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Blockchain for social good and stakeholder engagement: Evidence from a case study

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Abstract

Blockchain is a promising and emerging technology. Despite the number of studies on the subject, several studies require further exploration of the relationship between blockchain and social innovation. Moreover, there is an increasing interest in social entrepreneurship and in how technical solutions may address social or environmental issues. Hence, this work aims at understanding how a venture can apply blockchain technology for social good. The study adopts a qualitative approach based on a case study and builds on stakeholder theory as a theoretical background. The case study under review is a social venture working on Sustainable Development Goal (SDG) number 10. Our findings present four peculiarities of blockchain for social good: (i) reliability, (ii) transparency, (iii) decentralization, and (iv) accessibility. Moreover, the present study develops a framework on blockchain for social good based on the possible stakeholders' involvement. Finally, four challenges related to blockchain for social good are presented and discussed.

KEYWORDS
blockchain technology, SDGs, social good, social innovation, social venture

1 | INTRODUCTION

Blockchain technology is defined as an electronic database system that records and distributes transactional data, which is secured by cryptography and governed through a consensus among the participants involved in a system (Sun Yin et al., 2019). In other words, a blockchain is a digital and secure record of transactions organized in blocks (ledgers) that communicate with each other creating a chain. This emerging technology is reliable because people involved in the network may not change past data without the permission of all others. As explained by Chapron (2017), this technology holds truthfulness and integrity, and it is governed via secure algorithms. Moreover, blockchain is a decentralized technology since asset exchange in a blockchain network occurs through the direct consensus of the involved players. However, some exceptions are possible. For instance, a fork of the original blockchain may also be created as a result of a consensus (e.g., a change in the protocol like Ethereum and Ethereum Classic). Finally, the zero-knowledge proof allows the users to prove a transaction, keeping both the counterpart and the transaction's content anonymous.

In the last few years, blockchain has created a huge hype among governments, corporates, entrepreneurs, universities, and risk capital investors (Catalini & Michelman, 2017). Lumineau et al. (2021, p. 514) explained that "since blockchains can help standardize cooperation and coordination, they can potentially further accelerate crowd-focused collaborations, where organizations work with independent contributors to tackle innovation challenges and leverage extraorganizational resources and talent." However, blockchain is still in its experimental phase and is surrounded by political and economic uncertainties (Allen et al., 2020). This scenario happens when an emerging technology is on the horizon and ambiguity about its real impact is high. Usually, since people are generally optimistic about new technologies, they are led to overestimate their benefits and ignore the fact that technological changes take

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time (Catalini & Michelman, 2017). Blockchain may also have a positive social impact. Indeed, it may be involved in supporting several Sustainable Development Goals (SDGs) (de Villiers et al., 2021; Tsolakis et al., 2021). Public institutions and policymakers, too, have recognized this opportunity. An example is the EIC Prize Horizon "Blockchain for Social Good", recently created by the European Commission.

Consequently, blockchain is a promising and emerging technology, and several studies investigating it support this thesis (e.g., Chen, 2018; Dabić et al., 2021; Gligor et al., 2021; Kher et al., 2020; Massaro et al., 2020). Most of these studies analyze blockchain related to information systems (e.g., Hughes et al., 2019), the supply chain (see Gurtu & Johny, 2019 for a recent literature review), or economics (e.g., Catalini & Gans, 2016). However, further studies are needed to highlight blockchain applications from a broader perspective and different aspects (Bai et al., 2020; Dabić et al., 2021; Gurtu & Johny, 2019). A recent literature review highlights the need for further studies focused on how social enterprises may leverage blockchain applications (Kher et al., 2020). Wang, Han, and Beynon-Davies (2019) also pointed out that the applications of blockchain on social innovation have received less attention in the academic literature. In addition, several authors (e.g., Andoni et al., 2019; Bai et al., 2020; Kher et al., 2020; Wang, Han, & Beynon-Davies, 2019; Wang, Ouyang et al., 2019) are asking for studies on the relationship between blockchain and social improvement. To our best knowledge, just a very few recent studies have analyzed blockchain for social good (Calandra et al., 2022; Christ & Helliar, 2021; de Villiers et al., 2021). However, these recent papers, too, suggested the need to perform more studies on this topic. Indeed, understanding how to apply blockchain for social good is an unresolved issue not only for the academic literature but also for organizations and policymakers (Soni et al., 2021). This need also derives from a growing interest in social entrepreneurship (Gazzola et al., 2019; Phillips et al., 2015; Shepherd & Patzelt, 2011; Short et al., 2009; Tsalis et al., 2020; Van der Have & Rubalcaba, 2016; Wilson & Post, 2013) and in how technical and business solutions may address social or environmental issues (Asif et al., 2022; Bai et al., 2020; Tsolakis et al., 2021; Wang et al., 2016). For all these reasons, this paper attempts to provide an answer to the following Research Question (RQ): how may a venture use blockchain technology for social innovation?

To answer this RQ, a case study of a well-known and multiple award-winning social venture, which uses blockchain for social good, was conducted in 2020. Created in 2015, the company, referred to as Company A in this study for privacy reasons, is an Italian social venture operating in the aid and donor sector and working on the SDG number 10: reducing inequalities within and among countries. The 17 SDGs are part of the 2030 Agenda for Sustainable Development adopted by all United Nations Member States in 2015. They represent a collection of 17 interlinked social objectives designed to serve as a shared blueprint for peace and prosperity for people and the planet now and into the future. For these reasons, the 17 SDGs can represent good proxies of social objectives. This study also adopted the stakeholder theory (Donaldson & Preston, 1995; Phillips et al., 2003) in order to examine the single case study of Company A. Indeed, as explained by Lumineau et al. (2021), it is crucial to analyze how stakeholders may influence blockchain applications. Stakeholder theory can be one of the most suitable theoretical lenses to study this relationship. Therefore, in addition to several semi-structural interviews with Company A, one key stakeholder collaborating with it was also interviewed.

In conclusion, the results from the interviews show early evidence of how blockchain may boost social innovation as a consequence of its peculiarities: (i) reliability, (ii) transparency, (iii) decentralization, and (iv) accessibility. Based on the analysis of the selected case study, this work develops a framework in order to explain why blockchain may support a venture to reach its social objectives by considering the need of its stakeholders. This study also presents some challenges to the application of blockchain for social good.

2 | LITERATURE REVIEW

The first well-known blockchain application occurred in October 2008 with the establishment of bitcoin (Hughes et al., 2019). The public release of Nakamoto's paper was the first evidence of the bitcoin establishment. Other prominent blockchain applications are the decentralized platform Ethereum (Murray et al., 2021) and the non-fungible tokens – NFTs (Dowling, 2022). Nevertheless, there are several applications of blockchain (Kher et al., 2020; Queiroz & Wamba, 2019), not only in the "Western countries" but also in Asia (Lim et al., 2019) and in developing countries. An example is blockchain application in the supply chain sector, such as the Walmart case (Hughes et al., 2019). Even big Asian players such as Baidu, Alibaba, and Tencent have applied blockchain in sectors such as banking, supply chain, and BaaS (Blockchain-as-a-Service) (Lim et al., 2019). Despite the advantages gained from a breakthrough technological advancement (e.g., competitiveness), corporations need to review their strategy (Chirumalla, 2021) to overcome some blockchain-related challenges (e.g., regulations and shared governance models). According to the literature (e.g., Bai et al., 2020; Böhme et al., 2015; Dabić et al., 2021; Parmentola et al., 2022; Sun Yin et al., 2019), several players are trying to understand the power of this technology for different goals such as security, integrity, and sustainability. However, others are interested in this technology only for speculative purposes (Cheng et al., 2019). Moreover, blockchain applications have also been an instrument of fraudulent activities in recent years in many ways by malicious individuals or organizations (Seele, 2018). This fraudulent use may derive from the fact that blockchain is an emerging technology with little or no regulation.

As a result of its applications, blockchain may foster entrepreneurship and innovation because it represents a new way to develop and spread collaborations, decentralized applications, raise funds, and engage stakeholders (Hughes et al., 2019; Lumineau et al., 2021). Chen (2022) stated that blockchain may provide a new way to promote low-carbon innovation by alleviating financial constraints and increasing R&D investments. Chirumalla (2021) suggested that integrating some emerging technologies (such as blockchain) leads

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TABLE 1 Main topics related to the use of blockchain technology presented in the literature.

Macro topic	Meso topic	Main references
Agriculture	Smart farming	Hang et al. (2020)
Biology	Genomics data	Ozercan et al. (2018)
Economics	Business development	Böhme et al. (2015); Catalini and Michelman (2017)
	Smart contracts	Cong and He (2019)
Energy	Carbon emission	Khaqqi et al. (2018)
	Demand side management	Noor et al. (2018)
	Electricity	Sikorski et al. (2017)
	Energy consumption	Truby (2018)
	Energy distribution resources	Andoni et al. (2019); Li et al. (2019); Hou et al. (2020)
	Transactive energy	Di Silvestre et al. (2018)
Information System	Fintech & cryptocurrency	Yuan and Wang (2018); Du et al. (2019); Sun Yin et al. (2019)
	Integration with other technologies	Xiong et al. (2018); Xu et al. (2019)
	Performance	Pazaitis et al. (2017); Xu et al. (2017)
	Security & privacy	Liang et al. (2018); Gai et al. (2019)
	Smart contracts	Murray et al. (2021); Wang, Han, and Beynon-Davies (2019); Wang, Ouyang, et al. (2019)
Geography	Cryptocarbon	Howson et al. (2019)
Law	Copyright	Savelyev (2018)
Management and Business	Automotive	Zavolokina et al. (2019)
	Business model	Massaro et al. (2020)
	Entrepreneurial Ecosystems	Rawhouser et al. (2023)
	Financial services	Ahluwalia et al. (2020)
	Government application	Schmeiss et al. (2019)
	Initial Coin Offerings (ICOs)	Fisch (2019); Schückes and Gutmann (2021)
	Organization science	Lumineau et al. (2021)
	Social innovation	Christ and Helliar (2021); de Villiers et al. (2021); Calandra et al. (2022)
	Supply chain	Ahmed and Broek (2017); Gurtu and Johny (2019); Mackey et al. (2019); Chod et al. (2020); Aslam et al. (2021); Tsolakis et al. (2021)
	Venture capital investment	Park et al. (2020)
Mathematics	Financial analyses	Gao and Su (2020)
Media and Entertainment	Music recording industry	Chalmers et al. (2021)
Medicine	Biomedicine/ healthcare	Mackey et al. (2019)
	Drug marketplace	Van Hout and Bingham (2013)
Sociology	Hierarchical authority	Bousfield (2019)
Transportation	Smart transportation & smart city	Li et al. (2018); Sharma and Park (2018); Xie et al. (2019)

stakeholders to discuss their organizations' strategies. Moreover, the adoption of these emerging technologies allows organizations to scale up or down their operations at a cost, effort, and speed that was not imaginable years ago, resulting in a greater unpredictability future. As pointed out by Pazaitis et al. (2017), the decentralized and reward system established by blockchain may positively affect the sharing economy that currently relies on a crowd-sourcing model in which users participate in a platform (Cavallo et al., 2022), but they do not actually gain any benefits from its success. Pazaitis et al. (2017) suggest that it is possible to create a conceptual governance model based on blockchain where everyone is simultaneously a contributor and an actual shareholder. Everyone is free to contribute to a community as they see fit. In return, they are rewarded with an increase in reputation that reflects the influence they may promote towards the community. Blockchain is also proven to reduce transaction costs for stakeholders by eliminating middleman interferences and reducing search costs (Ahluwalia et al., 2020).

Blockchain evolution is leading to breakthrough improvements simultaneously in many different sectors, such as supply chain (Martinez et al., 2019), fintech (Du et al., 2019), automotive (Zavolokina et al., 2019), agriculture (Hang et al., 2020), and governance mechanism (Marsal-Llacuna, 2018; Saadatmand et al., 2019). For instance, Martinez et al. (2019) discovered that blockchain improves the efficiency of the supply chain. The increasing demand for supply chain transparency even requires this improvement. Indeed, Martinez et al. (2019) explained that blockchain improves the efficiency of time management and traceability to various supply chain participants. Consequently, in comparison with traditional approaches, blockchain seems to provide some benefits in terms of expense, velocity, security (Yermack, 2017), and sustainability (Centobelli et al., 2022; Saberi et al., 2019). Even governments are exploiting the potential of blockchain in the public sector (e.g., Cheng et al., 2019). An example is the use of blockchain to provide e-governance services

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such as smart identity, I-Voting, and governance cloud by the Estonian government.

The majority of studies on the blockchain focus on information systems (e.g., Hughes et al., 2019), supply chain (see Gurtu & Johny, 2019 for a recent literature review), or economics (e.g., Catalini & Gans, 2016). However, in order to maximize the benefits coming from the technology itself, more attention in the literature on current and further business applications is necessary (Hughes et al., 2019). Table 1 provides an overview of blockchain-related studies. Table 1 is not a systematic literature review of all the papers on the blockchain, but it aims to present a general overview of its main related studies.

As it is possible to notice from Table 1, some meso-topics (e.g., Financial) may be related to more than one macro topic. As a result of Table 1, the present study highlights the main references performed on blockchain literature and provides an overview of blockchain applications analyzed in the literature. Regarding the studies on social innovation, to our best knowledge, there are only three studies. Christ and Helliar (2021) analyzed how blockchain may reduce modern slavery in terms of the immoral recruitment of migrants. To understand it, Christ and Helliar (2021) developed a qualitative process to explain how, in practice, blockchain may decrease weakness and danger among migrant workers. Calandra et al. (2022) recently presented different case studies on how blockchain can foster new sustainable business models. Furthermore, by analyzing a few examples of blockchains in different industries (e.g., the pharmaceutical industry supply chain and the construction industry), de Villiers et al. (2021) explained that blockchain increases transparency and innovation across supply chains. de Villiers et al. (2021) showed that blockchain allows customers to verify the exact origin of goods and, therefore, fosters the SDG number 12: responsible consumption and production. In addition, according to de Villiers et al. (2021), the integrity of the blockchain allows to create new markets where it is possible to authenticate organic produce that does not work with synthetic fertilizers and, consequently, contributes to SDG number 15: life on land. Finally, de Villiers et al. (2021) elaborated a conceptual framework for blockchain usage with SDGs engaged for startups and mature companies. However, even these recent papers suggested the need to perform more studies on blockchain for social innovation. For instance, de Villiers et al. (2021) called for research on how ventures can engage their stakeholders by using blockchain technology.

In addition, several studies (Andoni et al., 2019; Bai et al., 2020; Kher et al., 2020; Tsolakis et al., 2021; Wang, Han, & Beynon-Davies, 2019; Wang, Ouyang, et al., 2019) explained that the application of blockchain on social innovation had not received enough attention in academic literature yet. Moreover, the attention on social innovation and social entrepreneurship research is growing in the literature (e.g., Phillips et al., 2015; Shepherd & Patzelt, 2011; Short et al., 2009; Van der Have & Rubalcaba, 2016), and novel insights on the use of emerging technology (such as blockchain) for social good can serve as a fruitful base for future theory building on the social innovation research. In fact, as proven by Herrera (2015), stakeholders' engagement is crucial for pursuing social innovation.

Based on this background of the literature, this paper aims to understand how a venture may use blockchain for social innovation by applying the stakeholder theory.

3 | RESEARCH DESIGN AND CASE STUDY DESCRIPTION

3.1 | Research design

As suggested by Gurtu and Johny (2019) and Bai et al. (2020), it is necessary to perform more studies about how an organization may use blockchain in different business models and industries. Since blockchain is an emerging technology (Chen, 2018; Gligor et al., 2021), a qualitative study seems to be more feasible (Yin, 2003). Indeed, a case study analysis allows a better understanding of actual work (Ridder et al., 2014) and managerial practices (Massaro et al., 2020). A case study methodology is also preferred when, as in this study, the RQs are "how" or "why" questions which are being asked about a contemporary set of events over which the investigators have no control (Yin, 2003). For these reasons, as proposed by similar studies (e.g., Massaro et al., 2020), a single case study methodology based on semi-structured in-depth interviews was applied. Moreover, as Calandra et al. (2022) recently suggested, a single case study is a suitable methodology for performing an in-depth analysis of relevant experiences. This methodology, indeed, allows scholars to obtain in-depth and robust understandings of an evolving phenomenon, such as the adoption of blockchain for social good. In addition, in order to improve the rigor of the conducted case study, the Case Study Evaluation Template (CASET), developed by Goffin et al. (2019), was adopted at the design stage of this study. In order to analyze the case of a significant and extensively documented use of blockchain for social good, we selected a well-known and multiple award-winning Italian social venture focused on the use of blockchain as the case study of this research: Company A. Therefore, similarly to other studies in the managerial literature (e.g., Busch & Barkema, 2022; Elia et al., 2020; Massaro et al., 2020), we performed a single case study.

This study adopts the stakeholder theory, defined as "a theory of organizational management and ethics" (Phillips et al., 2003, p. 480), as a theoretical background. We selected this theory since blockchain requires an open and dynamic environment with a large number of distributed and affiliated organizations (Yuan & Wang, 2018), and we wanted to analyze the relationship between ethical and organizational aspects. The stakeholder theory is here used to highlight the connection and the relationship between the social venture and an external beneficiary of Company A through the use of blockchain. In fact, in order to examine the case study from several points of view and to analyze the relationship between stakeholder management and the use of blockchain for social good, interviews were also carried out with one of the social innovation projects supported by Company A. This project supported by Company A is a nonprofit organization which involves 140 volunteers.

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Following the CASET, this study carried out a pilot study before the main case study. In this way, it was possible to test, revise, and shape the research protocol and the observation guides. The pilot was performed with two co-founders of a university student-led association focused on blockchain and bitcoin in May 2020. The interview carried out for the pilot lasted three hours, while the overall pilot (testing, revising, and shaping of the research protocol) lasted about twenty hours. After the pilot study, researchers involved in the present study performed six interviews with two co-founders of Company A from June 2020 to July 2020. The two co-founders are, respectively, the COO and Lead Software Developer of Company A. Each interview with the two co-founders lasted approximately two hours and was carried out by three researchers. Finally, in September 2020, we performed three interviews with a key stakeholder of Company A. In addition, this study analyzed the literature and the company with secondary resources such as its website, its posts on social media, magazines and newspaper articles, and documents that Company A's team shared with the authors (e.g., application forms for grants). In this way, a triangulation of data was possible.

The interviews were structured as follows. The first introduction interview was developed based on secondary resources. As suggested by Yin (2003), using multiple sources of evidence allowed to ensure construct validity. In fact, during the pre-work, the history of Company A was investigated through its secondary resources. Furthermore, as a result of the introduction section of the interview, additional secondary resources have been investigated. A double-check with the reference person has also been done before, during, and after the interview in order to validate the reported information. This introduction section gave the interviewee an overview of the research as well as obtained general information necessary for the description of the case study. Then, to better understand the main peculiarities and modus operandi of the companies and their stakeholders, the Business Model (BM) of Company A was analyzed and discussed in the second interview. In this interview, we also developed and discussed the Business Model Canvas (BMC). In the third interview, a SWOT analysis was developed and discussed with the two co-founders of Company A since Gatteschi et al. (2018) explained that the SWOT analysis allows scholars to understand how blockchain may fit with the corporate business model. In the fourth interview, we analyzed how Company A implements blockchain for its social aim. To investigate that, the following questions are some examples: "*Which Sustainable Development Goals (SDGs) are you contributing the most with your project?*"; "*In your opinion, how will blockchain technology affect social impact projects in the future? What could be the role of decentralization in this?*"; "*How have you made your revenue model sustainable, while continuing to focus on social impact?*"; "*What were the main problems encountered in developing a blockchain solution?*". In the fifth interview, to better understand how the company works, with the support of the two co-founders, the authors used the application created by Company A to perform a real donation in bitcoin to a social innovation project. The authors present, discuss, and revise all the materials in the last interview. Finally, three additional interviews of a key stakeholder were performed with the staff and fundraising manager of the key stakeholder.

TABLE 2 Descriptions of the interviews.

Organization	Interview topic	Role of the interviewees
University student-led association focused on blockchain and bitcoin	Opportunities and challenges (Pilot)	Two co-founders
Company A	1. Case study description of Company A 2. BM and BMC 3. SWOT 4. Questionnaire on how blockchain may support Company A to reach its social objectives 5. Concrete use of the application 6. Present, discuss, and revise all the materials	Co-founder and COO, and co-founder and Lead Software Developer
Key stakeholder of Company A	1. Key stakeholder's description 2. Questionnaire on how a stakeholder works with Company A to use blockchain for social good 3. Present, discuss, and revise all the materials	Staff and fundraising manager

Table 2 presents the information on interviews carried out.

As suggested by literature (e.g., Saldaña, 2015; Strauss & Corbin, 1998), the authors applied an inductive open coding procedure. Despite being iterative, the coding procedure involved the following phases. In the first phase, the transcriptions of the interviews were read repeatedly to generate first-order codes. The codes were taken directly from the transcriptions of the interviews (i.e., in vivo codes). Subsequently, these first-order codes were aggregated with conceptually similar ones into increasingly abstract subcategories and, consequently, categories. Afterwards, the transcriptions of the interviews were re-coded based on the resulting categories. By doing this, two researchers reached 96% intercoder agreement and reconciled the disagreements. As suggested by several studies (e.g., Saldaña, 2015), this percentage is an adequate level of agreement for qualitative researchers.

3.2 | Case study description

Company A enables worldwide charities to accept bitcoin and crypto donations in the most secure way. Company A also provides technological, educational, and marketing activities to enable nonprofit organizations to use blockchain and bitcoin technology immediately and create new fundraising campaigns. The company was born due to a specific need: to restore confidence in the charity sector. As a matter of fact, the lack of transparency has led citizens to be wary of some institutions. The intuition took shape in 2013 when the current CEO

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of Company A approached the world of cryptocurrency. Thus, in 2014, Company A was born. In 2016, the social venture received an investment from a blockchain acceleration fund. Company A uses bitcoin through blockchain, taking advantage of the efficiency, speed, and transparency of this technology in order to offer unique products to the charity. Blockchain provides the opportunity to donate directly to people, nonprofit organizations, and local organizations, reducing the number of intermediaries and allowing a detailed audit of the flows.

Company A's platform has been developed to simplify access to this technology, maintaining safety, resilience, and quality standards that comply with the highest available approaches. Company A is trying its best to be a profit venture aiming to gain social and financial returns. The combination of social and business aspects is also evident in the dual nature of the platform: some services are designed to be free, with some premium tools. Therefore, Company A is a hybrid organization. According to the literature (Doherty et al., 2014; Pache & Santos, 2013), hybrid organizations aim to have a positive social or environmental impact besides financial returns. Hybrid organizations may experience difficulties in being very profitable (Santos, 2012; Sud et al., 2009). Company A aims to maintain free access for individuals, nonprofit organizations, and government agencies, allowing them to use basic services. Company A does not intend to have revenues directly from donations, which can be used to help people in need. Until 2020, Company A helped charities to raise $250.000+ in bitcoin. It was selected for an accelerator program of blockchain and has been featured in several magazines and newspapers such as Nasdaq, Techcrunch, il Sole 24 Ore, Wired Italia, and many more. Company A also won many competition awards, such as at the D10e conference in Amsterdam, the GTEC competition in Berlin, Blockchain Hub in Graz, the ABI competition in Milan, and Startup Europe Awards. However, Company A faces some challenges to be profitable that we will discuss in the following sections of the paper.

4 | FINDINGS

Based on the literature (e.g., Queiroz & Wamba, 2019; Sun Yin et al., 2019), secondary resources and the interviews, this study developed Table 3 to identify four peculiarities and four obstacles regarding blockchain application for social good. These four peculiarities and four obstacles reported correspond to the categories identified by the authors through the coding of the interviews carried out as previously described.

4.1 | Peculiarities of blockchain for social good

We define the following four peculiarities of blockchain that can be linked to social objectives: (i) reliability, (ii) transparency, (iii) decentralization, and (iv) accessibility. Reliability because all active nodes maintain full copies of the blockchain ledger. All the additions to the chain are governed via secure algorithms since the blockchain is almost immutable. Transparency because everyone with access to the network may see all history of transactions. In fact, blockchain is an open-access secure technology. Decentralization is due to the fact that asset exchange in a blockchain network occurs through the direct consensus of the involved parties. Blockchain allows every user the opportunity to directly contact another single user without the need to pass through an intermediary or middleman. For instance, blockchain is designed as decentralized; therefore, it does not have any single point of failure, making it more resilient, efficient, and democratic. Decentralization of the blockchain may be a source of truth. However, without an institutional guarantor, we must believe in the "code" of blockchain. Accessibility because, potentially, you may access blockchain in the same way worldwide with an internet connection. This feature may allow to create community-based ventures since it allows the involvement of all the stakeholders. Moreover, its access is open to a global market (including talented people).

Based on our case study, we understand how Company A applies these four peculiarities of blockchain to reach its social object SDG number 10. For instance, Company A uses the peculiarity of reliability because it uses blockchain for its transactions. Therefore, it can

TABLE 3 Peculiarities and obstacles of blockchain for social good.

	Blockchain for social good	Examples of representative quotes
Peculiarities	Reliability Transparency Decentralization Accessibility	"*You are confident about your transaction.*" "*Blockchain helps track not only money but also objects.*" "*People prefer to donate to this person or organization because the impact is much more direct, and this also involves the donor because they can see instantly and without the opacity of intermediaries what the impact of their gesture is.*" "*In some countries, it is extremely difficult to get access to a bank account. With blockchain, this problem is solved. All you need is access to the Internet.*"
Obstacles	Knowledge of the blockchain	"*Many people prefer not to use something they do not know and trust.*"
	Interface with other technologies and services	"*In most cases, you still have to get off the blockchain to use what you received from a transaction.*"
	Absence of social and environmental metrics	"*We do not know how to measure our social impact in a comprehensive and easy way to our stakeholders.*"
	Economic sustainability	"*It is very difficult to find a financial balance for a business like ours.*"

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ensure its donors that their donations will arrive at their selected organizations safely. In fact, as one of the co-founders said, "*We did not report any transaction issues for any of our activities*." Consequently, blockchain allows Company A to manage donations in a secure way worldwide.

Company A is also applying the transparency peculiarity of blockchain for social good by showing every transaction. In one of our interviews, Company A explained "*Among the tools [offered by Company A], there is the donation graph. It is a donation chain analysis by which a graph allows the donors to take information from the blockchain. This tool is not our invention, but it shows information that for an average user might be hard to find without the blockchain*." In this way, everyone may know the beneficiary of the donation and how the beneficiaries are using the donations. Thus, the donors are increasing their confidence in the transactions, and the beneficiaries are showing how they use the donations, whose number, therefore, may rise.

Company A is also exploiting the decentralization peculiarities since Company A allows donors to directly perform a donation to the selected organization without going through intermediaries. This peculiarity is relevant to the donor sector since there were scandals related to the mismanagement of donations in several countries. For instance, one of the co-founders explained that "*There are tracking issues in the donor sector. Many works state that donations have been decreasing in the last few years. One of the reasons for this decrease is related to a lack of trust in nonprofit organizations. What we have seen by analyzing macro-trends in the United States is the fact that there is an increase in decentralization in the donor sector. Previously, people donated to large organizations with a philanthropic approach because they trusted them since they were strong and solid brands. Now, we have observed that even individuals can collect donations without the intermediation of large entities to meet a specific need*."

Finally, Company A uses the peculiarity of accessibility since it employs blockchain to support social projects from all around the world (e.g., Africa, Europe, and China) and receives donations from all around the world (e.g., Europe, Oceania, and Africa). Hence, by using the blockchain, Company A has higher accessibility in comparison to other technologies. Looking at Company A's website, it is possible to notice individuals and organizations worldwide. #As a result of this case study and to answer our RQ, we then generalize our findings to develop a framework on blockchain for social good. The following framework represented in Figure 1 explains that blockchain may support a venture to reach its social objectives as a result of its peculiarities by considering the need of a stakeholder.

This process is carried out with one or more than one peculiarity of blockchain for social good and the needs of stakeholders. However, different peculiarities of blockchain for social good may support a venture to reach different social objectives. Additionally, according to the stakeholder theory, we include the stakeholders' needs since they may influence a venture's strategy to solve one or more than one social objective. Moreover, stakeholders' needs are linked to social goals. For instance, stakeholders such as employees request decent work and economic growth (SDG number 8).

Here are some examples of how a venture may apply a peculiarity of blockchain for social good. The reliability of blockchain may support a venture to improve a corporation's cybersecurity to reach the social objective of privacy protection. Being a secure database, blockchain may help with privacy protection. In addition to privacy protection, another critical social objective influenced by stakeholders is reducing bribery and fraud. The transparency of blockchain may also support a venture to solve this. A venture, indeed, may demonstrate all its transactions through blockchain. A venture may use the transparency of blockchain to improve the trust of its stakeholders (e.g., clients, investors, and employees) in their business by showing their transactions.

Another possible example is a supply chain company that shows all its operations to its stakeholders in order to reduce bribery and fraud.

The decentralization of blockchain may support a venture to reduce the bureaucracy of the government in order to improve democratization. A venture may use blockchain to work with citizens directly. The decentralization also allows a venture to work directly and reward its stakeholders. For instance, a venture may decide to implement the blockchain to create a reward platform for their employees. In this way, it faces the SDG number 8.

Moreover, the accessibility of blockchain may support a venture to give its service to everyone to reduce inequality. An example can be the use of blockchain to offer its services or data in underdeveloped countries. Since blockchain is accessible, it is possible to receive and perform transactions also in countries where other online transactions (e.g., PayPal, Mastercard, or Visa) are not available and where citizens have limited access to the banks and, consequently, their services. To reduce inequality, a venture may use blockchain to offer its services worldwide without geographical limitations. For example, a venture or person could conclude smart contracts through a blockchain to provide its service around the world uninterruptedly. Organizations and people in developing countries may benefit from advanced services from other countries. Moreover, the accessibility of blockchain can make it easier and quicker to raise money on projects since blockchain is open to anyone who might be interested. This opportunity may allow a venture to reduce inequality by reducing individuals' and organizations' liquidity problems.

These results and examples suggest how a peculiarity of blockchain may support a venture to reach its social objectives. However, a venture may implement more than one peculiarity of blockchain to solve one or more than one social objective. For instance, as also explained by Calandra et al. (2022), the reliability, transparency, and decentralization peculiarities of blockchain allow a venture to solve several social objectives. A venture may implement these peculiarities to solve the SDG number 7 (Ensure access to affordable, reliable, sustainable, and modern energy for all) and SDG number 12 (Responsible consumption and production). Indeed, a venture working in the Cleantech sector may use the reliability of blockchain to protect its clients' data. The same venture may use blockchain's transparency to show its clients' actual energy consumption. Finally, the decentralization of blockchain may allow that venture to allow the control back into users' hands for their energy consumption.

These are only a few examples of how a venture may apply a peculiarity of blockchain for social good by considering the stakeholders' needs. However, several other implementations are possible.

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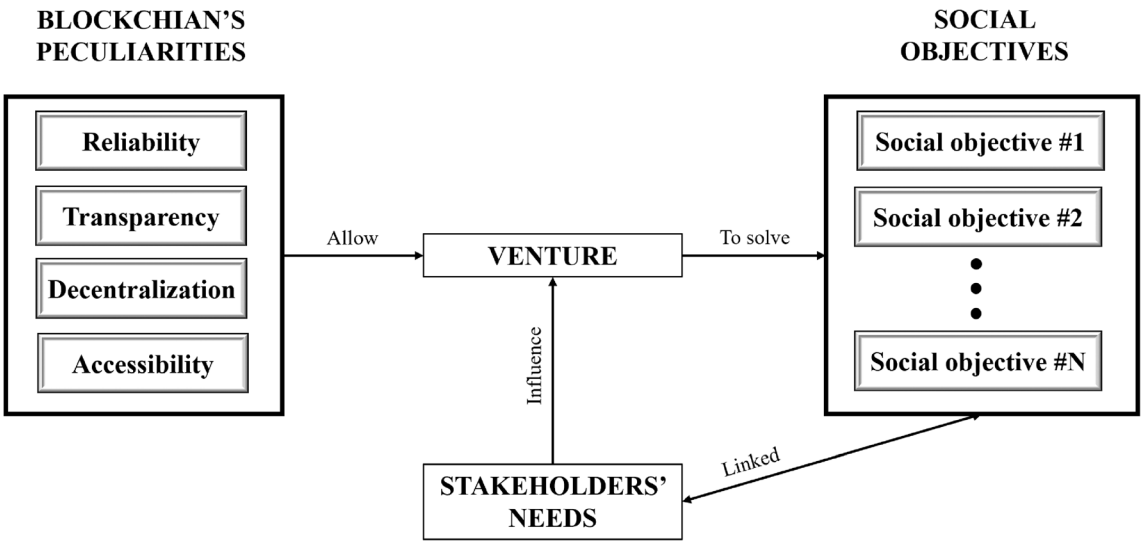

FIGURE 1 Framework on blockchain for social good.

For instance, one or more than one venture may implement together one or more than one peculiarity of blockchain for social good by considering the stakeholders' needs. An example is the implementation of several peculiarities of blockchain to support several ventures to offer education worldwide. The reliability of blockchain allows ventures to be reliable (e.g., transactions by clients are verified). The transparency of blockchain enables ventures to show all the information on the services (e.g., available courses, professors, etc.). The decentralization of blockchain allows ventures to work directly with other ventures as well as their clients. The accessibility of blockchain allows ventures to collaborate and to offer their educational programs worldwide. Finally, all these peculiarities of blockchain together may enable ventures to work together to handle the SDG number 4: ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

In conclusion, it is important to highlight that even if these peculiarities are typical of blockchain, they may not be present in one of its applications. If an organization or an individual decides to apply blockchain for a social purpose, it will have to be careful to verify the correct presence of these peculiarities in the selected application. Lack of one or more than one peculiarity could be related to one of the four obstacles discussed in the following subsection.

4.2 | Obstacles to blockchain for social good

Even if some peculiarities of blockchain may support a venture to reach its social objectives by considering its stakeholders, there are several obstacles. Four main obstacles to blockchain for social good emerged in our interviews.

First of all, there is a lack of knowledge of blockchain. This aspect is fundamental, especially when applications of blockchain are implemented. In fact, as mentioned above, it is crucial to understand if and how the applications are implemented to respect the blockchain's features. Moreover, individuals and organizations may not use blockchain because they are afraid of not being confident in their knowledge regarding blockchain technology. Company A and its stakeholders explained this several times regarding applying blockchain for social good in a venture. For instance, the stakeholder interviewed explained that "*There were some people to whom I had to explain what they were talking about, plus there were false myths that I then had to dismantle*." As a result of this problem, blockchain ventures may face difficulty scaling. One possible solution to this challenge is increasing educational activities on this technology. Company A, for instance, is collaborating with some stakeholders, several student-led university organizations, and other national organizations on educating people and organizations on this technology. Another obstacle is the interface with other technologies and services. The beneficiary organizations that receive the donations usually need to go out of the blockchain and the cryptocurrency world to spend the money received. After that, it would be difficult to track the movements. This problem is linked to the fact that there is also a general difficulty in integrating different blockchain systems and networks nowadays. A possible solution to this problem is to improve the use of blockchain and the cryptocurrency world in our daily life. Moreover, there is also a need to reduce the challenges related to blockchain interoperability with other technologies and services. This challenge may require some regularizations. The third obstacle regards the lack of social and environmental metrics to measure blockchain's social and environmental impact. For instance, Company A does not use any social metrics to show the stakeholders its social impact. This obstacle is also generated by the fact that the stakeholders may not understand the real value of blockchain in comparison with other technologies for social good. In line with this problem, today, there is a discussion regarding blockchain's real energy consumption. Without a clear overview of the energy consumption of blockchain applications, it would be challenging to implement them. We then suggest developing metrics for measuring the social and environmental impact of blockchain. As

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expressed before, this may also request that some rules of blockchain applications be implemented. Finally, as also suggested by the literature (e.g., Stubbs, 2019), ventures that want to pursue financial and environmental/social returns (named as hybrid organizations) may face difficulties in reaching their double aims (positive financial and environmental/social returns). For instance, Company A expressed that "*We are still facing some difficulties to be a profitable company*." Possible solutions for this obstacle are financial incentives (e.g., tax discounts) for these hybrid organizations and higher involvement of their stakeholders in their activities.

5 | CONCLUSION

As shown by the various calls to research in the literature (e.g., Andoni et al., 2019; Bai et al., 2020; Kher et al., 2020; Tsolakis et al., 2021; Wang, Han, & Beynon-Davies, 2019; Wang, Ouyang, et al., 2019), it is necessary to investigate deeper how blockchain is applied for social good. More in detail, de Villiers et al. (2021) recently asked for studies on how ventures may apply blockchain in their business models by considering their stakeholders. This paper aims to fill this gap by analyzing a case study of a social venture based on blockchain, considering both its founders' and stakeholders' perspectives.

This study suggests that the following four peculiarities of blockchain may support social good: (i) reliability, (ii) transparency, (iii) decentralization, and (iv) accessibility. For instance, these four peculiarities may support a venture to reach its social objectives by considering the need of a stakeholder. In order to explain it, this work develops a blockchain framework for social good and identifies its four related challenges. The four obstacles are: (i) lack of knowledge of the blockchain, (ii) interface with other technologies and services, (iii) absence of metrics able to measure the social and environmental impact of blockchain, and (iv) difficulty in achieving economic sustainability.

The present study presents some theoretical and practical implications. First, it explains how the stakeholder theory can be applied in the blockchain domain. Nevertheless, as suggested by the literature (Santos, 2012; Sud et al., 2009), it highlights the issue of hybrid organizations achieving their financial and social/environmental objectives. In fact, the literature suggested that maximizing the financial and social/environmental impact of a venture can be defined as a "paradox" (Smith et al., 2012). In addition, the framework developed in this study can be applied in practice to understand how to use blockchain for social good considering the stakeholders. Finally, we present some concrete obstacles and possible solutions of blockchain for social good.

Although this study provides some interesting findings, some limitations should be noted. First of all, the present study derives from a single case study of a social venture in a specific country. Multiple case studies in different countries are needed in order to explain and understand how different economies, legislations, and cultures may influence social ventures by applying blockchain. Another limitation is that this study analyzed only a social venture working on SDG number 10. Moreover, based on the obstacles presented in this study, future studies may develop social and environmental metrics for blockchain. Environmental metrics are especially relevant since there is a huge demand for more transparency regarding the energy consumption and transactions overload of blockchain applications. In addition, this study analyzed the implications of blockchain peculiarities for a venture, but they can be helpful to individuals as well. Additionally, due to the recent interest in Corporate Social Innovation (e.g., Herrera, 2015; Mirvis et al., 2016) and Industry 5.0 (e.g., Ghobakhloo et al., 2022), future studies may analyze if and how the blockchain is able to foster social innovation in corporations. It is also relevant to study how and if blockchain may be implemented in developing countries. Finally, it is important to analyze how and if NFTs (Dowling, 2022) and the metaverse may be applied to blockchain for social good.

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