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Understanding cryptocurrencies (ICOs) using artificial intelligence – Infographics, bullet points, textual content

Auteur: WOUTERS Manon
Promoteur: THEWISSEN James
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Abstract

With the growing popularity of ICOs as crowdfunding methods, it is crucial to understand the factors contributing to the success of these fundraising campaigns. Regression analysis is conducted on a dataset of ICO whitepapers to examine the impact of human presence, the differential effects of images featuring women and men, and the role of sentiments elicited by the whitepapers on the fundraising outcomes. The results indicate a non-linear relationship between the number of human images and the amount raised, suggesting the existence of an optimal balance in this regard. When comparing gender-specific images, the presence of women exerts a stronger influence on fundraising success as well as on the sentiment expressed towards the whitepaper. Moreover, the sentiments evoked by whitepapers combined with images depicting humans have a significantly positive effect on the funds raised. However, the overall adjusted R-squared value of the models indicates that the included variables explain only a small portion of the variation in the amount raised by ICOs. Therefore, while these findings provide valuable insights for ICO project teams, future research is recommended to further explore and refine the relationship between images, sentiments, and fundraising success in ICOs.

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Contents

Introduction

Technological progress have transformed the way money is stored and how payments are made. In many countries, cash is being increasingly replaced by electronic transactions such as credit cards, bank transfers or online payments. These changes have altered our perception of money and have given rise to a new form of currency, known as cryptocurrencies [16].
In this context, crowdfunding campaigns involving cryptocurrencies have emerged, known as Initial Coin Offerings. ICO creators raise funds by selling tokens, which are digital assets. ICOs have quickly become attractive due to the technology they use, enabling peer-to-peer transactions, reducing financing costs, and providing transparency and security in transactions [3].
Most ICOs are accompanied by an associated whitepaper that presents key information about the project, enabling investors to make informed decisions based on all the necessary data. These whitepapers play an important role in the success of ICOs [7].
Considerable research has already been conducted on the impact of whitepaper content on ICO success, both in terms of textual content [15] and visual elements [26].

This research aims to investigate the influence of images depicting humans in ICO whitepapers on the success of these ICOs. We will examine whether the presence of humans affects the amount raised during ICO campaigns. We will also investigate the impact of the exclusive presence of women and of men. Additionally, we will inspect the role of sentiments evoked by the whitepaper, exploring whether positive or negative emotions have an impact on investor behavior and therefore on fundraising outcomes. To achieve these objectives, we will employ a statistical analysis approach, utilizing regression models to analyze a dataset of ICO whitepapers and their corresponding fundraising outcomes. By examining the relationship between human presence, differences in gender, sentiment and the amount raised, we aim to uncover valuable information about the factors that contribute to an ICO's success. By identifying the factors that influence investor decision-making and fundraising outcomes, we can provide valuable information for ICO project teams seeking to optimize their whitepaper and increase their chances of running a successful

fundraising.

This first chapter of this thesis is a literature review, introducing the concept of cryptocurrencies, ICOs, and whitepapers. We explore the existing research on the impact of images on individuals in general, followed by specific studies on the influence of human in images. And gender differences will be addressed. Next, a detail explanation of the objectives of this paper and the hypotheses we aim to address will be provided. The third chapter will present our dataset and the methodology we will employ to conduct our analyses. A descriptive statistic study of the variables will also be proposed. Subsequently, we will present the results of our analyses, providing insights and findings related to our hypotheses. Finally, we will conclude this paper by summarizing the overall conclusions drawn from our hypotheses.

Chapter 1

Literature review

To investigate the impact of human presence in figures depicted in ICO whitepapers, a comprehensive literature review will be conducted. The review will begin by providing a brief overview of cryptocurrencies and blockchain technology, emphasizing its role in securing and verifying transactions. Subsequently, ICOs and white papers will be introduced. Then, the topic of images will be addressed along with their impact on individuals. The review will examine the effects of human presence in images on individuals, providing valuable insights into this aspect of ICO whitepapers. Finally, given the analysis's subsequent exploration of the influence of men and women separately in the images, gender differences will also be discussed.

1.1 Cryptocurrencies and blockchain

Cryptocurrencies are global digital currencies that are used as a means of exchange. Unlike traditional money transfers, which use the Society for Worldwide Interbank Financial Telecommunication (SWIFT) system worldwide or the Single Euro Payments Area (SEPA) system in the European Union, they are not tied to central authorities and are thus not subjected to control. In addition, these systems sometimes can take up to 5 days to complete transactions, while digital payments can be made in an hour or even a few seconds. The value of cryptocurrencies is established through transactions, and exchanges are verified by a decentralized system that ensures the legitimacy of each party's holdings. This system employs highly advanced cryptography to secure transactions and prevent fraud [38] [19].

Blockchain is the system that enables a secure way to record transactions in a ledger. Instead of relying on a central server, the ledger is stored on private computers distributed worldwide, known as nodes. Each node maintains a copy of the ledger and performs the

necessary calculations to validate transactions according to strict rules.
The name "blockchain" comes from the fact that transactions are grouped into blocks and linked together, with each new block linked to the previous one using a hash function. This ensures that the entire ledger is collectively validated and remains decentralized [22]. The structure of the blockchain can be illustrated using Figure 1.1. Each block in the chain contains a set of transactions (TX1-TXn), as well as a timestamp, the hash value of the previous block in the chain (also known as the parent block). They also have a nonce which is a random number used to verify the hash. This idea guarantees the consistency and reliability of the entire blockchain, extending from the very first block, commonly referred to as the "genesis block". Because the hash values are unique to each block, any attempt to modify the contents of a block would be immediately detected. New transactions are initially hold in a block for a certain period of time waiting to be validated before being added to the ledger. This validation process involves a majority of nodes agreeing that the transactions are valid and the block itself is valid. Once validated, the transactions are added to the blockchain and become a permanent part of the ledger. Once it is included in the ledger, it cannot be modified or deleted. This structure and system provide thus a secured and tamper-proof record of all transactions [31].

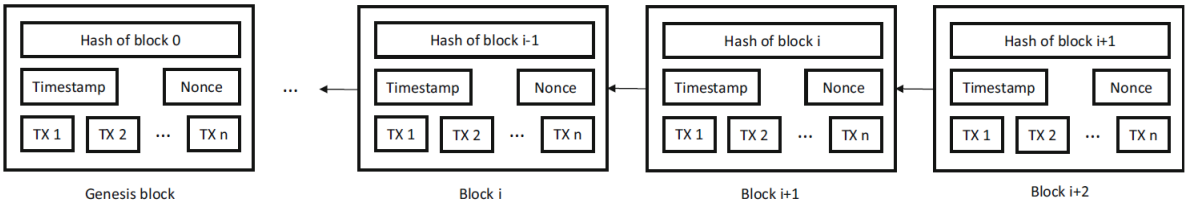

Figure 1.1: Illustration of a blockchain from Zheng et al. [42]

Bitcoin is the first cryptocurrency to have been created and is today the most well-known and widely used in the world. It uses the blockchain system.
It was invented in 2008 by Satoshi Nakamoto [30], which is a pseudonym for a person or a group of people. The open source code for the reference implementation was published in 2009 and numerous programmers continued to contribute to the code since then. The value of bitcoin fluctuates over time and has increased dramatically over time. For example, in May 2010, Laszlo Hanyecz traded 10 000 bitcoins for 2 pizzas, which was the first physical purchase with bitcoins. At the time, it was worth 41$, now it is worth 274M$[36]. The process of validating the blockchain by the various nodes of the network is called mining, and the nodes are called miners. Mining activity is rewarded, indeed miners receive bitcoins in exchange for their work. Each transactions offers a reward and newly created bitcoins are given to creators of new blocks via a special transaction known as coinbase transaction, which is included in the new block. This incentive system motivates people

to participate in mining and ensures the evolution of the system.
The creation of bitcoins is gradual, and when Nakamoto created the first block, also called genesis block, in 2009, the reward for validating a block was 50 bitcoins [43].
He established the rule of halving, which means that the number of bitcoins generated per block would be halved every 210000 blocks (roughly every four years as the waiting time for validating a block is 10 minutes: 6 blocks * 24 hours * 365 days * 4 years = 210 240 blocks). After a while, the reward will no longer be divisible by two and no more bitcoins will be created. In fact,this system has a limit, the smallest unit of the bitcoin is the Satoshi, which is equal to 10^{-8} bitcoin, it is therefore impossible to create a fraction of a bitcoin smaller than a Satoshi. This should happen about the year 2140 and the number of bitcoins at that time will be 21 millions. Indeed, this number comes from the following calculation:

$$\sum_{n}^{N} 210000 * \frac{50}{2^n}$$

with N, the maximum number of divisions. It can be determined that at N=33, the factor $\frac{50}{2^n}$ become smaller than a Satoshi. Therefore, with N=32, this number becomes equal to 20 999 999,9769 [5]. Limiting the creation of bitcoins is a protection against inflation [11]. This also ensures the scarcity of bitcoin [23].

Although the blockchain system remains the system used by the majority of cryptocurrencies, there are other types of systems used in cryptocurrencies to record and secure transactions. In fact, the blockchain is actually one type of systems called distributed ledger technology (DLT). DLTs are essentially databases that have multiple copies distributed among various participants, who update them simultaneously and agree on any changes. Therefore, there is no need for a controlling organisation [39].
Among the DLTs, there is Tangle, Hashgraph or even Sidechain [18].

1.2 ICOs and whitepapers

Initial coin offerings (ICOs) are special cryptocurrency fundraising methods organized by companies, entrepreneurs or organizations. They sell tokens to investors to raise money. Tokens are units of value issued by the entity organizing the ICO and can be divided into two types: utility tokens and security tokens [1].
Utility tokens, which represents the majority of tokens issued, serve as a form of currency that can be used within the venture, allowing investors to purchase products or services offered by the venture once the project is completed. In a way, these tokens represent a cryptocurrency specific to the venture. Their value is expected to increase as the venture grows, which reward early investors [34].

Security tokens are investment products that, unlike utility tokens, are regulated by securities law. These tokens provide investors with a stake in the decision-making in the venture, such as the right to vote on the composition of the board of directors or the company's policies. These investment products offer the potential for capital gains and/ or generating income, which includes dividends, fixed-interest payments and income-sharing payments [24].

In 2016, the DAO project created one of the first important ICO, which raised $150 million. This ICO allowed investors to purchase token in the organization using Ethereum cryptocurrency and gave them voting power in the organization decisions proportional to their pledged amount. The creator claimed that DAO could ensure constant control over funds and compliance with regulations would have been enforced by software. However, DAO experienced a security issue and was hacked, resulting in a theft of $60 million [1]. In fact, the first ICO was launched in 2013 by the Mastercoin project which raised 5000 bitcoins. However, the DAO project is often considered as the first to have launched an ICO because it was the first to raise such a significant amount of funds, demonstrating the potential for crowdfunding through blockchain technology and paving the way for many other ICO projects. It also garnered significant attention following the hack which is considered to be "one of the largest digital heists in history" [37].

When launching an ICO, many ventures choose to publish a white paper, which provides detailed information about the project's technology, the venture's vision, and strategy. Although not mandatory, this document helps to present the project to investors, highlight its attractive features, and promote the tokens. Typically, the white paper is posted on the venture's website and on ICO listing platforms. Although there are no legal or stock exchange requirements for ICOs, the information in the white paper must be credible because it serves as the primary source of information for potential investors [15].

Amsden et al. study was one of the first to investigate the impact of ICO content on project success. They analyzed 1,009 white papers published between 2015 and 2018. According to their findings, what they refer to as "venture uncertainty" negatively affects the funds raised by ICOs.They have highlighted that if a company is not present on Github and Telegram (two social networks), it may suggest a lack of transparency and communication channels, which could indicate potential problems in the venture's source code and raise doubts about its quality. A relatively short white paper may reflect a less sophisticated business plan. Furthermore, a high percentage of tokens offered during the ICO could imply a lack of confidence from the team about the venture's quality, leading

to concerns that the ICO is motivated by monetary gain. Also, the presence of a pre-ICO may suggest uncertainty from the entrepreneurs, as it is common to launch a pre-ICO if there is doubt about the quality of the project. Finally, a high ether price reduces the relative attractiveness of ICOs.
All these factors could lead to the failure of the ICO, resulting in the loss of investors' investments and wasted time and resources for the entrepreneurs as the project would not come to fruition.
Next, the authors found that what they call "high venture quality" positively affects the success of the fundraising. Having a CEO or founders with strong connections, advisors and large motivated teams are all positive factors. Additionally, setting a hard cap before launching the ICO allows investors to measure the success of the pre-sale. But attention must be paid to the duration before reaching this cap, as it represents the strength of demand. Setting a soft cap reduces the risks taken by investors. In fact, if this threshold is not met, investors are refunded. This can reassure investors that the project can still proceed with this minimum amount and reduce their fear of investing.
They claim that their results could be useful in creating strong regulations that would allow investors to be protected while enabling entrepreneurs to continue using ICOs. These rules should focus on the information transparency of venture characteristics as well as the profile of team members, by requiring reliable and available CVs for example [2].

Sergey Kasatkin studied white papers content from a legal perspective and determined that investors are not influenced by the legal content of white papers. There is, in fact, no direct relationship between a venture's success and the obligations and responsibilities of developers. Investors are mainly interested in the development team's reputation and the technological component.
It is clear that the increasing number of jurisdictions regulating ICOs should encourage greater attention to the legal aspects of ICOs. Codes are not subject to any law, as regulations can only apply to the action of legal entities such as human beings or organizations of human beings. Therefore, white papers can serve as a link between source code and traditional legal institutions since it is the document containing the theoretical and practical aspects of projects.
According to him, technical regulations linked to legal regulations would enable the security and success of ICOs. Based on his observations, "a white paper should include the following legal provisions: information about the applicable law and the procedure for resolving possible disputes between investors and developers; a detailed description of the rights provided by tokens and how those rights may be enforced; determination of the moment of a smart contract conclusion; special section for consumers 'Disclosure

information'; description of certain ways to correct and terminate a smart contract that ensures the implementation of the ICO." (Sergey Kasatkin, 2021, p.19)
By including these elements, white papers would help establish trusting relationship between investors, developers and regulatory authorities, and ultimately lead to greater investment and successful project outcomes [20].

Given that white papers are not yet regulated and are anonymized, there is a high risk of criminal activity and theft. To address this issue, Dürr et al. conducted a study which focuses on using a natural language processing and machine learning algorithms to develop a predictive model than can identify fraudulent ICOs based on their white papers. The model they developed has a strong predictive ability, achieving an accuracy rate of more than 80% across all testing.
The study's findings can be of great value to both researchers seeking to gain a better understanding of fraud and to practitioners requiring additional support for their investment choices. Additionally, the results can serve as evidence of transparency for the latter group [12].

It can also be interesting to examine the long-term performance of ICOs. A study was carried out by Momtaz on a sample of 1400 ICOs. On average, ICOs are underpriced by 15%, but 40% of them are overpriced. Short-term returns are influenced by liquidity, market capitalization, and high/low price ratios. Longer-term returns (up to three years) show a positive performance for the top half of the sample, but a negative performance for the bottom half. The median ICO experiences a significant loss of value in the long term. In other words, the value of most tokens issued by ICOs has decreased significantly after their introduction to the market and has never recovered. Smart contracts behind ICOs often set the total token supply, effectively preventing later offerings from the same company. The company therefore has only one chance to raise funds with the tokens. This encourages companies to maximize the funds raised initially, even if it may lead to long-term problems for the token value and therefore the investors [29].

1.3 Images

The dual coding theory was developed by Allan Paivio in 1971 [32]. This theory suggests that information is encoded and stored in the brain in two distinct ways: verbal and non verbal.
Verbal information are processed in the left hemisphere of the brain which controls speech, while non-verbal information are encoded in the right hemisphere in a visuo-spatial sys-

tem. However, these both hemisphere can interact with each other to facilitate understanding and memorization of informations. Therefore, information that is encoded in both systems is more likely to be remembered than if it is only stored in one of the systems. Thus it is better to have both visual and linguistic elements when trying to memorize something [33].
Given that ICOs contain both visual and written elements, this will enhance their ability to effectively communicate their intended message to investors.

Sentiments play a significant role in investors' decision-making, especially when the decision involves risk and/or uncertainty. Their judgment is strongly influenced by their state of mind, as a person in a good or bad mood will make different decisions, even if they are unrelated to the decision at hand [27] [35] .
Speaking of sentiments, in 2002, a study was performed on the influence of images on memories. Wade et al. showed adults fake photographs relating a false childhood event and asked them to explain the pictures. 50% of them recalled memories, indicating that their brains had created false childhood memories based solely on a photograph [40].
The impact of investors' decision-making is heavily influenced by emotions and powerful messages can be conveyed through images. By combining emotions and images in order to create visuals that elicit intense feelings in individuals, a significant impact can be achieved.

Kathy et al. conducted a study on the use of images in advertising. Many companies use images in their advertising as visual memory is thought to be more efficient than verbal memory. However, according to their study, simply including an image in an advertisement does not necessarily improve better recall compared to a purely verbal presentation. One must differentiate an external image and an internal/mental image that is created inside the right hemisphere of the brain in reaction to the external image. The effectiveness of images depends on whether they are interactive or not. Interactive images associates two elements, therefore the resulting mental image is stronger and more memorable than with a non-interactive image as people will remember the two elements together. To effectively associate a brand name with a product or service, interactive images are recommended, but it can be challenging to depict a brand name pictorially. Humorous or unusual images are more likely to be remembered, therefore companies must be inventive [28].
Although ICOs may not be considered as traditional advertising, this study demonstrates the effectiveness of interactive images in capturing the audience's attention. Therefore, it is important to design images that connect the key information to maximize the impact.

They also confirm the dual coding theory, as their findings suggest that images alone do not have a stronger impact than text, but rather a combination of both is necessary to achieve the most effective results.

Based on all these informations, it is clear that images have a significant impact on people and investors in general. This holds true in the case of white papers too, as evidenced by Sen Lin's study, which found that images present in white papers can influence positively the funds raised by ICOs [26].

1.4 Human presence in pictures

Researches had investigated how the inclusion of humans in pictures affects individuals' responses.
Humans have developed a hierarchical processing mechanism to prioritize visual information, determining which elements are more important. Amongst these, emotional information and human faces receive preferential treatment. Emotional stimuli are rapidly detected, resulting in better information memorization. Faces also quickly capture attention, which is important for social interactions. These processes are generally automatic and unconscious. Notably, newborns exhibit a stronger attraction to face compared to objects [14].
Moreover, research by Droulers et al. has demonstrated that faces are better retained than objects in advertisements, leading to improved memorization of information presented in the ads [10].

This phenomenon can be explained by the existence of a central network of brain regions that preferentially respond to faces. However, there is a correlation between the responses to emotional and facial stimuli. When neutral face photos are presented to individuals, it leads to an increase in regions traditionally associated with emotional processing.
The late positive potential (LPP) is employed to assess how attention is dynamically allocated to visual stimuli. It is an indicator of sustained attention to visually salient stimuli, which can be salient either due to task requirements, such as target stimuli, or due to their content, such as emotional images. Additionally, the LPP is responsive to emotional faces and the presence of individuals in neutral images. When there are individuals and therefore faces present in pictures, they easily capture attention, thereby increasing the amplitude of the LPP.
In the study conducted by Ferri et al., they examined the effect of faces in both neutral and threatening images. They discovered that in neutral images, the presence of faces

resulted in a larger LPP. However, in threatening images, the inclusion of faces did not alter the LPP. This could be attributed to the fact that threatening images already evoke a significant LPP response, reaching a saturation point where further augmentation is not feasible. On the other hand, neutral images do not inherently influence the LPP, so the addition of faces has a noticeable impact [14].

Zhang et al. show the impact of human presence in photos on the perception and intentions of tourist destinations. They pointed out that much of the activity on social networks is related to photos and that human elements in photos are often used for marketing purposes. The findings revealed that maintaining a human proportion between 0 and 1% yielded the most positive perception. However, as the proportion exceeded 1%, the perception gradually deteriorated. Their analysis also shows that the presence of human elements in photos does not have a significant impact on tourist attractiveness [41].

Charity fundraising often struggle to achieve their goals, facing challenges in generating sufficient support. To enhance their success, it can be valuable to examine the content of these campaigns, including both textual and visual information they provide.
Hou et al. conducted a study focusing on the impact of images in charity crowdfunding. They examined whether these images had the ability to evoke emotions in potential investors and whether the emotions had any correlation with the campaign's fundraising success. Their findings revealed that emotions indeed played a significant role in determining the success and these emotions were largely influenced by the images utilized. The design and composition of the images, particularly the inclusion of human subjects, had a notable impact on the emotional response generated in potential donors. It also indicated that the presence of humans in images increased feelings of anger and excitement, decreased sadness and disgust, and reduced fear. Interestingly, the presence of human faces specifically evoked a sense of sadness. When evaluating the performance of the crowdfunding campaigns, particularly in terms of the amounts raised, the number of images alone did not have a substantial impact compared to other factors such as the number of videos. In conclusion, the study suggests that incorporating visual content that elicits feelings of contentment and sadness, particularly through the inclusion of human faces, can effectively persuade individuals to participate in charitable crowdfunding campaigns and encourage greater levels of investment [17].
A similar study was conducted by Lee et al. Their findings revealed that the quantity of images in the campaign document had a positive influence on the number of donors. However, the presence of people in the images had a negative impact, meaning that the more people depicted, the less inclined individuals were to contribute. Furthermore, the

researchers examined the effect of gender proportions in the images. Unfortunately, this variable did not yield significant results, and thus, no conclusive statements could be drawn regarding its impact [25].

1.5 Differences between gender

The representation of men and women in advertising has been a topic of investigation for a long time. Stereotypes have been ingrained since the beginning and despite some progress, women continue to be heavily stereotyped.

In 1972, Dominick et al. conducted a study analyzing television advertisements for an entire week. Women were portrayed as decorations, consistently depicted as homemakers, featured in ads for the kitchen or the bathroom. They were rarely shown in work settings and when they were, it was usually as secretaries or flight attendants [8].
A few years later,in 1988, Ferrante et al. replicated the same study and found a slightly higher representation of women in professional environments. Nevertheless, they remained significantly underpresented in traditionally male-dominated roles. Meanwhile, men were finally depicted as fathers and husbands. The conclusion is that despite some changes, women continue to be predominantly depicted in domestic contexts, while men are primarily associated with the working world. The portrayal of society in advertising fails to accurately reflect reality, and there is still a lack of equitable treatment between men and women [13].

A similar study was conducted on advertisements for telephones and it discovered identical stereotypes to those observed in television commercials. On the other hand, they suggest that these stereotypes may be intentionally employed. Surprisingly, despite their presence, the products still manage to be sold. This could be explained by the fact that with stereotypes, consumers relate more to the product. In some cases, individuals perceive the depiction in advertisements as an accurate reflection of reality. Unfortunately, the media manages to shape societal norms and behaviors, hindering progress towards a stereotype-free world [9].
Indeed, Kay et al. performed a study that effectively demonstrated the influence of information environments on individuals. They examined the images chosen by people to represent various professions. The findings revealed a slight underrepresentation of women, an exageration of gender stereotypes. Furthermore, the study indicated that individuals perceive search results as more favorable when they align with the stereotypes associated with a particular profession [21].

Chapter 2

Objectives and hypotheses development

In the first chapter, we examined the existing literature on the impact of images on investors and particularly the presence of humans within them. The dual coding theory supports the notion that images have a greater effect when combined with text, which is commonly seen in ICO whitepapers. Emotions play a crucial role in investors' decision-making processes, and images serve as a powerful tool for eliciting emotional responses in individuals. Studies have demonstrated that images included in ICO whitepapers have a positive influence on the amount raised by ICOs.

Furthermore, we explored the significance of human presence in the images of documents. Research have revealed that the visualization of humans, specifically human faces, has a significant impact on individuals' emotional reactions. People are inherently more drawn to human faces than to inanimate objects. However, if the image already captures strong attention from the viewer, the addition of human faces does not significantly alter their emotional response. Additionally, while the presence of humans has a positive effect, adding more individuals gradually diminishes this effect.

Moreover, we examined the specific case of charity fundraising and its association with the inclusion of images featuring humans. It has been found that such images have a positive influence on the amount raised for these projects, as they evoke a wide range of emotions in donors.Regarding the number of images, the various studies have mixed findings. Although there is agreement that the number of images has a positive influence, some suggest a significant impact, while others indicate a less pronounced effect. Furthermore, it has also been observed that as the number of humans in the images increases, the positive effect gradually diminishes.

Despite extensive research on the influence of images in ICO whitepapers, the specific impact of human presence in these photos remains relatively understudied. Thus, this study aims to address this gap and formulate its first hypothesis based on this aspect:

Hypothesis 1: Human presence in images of ICO whitepapers influences the amount raised during the ICO campaign.

Furthermore, we explored the disparity in gender representation within the advertising sector. Gender stereotypes continue to be prevalent in advertisements, and some studies suggest that this may be a deliberate strategy to enhance stronger consumer identification with the product. People have a strong tendency to identify with the way media depicts reality, even if it deviates from actual reality. Consequently, it would be interesting to investigate whether this gender difference has an impact on investment behavior. Given that stereotypes are more pronounced for women, the presence of women in photos may exert a greater impact on the amount raised compared to the presence of men. Thus, the second hypothesis will be formulated based on this premise:

Hypothesis 2: Women presence in images of ICO whitepapers influences more the amount raised during the ICO campaign than men presence.

Finally, we have observed that investors' sentiments play a strong role in their decision-making process. Additionally, images depicting humans and human faces also influences these emotions. Hence, our aim is to investigate whether there is a correlation between the emotions experienced by investors towards the ICO whitepaper and the amount raised by the project, as well as the number of photos included in the paper. Therefore, our third hypothesis is formulated as follows:

Hypothesis 3: The sentiment towards the whitepaper felt by investors are associated with both the amount raised and the number of photos featuring humans in ICO whitepapers.

Chapter 3

Methodology and variables description

In this chapter, we will introduce our database, present the methodology employed to test our hypotheses, describe the variables used in our study and their purposes, and finally conduct descriptive statistics on these variables.

3.1 Data sample

The database we are using contains 2504 ICO whitepapers that took place between 2015 and 2021. The ICOs are sourced from popular websites such as icobench.com, icoholder.com, icomarks.com, icorating.com, and foundico.com. The whitepapers and all associated data were collected and compiled by Professor James Thewissen from UCLouvain. For 1302 whitepapers out of the 2504, a manual counting process was carried out to count the nomber of images containing humans. Consequently, our final dataset comprises 1302 ICO whitepapers.

3.2 Methods

In order to test hypothesis 1, we employ the following cross-sectional regression model:

$$AMOUNT\_RAISED = \alpha + \beta \cdot TI + \rho \cdot Controls + \epsilon \tag{3.1}$$

where AMOUNT_RAISED is the logarithm of the total amount raised during the ICO, ϵ are the standard errors, TI is the total number of images depicting humans in the ICO whitepapers and *Controls* is the set of variables that we will employ to investigate their potential influence on the fundraising outcomes. These variables will be explained in the following section.

To test the second hypothesis, we will modify Equation 3.1 by replacing TI with two separate variables, namely TI_wom and TI_men, representing the number of images depicting women and men, respectively. This will allow us to examine their individual influences on the outcome:

$$\begin{aligned} AMOUNT\_RAISED &= \alpha + \beta \cdot TI\_wom + \rho \cdot Controls + \epsilon \\ AMOUNT\_RAISED &= \alpha + \beta \cdot TI\_men + \rho \cdot Controls + \epsilon \end{aligned} \tag{3.2}$$

Finally, to examine hypothesis 3, we introduce the SENTIMENT factor as an additional independent variable in our analysis. This variable takes on positive values when the sentiments expressed towards the ICO whitepaper are positive, and negative values when the feelings are pessimistic. Furthermore, we include an interaction term between the SENTIMENT variable and TI to explore the potential combined effect of sentiment and the number of images.

$$\begin{aligned} AMOUNT\_RAISED = &\alpha + \beta \cdot TI + \gamma \cdot TI \cdot SENTIMENT \\ &+ \delta \cdot SENTIMENT + \rho \cdot Controls + \epsilon \end{aligned} \tag{3.3}$$

where ϵ are the standard errors and $Controls$ is the same set of variables as in Equation 3.1.

3.3 Variables

Table 3.1 presents a comprehensive list of all dependant, independent, and control variables utilized in our models.

The dependant and independent variables have already been described in the previous section. As for the control variables, we selected nine variables that are relevant to our study. These control variables enable us to ensure unbiased estimations of the influence of images featuring individuals on the fundraising amount collected.

To assess the extent of promotion of the ICO on social media, we include the number of social media platforms for which a link is provided in the ICO (SOCIAL_MEDIA). Additionally, we include a variable indicating whether a project presentation video has been provided or not (VIDEO). These variables serve as a measure of the ICO's visibility and presence across different social media channels.

Subsequently, we examine whether the whitepaper specifies the structure of token distribution (TOKEN_DIST) and if there was a pre-ICO (PRE_ICO). These are important factor to consider as they reflect the level of confidence the creators have in their product. If a significant number of tokens are distributed freely, it may raise concerns about the creators' belief in the product and suggest that their primary motivation is financial gain. Additionally, understanding the token sale process is crucial before making any investment, as it helps investors anticipate what to expect and evaluate the fairness and transparency of the distribution. Conducting a pre-ICO implies that the creators are seeking additional funding and validation before launching the main ICO. These informations are valuable for making informed investment decisions.

Moreover, we assess whether there were a hard cap and a soft cap in place (HARD_CAP, SOFT_CAP), which are the minimum amount of funding required for a project to succeed and the maximum amount of funding the project aims to raise. Firstly, the presence of these caps demonstrates the seriousness of the project creators. It indicates that they have a clear understanding of the minimum funding required to finance their project and have a budget management plan in place. The hard cap can generate excitement and encourage early investment, as investors aim to secure their stake in the project before it potentially reaches its hard cap. On the other hand, the soft cap is beneficial as it significantly reduces risks. Achieving the soft cap provides reassurance to investors that the project has secured a minimum level of funding, increasing the likelihood of its successful execution. If the soft cap is not reached, investors are refunded their investments, minimizing their financial risks.

When it comes to the structure of the whitepaper itself, we consider the number of pages (WP_PAGES) and the total number of images included (WP_IMAGES). The length of the whitepaper serves as an indicator of the project's sophistication, as a shorter document may imply a less complex business plan. On the other hand, a longer whitepaper may indicate a more comprehensive and detailed presentation of the project. The total number of images indicates the visual support within the whitepaper. By considering these elements, we gain a comprehensive understanding of the whitepaper's organization and presentation.

Finally, we consider the number of team members involved in managing the ICO (TEAM). This factor is indicative of the trustworthiness of the ICO. A large team offers a diversity of skills and expertise. This ensures that all necessary aspects are covered. This reduces the risks associated with launching the ICO. Moreover, a larger team provides access to a broader network of contacts and potential partners, further instilling confidence in the project.

Variable	Definition
Dependent variables	
AMOUNT_RAISED	The logarithm of the US dollar amount raised during the coin-offering period in US dollars.
Independent variables	
TI	The total number of images containing a certain gender (TI_k) found in the ICO white paper.
RI	The ratio of the number of images containing a certain gender compared to the total number of images (RI_k) found in the ICO white paper.
SENTIMENT	Indicates the feeling towards a document. Positive if the sentiment is optimistic and negative if it is pessimistic.
Control variables	
SOCIAL_MEDIA	The number of social media for which the ICO has a link.
VIDEO	Indicates whether the ICO provided a descriptive video.
TOKEN_DIST	Indicates whether the token distribution structure is specified.
PRE_ICO	Indicates whether the a pre-ICO sale is conducted.
HARD_CAP	Indicates whether a hard cap is specified.
SOFT_CAP	Indicates whether a soft cap is specified.
WP_PAGES	The logarithm of 1 + the number of pages of the ICO whitepaper.
WP_IMAGES	The logarithm of 1 + the number of images of the ICO whitepaper.
TEAM	The logarithm of 1 + the number of members in the team behind the ICO.

Table 3.1: Variables definition

3.4 Descriptive statistics

Descriptive statistics for all variables are presented in Table 3.2. The average amount raised from fundraising campaigns is $8.8 million, with a minimum of $1,000 and a maximum of $94 million, indicating a large difference (AMOUNT_RAISED).
In terms of the photos, we find that the average number of photos containing humans per whitepaper is slightly over 9 (TI). It is interesting to note that the majority of these photos (80%) exclusively feature men(TI_men), while 15% exclusively feature women (TI_wom). The remaining photos showcase a combination of both genders (TI_both). This distribution highlights a gender imbalance in the representation within the ICO whitepapers. The high standard deviations for these variables indicate a wide range of variation in the number of photos from one document to another. Additionally, it is worth mentioning that 429 whitepapers in our dataset do not include any images representing humans. This accounts for approximately 33% of the total whitepapers analysed. Examining the sentiment evoked by the white papers, we observe that approximately 67.2% of them elicit a positive sentiment among investors (SENTIMENT). This suggests that the majority of our ICO whitepapers are designed to create a favorable impression and generate enthusiasm among potential investors.
Moving on to the control variables, we find that ICOs, on average, have a presence on nearly 7 social media platforms (SOCIAL_MEDIA). This highlights the importance of utilizing various digital channels to promote the ICO projects. Additionally, a considerable proportion (88.8%) of ICOs have released a video presentation of their projects (VIDEO), indicating the significance of taking advantage of multimedia content to transmit information and attract potential investors. Furthermore, most ICOs in our dataset (97%) specify their token distribution (TOKEN_DIST), providing clarity on how the tokens will be allocated and distributed among investors. A notable percentage (69%) of ICOs have conducted a pre-ICO (PRE_ICO), indicating a possible lack of confidence from the creators in their own project. Regarding the funding structure, 92.3% of ICOs have specified a hard cap and 83% have specified a soft cap (HARD_CAP, SOFT_CAP). This demonstrates the projects' intention to communicate their financial targets and establish transparency in their fundraising efforts, contributing to the overall credibility and professionalism of the ICO. The number of pages in the whitepapers exhibits considerable variation, ranging from 3 to 167 pages, with an average of slightly over 34 pages (WP_PAGES). The varying lengths of white papers suggest different approaches to presenting information and conveying the project's details. Regarding the total number of images, there is considerable variation in the ICO whitepapers in our dataset (WP_IMAGES). This diversity suggests that ICO projects employ different strategies

when it comes to incorporating visual elements in the whitepaper. Some projects may choose to focus on textual explanations and rely less on visual elements, while others may prioritize visual representation to create a stronger impact on investors. Lastly, the average team size behind the ICOs is 14 members (TEAM), influencing investors' perception of the project's credibility and capability to deliver on its promises. A larger team can convey a sense of professionalism, competence, and resourcefulness, which may instill greater confidence.

	Mean	Std Dev	Min	Max
Dependent variables				
AMOUNT_RAISED (mil.)	8,844	12,313	0,001	94,070
Independent variables				
TI	9,169	10,321	0,000	77,000
TI_wom	1,381	2,490	0,000	43,000
TI_men	7,346	8,237	0,000	63,000
TI_both	0,442	1,786	0,000	27,000
SENTIMENT	0,672	0,470	0,000	1,000
Control variables				
SOCIAL_MEDIA	6,889	1,899	0,000	12,000
VIDEO	0,888	0,316	0,000	1,000
TOKEN_DIST	0,971	0,168	0,000	1,000
PRE_ICO	0,692	0,462	0,000	1,000
HARD_CAP	0,923	0,267	0,000	1,000
SOFT_CAP	0,830	0,376	0,000	1,000
WP_PAGES	34,630	17,106	3,000	167,000
WP_IMAGES	31,667	31,320	0,000	249,000
TEAM	14,000	7,893	1,000	67,000

Table 3.2: Descriptive statistics of dependent, independent, and control variables

In Table 3.3, we compare the number of images between whitepapers that evoke a positive sentiment and those that evoke a negative sentiment, as well as the funds raised. To analyze the data, we conducted a Welch two-sample t-test which is a method for comparing means between two groups.

Regarding the amount raised, the results do not yield a statistically significant difference, and therefore we cannot draw any definitive conclusions. However, we do observe a general trend of more human images being present in whitepapers that evoke a positive sentiment. This pattern holds true for both images of men and women. On average, whitepapers with a positive sentiment have a higher number of images representing humans, with a mean of 9.88, compared to 7.72 for whitepapers with a negative sentiment. This difference is statistically significant at a confidence level of 99%.

These findings suggest that there may be a correlation between the sentiment expressed

towards whitepapers and the presence of human images. Whitepapers that elicit a positive sentiment tend to incorporate a greater number of human images. It is important to note that while this analysis demonstrates statistical significance, further research and exploration are required to fully understand the underlying factors influencing sentiments and their impact on investor response and fundraising outcomes.

	+ Sentiment	- Sentiment	T-Test
AMOUNT_RAISED (million)	8,635	9,271	-0,816
TI	9,875	7,718	3,601***
TI_wom	1,565	1,003	4,457***
TI_men	7,740	6,536	2,416**
TI_both	0,570	0,180	4,709***
			*p<0.1, **p<0.5 and ***p<0.01

Table 3.3: Comparison between optimistic and pessimistic ICOs with a Welch two-sample t-test

Finally, we conducted a Pearson correlation analysis among the dependent, independent, and control variables. The correlation coefficients are presented in Table 3.4. Interestingly, we found that the amount raised did not show any statistically significant correlation with the number of human images or the sentiments expressed towards the whitepaper. This indicates that there is insufficient evidence to support the existence of a significant linear relationship between these variables. Consequently, alternative methods should be employed to analyze the relationship between our variables.

However, we did observe weak but highly significant positive correlations between sentiments and the number of human images. This implies that as the number of human images in whitepapers increases, there is a higher chance of experiencing positive sentiments towards the whitepaper. Furthermore, we noticed that the correlation between images depicting women and sentiments was stronger than that between images featuring men and sentiments. This implies that women have a greater influence on the overall sentiments evoked by the whitepaper compared to men.

These findings allow us to draw a first conclusion regarding our hypothesis 3. Indeed, we have seen that the number of images featuring humans has a modest impact on the sentiments towards the whitepaper. However, it is important to note that a correlation alone does not guarantee causality between variables. It indicates a statistical association between the variables, therefore, additional analyses must be done.

	AR	TI	TI_wom	TI_men	TI_both	SENT	S_M	VIDEO	T_D	P_ICO	H_CAP	S_CAP	WP_P	WP_I	TEAM
AMOUNT_RAISED	1														
TI	-0,008	1													
TI_wom	0,011	0,709***	1												
TI_men	-0,016	0,958***	0,534***	1											
TI_both	0,01	0,373***	0,241***	0,178***	1										
SENTIMENT	-0,024	0,098***	0,106***	0,069**	0,102***	1									
SOCIAL_MEDIA	-0.052*	0,156***	0,082***	0,168***	0,011	-0,004	1								
VIDEO	0,04	0,066**	0,045	0,062**	0,032	-0,029	0,305***	1							
TOKEN_DIST	-0,009	0,045	0,042	0,043	0,004	0,006	0,157***	0,079***	1						
PRE_ICO	-0,024	0,1***	0,022	0,112***	0,031	-0,005	0,197***	0,1***	0,099***	1					
HARD_CAP	0,01	0,045	0,021	0,066**	-0,073**	0,004	0,131***	0,035	0,209***	0,124***	1				
SOFT_CAP	-0,014	0,048*	0,024	0,063**	-0,05*	-0,052*	0,194***	0,077***	0,158***	0,105***	0,324***	1			
WP_PAGES	0,061**	0,373***	0,266***	0,346***	0,19***	0,003	0,144***	0,164***	0,078***	0,131***	0,112***	0,106***	1		
WP_IMAGES	0,073**	0,41***	0,315***	0,374***	0,202***	0,088***	0,12***	0,111***	0,042	0,046	0,053*	0,086***	0,5***	1	
TEAM	0,123***	0,31***	0,188***	0,315***	0,081***	0,02	0,288***	0,174***	0,09***	0,136***	0,1***	0,113***	0,342***	0,289***	1

*p<0.1, **p<0.5 and ***p<0.01

Table 3.4: Pearson correlation

Chapter 4

Empirical results

In this chapter, we will present the results of our linear regression analyses to provide insights and evidence regarding our research hypothesis. Linear regression allows us to examine our variables of interest and determine their impact on the dependent variable, which in this case is the amount raised during ICOs.
To accomplish this, we use some performance indicator such as the adjust R-squared, the Akaike Information Criterion (AIC) and the Bayesian information criterion (BIC) in order to compared the models. The first one is an indication of the model's ability to explain the variance of the data, taking into account the increase in the number of variables. A higher adjusted R-squared value, closer to 1, indicates a better-fitting model. The AIC and the BIC are criteria used to compare models and penalize those with a higher number of parameters. The penalty term in the BIC is more substantial compared to the AIC. A lower AIC and/or BIC value suggests a better-performing model [4] [6].

4.1 Impact of human presence in images of ICO whitepapers on the amount raised during the ICO campaign

To begin with, we evaluate Equation 3.1 without the inclusion of control variables. The results of this analysis are presented in Table 4.1, Model 1. We observe that the impact of images containing humans (TI) is statistically significant and positive. This suggests that as the number of images containing humans increases, the amount raised also increases. If the number of images depicting humans increases of one unit, the logarithm of the amount raised will increase of 0.011 unit with other conditions remaining the same.
Next, we introduce the squared term of the number of images (TI^2) to investigate whether there is a non-linear relationship between the number of images and the amount raised. This is represented by Model 2. In this model, we find that the coefficient of TI is not statistically significant, implying that we cannot draw conclusions about its impact on the

amount raised. However, the squared term of the number of images is highly significant but very small. This suggests the presence of a non-linear relationship between the number of images and the amount raised. In other words, the effect of the number of images on the amount raised depends on how the number of images changes, with a stronger effect for extreme values. We can see that Model 2 is an improvement over Model 1 as the adjusted R-squared is more than twice as large. This indicates that the inclusion of the squared term of the number of images enhances the ability of the model to explain the variance in the amount raised.

Subsequently, we incorporate the control variables into these two models, yielding Models 3 and 4. In Model 3, we observe that the coefficient of the number of images is not statistically significant, suggesting uncertainty regarding its direct impact on the amount raised. However, we find that control variables such as VIDEO, WP_PAGES, WP_IMAGES and TEAM are significant and have relatively high coefficients. This indicates that the presence of a project presentation video, the number of pages in the whitepaper, the total number of images, and the team size have a significant influence on the amount raised by the fundraising campaign.

Moving on to Model 4, we observe that these same control variables continue to be significant and exhibit substantial coefficients. The coefficient of TI is significant at a 99% confidence level but it takes on a negative value. This implies that an increase in the number of images is associated with a decrease in the amount raised. The coefficient of TI^2 is statistically significant but its effect is relatively weak. This suggests that there is a curved relationship between the number of images and the fundraising outcome. This implies that if TI (respectively TI^2) increases of one unit, the logarithm of the amount raised will decrease of 0.037 unit (respectively increase of 8.12e-4 unit) ceteris paribus. The control variables have a much greater impact on the amount raised than the number of images and its squared term. For instance, the coefficient of the TEAM variable is 0.69 compared to -0.037 for TI. Moreover, the adjusted R-squared for models 3 and 4 is approximately 10 times larger than those of models 1 and 2. This indicated a substantial improvement in model fit when the control variables are added. The adjusted R-squared of Model 4 is slightly larger than that of Model 3, making Model 4 the best of the four has it provides a slightly improved explanation of the variation in the amount raised. The AIC and BIC values are lower in models 3 and 4 compared to models 1 and 2, further reinforcing the notion that the inclusion of control variables improves the model. This suggests that these variables capture important information and enhance the model's ability to explain the variability in the amount raised.

We can conclude that the control variables play a significant role in explaining the variations in the amount raised. Based on Model 4, we can infer that the negative effect of

the number of images diminishes as the number of images increases because the squared term TI^2 takes over at some point. There is an optimal point for the number of images beyond which the negative impact decreases. The complexity of the relationship between the number of images and the amount raised is evident from the contradictions between Model 1 and Model 4. The presence of control variables likely introduces interactions that affect the relationship. Overall, the R-squared values for all the models are relatively low, indicating that the variables included in the models do not account for a large portion of the variation in the amount raised by ICOs. This suggest that there may be other factors not included in the models that have a significant influence on the amount raised.

	Model 1	Model 2	Model 3	Model 4
(Intercept)	14,684***	14,77***	11,686***	11,680***
	(0,078)	(0,085)	(0,606)	(0,605)
TI	0,011**	-0,013	-0,009	-0,037***
	(0,006)	(0,012)	(0,007)	(0,013)
TI^2		7,33e-4**		8.12e-4***
		(3,00e-4)		(3.07e-4)
SOCIAL_MEDIA			-0,050	-0,042
			(0,035)	(0,035)
VIDEO			0,389*	0,376*
			(0,206)	(0,206)
TOKEN_DIST			-0,256	-0,281
			(0,404)	(0,403)
PRE_ICO			-0,125	-0,089
			(0,136)	(0,136)
HARD_CAP			0,065	0,081
			(0,245)	(0,245)
SOFT_CAP			-0,063	-0,059
			(0,175)	(0,175)
WP_PAGES			0,324**	0,330**
			(0,159)	(0,159)
WP_IMAGES			0,169**	0,192**
			(0,076)	(0,077)
TEAM			0,705***	0,692***
			(0,124)	(0,124)
Adj. R^2	2,49e-3	6,61e-3	6,12e-2	6,65e-2
AIC	5097	5093	4536	4531
BIC	5113	5114	4596	4596

Table 4.1: Regression results for Equation 3.1

4.2 The difference between the impact of women presence and men presence in images of ICO whitepapers on the amount raised during the ICO campaign

To address our second hypothesis, we followed the same procedure as in the previous section. We replaced the variable for the number of images containing humans (TI) with variables for the number of images containing only women (TI_wom) and the number of images containing only men (TI_men), and we performed the same four models. The results are provided in Table 4.2.

Firstly, we can observe that for the models using images containing only women, the only model for which we can draw conclusions is the first one (Model 1W). The other three models do not have statistically significant coefficients for the variables TI_wom and TI_wom^2. However, when the control variables are added, the same variables as in our first hypothesis (VIDEO, WP_PAGES, WP_IMAGES and TEAM) are significant and have a substantial impact.

Moving on to the models using images containing only men, we observe a similar pattern as in the analysis with images containing humans. In the first model (Model 1M), the number of images containing only men has a positive and statistically significant effect on the amount raised by ICO campaigns. When we introduce the squared term, it is significant but with a very weak coefficient, while the non-squared term is not statistically significant. Again, when the control variables are included, the coefficient for TI_men becomes significant and negative, whereas the coefficient for TI_men^2 is significant and positive. This indicated that there is a curvilinear relationship between the number of images depicting men and the amount raised. And it is the same four control variables that are significant and have a notable influence.

To study the difference between the impact of the presence of women and men in images on the amount raised, we will compare the first models together (Model 1W and Model 1M) since it is the only one where we have significant terms for women. When comparing, we can observe that the coefficient for TI_wom is 0.052, while it is 0.013 for TI_men. This means that for an increase of 1 unit of the number of images containing women (respectively men), the logarithm of the amount raised will increase of 0.052 unit (respectively 0.013 unit) if all conditions remain the same. This finding confirms that images featuring only women indeed have a greater impact on the funds raised by ICOs compared to images containing only men. This suggests that women may have a greater persuasive influence or that potential investors are more responsive to campaigns featuring female representation. It is important to note that while the coefficient difference is statistically significant, the actual effect size is relatively small. Other factors, such as the presence of

a video of presentation, the length of the whitepaper, the number of total images or the number of people in the team have a more notable impact on the fundraising outcomes. However, the observed difference in the impact of women and men on the amount raised provides valuable insights into the dynamics of gender representation in crowdfunding campaigns.

	Model 1W	Model 2W	Model 3W	Model 4W	Model 1M	Model 2M	Model 3M	Model 4M
(Intercept)	14,715***	14,711***	11.845***	11.827***	14,692***	14,776***	11,676***	11,661***
	(0,066)	(0,07)	(0,600)	(0,600)	(0,078)	(0,084)	(0,606)	(0,604)
TI_wom	0,052**	0,056	0,003	-0,018				
	(0,023)	(0,035)	(0,025)	(0,037)				
TI_wom^2		-2,14e-4		0,001				
		(1,48e-3)		(0,002)				
TI_men					0,013*	-0,02	-0,012	-0,050***
					(7,04e-3)	(0,015)	(0,008)	(0,016)
TI_men^2						1,33e-3***		0,001***
						(5,14e-4)		(5,28e-3)
SOCIAL_MEDIA			-0,052	-0,052			-0,049	-0,043
			(0,035)	(0,035)			(0,035)	(0,035)
VIDEO			0,399*	0,395*			0,386*	0,383*
			(0,206)	(0,207)			(0,206)	(0,206)
TOKEN_DIST			-0,245	-0,245			-0,261	-0,258
			(0,404)	(0,404)			(0,404)	(0,402)
PRE_ICO			-0,124	-0,117			-0,123	-0,099
			(0,136)	(0,136)			(0,136)	(0,136)
HARD_CAP			0,067	0,066			0,072	0,079
			(0,246)	(0,246)			(0,245)	(0,245)
SOFT_CAP			-0,051	-0,056			-0,061	-0,053
			(0,175)	(0,175)			(0,175)	(0,175)
WP_PAGES			0,297*	0,300*			0,322**	0,334**
			(0,159)	(0,159)			(0,159)	(0,159)
WP_IMAGES			0,138*	0,144*			0,171**	0,194**
			(0,074)	(0,075)			(0,076)	(0,076)
TEAM			0,676***	0,682***			0,710***	0,685***
			(0,123)	(0,123)			(0,124)	(0,124)
Adj. R^2	3,38e-3	2,57e-3	5,98e-2	5,94e-2	1,98e-3	6,69e-3	6,15e-2	6,72e-2
AIC	5096	5098	4538	4539	5098	5093	4536	4530
BIC	5111	5119	4598	4604	5113	5114	4596	4595

Table 4.2: Regression results for Equation 3.2

4.3 The relationship between the sentiments felt by investors towards the whitepaper and both the number of photos featuring humans and the amount raised

To examine our third hypothesis, we evaluated Equation 3.3 for which the results are presented in Table 4.3. We can observe that the impact of the sentiment expressed

towards the whitepaper is strongly negative and the coefficient of the number of images depicting humans is slightly negative. However, the interaction between the number of images and the sentiment is positive and all three coefficients are statistically significant at a confidence level of 99%. This indicates that the combined effect of the number of images and the perceived sentiment can lead to an increase in the amount raised, despite the negative individual effects of each variable. In other words, when considered together, there is an interaction that partially attenuates the negative effects of each variable taken separately. This finding suggests that specific conditions related to the combination of the number of images and sentiment can lead to an increase in the amount raised during an ICO.

	Model 1
(Intercept)	11,720***
	(0,609)
SENTIMENT	-33,691***
	(12,063)
TI	-0,020***
	(0,008)
TI x SENTIMENT	2,769***
	(0,902)
SOCIAL_MEDIA	-0,047
	(0,035)
VIDEO	0,381*
	(0,206)
TOKEN_DIST	-0,361
	(0,404)
PRE_ICO	-0,099
	(0,136)
HARD_CAP	0,072
	(0,245)
SOFT_CAP	-0,072
	(0,175)
WP_PAGES	0,330**
	(0,160)
WP_IMAGES	0,193**
	(0,077)
TEAM	0,728***
	(0,124)
Adj. R^2	6,89e-2
AIC	4529
BIC	4599

Table 4.3: Regression results for Equation 3.3

Conclusion

The aim of this thesis was to study the impact of human presence in ICO whitepapers images on the amount raised by these ICOs.

The first chapter was dedicated to the literature review. Firstly, cryptocurrencies and their blockchain technology were introduced. This was followed by an exploration of ICOs and the role of whitepapers in their success. The impact of images on individuals was examined by reviewing existing research in the field, highlighting the significant role of emotions in decision-making. Specifically, the influence of human presence in images was investigated, revealing that human faces strongly attract the attention of investors. Lastly, the study looked at gender differences in advertising and people's responses to them.

The following chapter presented the objectives of this thesis in relation with the literature review. The three hypotheses that we chose to investigate were introduced: the impact of human presence in photos included in whitepapers on the amount raised by ICOs, the difference between the impact of women and men, and the role of sentiments towards the whitepaper.

In chapter 3, we outlined the methodology employed to address our research hypotheses. To begin with, the dataset that forms the foundation of our analysis was introduced. Next, the regression models utilized in our study were presented. A comprehensive description of the variables was provided. This involves explaining the nature and significance of each variable.
A descriptive statistical study of the variables was conducted. This provided initial insights for our hypotheses. Specifically, we observed that one-third of our whitepapers do not contain any picture representing humans, and among those that do, women are represented in a relatively low proportion. Most of our whitepapers evoke a positive sentiment among investors.
By comparing whitepapers that evoke a positive sentiment with those that evoke a nega-

tive sentiment, we noticed that optimistic whitepapers contained a higher average number of human images. This suggests a potential relationship between the sentiment felt towards the whitepaper and the number of human images.
Additionally, when analyzing Pearson correlations between our variables, we detected a weak correlation between the number of human images and the evoked sentiment, which further supports our hypothesis. We also observed that images containing only women had a stronger impact on the sentiments expressed by investors compared to those representing men. These findings highlight the potential influence of gender representation in images on investor sentiments.

The final chapter presents the results of our linear regression analyses. Firstly, we conducted the regression on images containing humans to address our first hypothesis. We performed four different models, starting with the number of images alone, then adding the squared term oh this number, and finally including control variables in the last two models. The best model was determined to be the one with the control variables and the squared term, as all independent variables were significant, and the adjusted R-squared value was the highest. This model revealed that the number of images depicting humans has a negative impact on the amount raised, but the squared term has a weak positive impact. This suggests a nonlinear relationship between the two variables. It also implies that the negative effect of the number of images diminishes as the number of images increases since the squared term eventually dominates, resulting in an overall positive effect. This findings aligns with the study of Lee et al.[25], which suggests that the number of images has a positive influence on the amount raised by crowdfunding campaigns, but when it specifically comes to images representing humans, the effect is negative.
We then conducted the regression analysis considering the number of images containing only women and only men. We employed the same four models as in the previous regression, separately for women and men. However, our findings regarding the impact of women were not very conclusive, as only one out of the four models showed significant results, indicating that the presence of women in the images has a positive impact on the amount raised by ICOs. For the model with only images of men, the conclusions were similar to those of the model with images depicting humans. However, when comparing the two models, we observed that each additional unit of women images had a greater effect on the amount raised compared to an equivalent increase in men images. This suggests that images exclusively featuring women have a more positive impact than those containing only men. However, similar to the first regression, the impact of these gender-related factors was relatively small compared to the influence of the same four control variables.

Additionally, throughout all these regressions, we observed that certain control variables, such as the presence of a project description video, the number of whitepaper pages, the total number of images, and the team size, had a significant and substantial positive effect on the amount raised. All of these variables had a much greater impact compared to the number of images featuring humans, women and men.
In our final regression analysis, the sentiments evoked by the whitepaper were considered. To do so, we introduced a sentiment variable that takes the value of 1 when the whitepaper evokes positive sentiments among investors and 0 when these sentiments are negative. Additionally, we included an interaction term between sentiments and the number of images featuring humans. The results showed that the individual effects of the number of human images and sentiments on the amount raised were negative. However, the interaction between the two variables had a positive effect. This suggests that despite the negative effects of each variable individually, their combined influence can lead to an increase in funds raised. These findings are consistent with the study conducted by Hou et al.[17], which states that the inclusion of images featuring humans evoking positive sentiments has a positive impact on the amount raised by ICOs.

An important observation is the relatively low value of the adjusted R-squared overall, indicating that the variables included in the models explain only a small portion of the variation in the amount raised by ICOs. This could potentially be explained by the fact there may be other factors not included in our model that influence the amount raised. Furthermore, since the counting of images was done manually, there could be a small margin of error due to this.
We therefore recommend further research on the impact of images containing humans in whitepapers on the amount raised by these ICO whitepapers. Our models did not sufficiently explain the variations in the amount raised, and thus while our study has provided initial insights into the role of images of human on the funds raised, our conclusions are not robust enough.
To improve the understanding of the relationship between images and fundraising outcomes, future studies could consider expanding the dataset by including a larger sample of whitepapers. Additionally, incorporating more variables related to the content and design of whitepapers, as well as investor characteristics, could provide a more comprehensive analysis.

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Abstract : With the growing popularity of ICOs as crowdfunding methods, it is crucial to understand the factors contributing to the success of these fundraising campaigns. Regression analysis is conducted on a dataset of ICO whitepapers to examine the impact of human presence, the differential effects of images featuring women and men, and the role of sentiments elicited by the whitepapers on the fundraising outcomes. The results indicate a non-linear relationship between the number of human images and the amount raised, suggesting the existence of an optimal balance in this regard. When comparing gender-specific images, the presence of women exerts a stronger influence on fundraising success as well as on the sentiment expressed towards the whitepaper. Moreover, the sentiments evoked by whitepapers combined with images depicting humans have a significantly positive effect on the funds raised. However, the overall adjusted R-squared value of the models indicates that the included variables explain only a small portion of the variation in the amount raised by ICOs. Therefore, while these findings provide valuable insights for ICO project teams, future research is recommended to further explore and refine the relationship between images, sentiments, and fundraising success in ICOs.

Résumé : Avec la popularité croissante des ICO en tant que méthodes de financement participatif, il est crucial de comprendre les facteurs qui contribuent au succès de ces campagnes de collecte de fonds. Une analyse de régression est menée sur un ensemble de livres blancs d'ICO pour examiner l'impact de la présence humaine, les effets différentiels des images représentant des femmes et des hommes, ainsi que le rôle des sentiments suscités par les livres blancs sur les résultats de la collecte de fonds. Les résultats indiquent une relation non linéaire entre le nombre d'images humaines et le montant collecté, suggérant l'existence d'un équilibre optimal à cet égard. Lors de la comparaison des images spécifiques à chaque sexe, la présence de femmes exerce une influence plus forte sur le succès de la collecte de fonds ainsi que sur le sentiment exprimé à l'égard du livre blanc. De plus, les sentiments suscités par les livres blancs combinés aux images représentant des humains ont un effet significativement positif sur les fonds collectés. Cependant, la valeur globale ajustée du coefficient de détermination (R au carré) des modèles indique que les variables incluses expliquent seulement une petite partie de la variation du montant collecté par les ICOs. Par conséquent, bien que ces résultats fournissent des insights précieux aux équipes de projets ICO, il est recommandé de mener des recherches futures afin d'explorer et de préciser davantage la relation entre les images, les sentiments et le succès de la collecte de fonds dans le contexte des ICOs.

UNIVERSITÉ CATHOLIQUE DE LOUVAIN
Louvain School of Management
Place des Doyens, 1 bte L2.01.01, 1348 Louvain-la-Neuve
Boulevard Emile Devreux 6, 6000 Charleroi, Belgique
Chaussée de Binche 151, 7000 Mons, Belgique
www.uclouvain.be/lsm