BLOCKCHAIN TECHNOLOGY AND THE IMPACT ON BUSINESS MODELS
Tecnologia Blockchain e o impacto nos modelos de negócios

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ABSTRACT

Blockchain is an innovative technology, which emerged in 2008 and presents important possibilities for application. Thus, this article aims to analyze the main characteristics, of the business models, the companies that use the blockchain. To this end, a survey was carried out based on Crunchbase, which is a market intelligence platform. Resulting in a sample of 48 companies more relevant according to the site. The next step was to make a content analysis, with the help of the Iramuteq software, of the material collected on the websites of these companies. As a result of the process, three classes of business blockchain impact were found: a distributed value structure, a governance structure, and an application structure aimed at encrypted and tokens.
Keywords: Blockchain technology; Business model, Trust, Value, Innovation.

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RESUMO

Blockchain é uma tecnologia inovadora, que surgiu em 2008 e apresenta importantes possibilidades de aplicação. Assim, este artigo tem como objetivo analisar as principais características, dos modelos de negócios, das empresas que utilizam o blockchain. Para tanto, foi realizada uma pesquisa com base no Crunchbase, que é uma plataforma de inteligência de mercado. Resultando em uma amostra de 48 empresas mais relevantes de acordo com o site. O passo seguinte foi fazer uma análise de conteúdo, com o auxílio do software Iramuteq, do material coletado nos sites dessas empresas. Como resultado do processo, três classes de impacto de blockchain de negócios foram encontradas: uma estrutura de valor distribuída, uma estrutura de governança e uma estrutura de aplicativo voltada para criptografados e tokens.
Palavras-chave: Tecnologia Blockchain; Modelo de negócios, Confiança, Valor, Inovação.

INTRODUCTION

The accelerated advance of technology, especially in the last decade, led to important transformations for organizations. With the emergence of the Internet, were born the "companys.com" whit models very profitable and different from traditional industries (Dasilva; Trkman, 2013). Making the discussion about business models a great topic for research about how organizations behave in the face of innovation and technological adoption processes (Botsman, 2018).

Blockchain technology emerged with the publication of Satoshi Nakamoto, about Bitcoin (Nakamoto 2008). Being the platform behind cryptocurrency, it can be defined as a distributed database (peer-to-peer), which operates through consensus of the network participants, and is able to record the entire history of exchanges, in order to guarantee data integrity and immutability (Bano et al., 2017). Making this technology relevant for many applications like the production of products and services (Hughes et al, 2019) .In addition, technology is important to the other fronts of digital transformation, such as IoT (Internet of Things), Industry 4.0, and AI (Artificial Intelligence).

The application possibilities, they extend to various sectors of activity and interest to society (Tapscott; Tapscott, 2017). Standing out the process of disintermediation of the platform, in the consensus of the network (Muzammal, Qu, Nasrulin, 2019). According to Deloitte's annual report (Deloitte, 2019), which captures a perception of 1,386 leaders of organizations in 12 countries, there is a focus on understanding how this technology can impact the generation of advantages for the business model and the value chain, increasing security and mitigating operational risks. Making blockchain relevant to issues of seeking competitive advantage and innovation through technological adoption (Grayher; Klein; Prinz, 2018).

1 THEORETICAL REFERENCE

The Blockchain emerged in 2008 with the publication of Satoshi Nakamoto about the cryptocurrency Bitcoin (Nakamoto, 2008). The platform is a peer-to-peer database whit works basically in some stages: 1) the beginning is a value proposition of the operation with basic registration information; 2) then a signature is assigned to each hash; 3) with transmission to the computer network that initiates the consensus process, 4) with subsequent authentication and completion of the transfer through the chaining of a new block, 5) in the historical chain of operation (Morkunas, Paschen, Boon, 2019).

Also, the technology consists of four layers that must be executed in synchronicity, they are: I) transfers between "network nodes", that is, transfers of assets (physical or digital) between the participants; II) a search for consensus with verification of transparency and credibility of the transaction, such as, for example, the Bitcoin "proof of work"; III) a computer interface where smart contracts operate; IV) and finally, a governance layer, which deals with aspects related to human interactions, social processes and how various actors produced and altered the entry of information within the blockchain (Casino, Dasaklis, Patsakis, 2019).

Swan (2015), offers three moments of technology maturity, the first phase of the so-called "blockchain 1.0" marked by the emergence of Bitcoin and other cryptocurrencies, and which focuses on the applications of financial statistics and digital payment. The second phase, "blockchain 2.0", with the emergence of Ethereum (2014) and the smart contracts, increasing the level of applications of finance, such as the registration of securities, discounts, contracts, and actions. Making the use of platform more value. Since then, we walk, to so-called "blockchain 3.0" with the focus of applications aimed at various areas of interest to society, such as, for example, health, education, agriculture, supply chain, among others.

It is important to note that blockchain technology presents challenges in its development process. In aspects like, such as the processing time during the network consensus, which requires high-energy consumption. Another challenge is scalability issues in the integration with other technologies, like the IoT (Internet of Things) due to the interaction with low computational and energy capacity devices (Atzori, 2017). Also is important to comment about the need for institutional innovations for the use of blockchain, whit systems that are more open to transparency and information governance (Tapscott, Tapscott, 2017).

2 METHODOLOGY

This is an exploratory study that seeks to contribute to the discussion about blockchain and business models. For this proposal, it was searched the base of Crunchbase the 50 more relevant companies in the blockchain category. The final sample was composed for 48 companies because the website of two were inactive. Using Iramuteq software, were make textual analysis whit the Descending Hierarchical Classification process to classification the emerging themes.

3 RESULTS AND DISCUSSION

The 48 selected companies are private (for-profit) and were classified according to 9 sectors of activity (Table 1). The first identification was the finance sector which encompasses activities aimed at cryptocurrency trading, lending, investments, and portfolio management with blockchain. This is also the sector with the highest technology maturity and the highest concentration in the companies' sample. Highlighting initiatives such as liquidity on demand, reduction of transaction costs, and extinction of fees (companies Ripple and Terra). In information security sector, which is the second most significant of the sample, the activities are focused on cybersecurity, data resources, online privacy preservation, and identity protection through blockchain. Examples of companies are i2Chain, NuCypher, and Ledger.

**Table 1** – Distribution of companies according to identified sectors of activity

Sector	Number of companies	(%)
Finance	23	48%
Information security	9	19%
Media	6	13%
Information management	3	6%
Integration with other technologies	3	6%
Mining	1	2%
Biotechnology	1	2%
Governance	1	2%
Energy	1	2%
Total	**48**	**100%**

Source: Prepared by authors.

In the media sector, there are applications for the validation of streaming music services, management of advertisements on websites, game development, and platforms for sports betting. Companies like Viberate stand out in the sector for connecting events, fans, and artists in a distributed way. In the information management sector, activities related to data organization and storage are observed. As is the case with Acronis, which focuses on cyber backup and protection and Elementus with its search engines indexed to the blockchain.

Another sector identified was integration with other technologies, such as solutions to connect devices (Helium Company) and management of cryptographic keys and identities (Ockam Company). In the mining sector are the infrastructure activities (equipment) to processing of the blockchain network. The company Bitfury stands out with the various hardware it develops in the segment. The biotechnology sector deals with the management of personal genomic data in a distributed way (Company Nebula). And the governance sector presents applications aimed at the management of crypto assets, such as accounting and audit of digital assets (Company Verady). Company).

Figure 1 – Distribution of the sectors of activity of the companies according to concentration, size, and revenue.
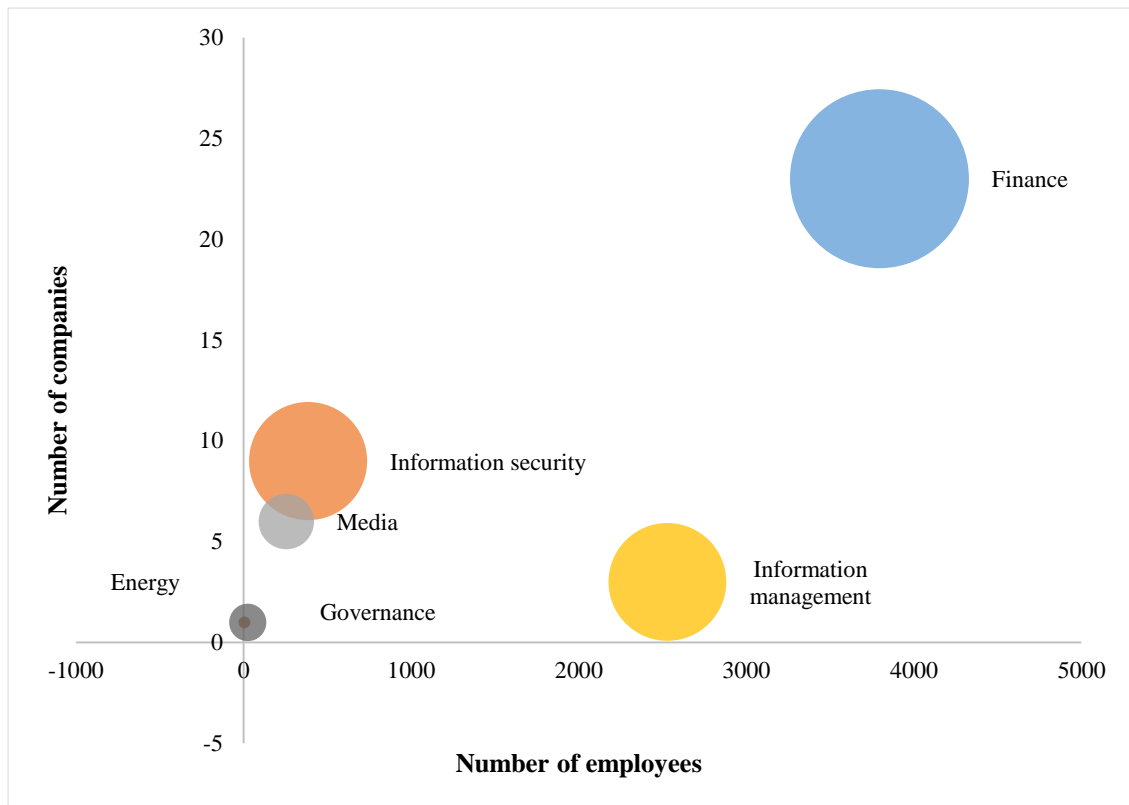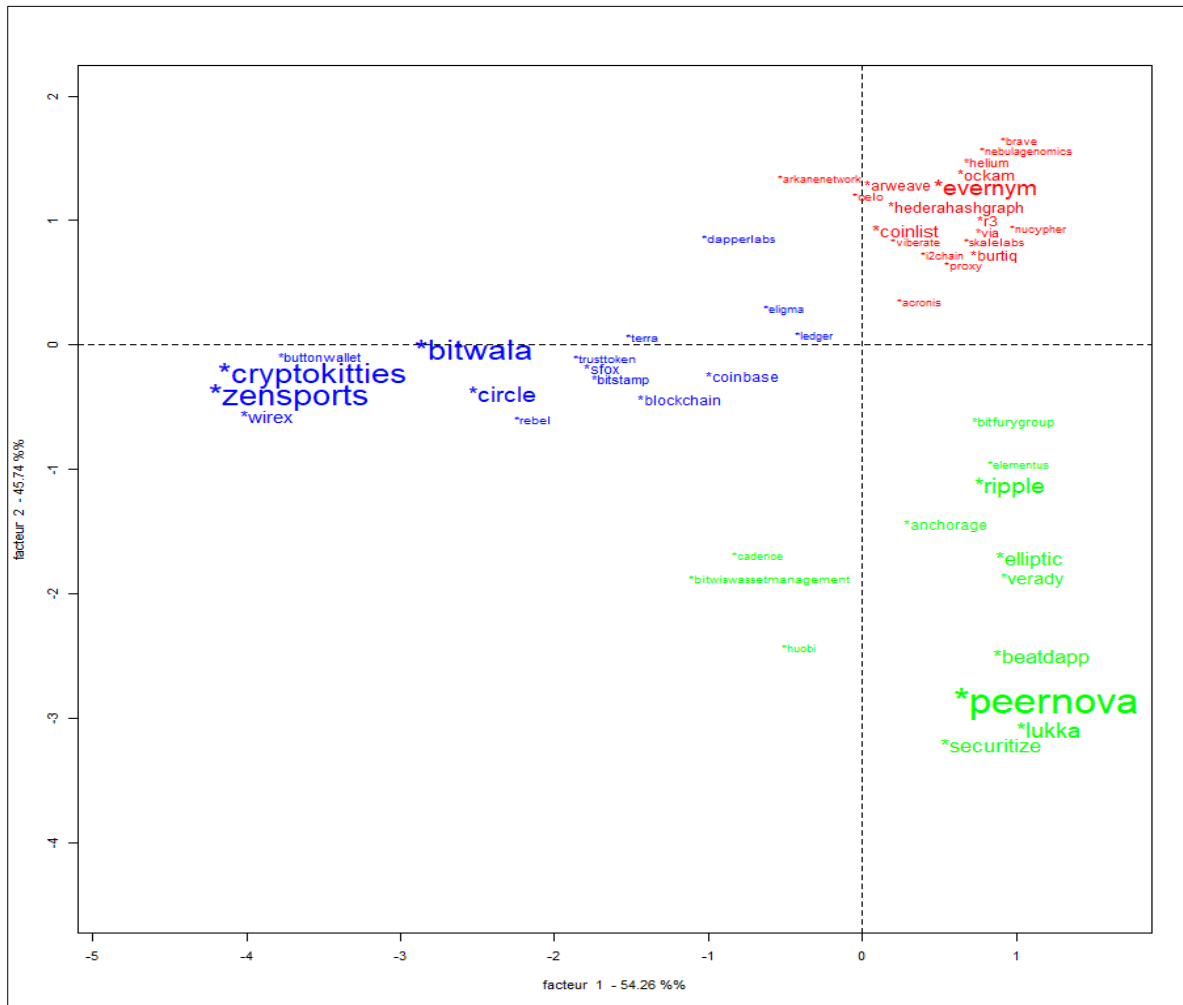

Source: Prepared by authors.

Is observed diversification of applications of blockchain in the ripening of the phases proposed by Swan (2015), where "blockchain 3.0" has the objective of attending Solutions aimed at different demands of society, such as governance and energy management for example. Regarding the geographic distribution of companies, 71% is in America, 25% in Europe and 4% in Asia. Based on the information on the billing range, the number of employees, and the concentration of the companies, Figure 1 was elaborated, in which it is possible to visualize the representation of this distribution. It is worth mentioning that, due to the unavailability of information about the number of employees and billing about all companies, the graphic representation of the sample is 90% (n = 43), disregarding the areas of mining, biotechnology, and integration with other technologies.

The finance sector is the largest and most profitable of all. Both in the maturity of the technology as in return and market value. In parallel, the sectors of management and information security get closer in terms of revenues. Also, the media sector has a median revenue range. Finally, the governance and energy sectors are closer in terms of the concentration of the number of companies.

Through lexical analysis, performed with Iramuteq software found a textual corpus composed of 48 texts (UCI), with 1,202 usable segments (75.88%), of a total of 1,584 segments. Indicating a significant sample, which representativeness greater the 70%. Also, there were found 5,710 occurrences, 4,303 forms, and 3,361 forms that appear only once in the entire body of the text (hapax). It was possible to identify the distribution of companies according to emerging classes of the textual corpus and x^2 (chi-square), according to the frequency of identified forms (Figure 2). Being that companies that most stood out in the Cartesian plan were: Evernym (class 1, X^2 = 99.44); PeerNova (class 2, X^2 = 95.29); ZenSports (class 3, X^2 = 70.65); Bitwala (class 3, X^2 = 67.86) and CryptoKitties (class 3, X^2 = 66.67).

Figure 2 – Distribution of companies by classes emerging from the textual corpus and function of their X^2.

Source: Prepared by authors.

Class 1 was named "Value structure" and is formed by companies with red color in Figure 1. This class is the more representative of the sample (57.8%) and deals with blockchain as a platform that enables the connection between people and companies in a decentralized network of value. When considering the p-value (<0.05), of this class, we have as an example the Hedera company and your proof of participation for the blockchain network.

Class 2 was called "Governance structure" and is formed by companies with green color in Figure 1. This class represents 21.6% of the total approved text items and talks about the centrality of data and assets in the blockchain, as well as the search for transparency and compliance of processes. Also, talks about regulatory issues arise for institutions, minimizing risks and costs. In this class, the companies that stand out are Bitwise that offers cryptography funds and Bitfury has created a leadership council of several organizations focused on the integrity of management for the blockchain.

Class 3 was named "Structure of crypto-actives" and is formed by the companies with blue color in Figure 1. This class represents 20.55% of the total text segments used. And talks about applications and solutions aimed at blockchain assets, especially cryptocurrencies. Highlighting for the management of tokens and digital currencies. A company that stands out in this group is Trusttoken, which is a tokenization platform for various assets. And the company Coinbase, where is possible to create a wallet that manages collectible tokens.

CONCLUSIONS

The Blockchain technology, it is recent and extremely innovative with your distribution structure (peer-to-peer) and capacity of historical record keeping. Through content analysis, using the Iramuteq software, we identified 3 emerging classes: structures of value, governance, and "crypto-actives". The main contribution of the research is to contribute to the deepening of discussion about the impact of blockchain for business. It is worth mentioning, the results found should not be generalized, but they contribute to the advancement of the field, mainly from the point of view of scarce literature, for a relationship between business models and blockchain. Another important issue of the study is to observe the advancement of "blockchain 3.0", in all layers of research carried out. For example, in the management of genetic information, public transport, integration with smart devices, among others.

Research does not seek to generate conclusive results, but to collaborate with the advancement of discussions on the theme. As future development is suggested the deepening of the results, through interviews with managers and specialists on the topic. Where the Delphi method may be applied, with rounds of interviews with the leadership of these companies. It would also be interesting to expand the size of the companies' sample. About survey limitations: use a single database to choose the sample (Crunchbase) and unavailability of access to some information even with the platform's Pro subscription.

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