Exploring the ICOs Phenomenon: The Role of White Papers’ Linguistic Content

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Abstract

KEYWORDS: Initial Coin Offering (ICO), Crowdsale, White paper, Token sale, Cryptocurrency, Signaling theory, Information asymmetry, Quantitative linguistic analysis, Positive emotions

New ventures and private investors are showing increasing interest in innovative forms of fundraising. ICO is the abbreviation of Initial Coin Offering and it represents an innovation in entrepreneurial finance (Fish, 2019; Block, Colombo, Cumming, & Vismara, 2018). Specifically, ICO can be described as a mechanism through which new ventures raise capital by selling tokens to a crowd of investors (Fish, 2019; Li and Mann, 2018; Willet, 2013). This token, generally, is a cryptocurrency, a digital medium of value exchange based on the distributed ledger technology (DLT). Tokens will become functional future units of the venture’s project in the form of right to ownership, royalties or other utility functions (Sameeh, 2018).

Drawing on the Signaling theory (Spence, 1973), whose aim is to reduce information asymmetry in the investor-investee relationship, the purpose of my research is to understand how white papers can contribute to reducing investors’ skepticism. A white paper is an official document that describes the problem that the project is seeking to solve. White papers are relevant to provide information to potential ICOs. White papers are crucial to make investors more trusting and, consequently, could represent an important factor to determine the amount of funding raised.

While previous academics have found that technical white papers attract higher amounts of funding (Fish, 2019), little is known about how non-technical content can contribute to reducing information asymmetry.

This research investigates whether the use of signals regarding positive emotion words mentioned in the document can predict the amount of money raised by a venture.

As a result, two salient questions emerge: how emotional words mentioned in white papers affect ICO success? More specifically, how positive emotions used in the document improve fundraisings?
To explore these questions, I used an empirical quantitative method, compiling a sample manually using data, mainly, from Icobench website which is considered the number one ICO rating platform. To promote the projects, the entrepreneur team will usually register on various ICO tracking websites, which will then rate the plans based on the submitted information. I added more information from several ICO listing websites such as www.icodrops.com, www.icobench.com, www.coinmarketcap.com, www.tokenmarket.net, www.foundico.com, www.icomarks.com, www.icorating.com, www.trackico.io, www.findico.io, in order to collect the top 100 best ICOs carried out between 2016 and 2019 through the three top countries in the world by the number of ICOs: USA, UK, and Singapore. Finally, I obtained every single white paper for every top 100 ICOs using information from the venture’s website. I used a multivariate regression analysis to find the relationships between the dependent variable (the amount of funding raised) and the independent variable (positive emotions).

Surprisingly we noted a negative correlation between positive emotions and the amount of money raised. How should we interpret a negative correlation? Why positive emotions mentioned in whitepapers do not seem to condition fundraising? The new venture’s goal is to reduce information asymmetry. They consider that writing a good White Paper is a way to reach its goal, especially if you insert positive emotional words. Probably the investor is much more culturally prepared in terms of financial risk and is not fooled by pure dialectics. Potential investors are aware of grey areas related to the financial regulatory system. The result is that the positive words mentioned in a white paper are quite often insufficient as it frequently lacks information which inspires confidence. Therefore positive emotional words do not play a large enough role to decrease the level of information asymmetry between investors and the ICO team.
EXPLORING THE ICOs PHENOMENON: THE ROLE OF WHITE PAPERS’ LINGUISTIC CONTENT

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INTRODUCTION

New ventures and private investors are showing increasing interest in innovative forms of fundraising.

ICO is the abbreviation of Initial Coin Offering and it represents an innovation in entrepreneurial finance (Fish, 2019; Block, Colombo, Cumming, & Vismara, 2018).

The easiest way to define ICOs is that they can be considered a financing activity that allows online projects and start-up companies to raise the required funds with the support of venture capitalists.

The definition includes many similarities with the notion of crowdfunding campaign: with crowdfunding, an entrepreneur raises external financing from a large audience (the “crowd”), in which each individual provides a very small amount, instead of soliciting a small group of sophisticated investors (Belleflamme, Lambert, & Schwienbacher, 2014).

Initial Coin Offerings as happens for a crowdfund, usually take place in the early stages of a tech project. The difference being a crowdfund is a donation whereas an ICO is made up of investors wishing to see a profit on investments. Some academics define ICOs as “Crowd Sales” distinguishing them from crowdfunding.

At the same time, as the name suggests, an Initial Coin Offering is the process by which a company sells its stocks to the general public, very similar to the common IPOs or Initial Public Offering of regular stock.

The public token sale, colloquially known as an “Initial Coin Offering,” is a powerful new tool for creating decentralized communities, kickstarting network effects, incentivizing participants, providing faster liquidity to investors, and forming capital for creators (Batz-Benet, Santori, & Clayburgh, 2017).
Compared to traditional IPOs that are very standardized and require a lot of legal work, ICOs are very different.

In IPOs, investors pay for shares of stocks of a company using fiat currency or money in return of some level of control in the company.

ICOs are different, there is no need for an investment bank to manage the fundraising activity, shares of stock and voting rights are excluded to investors, and there is no government involvement. Also, projects or startups that do ICOs hardly have any corporate history or goods in the market.

ICOs enable startups to raise large amounts of funding with minimal effort while avoiding compliance and intermediary costs (Kaal and Dell’Erba, 2018; Sameeh, 2018).

Specifically, ICO can be described as a mechanism through which new ventures raise capital by selling tokens to a crowd of investors (Fish, 2019; Li and Mann, 2018; Willet, 2013). This token, generally, is a cryptocurrency, a digital medium of value exchange based on the distributed ledger technology (DLT). Tokens will become functional future units of the venture’s project in the form of right to ownership, royalties or other utility functions (Sameeh, 2018).

Distributed Ledger Technology is a database distributed on different nodes or IT devices, which one is individually involved in the network replicating and saving a copy of the ledger. There is no central authority in command, no arbitrator, and any node that proceeds with registration and rescue, work independently.

Currently, the most common type of DLT is the blockchain technology (BCT). Blockchain startups have embraced initial coin offerings (ICOs) as a vehicle to raise early capital. The crypto-tokens offered in these sales are intended to fill a widely varied set of roles on different platforms (Conley, 2017).

The basic idea behind the BCT is that it allows actors in a system (called nodes) to transact digital assets using a P2P network that stores these transactions in a distributed way across the network (Back et al., 2014). This innovative technology has provided the ICOs to collect large amounts of money.

When evaluating ICOs by size, we can consider both the amount of money raised in the ICO as well as the return on investment. Sometimes ICOs with a relevant return on investment are not among the highest-earning projects and vice versa. Ethereum’s ICO in 2014 was an early pioneer raising 18 million US dollars in 42 days. Ethereum was essential for the ICOs’ development, thanks to its innovations regarding decentralized apps. More recently, ICOs have generated significantly larger amounts in terms of total funds raised. The largest ICO in this term is Filecoin, a decentralized cloud storage project. During a one-month ICO ending in September of 2017, Filecoin managed to collect about 257 million US dollars (Frankenfield, Investopedia.com).

In 2018, 2,284 initial coin offerings have been concluded and investors could choose, on average, among 482 token sales. The total amount raised in 2018 was almost $11.4 billion (ICObench database, which includes over 5,100 ICOs since August 2015.)
THEORETICAL FRAMEWORK

Drawing on the Signaling theory (Spence, 1973), whose aim is to reduce information asymmetry in the investor-investee relationship, the purpose of my research is to understand how white papers can contribute in reducing investors’ scepticism.

Spence demonstrated that under certain conditions, well-informed agents can improve their market outcome by signaling their private information to poorly informed agents (G.Akerlof, M.Spence, and J.Stiglitz 2001).

Signaling is the idea that one party (the agent) transfer information about itself to another party (the principal). In Michael Spence’s job-market signaling model, (potential) employees send a signal about their ability level to the employer by improving education skills. The informational value results from the fact that the employer considers that there is a positive correlation with having a greater ability.

In a similar context, signaling theory has been used to explain which types of non-technical information lead investors to invest in startups. This stream of literature has focused mainly on the signaling of startups regarding technical aspects, board and top management characteristics, gender, the presence of venture capitalists or angel investors and founder involvement.

This research enriches the extant literature in signaling theory by introducing white paper’s linguistic content analysis, more precisely how positive emotions that emerge from white papers can affect the amount of money raised.

A white paper is an official document which describes the problem that the project is seeking to solve. White papers are relevant to provide information to potential ICO investors representing a crucial tool to make investors more trusting and, consequently, could represent an important factor to determine the amount of funding raised.

White papers contain a number of pieces of information on IT protocols, adopted public blockchain, token supply, pricing and distribution mechanism, and details on the project to be developed, eventually a business plan, including team description (Adhami, Giudici, & Martinazzi, 2018).

So it can be stated that this tool provides detailed information about a project's plan, technical details, budget, goals, and how the tokens will be distributed.

More specifically the contents of any white paper should include several points: introduction, disclaimer, table of contents, description of the market and the problem, description of the product and how it’s going to solve said problem, tokens (how many, why, how, when), how the raised funds are going to be used, the team and the roadmap (cointelegraph.com).

While previous academics have found that technical white papers attract higher amounts of funding (Fish, 2019), little is known about how non-technical content can contribute to reducing information asymmetry.

This research investigates whether the use of signals regarding positive emotion words mentioned in the document can predict the amount of money raised by a venture.
As a result, two salient questions emerge: how emotional words mentioned in white papers affect ICO success? More specifically, how positive emotions used in the document can improve fundraisings?

**METHODOLOGY**

This study seeks to introduce a quantitative linguistic analysis to investigate how the use of positive emotional words, can enhance investor confidence and, consequently, the total amount of tokens sold and funds raised.

To explore these questions, I used an empirical quantitative method, compiling a sample manually using data, mainly, from Icobench website which is considered the number one ICO rating platform. To promote the projects, the entrepreneur team will usually register on various ICO tracking websites, which will then rate the plans based on the submitted information.

Lee et al. (2018) considered Icobench the main online hub for ICOs rating using its data and one-to-five ratings, finding that the probability of a successful fundraising increase by 19.8% for any 1% increase in the average analyst rating, after controlling for other project features.


Rating is the result of the combination of:

- Icobench assessment algorithm that uses more than 20 different criteria on which each ICO can earn more than 30 points
- The rating that independent experts give to the ICO following its rating methodology suggestions.

When an ICO is first listed on the site, an automated assessment algorithm called “Benchy” calculates its score based on several objective criteria considering: team, ICO information, product presentation and marketing and social media. Initially, the Benchy score represents 100% of an ICO’s rating on ICObench, but as ICObench “experts” begin to weigh in with their opinions, the importance of the Benchy score diminishes considerably (https://icobench.com/ratings).

I gathered the top 100 ended ICOs among USA, Singapore and the UK collecting their respective white papers.

I used a generalized linear regression analysis to find the relationships between the amount of funding raised (dependent variable) and the positive emotion score (independent variable) obtained from LIWC.

LIWC is a transparent text analysis program that counts words in psychologically meaningful categories. Empirical results using LIWC demonstrate its ability to detect meaning in a wide variety of experimental settings, including to show attentional focus, emotionality, social relationships, thinking styles, and individual differences (Tausczik and Pennebaker, 2010).
Research suggests that LIWC accurately identifies emotion in language use. For example, positive emotion words (e.g., good, nice, successful) are used in writing about a positive event, and more negative emotion words (e.g., hurt, ugly, nasty) are used in writing about a negative event (Kahn, Tobin, Massey, & Anderson, 2007). LIWC ratings of positive and negative emotion words correspond with human ratings of the writing excerpts (Alpers et al., 2005).

**Variables**

**Dependent variable: amount raised (ln)**

The amount of funding raised in the ICO is the dependent variable (in USD). This kind of dependent variable is generally used in entrepreneurial finance research (e.g., Mollick, 2014). The data have been extracted from Icobench when available. I used a natural log transformation to consider the skewness of the variable (Anglin et al., 2018; Block et al., 2018).

**Independent variable: positive emotions (posemo)**

The study explores the potential signals of positive emotions, which represent the independent research variable.

The words used in the top 100 white papers for the USA, Singapore and the UK have been analysed using the software LIWC (Linguistic Inquiry Word Count). LIWC reads a given text and counts the percentage of words that reflect different emotions, thinking styles, social concerns, and even parts of speech. Because LIWC was developed by researchers with interests in social, clinical, health, and cognitive psychology, the language categories were created to capture people’s social and psychological states (http://liwc.wpengine.com/how-it-works/).

The way how LIWC categorize “posemo” words has been outlined below testing, for example, the NAGA white paper which is an American ICO rated 4.1 by Icobench.

NAGA’s mission is to open up the world of trading financial and virtual goods to everyone. After building up a team of 120 dedicated and motivated people, spending tens of millions EUR on licences and technology as well as establishing a business that has hundred-thousands of clients, millions EUR of revenues and billions EUR in trading volume, NAGA formulated the credo “Power to the people”. As a logical step NAGA is introducing a decentralized unit of account The NAGA Coin (NGC). The NGC will unite all platforms in the NAGA ecosystem through an own wallet service called The Naga Wallet. The NAGA Wallet aims to bridge the two projects and enable an ecosystem for social trading of cryptocurrencies, virtual goods and stocks. The concept of enabling gamers to turn their passion into a wealth generating hobby has been a dream come true for many millennials. Hence the digital NAGA ecosystem powered by the NGC will give everyone access to convert any currency to crypto-currencies, stocks or virtual in-game goods from various platforms. It will allow everyone to trade at a transparent cost structure, and receive cashback and loyalty bonuses through a sophisticated token economy framework. Ultimately the NAGA Wallet will serve as a one-stop shop solution that ensures that the user’s currency is stored in a secured and reliable platform. The NAGA team strongly believes that the combination of merging an innovative, established and

*Figure 1- Excerpt from NAGA white paper*

LIWC highlights “posemo” words in the document, as a result, the software will give the percentage of words that reflect this kind of emotion (in this case: 2,71%).
Control variables: characteristics of the Venture

To exclude confounding effects, and to explore additional determinants of the amount raised in ICOs, the analysis includes control variables. Two variables refer to the venture’s characteristics, while one refers to the rate assigned by Icobench.

Team members (ln). I considered the natural log of the number of components in the ICO team. Icobench provides name and surname, pics and Linkedin URL of the whole team.

Category. Icobench identifies 29 ICO categories listed below:

1. Art
2. Artificial Intelligence
3. Banking
4. Big Data
5. Business services
6. Casino & Gambling
7. Charity
8. Communication
9. Cryptocurrency
10. Education
11. Electronics
12. Energy
13. Entertainment
14. Health
15. Infrastructure
16. Internet
17. Investment
18. Legal
19. Manufacturing
20. Media
21. Other
22. Platform
23. Real estate
24. Retail
25. Smart Contract
26. Software
27. Sports
28. Tourism
29. Virtual Reality

Control variables: characteristics established by external evaluators

Ico rate (ln). I used the natural log of the ICO rate assigned by Icobench. All ICOs are rated under the same condition, by the same assessment algorithm which considers four different areas: Team, Ico information, Product presentation, Marketing and Social media.

RESULTS

The following table shows the matrix correlation. We can notice a negative correlation between the amount of funding raised and the use of positive emotions in white papers.

<table>
<thead>
<tr>
<th>CORRELATION</th>
<th>lnAMOUNTRA~D</th>
<th>POSEMO</th>
<th>lnTEAM~S</th>
<th>lnRATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>lnAMOUNTRA~D</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POSEMO</td>
<td>-0.0931</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lnTEAM~S</td>
<td>-0.0144</td>
<td>-0.1209</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>lnRATE</td>
<td>0.0236</td>
<td>-0.0341</td>
<td>-0.0842</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

In this research, I adopted a Generalized Linear Model to find possible relationships among variables.

In the first table only control variables were included.

<table>
<thead>
<tr>
<th>Model 1</th>
<th>No. of obs = 103</th>
<th>Log pseudolikelihood = -180.1868396</th>
</tr>
</thead>
<tbody>
<tr>
<td>lnAMOUNTRA~D</td>
<td>Coef.</td>
<td>Robust Std. Err.</td>
</tr>
<tr>
<td>lnTEAM~S</td>
<td>1.219464</td>
<td>3.062748</td>
</tr>
<tr>
<td>lnRATE</td>
<td>1.219464</td>
<td>3.062748</td>
</tr>
<tr>
<td>Categories (1-29)</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>
In the second table, all variables were included.

|                | Coef.     | Robust Std. Err. | z     | P>|z|    | [95% Conf. Interval] |
|----------------|-----------|------------------|-------|--------|---------------------|
| lnAMOUNTRA~D   | -0.2673694| 0.1611828        | -1.66 | 0.097  | [-0.5832818, 0.0485431] |
| POSEMO         | -0.1072171| 0.4218471        | -0.25 | 0.799  | [-0.9340221, 0.719588] |
| lnTEAMMEMB~S   | 1.342171  | 2.955611         | 0.45  | 0.650  | [-4.450719, 7.135062]  |
| lnRATE         |           |                   |       |        |                     |
| Categories (1-29) | yes     | yes              | yes   | yes    | yes                |

Surprisingly we can note a negative correlation between positive emotions and the amount of money raised. How should we interpret a negative correlation? Why positive emotions mentioned in white papers do not seem to condition fundraising?

We have to remind that venture's goal is to generate investor trust. White paper is a useful tool to generate trust, especially if investees use a positive language.

The Australian market authority issued a document stating that “ICOs have the potential to make an important contribution to the options available to businesses to raise funds and to investment options available to investors,” however specifying that “an ICO must be conducted in a manner that promotes investor trust and confidence, and complies with the relevant laws” (Adhami, Giudici, and Martinazzi 2018).

New ventures’ goal is to reduce information asymmetry. They consider that writing a good White Paper is a way to reach its goal, especially if you insert positive emotional words. Probably the investor is much more culturally prepared in terms of financial risk and is not fooled by pure dialectics. Potential investors are aware of grey areas related to the financial regulatory system.

The result is that the positive words mentioned in a white paper are quite often insufficient as it frequently lacks information which inspires confidence. Therefore positive emotional words do not play a large enough role to decrease the level of information asymmetry between investors and the ICO team.

THEORETICAL AND PRACTICAL IMPLICATIONS

This study will contribute to the literature on entrepreneurial finance by introducing a quantitative linguistic analysis related to ICOs whitepaper. More specifically the research aims to capture investors’ psychological states reflecting their different kind of emotions. The research will have also implications for practitioners, as they inform potential ventures about how to write a whitepaper that can attract larger funding.

LIMITATIONS AND FUTURE RESEARCH

Several issues, regarding data accessibility and quality, limit the generalizability of the results. Most of the data were collected manually and some ICOs were excluded because of the lack of white paper or the amount of money raised.
I was unable to gather data for some variables that might affect the amount raised in ICOs such as the kind of platform, hard and soft cap, minimum investment, bonuses, whitelist/KYC, restricted areas, presale/ico time and statistics related to social media activity.

Additionally, the number of observations is limited to three countries and one hundred ICOs. Results will be statistically more significant adding more ICOs.

Future research could explore additional variables regarding psychological states in text analysis such as sadness, anger and anxiety.

Additionally, academics could survey investees to gather data. Researchers could contact ICO CEO via LinkedIn, Twitter, Facebook, Reddit, Telegram to collect information regarding not only technical but also psychological aspects.

Exploring the relationship between ICO and post ICO performance could be another interesting point. While most ventures intend to develop a product, these ventures often do not have a working product at the time of the ICO (Fish, 2019).
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