The Language of Cryptocurrencies: Frequent Words, Neologisms, Acronyms, and Metaphors

El lenguaje de las criptomonedas: palabras frecuentes, neologismos, acrónimos y metáforas

Le langage des criptomonnaies : mots fréquents, néologismes, acronymes et métaphores

A língua das criptomonedas: palavras frequentes, neologismos, acrônimos e metâforas

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Abstract

Cryptocurrencies have been the latest technological revolution in the world of finances. Although this revolution has not been completed yet, and as a payment method is still limited, their popularity has vastly increased since 2020 due to speculation about their value. As in any other field, any revolution in economics, technology, education, or society implies another parallel language revolution. This is how the introduction of cryptocurrencies has led to the emergence of some new forms of language. This quantitative case study aims to analyze the characteristics of that crypto language and identify some of the most usual words, acronyms, metaphors, and other popular expressions within this field. To achieve this purpose, a glossary published by the company Bit2Me was used along with the Google search bar, which provided the number of appearances on the net. Results showed that some neologisms had been created, acronyms prevailed over some words and expressions, and the use of animal metaphors was a usual practice. These results contribute to the field of electronic finances by showing that the community of cryptocurrency users have created their own linguistic rules to communicate among them with the use of specific words as detailed in this paper.

Keywords: cryptocurrency; crypto language; financial language; language analysis; Bit2Me.

Resumen

Las criptomonedas han sido la última revolución tecnológica en el mundo de las finanzas. Aunque esta revolución aún no se ha completado, y su uso para pagar cosas aún es muy limitado, su popularidad ha aumentado enormemente desde 2020 debido a la especulación sobre su valor. Como en cualquier otro campo, cualquier revolución económica, tecnológica, educativa o social implica otra revolución lingüística paralela. La comunicación y el lenguaje han evolucionado

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con la invención de nuevas cosas e ideas. Es así como la introducción de las criptomonedas ha conllevado la creación de algunas nuevas formas de lenguaje. El objetivo de este estudio de caso cuantitativo es analizar las características de ese lenguaje criptográfico e identificar algunas de las palabras, siglas, metáforas y otras expresiones populares más habituales dentro de este campo. Para cumplir con este propósito, en esta investigación se utilizaron las palabras incluidas en un glosario creado por Bit2Me. Su uso se calculó después de buscar esas palabras con la barra de búsqueda de Google e identificar el número de apariciones en la red. Los resultados mostraron que se habían creado algunos neologismos, las siglas prevalecían sobre las palabras que representaban su significado y el uso de metáforas de animales era una práctica habitual. Estos resultados son una contribución en el campo de las finanzas electrónicas ya que demuestra que la comunidad de usuarios de criptomonedas ha creado sus propias reglas lingüísticas para comunicarse entre ellas usando términos específicos, como se detalla en este artículo.

Palabras clave: criptomoneda; criptolenguaje; lenguaje financiero; análisis del lenguaje; Bit2Me.

Résumé

Les crypto-monnaies ont été la dernière révolution technologique dans le monde de la finance. Bien que cette révolution ne soit pas encore achevée et que son utilisation pour payer des choses soit encore très limitée, sa popularité a énormément augmenté depuis 2020 en raison des spéculations sur sa valeur. Comme dans tout autre domaine, toute révolution économique, technologique, éducative ou sociale implique une autre révolution linguistique parallèle. La communication et le langage ont évolué avec l'invention de nouvelles choses et idées. Ainsi, l'introduction des crypto-monnaies a également entraîné la création de nouvelles formes de langage. L'objectif de cette recherche qualitative est d'analyser les caractéristiques de ce langage cryptographique et d'identifier certains des mots, acronymes, métaphores et autres expressions populaires les plus courants dans ce domaine. Pour remplir cet objectif, dans cette enquête, les mots inclus dans un glossaire créé par Bit2Me ont été utilisés. Son utilisation a été calculée après avoir recherché ces mots avec la barre de recherche Google et identifié le nombre d'occurrences sur le net. Les résultats ont montré que certains néologismes avaient été créés, les acronymes l'emportaient sur les mots qui représentaient leur sens et l'utilisation de métaphores animales était une pratique courante. Ces résultats sont une contribution dans le domaine de la finance électronique qui montrent que la communauté des utilisateurs de crypto-monnaie ont créé leurs propres règles linguistiques pour se communiquer entre eux utilisant termes spécifiques, comme est détaillé à cet article.

Mots-clés : crypto-monnaie ; crypto-langage ; langage financier ; analyse du langage ; Bit2Me.

Resumo

As moedas criptográficas têm sido a última revolução tecnológica no mundo das finanças. Embora esta revolução ainda não esteja completa e seu uso para pagar as coisas ainda seja muito limitado, sua popularidade aumentou enormemente desde 2020 devido à especulação sobre seu valor. Como em qualquer outro campo, qualquer revolução econômica, tecnológica, educacional ou social implica uma revolução lingüística paralela. A comunicação e a linguagem evoluíram com a invenção de coisas e idéias novas. É assim como a introdução

de moedas criptográficas também levou à criação de algumas novas formas de linguagem. O objetivo deste estudo de caso é analisar as características dessa linguagem criptográfica e identificar algumas das palavras, acrônimos, metáforas e outras expressões populares mais comuns dentro deste campo. A fim de cumprir este propósito, as palavras incluídas em um glossário criado pela Bit2Me foram utilizadas nesta pesquisa. Seu uso foi calculado após a busca por essas palavras com a barra de busca do Google e a identificação do número de ocorrências na web. Os resultados mostraram que alguns neologismos tinham sido criados, os acrônimos prevaleceram sobre as palavras que representam seu significado, e o uso de metáforas animais era prática comum. Estes resultados são uma contribuição para o campo das finanças eletrônicas, demonstrando que a comunidade de usuários de moedas criptográficas criou suas próprias regras linguísticas para se comunicarem uns com os outros usando termos específicos, conforme detalhado neste artigo.

Palavras chave: moedas criptográficas; cripto-linguagem; linguagem financeiro; análise de linguagem; Bit2Me.

Introduction

Andrew Jackson, president of the USA from 1829 to 1837, once said "money is power" (cited in Somit, 1948). The same quote was later used by other politicians, philosophers, or academics to show the connection between wealth and hegemony (Furnham, 1984; Klebanow, 1991; Worster, 1993). In this sense, money is used as a medium of exchange for assets, properties, and resources (Dyer, 1989; Lipton, 2019; Wallace, 2010). As a result, owning "something" implies having certain strengths or advantages for the owner's benefit.

Historically, there is no solid evidence about when exactly humanity began to use money. For a long time, bartering was how trade was made. People exchanged goods and services for other goods or services; however, stipulating an equal value for each part of the exchange was difficult. For example, acquiring a house was probably unfeasible if the buyer wanted to pay with eggs or milk. Similarly, if two products could not be exchanged simultaneously because they were seasonal or perishable, this situation required trust among the two parties. However, history has shown several episodes in which some individuals were not good enough at being trustworthy. As a result, in an attempt at avoiding fraud, a new system based on giving value to precious metals such as gold or silver to be exchanged with other goods or services was invented. The buyer would pay with precious metals for merchandise to a seller, and then they could later recover the precious metals by selling other goods or services.

This system gave rise approximately in 600 B. C. to present-day coins. Based on the definition provided by the Merrian-Webster dictionary, a coin is a piece of metal issued by a governmental authority as money. Later, these coins were transformed into paper notes. The problem of this financial system was the storage of wealth and the risk of robbery. As a measure to avoid this problem, the first banks appeared to store coins and notes. These coins and notes represented gold, and central banks were responsible for storing the amount of gold corresponding to the coins and notes in transit. In addition, other payment methods, such as cheques and credit cards, were also invented.

However, this financial system has evolved over time, and the transit money is no longer supported by any storage of the equivalent gold or silver. This new functioning is based on pure accountability instead; numbers enter or leave from people's bank accounts, but no real value supports them except for the promise of central banks that their money has value.

The banking industry has been severely criticized for different reasons over the course of history, and the fact that money is the value given by the authorities does not seem to be a reliable system for a part of the population. As it happened with the barter system, individuals must trust the promise of their authorities again. Due to this criticism, alternatives to banking have been created to substitute the traditional banking industry and decentralize the financial system. However, none of them seem to have been able to succeed yet.

One of the latest alternatives created to change the financial system is the introduction of cryptocurrencies. A cryptocurrency can be defined as a digital asset the aim of which is to be used as a medium of exchange. An important feature of cryptocurrencies is that their control is decentralized instead of being distributed among traditional banking systems. Decentralized control uses ledger technology, usually blockchains. This system works as a database with the information from any financial transactions made with a cryptocurrency. The technology avoids the participation of third parties in the transactions and eludes unnecessary fees since it is based on a peer-to-peer system with oneto-one transactions on a secure network between the sender and receiver. Cryptocurrencies also claim to be secure as there is a transaction record available for everyone, and it uses a reliable encryption technique to protect them from hackers.

In addition to these characteristics of the cryptocurrencies, their recent popularity is also related to their use as an investment or speculation fund with high volatility in their price. Investors in cryptocurrency who bought them in the first half of 2020 could have obtained a benefit higher than 1000% in a single year. It has also been popularly compared with gold. Consequently, some investors have recently become rich with their speculations, be the expert or inexpert; and they still expect to increase their benefits in the following years. The truth is that the number of investors has also increased, and some of them communicate with other investors via social networks or other online services.

As a result of the rise of cryptocurrencies, together with the widespread of its popularity, a new language community has been created. Like any community, they have specific language forms and rules (Bhatia, 1997, 2004; VanPatten, 2011). Therefore, the objective of this study is to analyze some of the characteristics of the language related to cryptocurrencies. In this sense, this paper focuses on the analysis of some of the most usual words, the relevance of acronyms over their meaning, metaphors, and other typical picturesque expressions within this field. Our hypothesis in this paper is that new forms of language have been created which also combine these new forms with the usual financial language related to investment and trade.

Theoretical Framework

This section introduces some relevant bibliography to help the reader understand how the language of cryptocurrencies has previously been described. It starts with some principles of word formation, and it moves towards the language of finances, which is the origin of the new form of language described in this paper.

Word Formation and Metaphors in the Language of Cryptocurrencies

The creation of new words per se is a social communication need. People constantly generate and coin new words as society evolves and the world changes. Every new situation requires that new forms of language be created to represent the new reality. Janssen (2005) stated that languages are dynamic rather than static; they continuously evolve. New words are also known as neologisms, and they are coined to explain or describe things or ideas which cannot be represented accurately with the current existing words.

According to Crystal (2001), neologisms are defined as the foundation of new lexical items acceptable within a community at a specific time. This idea is also supported by Trask (1999), who added that new words are created from new materials, and by Ten Hacken and Thomas (2013), who suggested that new words are based on some existing rules. In this sense, some forms of neologism can be loan words, acronyms, or abbreviations (Khan, 2013); or they can be created from or after other existing words (Plag, 2003). However, it shall be acknowledged that some of these new words do not need to be accepted by linguistics authorities or be considered formal language (Peprnik & Univerzita Palackého, 2006).

There are different strategies to create new words. Aronoff (1976) based his model of creating new words on three main blocks: suffixation, prefixation, and compounding. Harley (2006) explained the word-formation processes, including derivation compounding, blending, acronym, borrowing, and neologisms. Algeo (1977) divided word-formation into lexical blends, which included three groups: phonemic overlap, clipping, and the combination of both. More recently, Ratih and Gusdian (2018) suggested a taxonomy that included nine categories: affixation, folk etymology, compounding, abbreviation, acronyms, borrowing, blending, clipping, and back-formation. They also suggested that the double word-formation process was possible, as in the following cases: folk etymology and compounding, compounding, and affixation, blending and affixation, or clipping and blending.

Medellín, Colombia, Vol. 28 Issue 1 (January-April, 2023), pp. 122-138, ISSN 0123-3432 www.udea.edu.co/ikala In addition to these strategies, communicating with metaphors is also possible. In semantics, metaphors are defined as an expression to understand one concept by referring to another concept, in which there is a similarity or specific correlation between the two (Lakoff & Johnson, 1980). Similarly, Gibbs (1994) explained that a metaphor compares two terms that are different but share some characteristics. Related to our research, the study of Silaški (2011) shows some animal metaphors in Business English. Some examples are sharks referring to greedy people, bull and bears alluding to markets when they are moving upwards and downwards, respectively, or cow and goose to describe some products which produce a lot of sales revenue.

Some Characteristics of the Language of Finances

The language of finances is also involved in this process of change and evolution. New ideas, products, or technology continuously alter it, and the way it evolves follows the same linguistic parameters as other fields. Therefore, financial language should have some characteristics which could have been altered with the introduction and rising popularity of cryptocurrencies. On the one hand, few academic texts talk about or describe the language of cryptocurrencies. Some examples are the master's dissertation of Ciganović (2019), which focuses on translating some relevant terms from English into Croatian, or the work of Nădrag (2020), who explains how to teach Cryptocurrency and Bitcoin English vocabulary in the field of Economics. In parallel to these academic works, some glossaries have already been created in non-academic contexts; and some examples are the ones provided by some crypto exchange companies such as Bit2Me, Coinmarketcap, or Binance, among others.

However, it must be acknowledged that the language of cryptocurrencies is part of the language of finances; and a wide range of similarities should be considered. Some of these characteristics have been enlisted by previous authors. The work of Mateo-Martinez (2010) describes some of the general characteristics of the language of finances. This author explains that "Financial language should be understood in an ample sense as the variety of Business language that describes the use of money in all its possible forms" such as currency, securities, loans, insurance, or credits, among others (Mateo-Martinez, 2010, p. 31). Therefore, financial language and the language of economics are different. He suggests that financial language uses acronyms and abbreviations often, metaphors and expressions referring to animals, Anglo-Saxon words to avoid confusion with false friends, and plays on words. Besides, it includes popular and colloquial language, and the communication and expressivity tend to be clear and accessible to a broad public. In contrast, the language of economics is highly academic, includes Latinisms, and relies on the use of acronyms and abbreviations, and metaphors. Other authors have also suggested that the language of finances contains metaphors (Cheng & Ho, 2017; Sánchez-Pérez & Cortés-de-los-Ríos, 2015), acronyms and abbreviations (Laursen & Mousten, 2015; Rao, 2008), anglicisms (Laursen & Mousten, 2015; Gaudio, 2012), and the language is generally clear (Krimpas, 2017).

Method

The popularity of cryptocurrencies has quickly increased since the creation of Bitcoin in 2009 until the present. However, coinciding with the COVID-19 crisis, the fever of cryptocurrencies exploded in 2020, and several new investors joined the market. In an attempt at showing their popularity, some popular cryptocurrencies were searched in the Google toolbar, and these results were compared with other popular multinational non-financial brands.

This research aimed to describe some characteristics of the language of cryptocurrencies, or crypto language. Based on previous research, an experiment with the search tool of Google was completed. To this purpose, this experiment analyzes the most usual words related to cryptocurrencies, the relevance of acronyms over their meaning, metaphors, and other picturesque expressions within this field. To determine our corpus, a glossary published by the company Bit2Me was used. This glossary included what this company seems to consider the most relevant financial and trading words related to the world of cryptocurrencies. In total, our corpus was formed by 255 words. Initially, the glossary included 385 words, we decided to exclude the words that referred to the name of cryptocurrencies, companies, and relevant people related to this field.

These words were searched in Google with the word *crypto* to distinguish it from other uses. The formula introduced in the search bar was *"crypto"* + *"word"*. The asterisk character was placed next to the word to include words derived from the original root, for example, singular and plural. The quotation marks are used to determine that both words must appear in the search in the same text. All the words were searched in Google between the 14 and 15 of May 2021.

Our analysis focused on different features of cryptocurrencies. We first analyzed the most frequent words from the dossier published by the company Bit2Me. In addition, special attention was paid to the use of acronyms, the dossier frequently included both acronyms and the words represented, but in some cases, it was necessary to find the words represented with external resources. In the same way, this glossary included three animals as metaphors; therefore, the names of another twenty-three animals were also included in the list to determine their relevance within this type of language (Silaški, 2011).

Results

The results have been divided into three sections. The first section analyzes the frequency of the words introduced in the Bit2Me glossary. The second section focuses on the use of acronyms. And the third section studies the use of animal metaphors in the industry of cryptocurrencies.

Popular Crypto-Words

As shown in Table 1, the number of occurrences of Bitcoin appeared in Google was superior to the brands Adidas or Nintendo, a little inferior to Microsoft, but still far from the giants Google and Amazon. The other cryptocurrencies were not as popular as Bitcoin in our Google search, being Ethereum its main competitor. These results could represent the rise of their popularity since their creation during the first quarter of the 21st century; the first one was Bitcoin in 2009.

Table 1 Comparison Between Some Popular Crypto-Currencies and Other Non-Financial Brands

Currency	Tokens	Other Brands	Tokens
Bitcoin	1,070,000,000	Google	10,080,000,000
Ethereum	346,000,000	Amazon	5,000,000,000
Dogecoin	170,000,000	Microsoft	1,440,000,000
Binance	118,000,000	Adidas	868,000,000
Cardano	56,500,000	Nintendo	599,000,000

Note: Search term was *NAME*

On the most frequent words, our research found which words from the glossary were the ones that appeared more often in Google. These results are shown in Table 2, and as it can be observed, general financial words can be found and other neologisms. For example, the most usual word that accompanies the word *crypto* is *the exchange*. Other usual general financial words on the top of the list are *trading*, *asset*, *fee*, *input*, *spread*, or *inflation*. Other words are more technical, like *halving* and some of them are metaphors of animals like *bull* or *bear*. These words have previously been used in the fields of finances and economics, and they do not represent a novelty within this field; however, the fact that some of them appear on the

#	Word	Tokens	#	Word	Tokens
1	Exchange	281,000,000	51	CheckSequenceVerify (csv)	9,040,000
2	Crypto	242,000,000	52	Timestamp	8,930,000
3	Trading	150,000,000	53	Private key	8,810,000
4	Blockchain	148,000,000	54	Stablecoin	7,920,000
5	Asset	135,000,000	55	Hybrid crypto exchange (HEX)	7,910,000
6	Cryptocurrency	132,000,000	56	Bull market	7,820,000
7	Token	87,900,000	57	Flipping	7,560,000
8	Portfolio	85,200,000	58	Curve (crv)	7,520,000
9	Block	65,900,000	59	DD (due diligence)	7,510,000
10	Wallet	62,800,000	60	MetaMask	7,330,000
11	Mining	59,600,000	61	Smart contract	7,210,000
12	Fee	58,900,000	62	Mainnet	6,870,000
13	Input	47,500,000	63	Testnet	6,010,000
14	Spread	44,300,000	64	Proof of stake (PoS)	5,940,000
15	Inflation	44,100,000	65	Proof of work (PoW)	5,560,000
16	Succinct atomic swap (swap)	41,800,000	66	PoW (proof of work)	5,520,000
17	der (Signature)	38,000,000	67	HashGraph	5,500,000
18	Bull	38,200,000	68	Fork	5,490,000
19	Bear	24,200,000	69	Mempool	5,360,000
20	P2P (peer to peer)	22,300,000	70	Liquidity	5,190,000
21	Output	21,000,000	71	Discrete log contracts (DLC)	4,680,000
22	Dump	20,800,000	72	RenBTC	4,430,000
23	Node	19,300,000	73	Arbitrage	4,390,000
24	Satoshi	19,300,000	74	Mixer	4,290,000
25	Cryptography	17,200,000	75	Deflation	4,140,000
26	Fiat (fiduciary money)	16,900,000	76	Proof of authority (PoA)	4,040,000
27	Decentralized exchange (DEX)	16,600,000	77	Airdrop	3,940,000
28	CPU	16,400,000	78	Halving	3,660,000
29	Skynet (Sia)	15,700,000	79	Maker (мкг)	3,640,000
30	Hash	15,400,000	80	Evangelist	3,620,000
31	Compound (COMP)	15,200,000	81	Centralized exchange (CEX)	3,450,000
32	To the moon	14,500,000	82	Proof of elapsed time (PoET)	3,450,000
33	ChainLink	14,100,000	83	Bear market	3,430,000
34	Emission	14,100,000	84	Public key	3,400,000
35	Whitepaper	14,000,000	85	Tokenization	3,350,000
36	Altcoin	13,900,000	86	PoS (proof of stake)	3,310,000
37	otc (over-the-counter)	12,600,000	87	Cloud mining	3,270,000
38	Nonce	12,500,000	88	Margin Trading	3,180,000
39	Staking	12,500,000	89	Unit of account	2,830,000
40	Algorithm	12,400,000	90	Utility token	2.730.000

Table 2 100 Most Frequent Words in Bit2Me's Dossier

#	Word	Tokens	#	Word	Tokens
41	Pump	12,400,000	91	AML (anti-money laundering)	2,620,000
42	Escrow	12,300,000	92	Solidity	2,570,000
43	Script	11,900,000	93	P2PKH (pay to public key hash)	2,540,000
44	Balancer (BAL)	11,100,000	94	Yield farming	2,420,000
45	Graphic processor unit (GPU)	10,900,000	95	Blockchain explorer	2,310,000
46	Whale	10,600,000	96	Taker	2,280,000
47	Oracle	10,300,000	97	Block height	2,260,000
48	атн (all-time high)	10,100,000	98	Faucet	2,130,000
49	Miner	9,510,000	99	DeFi (decentralized finance)	2,110,000
50	Rig	9,500,000	100	CheckSum	2,100,000

Table 2 100 Most Frequent Words in Bit2Me's Dossier (Cont.)

Search: "crypto*" + "word*"

top of the list suggests how the market of cryptocurrencies operates.

For example, the most common action seems to be to exchange from fiduciary money to crypto, or vice versa. The words *trading* and *asset*, ranked 3 and 5, respectively, also suggest that cryptocurrencies should be understood as a speculative business in which several users participate. The words inflation and deflation are ranked in positions 20 and 111, which is also a sign to describe the market's volatility. The word *fee* is also very frequent, and it reveals that exchanging money to cryptocurrencies is part of the business that the users must pay, usually around 2 % (see Binance and Coinmarket). The word *halving* is another word that explains how the market works, in this case, Bitcoin. In this case, Bitcoin counts with 21 million tokens; these are gradually released to the market, and this amount is always half of the previous year until the total amount is released.

Other common words in the field of cryptocurrencies are *token*, *portfolio*, or *wallet*. These words already exist in other daily operations, but they need to be understood within this field. In this sense, a *token* is a digital representation of the value of an asset; and a *portfolio* is a set of financial tools that an investor has and uses to increase their financial assets, whereas a *wallet* is a software program that allows the users to store and transact cryptocurrencies without the permission or mediation of anyone else.

In addition to these words, other ones are exclusively related to the world of cryptos, such as *crypto*, blockchain, cryptocurrency, mining, node, or altcoin. To start with, crypto refers to cryptocurrency, but it is also a prefix that has been commonly used to create new words such as cryptography, cryptojacking, cryptonight, cryptowars, or cryptolanguage, among others. The meaning of crypto is hidden, and as it can be observed, it seems to be one of the most popular prefixes within this field. Another important term on cryptocurrencies is *blockchain*; it is a chain of *blocks*, and it refers to a type of distributed network that allows the development of the technology for cryptocurrencies. Blockchain is carried out by *miners*, who create and allow the transactions carried out in a network to be linked. Blocks are created in time intervals and link new transactions with existing ones on the *blockchain*.

The word *mine* is fundamental within this model of finances. It can be used as a noun, verb, or adjective as in *miner*, *to mine*, or *mining (pool* or *farm)*. *Mining* is the process by which *blocks* are added to a blockchain, and miners verify the transactions. These transactions are recorded on the global ledger or blockchain, and the *miners* are economically incentivized. Another word related to this process

is the *nodes*, which are computers that connect to the network, support the validation of transactions, and have an updated copy of the *blockchain*. It is also interesting to see the creation of the word altcoin or alternative coin; it refers to the cryptocurrencies that are not Bitcoin, such as Ethereum, Cardano, or Ripple, among others. Parallel to this word, shitcoin is a pejorative term that refers to those cryptocurrencies which seem to lack value, or the community predicts that their existence will be short due to the inconsistency of its code, team, or project; and most of them are completely speculative. Finally, in Table 2, the word Satoshi, ranked 24, should also be commented on. Satoshi Nakamoto was the inventor of Bitcoin, and after his name, a Satoshi refers to the minimum unit that a bitcoin can be divided into (0.00000001 BTC).

Other words that were not ranked in the top 100 should also be commented on. One of the most popular was the expression To the Moon. This sentence means that Bitcoin and Altcoin users expect the value of their cryptocurrencies to rise considerably, and they will multiply the value of their assets. The term Lambo refers to making big profits with a cryptocurrency. Lambo comes from Lamborghini, and it refers to having the possibility to buy something expensive with the benefits obtained. Also related to the acquisition of goods, the first purchase made with a cryptocurrency (Bitcoin) was two pizzas on 22 May 2010. To commemorate that date, it is remembered as Pizza Day. Some companies and traders in the field of cryptocurrencies celebrate it every Friday with their employees with pizza for lunch.

Use of Crypto-Acronyms

Another aspect that needs to be considered is the use of acronyms for the words represented. Among the words included in the glossary, 65 acronyms were identified. Table 3 shows the times and percentages that these words appeared as an acronym as well as a word. The mean percentage on the use of acronyms was 87.57 %, which was superior to the use of the words represented (12.43 %). In addition, the use of the acronym was superior in 60 out of the 65 cases, and the use of the acronym occurred over 90 % of the time in 45 of them. The use of the words represented by the acronym was only more frequent on 5 occasions.

Some of the most popular acronyms within Table 3 are general words, words related to finances, and words that originated with the rise of cryptocurrencies. Some words from this list can help us better understand the meaning of the cryptocurrency market. To start with, the most usual acronym from this glossary is *ICO*, which stands for *initial currency offering*. An *ICO* is a type of funding using cryptocurrencies, usually by crowdfunding. In this case, a quantity of cryptocurrency is sold in tokens to potential investors in exchange for legal tender and financing a project based on a blockchain network in its development phase.

The second one is *DeFi*, which means *decentralized* finance, one of the main features of cryptocurrencies. This implies that there is no governmental bank behind the operations made with cryptocurrencies. This is a system of smart contracts aimed at building a series of financial services supported by blockchain technology. The third on the list is NFT (non-fungible token). They are units of data stored in a blockchain that certifies the ownership of a digital asset such as photos, videos, audio, and other types of digital files. Fourth is P2P, or peer-to-peer, the system of how cryptocurrencies operate. It refers to decentralized networks in which transaction information is shared between two users through connection to the network with no intermediaries. Finally, the acronym Fiat refers to fiduciary money in current use.

In other words, coins and paper money are issued by different governments such as euro, dollar, yuan, ruble, or pound, among others. As a result, these usual words tell how cryptocurrencies work: created by individuals (not necessarily institutions or governments), a decentralized system of finance (no governmental banks involved), transactions are peer-to-peer (no intermediaries), and there is a register of contracts made to prove the originality of them as *non-fungible tokens*.

In addition, the role of miners is considered fundamental in the process of blockchain. Miners are individuals who work for a reward paid with cryptocurrencies. In order to show that miners have completed their tasks, some vocabulary has been created. Some examples are *PoA* (proof of authority), *PoB* (proof of burn), *PoET* (proof of elapsed time), *PoS* (proof of stake), *PoW* (proof of work), and *DPoS* (delegated proof of stake). This work of miners characterizes the blockchain or the decentralized system; to this purpose, some words from the glossary refer to it. Some examples are CEX(centralized exchange) and *DEX* (decentralized exchange), *DAICO* (decentralized autonomous

Table 3 List of Acronyms for the Words Represented

Word	Total	Acronym	Word	% Acr.	% W.
ıco (initial currency offering)	52,934,400	52,900,000	34,400	99.94	0.06
DeFi (decentralized finance)	50,910,000	48,800,000	2,110,000	95.86	4.14
NFT (non-fungible token)	49,970,000	48,900,000	1,070,000	97.86	2.14
API (application programming interface)	48,163,000	47,800,000	363,000	99.25	0.75
P2P (peer to peer)	43,200,000	20,900,000	22,300,000	48.38	51.62
crv (curve)	42,420,000	34,900,000	7,520,000	82.27	17.73
swap (succinct atomic swap)	41800979	41,800,000	979	100.00	0.00
DAG (directed acyclic graph)	33,136,000	32,700,000	436,000	98.68	1.32
сомр (compound)	31,700,000	15,200,000	16,500,000	47.95	52.05
мкr (maker)	28,540,000	24,900,000	3,640,000	87.25	12.75
οτς (over-the-counter)	25,000,000	12,400,000	12,600,000	49.60	50.40
CFD (contracts for difference)	22,952,000	22,500,000	452,000	98.03	1.97
ROI (return of investment)	19,525,000	18,800,000	725,000	96.29	3.71
BAL (balancer)	18,220,000	11,100,000	7,120,000	60.92	39.08
DEX (decentralized exchange)	18,010,000	16,600,000	1,410,000	92 .17	7.83
FIAT (fiduciary money)	16,920,000	16,900,000	20,000	99.88	0.12
DD (due diligence)	16,720,000	9,210,000	7,510,000	55.08	44.92
sia (Skynet)	16,369,000	15,700,000	669,000	95.91	4.09
атн (all-time high)	15,710,000	5,610,000	10,100,000	35.71	64.29
DNS (domain name system)	15,709,000	15,100,000	609,000	96.12	3.88
DAO (decentralized autonomous organization)	14,826,000	14,700,000	126,000	99.15	0.85
PoW (proof of work)	12,240,000	5,560,000	6,680,000	45.42	54.58
GPU (graphic processor unit)	10,901,130	10,900,000	1,130	99.99	0.01
IPFS (inter planetary file system)	10,300,000	8,540,000	1,760,000	82.91	17.09
AML (anti-money laundering)	10,030,000	7,410,000	2,620,000	73.88	26.12
PoS (proof of stake)	9,390,000	5,940,000	3,450,000	63.26	36.74
csv (check sequence verify)	9,089,400	9,040,000	49,400	99.46	0.54
кус (know your customer)	9,057,000	8,540,000	517,000	94.29	5.71
ASIC (application specific integrated circuits)	8,968,000	8,520,000	448,000	95.00	5.00

Table 3 List of Acronym	s for the Word	s Represented	(Cont.)
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Word	Total	Acronym	Word	% Acr.	% W.
BIP (bitcoin improvement proposal)	8,145,600	8,090,000	55,600	99.32	0.68
HEX (hybrid crypto exchange)	7,921,200	7,910,000	11,200	99.86	0.14
DAPP (cecentralized application)	6,550,000	6,300,000	250,000	96.18	3.82
DLT (distributed ledger technology)	5,770,000	4,630,000	1,140,000	80.24	19.76
zrx (ooken 0x)	5,325,290	5,320,000	5 <i>,</i> 290	99.90	0.10
HODL (hold on for dear life)	5,274,000	4,920,000	354,000	93.29	6.71
ATL (all-time low)	5,120,000	3,260,000	1,860,000	63.67	36.33
DLC (discrete log contracts)	4,687,360	4,680,000	7,360	99.84	0.16
PoA (proof of authority)	4,253,000	4,040,000	213,000	94.99	5.01
cex (centralized exchange)	3,727,000	3,450,000	277,000	92.57	7.43
PoET (proof of elapsed time)	3,556,000	3,450,000	106,000	97.02	2.98
CBDC (central bank digital currency)	3,542,000	2,810,000	732,000	79.33	20.67
гомо (fear of missing out)	3,525,000	3,080,000	445 <i>,</i> 000	87.38	12.62
1EO (nitial exchange offering)	2,713,000	2,600,000	113,000	95.83	4.17
Р 2 РКН (pay to public key hash)	2,559,500	2,540,000	19,500	99.24	0.76
FPGA (field programmable gate array)	2,456,000	2,040,000	416,000	83.06	16.94
Р 2 sн (pay-to-script hash)	2,365,000	2,150,000	215,000	90.91	9.09
FUD (fear, uncertainty, and doubt)	2,264,600	2,200,000	64,600	97.15	2.85
MAST (Merkelized Abstract Syntax Trees)	2,077,400	2,060,000	17,400	99.16	0.84
NBP (Nonce Blinding Protocol)	1,840,010	1,840,000	10	100.00	0.00
RBF (Replace by Fee)	1,099,100	1,030,000	69,100	93.71	6.29
SAFU (Secure Asset Fund for Users)	826,000	799,000	27,000	96.73	3.27
ECDSA (Elliptic Curve Digital Secure Algorithm)	561 <i>,</i> 053	561,000	53	99.99	0.01
PoB (Proof of Burn)	520,400	473,000	47,400	90.89	9.11
utxo (Unspent transaction output)	491,000	450,000	41,000	91.65	8.35
DPoS (Delegated Proof of Stake)	416,000	279,000	137,000	67.07	32.93
kWU (thousands wight units)	415,004	415,000	4	100.00	0.00
cLTV (checklocktimeverify)	398 <i>,</i> 000	266,000	132,000	66.83	33.17
UASF (USER activated soft fork)	374,000	351,000	23,000	93.85	6.15
zkp (zero-knowledge protocol)	358,300	340,000	18,300	94.89	5.11
CPFP (child pays for parents)	301 <i>,</i> 610	300,000	1,610	99.47	0.53
UAHF (USER activated hard fork)	163,210	156,000	7,210	95.58	4.42
DAICO (decentralized autonomous initial coin offer)	141,004	141,000	4	100.00	0.00
P2PK (pay to public key)	99,700	66,100	33,600	66.30	33.70
EDDSA (Edwards-curve digital signature algorithm)	45,980	39,000	6,980	84.82	15.18
MASF (miner active soft fork)	44,105	44,100	5	99.99	0.01
Mean Percentage				87,57	12,43

Note: Search: "crypto*" + "word*"

initial coin offer), DAO (decentralized autonomous organization), and DAPP (decentralized application). The methods of payment have also been coined after P2P; some derivate methods of payment are P2PKH (pay to public key hash), P2SH (pay-to-script hash), and P2PK (pay to public key). Another key of this decentralized money is security and legality, and there are some words to refer to it. Within the acronyms in Table 3, some of them represent these values: AML (anti-money laundering), CFD (contracts for difference), CPFP (child pays for parents), CSV (check sequence verify), D.D. (due diligence), DLC (discrete log contracts), and KYC (know your customer).

The community popularly uses other common acronyms that should be commented on. Some of them could *be FOMO*, *HODL*, or *FUD*. They are related TO how to operate in the investment market. *FOMO* means *fear of missing out*, whereas *FUD* stands for *fear*, *uncertainty*, *and doubt*. In the same way, the word *HODL* means *hold on to dear life*, and it was originated by a user of the Bitcointalk Forum in 2013 who committed a typographical error. The speaker intended to say "Hold"; however, this mistake was popularized, and the crypto community began to use it regularly.

Animals as Crypto-Metaphors

The following part of our research includes the use of animals as metaphors in the field of crypto finances. In addition to the three animals in the glossary, other animals were also used in metaphors. These results can give us a clue on the popularity of using certain animals to describe or represent specific characteristics or peculiarities of cryptocurrencies. In this sense, the interpretation of these results can be twofold. On one hand, these animals represent some characteristics of the cryptocurrencies, as explained in our theoretical framework. On the other hand, some cryptocurrencies are named after animals. Therefore, the popularity of these animals can be derived from the cryptocurrencies that they represent. An example of this is *Dogecoin*, a very popular cryptocurrency RICARDO CASAÑ-PITARCH

R.	Word	Tokens	R.	Word	Tokens
1	Bull	38.200.000	14	Goose	7.610.000
2	Dog	28.900.000	15	Elephant	6.480.000
3	Shark	26.700.000	16	Rabbit	5.530.000
4	Bear	24.200.000	17	Sheep	4.580.000
5	Fish	24,100,000	18	Dolphin	3.060.000
6	Tiger	17.400.000	19	Gorilla	3.060.000
7	Unicorn	13.800.000	20	Turtle	2.670.000
8	Chicken	13.700.000	21	Pig	2.510.000
9	Wolf	11.800.000	22	Stag	1.930.000
10	Cow	11.600.000	23	Hawk	1.290.000
11	Whale	10.600.000	24	Deer	1.020.000
12	Bird	9.920.000	25	Gazelle	707.000
13	Monkey	8.130.000	26	Ostrich	425.000

Note: Search: "crypto*" + "word*". The cells in grey appeared originally in the Bit2Me glossary.

supported by Tesla's CEO, Elon Musk, and represented by a dog.

Table 4 shows the animals that were used in this research. The grey ones are included in the glossary provided by Bit2Me, whereas the others were complemented with other studies, mainly from Silaški (2011). The originals from the glossary were bull, bear, and whale. Bull and bear are counterparts; they refer to the market moving upwards or downwards, respectively. Regarding the whale, its use refers to people or groups of people with large amounts of a cryptocurrency whose movements can raise or lower prices. It should be noticed that the price of some cryptocurrencies whose price is over thousands of dollars were once only cents. People who bought at the early stages would have an important role in the future when the price of cryptocurrencies multiplied exponentially.

Other popular animals that should be commented on, as shown in Table 4, were *shark*, *fish*, *unicorn*, *chicken*, *wolf*, and *cow*. *Sharks* might refer to greedy and aggressive investors who aim at their goals over the means. A similar meaning has the *wolf*, an animal that usually attacks with a pack in an organized way. The *fish* concern those investors who are diversifying their investments into different cryptocurrencies. The *unicorn* is a mystical and legendary animal that everyone aims to catch; thus it refers to new cryptocurrencies that, for some reason, sound attractive to investors, who believe they have found *gold* and could multiply their initial investment. Then, the chicken concerns the lack of *courage* and *bravery* to take risky decisions —for example, over-conservative individuals with their assets. Finally, a *cow* is an animal that connotes nourishment; it also refers to a product that requires little or no expense but continues to generate benefits.

Discussion

As hypothesized, any new product, idea, or concept would bring new forms of languages. In this case, cryptocurrencies have made language evolve, and more concretely so within the language of finances. Our objective was to analyze some characteristics of the language of cryptocurrencies. Following the work of Mateo-Martinez (2010), who had previously focused on the language of finances, our research analyzed some of the features described in his work: Metaphors, acronyms, and usual words from this field. Some previous literature has also been exposed within this paper to support our findings for each of these elements.

In the case of the most frequent words, a glossary published by the company *Bit2Me* was used. From this list of words, we selected 255 and rejected those related to the proper names of people, companies, or cryptocurrencies. Table 2 shows the 100 most usual words from this glossary according to the search toolbar of Google. In addition to these 100 words, other picturesque expressions within the glossary that we considered interesting were also commented (see *to the Moon, Pizza Day, Shitcoin, Satoshi*). As expected, the language of cryptocurrencies is an extension or subcategory of the language of finances. Mateo-Martinez (2010) had previously distinguished between the language of finances and the language of economics. Whereas our target, a subcategory of the language of finances, was characterized for the use of Anglo-Saxon words, plays on words (see *pump and dump* or *Mimble Wimble*), or clear and accessible language for the non-expert public, in addition to the use of acronyms and metaphors. In contrast, the language of economics is more academic, and it relies more on Latinisms. In this sense, the glossary did not include Latin words, and the language did not seem to be highly academic, but rather user-friendly and accessible to a broad audience, even though it contained several technical words, as shown in this paper.

Regarding the creation of new words or neologisms, the prefix "crypto-" was commonly used to form new words such as *cryptocurrency, cryptography*, or *cryptojacking*, among others. We could say that this prefix will preferably remain in use to create new terms that combine cryptocurrencies with other concepts or things. Other words that have been introduced to describe the functioning of and actions related to cryptocurrencies are *blockchain, blocks, miners* or *mining, wallet*, and *portfolio*. These words are essential for anyone who wants to understand or use cryptocurrencies.

On the use of acronyms, some authors such as Laursen and Mousten (2015), Mateo-Martinez (2010), and Rao (2008), among others, had advanced that financial language relied on the use of acronyms over the words represented. In this regard, the acronyms from the glossary were more popular than the words represented (87.57 % vs. 12.43 %). As we can observe, understanding the meaning of some acronyms is essential to understanding cryptolanguage. This seems to be especially important to people who work in this sector, either investing or mining.

Regarding the use of metaphors, the work of Silaški (2011) suggested that animals were commonly used within the field of finances. Within the glossary provided by *Bit2Me*, three animals were suggested (*bull, bear*, and *whale*); however,

following this author's work, we decided to extend this list to 26 animals. We found that determining their frequency as a metaphor was not possible since many cryptocurrencies are called after the name of an animal. Therefore, several references to these animals represent a type of cryptocurrency. All in all, consistent the meaning of these animal-based metaphors, our finding showed that the users of cryptocurrencies tend to use these terms in their written language regularly.

On a final note, this paper has shown that financial language is the origin of cryptolanguage. This fact coincides with the works of Laursen and Mousten (2015), among others, on the use of acronyms or that of Silaški (2011) on metaphors. On neologisms, this paper has found that the language of cryptocurrencies follows the pattern of the language of finances, being less academic and more accessible, using Anglo-Saxon words and plays on words, acronyms, and metaphors. In addition, as suggested by Aronoff (1976) and other authors, the creation of new words is usually carried out by suffixation, prefixation, and compounding. In sum, the aim of this study is to help the readers understand some features of the crypto language, or the language of cryptocurrencies, a relatively novel field in which few studies have been carried out from a linguistic view. As this field is relatively new, the evolution of cryptocurrencies and their language is still ongoing, and the decisions of some governments on accepting or refusing their use will determine their path and impact in our lives.

Conclusion

It seems that cryptocurrencies have an immeasurable potential that has attracted the attention of many investors worldwide, both professional and novice. Although it should be acknowledged that this revolution does not seem to be completed yet as very few goods or services accept cryptocurrencies as a valid payment method, their value during the years 2020 and 2021 has increased exponentially. However, their value is characterized by its volatility; therefore, even though it can quickly increase to a great extent, it could also fall again in a few days or weeks. At any rate, the name *Bitcoin* appears more frequently in Google than other popular multinational companies with more years of service and experience, which can be interpreted as a sign that cryptocurrencies are indeed being used in the real world.

As it happens with any new product, new forms of language are created by the community that uses them. This research has described some characteristics of its language considering the most usual words, neologisms, acronyms, and metaphors, all of them extracted from a glossary published by the company Bit2Me. Few studies have explored the phenomenon of cryptocurrencies from a linguistic perspective; therefore, in further research, the study of the language of cryptocurrencies could focus on a different context like communication in social networks such as *Twitter*, which seems to be one of the main channels by which crypto-people communicate with other members. Another topic that may be worth exploring in further research is the study of the language used for the technical analysis of the cryptocurrency market, which focuses on predicting the value of assets in the future. In addition, the industry of cryptocurrencies will probably change in the following months or years; therefore, new horizons in linguistic research will likely appear soon.

References

- Algeo, J. (1977). Blends, a structural and systemic view. *American Speech*, 52(1), 47-64. https://doi. org/10.2307/454719
- Aronoff, M. (1976). Word formation in generative grammar. Linguistic Inquiry Monographs Cambridge, Mass, 1(1), 1-134.
- Bhatia, V. K. (1997). Applied genre analysis and ESP. In T. Miller (Ed.), *Functional approach to written text: Classroom applications*, (pp. 134-149). Information Agency.
- Bhatia, V.K. (2004). Worlds of written discourse: A genrebased view. Continuum International.

- Cheng, W., & Ho, J. (2017). A corpus study of bank financial analyst reports semantic fields and metaphors. *International Journal of Business Communication*, 54(3), 258-282. https://doi. org/10.1177/2329488415572790
- Ciganović, B. (2019). A study of the cryptocurrency terminology in English and Croatian (Doctoral dissertation). Josip Juraj Strossmayer University of Osijek.
- Crystal, D. (2001). Language and internet. Cambridge University Press. https://doi.org/10.1017/ CBO9781139164771
- Dyer, A. W. (1989). Making semiotic sense of money as a medium of exchange. *Journal of Economic Issues*, 23(2), 503-510. https://doi.org/10.1080/0021362 4.1989.11504916
- Furnham, A. (1984). Many sides of the coin: The psychology of money usage. *Personality and individual differences*, 5(5), 501-509. https://doi. org/10.1016/0191-8869(84)90025-4
- Gaudio, P. (2012). Incorporation degrees of selected economics-related Anglicisms in Italian. *The anglicization of European Lexis*, *10*, 305-324. https://doi. org/10.1075/z.174.20gau
- Gibbs, R. (1994). The poetics of mind: Figurative thought, language, and understanding. Cambridge University Press.
- Harley, H. (2006). *English words: A linguistic introduction*. Blackwell.
- Janssen, M. (2005). Between inflection and derivation paradigmatic lexical functions in morphological databases. In J. D. Apresjan & L. L. Iomdin (Eds.), *East-West encounter: Second International Conference on Meaning and Text Theory* (pp. 187–196). Slavic Culture Languages.
- Khan, M. (2013). Neologisms in Urdu: A linguistic investigation of Urdu media. *Language in India, 13*(6), 816-826.
- Klebanow, S. (1991). Power, gender, and money. In S. Klebanow, and E. L. Lowenkopf (Eds.), *Money* and mind (pp. 51-59). Springer. https://doi. org/10.1007/978-1-4615-3762-5_5
- Krimpas, P. G. (2017). ISO 704: 2009 and equivalents of English financial terms in lesser-used languages: The case of Greek. *Perspectives*, 25(3), 397-416. https:// doi.org/10.1080/0907676X.2017.1287206
- Lakoff, G, & Johnson, M. (1980). *Metaphors we live by*. Chicago University Press.

- Laursen, A. L., & Mousten, B. (2015). Tracking anglicisms in domains by the corpus-linguistic method—A case study of financial language in stock blogs and stock analyses. In *IEEE International Professional Communication Conference*, (pp. 1-7). Institute of Electrical and Electronics Engineers. https://doi. org/10.1109/IPCC.2015.7235806
- Lipton, A. (2019). Toward a stable tokenized medium of exchange. In C. Brummer (Ed.), *Cryptoassets. Legal, regulatory and monetary perspectives* (pp. 89-115). Oxford. https://doi.org/10.1093/ oso/9780190077310.003.0005
- Mateo-Martinez, J. (2010). Professional and academic languages. In R. Giménez Moreno (Ed.), Words for working professional and academic English for international business and economics (pp. 17-56). Universitat de València.
- Nădrag, L. (2020). How to teach English for economics. Case study: Cryptocurrency and Bitcoin vocabulary. *Ovidius University Annals*, 20(1), (Series Economic Sciences), 444-450.
- Nakamoto, S. (2019). Bitcoin: A peer-to-peer electronic cash system. *Manubot*, 1-7. Retrieved on 31 May 2020 from https://bitcoin.org/bitcoin.pdf
- Peprnik, J., & Univerzita Palackého (2006). *English lexicology*. Univerzita Palackého v Olomouci.
- Plag, I. (2003). Word-formation in English. Cambridge University Press. https://doi.org/10.1017/ CBO9780511841323
- Rao, X. N. (2008). A study on business text translation from the perspective of translation aesthetics. Wuhan University.
- Ratih, E., and Gusdian, R. (2018). Word formation processes in English new words of Oxford English Dictionary (OED) online. *Celtic: A Journal of Culture, English Language Teaching, Literature and Linguistics, 5*(2), 24-35. https://doi.org/10.22219/ celtic.v5i2.7617
- Sánchez-Pérez, M., & Cortés-de-los-Ríos, M. E. (2015). The financial language used to communicate the same socio-economic events in English and Spanish press through metaphors and metonymies. *ESP Today*, 3(2), 216-237.
- Silaški, N. (2011). Animal metaphors in some business-related terms in English. *Radovi Filozofskog fakulteta u Istočnom Sarajevu, 13*(1), 565-576.
- Somit, A. (1948). Andrew Jackson as administrator. *Public Administration Review*, 8(3), 188-196.

- Ten Hacken, P., & Thomas, C. (2013). The semantics of word formation and lexicalization. Edinburgh University Press. https://doi.org/10.3366/ edinburgh/9780748689606.001.0001
- Trask, R. L. (1999). *Key concepts in language and linguistics*. Psychology Press.
- VanPatten, B. (2011). Stubborn syntax: How it resists explicit teaching and learning. In P. Leow and Sanz, C. (Eds.), *Implicit and explicit language learning:*

Conditions, processing, and knowledge (pp. 9-21). Georgetown University.

- Worster, D. (1993). The wealth of nature: Environmental history and the ecological imagination. Oxford University Press.
- Wallace, N. (2010). Fiat money. In S. N. Durlauf & L. E. Blume (eds), *Monetary Economics* (pp. 66-75). Palgrave Macmillan. https://doi. org/10.1057/9780230280854_8

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