantage, as any citizen can audit the investment from any part of the world.

"(...) these mechanisms must be extremely strong and transparent. Any mechanism that you doubt can cause problem, (...) so you have to contribute much in the reliability of this asset, you have to contribute much to the technology of where it will be marketed (right), then the blockchain comes in this, and it still has to be very efficient in spending the final resource (right) to promote sustainability with the input resources of that program." (Executive of the government 1)

4.2.4 Discussion of the Results

We consolidated the data analysis results of this chapter in Table 1. We made an effort to summarize in a few words the main objectives of each actor involved (government, companies and technology provider), relating to the respective dimension of the theory. We also point out in the table the excerpts from the interviews that validate our categorization.

Our findings suggest three considerations: (1) it demonstrates the different objectives of the actors involved in environmental services negotiation, where the government implemented the technology to offer benefits of transparency and security to the private sector that was clearly recognized through the AGT platform and the technology embedded; (2) it demonstrated different investors profiles in the private sector, one more social responsible seeking nature preservation while the other interested in environmental impact reduction and a marketing value to promote a sustainable brand; (3) the technology supplier focus was providing integration among investors and suppliers, where blockchain offers competitive advantages such as innovation, traceability and transparency.

These findings may contribute to the design of environmental services negotiation in the government taking consideration of these different investors objectives and communicating the advantages of the titles they sell in the proper way. For IS scholars this novelty may generate insights for future research on investment

profiles for public titles as Forest credits, Carbon credits, and other sustainable public titles. Understanding the investor's objectives will generate useful content for a big audience, as academics and managers.

Theory	Government		Companies		Technology provider	
Dimensions	objectives	Citations	objectives	Citations	objectives	Citations
Public Value	sustainability	"The AGT program advocates the preservation of the forest in a sustainable way at the same time as it advocates the development of the state"	nature preservation	"... that you really have an impact on society and that caring for nature that is so important" "I see this, not as just a gain, I see as a matter of the future of the generation"	Integration	"So it is a vehicle where the union of all promotes sustainable development, each one within its figure ...Bidders of conservation, which is the public entity, the rural producer and urban society"
Authorizing Environment	Integration	"What is needed most is the involvement and participation of all actors to make it happen"	Social responsibility	"What are each really doing to protect it? Will we just be waiting for the government to do something to achieve our goal?"	planning	"Comply with our plans in the short, medium and long term ... and for us to really accomplish everything that is within the planning"
Operational Capability	Security, auditing and transparency	"without this tool it would be impossible to gauge the values, the guarding of documents ... even because it is a fully auditable platform" "these mechanisms need to be extremely strong and transparent"	Transparency and security	"This has brought the real security of what is really being invested in the seal ... we can follow what is being the destination of this value" "That was the biggest contribution to us ... This enlightening factor of the business as a whole"	Innovation, traceability and transparency	"It brought a greater innovation ... brought unlimited access, without frontiers, and a total transparency that we call even an open box book ... this guarantee of traceability is one of the things that really sets the market apart"

Table 1: Data analysis summary

5 Limitations and Conclusion

According to statements from the public sector actors, AGT is a very recent project, that was launched in August 2018 and is therefore in the process of maturity, which limited our research on the number of operations performed for analysis. Despite the participation in our team of one of those responsible for the AGT, we sought to reduce all limitations through triangulation of researchers and triangulation of data available in the official AGT documents, which demonstrated alignment of objectives with the public value theory and with sustainability.

The use of this theoretical perspective explicitly for the blockchain phenomenon fills one of the research gaps identified in our literature review. The lack of applied cases, another observed research gap, was also filled with this study since it demonstrates a practical case of the blockchain in projects that promote sustainability in government.

We identified different objectives among suppliers and investors in the negotiation of forest credits in the three dimensions proposed by Moore (1995): Public Value, Authorizing Environment and Operational Capacity. In the first one, we verified that in the public sector, the economic issue stood out, possibly due to the difficulty of fundraising that the State of Amapá experiences. In the private sector, this issue was not a priority, probably because the cost of the Sustainability Seal was considered low by all entrepreneurs compared to the benefits offered to society.

Concerning the authorizing environment, we see more public sector concern with the synergy between the powers as a critical success factor (integration), and the sense of responsibility of the distribution of resources to society. In the private sector, the authorizing environment was interpreted as a sense of the responsibility of society in general for the preservation of natural resources and a conscientious request from all companies regarding compensation for their environmental impact.

With regard to operational capacity, we found that few people understand the technical issues of the blockchain in depth, but there were a consensus and full awareness of the benefits of this certification technology, with "security", "transparency", "traceability" and "auditing" reported as values for both sectors.

We must also emphasize the importance of the synergy between the actors involved so that a project such as this one, which has above all sustainable objectives, needs to be achieved. We find that even with government efforts, if the market and society do not actively participate and contribute to conservation

towards a new green economy, even with the right infrastructure and technology, the project is not feasible. The responsibility for generating public value in all dimensions of sustainability belongs to us all.

Finally, we conclude that we fulfill the 3 analysis pillars defined in our methodology and propose that in future research it is feasible to include a driver, called technology, in the theoretical model of public value. If included, this driver would be directly related to operational capacity, because we understand that technology is one of the means to reach this type of criterion. We also see an application of the blockchain for the common good, as suggested by Kewell, Adams and Parry (2017), a notion of blockchain for good, through projects that contribute to the UN's sustainability agenda countries of the Global South, as Kshetri (2017) complements.

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