MIC 2024
Management International Conference
Trento, Italy • 5–8 June 2024

Determinants of Initial Coin Offerings' Success: The Role of Social Networks Visibility, Crowd Involvement and Human Capital

Silvia Blasi
University of Verona, Department of Management, Italy
silvia.blasi@univr.it

Elena Sapienza*
University of Padua, Department of Economics and Management, Italy
elena.sapienza@unipd.it

Silvia Rita Sedita
University of Padua, Department of Economics and Management, Italy
silvia.sedita@unipd.it

* *Corresponding author*

Abstract. ICOs represent a novel fundraising mechanism wherein start-ups raise capital from a collective of investors in exchange for tokens, a currency issued by the company that can be used to access to services or be sold in the open market. Utilizing a database of 208 observations from October 2016 to June 2018, we investigate the determinants of ICO's success focusing on the role of social networks visibility, crowd involvement and human capital. We found that project visibility on social networks and user-producer interaction in specialized online channels positively impact ICO success likelihood, whereas interaction on generalist social networks lacks significant effect on funding campaign performance. Moreover, our analysis suggests that the use of crowdsourcing platforms for project co-creation with the online community does not significantly predict ICO success probability. Finally, there is statistical evidence supporting the significance of human capital in project assessment: the presence of experienced team members increases the likelihood of ICO success, while team homogeneity shows a positive, albeit small, impact on success probability.

Keywords: Initial Coin Offering, Crowdfunding, Visibility, Crowd Involvement, Human Capital, Regulation.

1 Introduction

Initial Coin Offerings (ICOs) are an innovative fundraising method where start-ups issue digital tokens to investors in exchange for capital. These tokens, typically based on blockchain technology, can represent access to the company's future services or be traded on cryptocurrency exchanges.
The evolution of ICOs is intrinsically linked to the broader transformations in the financial and technological sectors over the past decade. Specifically, the genesis of this transformation can be traced back to the global financial crisis of 2008, marked by the bankruptcy of Lehman Brothers. This event led to a tightening of traditional lending practices, compelling companies to explore alternative financing avenues. Simultaneously, there was a growing interest in investments in novel technologies, diversifying the landscape of financial opportunities.
In this context, 2008 saw the emergence of two pivotal innovations: Indiegogo, one of the most prominent crowdfunding platforms, and Bitcoin, a digital currency underpinned by blockchain technology. These developments laid the foundation for new financing systems and technologies that operate independently of traditional banking structures. On one hand, crowdfunding facilitated capital raising for small entrepreneurial initiatives from numerous small investors via online platforms, while on the other hand Bitcoin introduced a decentralized payment system.

https://doi.org/10.26493/978-961-293-323-4.67-80

Furthermore, the launch of Ethereum in 2015 marked another significant milestone in the evolution of blockchain technology. Ethereum integrated Smart Contracts and Distributed Applications into its blockchain framework, catalyzing the convergence of crowdfunding and blockchain technology. This convergence subsequently gave rise to Initial Coin Offerings (ICOs). Moreover, Ethereum's introduction of the ERC20 standard for token implementation was particularly crucial. This standard significantly reduced the technical barriers to creating and participating in ICOs (Ofir and Sadeh, 2019). As a result, there was a dramatic proliferation of ERC20 token contracts. Amsden and Schweizer (2018) reported 67 000 such contracts in April 2018, a number that ballooned to over 165 000 by January 2019 (Momtaz, 2020).

This simplification and standardization fueled the exponential growth of the ICO market. Indeed, data from Benedetti and Kostovetsky (2022) illustrate this remarkable trajectory: the number of ICOs skyrocketed from a mere 9 in 2015 to over 1,000 in 2017. In terms of capital raised, ICOs accumulated $5.38 billion in 2017 alone, surpassing early-stage venture capital investments in blockchain startups for that year (Sunnarborg, 2017).

However, the rapid expansion of the ICO market coincided with increased complexity and uncertainty. Between 2017 and 2020, an alarming 80% of thousands of conducted ICOs were revealed to be scams or failures, resulting in investor losses exceeding $1.9 billion in 2020 alone (Lyandres and Rabetti, 2023). Consequently, these high-profile scandals and instances of misconduct severely undermined investor confidence and tarnished the reputation of ICOs.

In response to these challenges and growing concerns about fraud in the largely unregulated crypto market, regulatory bodies worldwide initiated measures to safeguard investors and mitigate risks associated with ICOs. For example, China and South Korea implemented complete bans on ICOs in late 2017 (Tiwari et al., 2020; Benedetti and Kostovetsky, 2021). Concurrently, major social media and advertising platforms took proactive steps to restrict or prohibit ICO and cryptocurrency advertisements. Facebook pioneered this trend in January 2018 (Facebook, 2018), followed by Google, Twitter, and Snapchat in March 2018. These bans were implemented due to regulatory pressure, consumer protection concerns, reputational risk, and market volatility concerns. It is noteworthy that subsequent to the initial implementation of these restrictive policies, several platforms underwent a process of policy recalibration. For instance, in 2019, Facebook enacted a partial reversal of its prohibition, allowing pre-approved advertisers to disseminate promotional content related to cryptocurrencies. However, the ban on ICO advertisements remained in place.

These actions by major tech companies significantly impacted the visibility and reach of cryptocurrency and ICO projects, contributing to the cooling of the ICO market in the latter part of 2018 and beyond. Moreover, it signaled a shift towards more cautious and regulated approaches in the cryptocurrency space, highlighting the ongoing tension between innovation and investor protection in this rapidly evolving financial landscape.

This study examines the determinants of ICO success during the early and peak stages of market expansion, characterized by a lack of regulation. The aim is to expand existing literature on ICO success factors focusing on project exposure to the online community, crowd involvement in project development and the significance of human capital. The database consists of 208 observations from October 17, 2016, to June 24, 2018.

The methodology has a quantitative, explanatory approach and uses a Probit model to test three hypotheses.

Firstly, we investigate the impact of a project's online presence, distinguishing between visibility and interaction on both general (Facebook and Twitter) and specialized (BitcoinTalk) online communication channels. This investigation was informed by previous studies, including those by Courtney et al. (2017), Vismara (2016), Jin et al. (2017), Lu et al. (2014), Mollick (2014), Hekman and Brussee (2013), and Freedman and Jin (2017).

Moreover, we investigate the use of crowdsourcing platforms (GitHub) as a means of facilitating project co-creation with the online community, positing that this practice would increase ICO success probability. This hypothesis was inspired by the work of Adhami et al. (2018).

Lastly, we investigate the significance of human capital within ICO teams, focusing on the presence of experienced individuals and the heterogeneity of competencies among team members. We hypothesized that these factors would positively influence the likelihood of success, drawing upon research from Staniewski (2016), Jin et al. (2017), Knight et al. (1999), Unger et al. (2011), Dissanayake, Zhang, and Gu (2015), and Ahlers et al. (2015).

We contribute to the recent literature on ICOs in three ways. First, the activity of ICOs with the online community is observed on Facebook, Twitter, and BitcoinTalk. From this perspective, the data collection represents a unique sample capable of providing an overview of the role that visibility on these platforms played in the market expansion phase before Facebook and Twitter intervened in 2018 by introducing the ban on ICO advertising. Second, we investigate the role that social media played during the early stage of the market explosion, distinguishing between visibility and interaction, and between general and specialized platforms. Academic literature generally discusses the role of social media in terms of its broad impacts, but our study delves deeper into specific dimensions of this role. Finally, while most prior studies have primarily analyzed team heterogeneity from perspectives such as gender and ethnicity diversity, we assess the impact of team characteristics in terms of role heterogeneity, providing a novel perspective that complements existing research on team composition.

This research contributes to the field by helping practitioners gain a deeper understanding of how strategic approaches to social channels and specific aspects of team composition can facilitate the success of a campaign. This involves evaluating the effectiveness of targeted social media strategies and the impact of diverse skills and experiences within the team, which is particularly relevant during periods of uncertainty and excitement in an expanding, deregulated market.

The remainder of this paper is structured as follows. Section 2 presents the theoretical framework and outlines our hypotheses. Section 3 introduces data and methodology. Section 4 discusses the results. Section 5 offers concluding remarks.

2 Theoretical framework and research hypotheses

ICOs are considered as a hybrid mechanism between Initial Public Offerings (IPOs) and crowdfunding (Domingo et al., 2020). They combine elements of IPOs, such as access to substantial capital and large-scale fundraising, with elements of crowdfunding, including public participation from individuals outside traditional capital markets and the use of online platforms for fundraising purposes (Ofir and Sadeh 2019).

Although the term ‘ICO’ was inspired by the IPO process in conventional capital markets (Bourveau et al., 2022), there are significant distinctions between the two. IPOs involve the sale of equity shares, conferring ownership and voting rights, whereas ICOs sell digital tokens that offer various rights and obligations without ownership rights. The regulatory landscape is strict for IPOs, requiring extensive disclosure and registration, while ICOs lack standardized regulations and rely on often variable white papers (Florysiak and Schandlbauer, 2022). IPOs are typically launched by established companies and involve lengthy, costly processes with investment banks, whereas ICOs allow younger, smaller firms to raise capital quickly with lower costs.

All these factors result in different communication strategies, with IPOs using underwriters for valuation and marketing and ICOs leveraging social media for direct investor engagement. The following sections examine two key mechanisms from the literature to mitigate these information asymmetries: the use of social media and the value of human capital within the project team. We then formulate our research hypothesis.

2.1 Presence on online channel community

The role of social networks in reducing information asymmetry is a common theme in both crowdfunding and ICO literature. In crowdfunding, social networks enable project teams to engage with backers, share updates, and build trust, thus enhancing transparency and credibility (Courtney et al.,

2017; Freedman and Jin, 2017; Jin et al., 2017; Lu et al., 2014; Zaid and Hussin, 2024; Mollick, 2014; Vismara, 2016). Similarly, in ICOs, active engagement on social media helps project teams build trust and attract a broader investor base, addressing the significant informational asymmetry between creators and investors (Fisch, 2019). Studies like those by Benedetti and Kostovetsky (2021), Bourveau et al. (2022) and Howell et al. (2020) emphasize the relevance of social media for ICO success. Lyandres et al. (2022) find a strong positive correlation between ICO success and social media activity: platforms like Medium and BitcoinTalk provide potential investors with real-time updates and discussions, which are crucial for investment decisions. Moreover, Benedetti and Kostovetsky (2021) explore the relationship between Twitter followers, activity, and market prices, using these metrics to measure the performance of crypto companies post-ICO. Bourveau et al. (2022) examine a sample of 2113 ICOs, revealing that 97% maintain an active social media presence and 53% disclose technical source code on platforms like GitHub. Howell et al. (2020) highlight the success associated with ICOs that use dynamic pricing, promote transparency, and engage with large Telegram user groups. Finally, researchers like Adhami et al. (2018), Fisch (2019) and Lyandres et al. (2022) emphasize the importance of disclosing comprehensive information to reduce investor uncertainty in the market. The availability of technical details, such as source codes, signals the reliability and technical feasibility of projects.
Given these insights from the current literature, we introduce our first two hypotheses:

H1. *The visibility and interaction of projects within generic social network and other specialized online channels of communication increase the probability of ICOs' success.*
H2. *The use of crowdsourcing platforms enabling the co-creation of projects with the online community increases the probability of ICOs' success*.

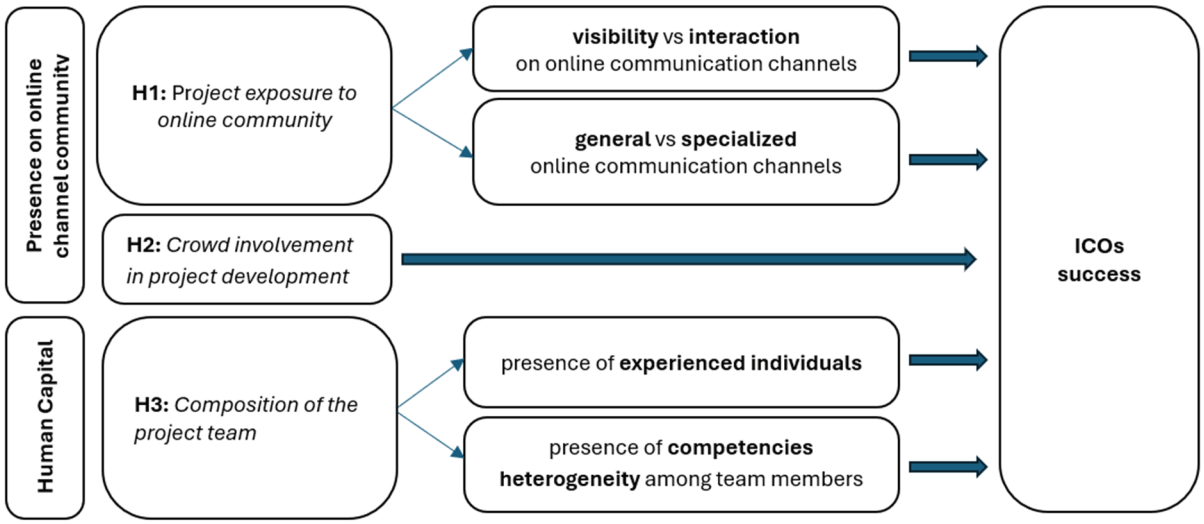
2.2 Human Capital

Academic literature extensively explores the multifaceted relationship between human capital and the success of ICOs, offering insights into various dimensions of this dynamic.
Firs of all, research indicates a positive correlation between team size and ICO success: larger teams are perceived positively by investors as they suggest an ability to attract diverse human capital and mobilize a wider network, enhancing project development and promotion efforts (Amsden and Schweizer, 2018; Bourveau et al., 2022). However, larger teams also come with potential downsides, such as inefficiencies due to diverse expertise and management styles, and higher future costs due to team compensation (Lechler, 2001).
The size and composition of the advisory board are equally crucial. A diverse and experienced advisory board can offer valuable insights and boost investor confidence, signaling the project's quality and potential for success (Adhami et al., 2018; Ahmad et al., 2023). Additionally, the attributes of the CEO, including previous startup experience, educational background and leadership skills play a significant role in shaping investor perceptions of the team's ability to execute the project effectively (Adhami et al., 2018; Amsden and Schweizer, 2018).
The reputation and prior experience of team members and advisors, especially in blockchain projects, are also critically important. Investors tend to favor teams with a proven track record, which can be verified through professional and social media platforms (Lyandres and Rabetti, 2023). A strong social media presence enhances transparency and credibility, providing investors with additional means to assess the team's capabilities (Albrecht et al., 2020; Yeh and Chen, 2020).
Finally, diversity in team composition, including factors such as gender and ethnicity, can positively impact decision-making quality and organizational performance, leading to increased investor interest and support (Buyl et al., 2011; Fisch et al., 2022). These elements collectively contribute to the likelihood of an ICOs' success by addressing information asymmetries and signaling project quality to potential investors.
Given these insights from the current literature, we introduce our third hypothesis:

H3. *The size and the composition of the ICO teams (presence of experts/advisors and heterogeneity of competencies among team members) increases the probability of ICOs' success*

Figure 1 summarises our research model.

Figure 1: Research hypothesis



3 Sample and data collection

Information regarding concluded ICOs was collected from two specific websites that provided data on social media activity and team composition: tokendata.io and icoholder.com. Additionally, control variables were established using Bitcoin price time series data obtained from coinmarketcap.com. After the initial data extraction, extensive cleaning procedures were carried out to resolve discrepancies and remove observations with missing values. As a result, the final database consists of a comprehensive dataset of 208 ICOs completed between October 17, 2016, and June 24, 2018.

3.1 Dependent variable

The dependent variable is a dummy variable, *Success*, taking value of one when ICO achieves success and zero otherwise. Consistent with the methodology outlined by Adhami et al. (2018), ICO success is defined based on whether the minimum funding goal (soft cap) has been met.

3.2 Independent variables

To test Hypothesis 1 (H1)
The activity and interaction of ICOs with the online community have been observed, from a multiple-social-network perspective, on three main platforms: Facebook, Twitter, and BitcoinTalk. Facebook and Twitter are notoriously among the most widely used social networks for promotional purposes (Buccafurri et al., 2015). Facebook offers users the ability to post and share videos, advertise businesses, and employ visually appealing content. Conversely, Twitter imposes constraints on content sharing, limiting tweets to a maximum of 140 characters. As a result, Twitter is often utilized by companies as a platform for concise and impactful messaging. In contrast, BitcoinTalk caters to a completely different audience. This forum has long been a central hub for crypto enthusiasts to explore technical details and participate in discussions about Bitcoin and various other cryptocurrencies (Sheth and Ram, 1989). With the exponential growth of the ICO market in 2017, BitcoinTalk emerged as a central hub for new projects

seeking to engage with the online community, promote their business endeavors, and glean insights from industry best practices (Agrawal, 2018).
To track the activity of ICOs in these three online channels and observe the response from their audience, we collected the following variables: *FacebookFollowers*, *FacebookLikes*, *FacebookPosts*, *TwitterFollowers*, *TwitterTweets*, *BitcoinTalkPosts* and *BitcoinTalkViews*.

To test Hypothesis 2 (H2)
To evaluate the presence of co-creation processes in the development of the ICO project, we monitored activity on GitHub. By using GitHub, project initiators can share their code and receive significant contributions from the developer community (Fisch, 2019). We built the dummy variable *GitHub*, taking value one when the ICO's team owns an open repository in the development platform and value zero otherwise.

To test Hypothesis 3 (H3)
Our database collects information on the name and role of each team member for every project. We started by classifying team member roles to understand the average composition of teams and to analyze their characteristics. This classification process involved three steps: 1) team members (2278 observations) were ordered by position from the one with highest occurrence to the one least occurred; 2) key-words were assigned to each position which occurred at least 12 times (corresponding to 50% cumulative frequency); 3) key-words were grouped into 20 categories and used to classify the remaining positions.
We then examined two key variables: *TeamSize*, which represents the number of team members involved in the ICO, and *Advisor*, a dummy variable taking the value of one if there is at least one advisor within the ICO team. Ahmad et al. (2023) assert that these metrics serve as foundational indicators reflecting the composition and impact of the project team and correlate positively with the likelihood of ICO success.
Next, we checked whether each team member had participated in other projects within the database and constructed the dummy variable *Expert*. This variable takes the value one if at least one team member has participated in more than four projects, and zero otherwise.
Finally, to assess team composition heterogeneity based on the diversity of roles covered, we calculated the Herfindahl-Hirschman Index (HHI). This index ranges from 0 to 10000 and measures role concentration within a team: a lower HHI signifies greater heterogeneity, while a higher index indicates more uniformity. The formula used to compute the HHI is: $HHI = \sum_i f_i^2$, where f represents the relative frequency of roles multiplied by 100. An *HHI* below 100 indicates high heterogeneity, from 100 to 1500 signifies moderate heterogeneity, from 1500 to 2500 indicates moderate homogeneity, and above 2500 points high homogeneity.

3.3 Control variables

To effectively study the effect of independent variables, we introduced three control variables in the model to capture market conditions: *PriceReturns*, *PriceVolatitlity* and *ICOVolume*.
According to Amsden and Schweizer (2018), ICOs are more likely to succeed during bull markets when investor sentiment tends to be optimistic and there is a greater appetite for risk-taking. Thus, the first two controlling variables respectively capture the effect of Bitcoin price return and price volatility 30 days prior to the beginning of the ICO. Using Bitcoin price instead of other cryptocurrencies serves as a primary indicator of industry trends in the crypto market (Domingo et al., 2020). Bitcoin, being the dominant cryptocurrency in terms of market capitalization and price performance, influences the decisions of investors in smaller cryptocurrencies during industry-wide fluctuations. High volatility periods in the crypto market preceding an ICO launch, for instance, may adversely impact its performance due to heightened investor uncertainty.

The final control variable used to assess market conditions is *ICOVolumes*, which quantifies the number of ICOs initiated in the same month. This variable serves as an indicator of the level of activity and competition within the ICO market in a given time period. A larger number of ICOs launched at the same time may indicate a more saturated market, potentially affecting factors such as investor sentiment, availability of funds, and general competition for resources (Roosenboom et al., 2020).
Lastly, with the inclusion of the control variable *Duration*, we accounted for any influence that the timeframe between the start and end of an ICO might have on its ultimate success. At the outset of an ICO, the project team typically specifies the duration of the fundraising campaign, outlining the period for accepting contributions. While Cordova et al. (2015) suggest that initiators who have more time to develop their projects, communicate achievements, and engage backers are more likely to gain visibility and reach their funding goals, Roosenboom et al. (2020) provide empirical evidence indicating a positive correlation between shorter expected durations of token sales and successful fundraising outcomes. Extending the campaign duration could inadvertently convey hesitation or ambiguity about the project, potentially undermining investor confidence.
Table 1 summarises the variables used by our model.

Table 1: Variables description

Variable	Label	Definition	Data source
Dependent variable			
Success (dummy)	"ICO Success"	Dummy variable taking value 1 if the softcap is reached and 0 otherwise.	tokendata.io
Independent variables			
H1. Social media			
FacebookFollowers (#)	"Facebook followers"	Number of followers on the ICO team's Facebook page	icoholder.com
FacebookLikes (#)	"Facebook likes"	Number of likes for the Facebook page's content	icoholder.com
FacebookPosts (#)	"Facebook posts"	Number of contents posted by the team on the Facebook page	icoholder.com
TwitterFollowers (#)	"Twitter follower"	Number of individuals following the project's Twitter page	icoholder.com
TwitterTweets (#)	"Twitter tweet"	Number of contents posted by the team on the Twitter page	icoholder.com
BitcoinTalkPosts (#)	"BitcoinTalk posts"	Number of posts generated by the BitcoinTalk community within the topic created by the ICO development team	icoholder.com
BitcoinTalkViews (#)	"BitcoinTalk views"	Number of views accumulated by BitcoinTalk topic	icoholder.com
H2. Crowd involvement			
GitHub (dummy)	"GitHub Repository"	Dummy variable taking value 1 if the ICO have an open repository on GitHub and 0 otherwise.	github.com
H3. Human capital			
TeamSize (#)	"Team size"	Number of members of the project team	icoholder.com
Advisor (dummy)	"Advisor"	Dummy variable taking value 1 if inside the ICO's team there is at least 1 advisor and 0 otherwise.	icoholder.com

Expert (dummy)	"Expert"	Dummy variable taking value 1 if inside the ICO's team there are members who worked for more than 4 projects and 0 otherwise.	icoholder.com
HHI (from 0 to 10000)	"Herfindhal-Hirschman Index"	Measure of the homogeneity/ heterogeneity of team members. Range from 0 to 10,000 where 10000 is the maximum homogeneity value.	icoholder.com
Control Variables			
PriceReturns (%)	"30 Days Bitcoin Price Returns"	Measure of Bitcoin price returns: (Pt – Pt-30)/ Pt-30, where t = Starting date of ICO.	coinmarketcap.com
PriceVolatility (%)	"30 Days Bitcoin Price Volatility"	Standard deviation of daily prices in the 30 days prior ICO's launch.	coinmarketcap.com
ICOVolume (#)	"ICO volume"	Number of ICOs launched in the same month.	tokendata.io
Duration (#)	"ICO Duration"	Days between the start and the end of the ICO.	tokendata.io

4 Results

4.1 Descriptive Statistics

Table 2 reports descriptive statistics for our main variables.

Table 2: Descriptive statistics and Shapiro-Wilk test of normality for the different measures

Variable	N	Mean	std	Min	p50	Max	Shapiro-Wilk Statistic	
Success	208	0.83	0.38	0	1	1		
FacebookFollowers	208	14007	51530.84	0	2030	604597	0.251	***
FacebookLikes	208	319	903.34	1	134	10858	0.277	***
FacebookPosts	208	8377	19536.97	2	2923	168479	0.405	***
TwitterFollowers	208	528	1048.25	0	188	7652	0.456	***
TwitterTweets	208	1074	2326.18	3	366	21389	0.436	***
BitcoinTalkPosts	208	49553	172292.60	146	9090	1773856	0.266	***
BitcoinTalkViews	208	14181	51653.39	0	2188	606047	0.253	***
GitHub_dummy	208	0.40	0.49	0	0	1		
TeamSize	208	11.2	6.85	1	10	49		
Advisor_dummy	159	0.80	0.40	0	1	1		
Expert_dummy	208	0.24	0.43	0	0	1		
HHI	208	2914	1735.16	865.05	2474.49	10000		
PriceReturn	208	0.26	0.47	-0.49	0.16	1.85		
PriceVolatility	208	1016.52	983.07	9.137284	674.14	4025.67		
ICOVolume	208	18.71	8.38	1	23	28		
Duration	208	40.62	24.96	1	32	150		

Consistent with the findings of Adhami et al. (2018), ICOs demonstrate a success probability of 83%. This is significantly higher than the success rate of 41.8% observed on Kickstarter, a major reward-based crowdfunding platform, as reported by Mollick (2014) for the period from its inception in 2009 to 2012, corresponding to its phase of expansion.
Our dataset confirms Facebook's dominance over Twitter in terms of audience engagement: ICO projects have, on average, nearly triple the number of Facebook followers compared to Twitter followers. Interestingly, BitcoinTalk surpasses both platforms in terms of interaction. The community's engagement on BitcoinTalk is notable, with an average of almost 50000 posts per ICO, and some projects reaching well over a million posts. This evidence suggests a preference among blockchain community members for specialized media channels over generalist social networks like Facebook and Twitter (Domingo et al., 2020).
Upon initial analysis, we observed our social activity variables are not normally distributed. To prepare them for analysis, we transformed them using a logarithmic transformation.
Approximately 40% of ICOs in our sample use GitHub to share their code and encourage community contributions, contrasting with the majority of projects that choose to keep their code confidential. Bourveau et al (2022) similarly find that 53% of successful ICOs have public repositories. Adhami et al. (2018) note that while sharing code can reassure investors about the project's reliability, it also exposes the ICO to potential hacker attacks. Their research suggests that despite this risk, the availability of code positively influences token sale success, indicating investor preference for transparency even amidst potential security risks.
Regarding team composition, the average ICO team consists of 11 members, in line with findings by Amsden and Schweizer (2018) who report an average of 8 members. Furthermore, 80% of ICOs include at least one *Advisor*, and almost 25% have an *Expert* on their team. This reflects the necessity for specialized advisory and expert input during the early stages of ICO development, essential for navigating the challenges of a rapidly evolving market. On average, the HHI exceeds 2500, suggesting ICO teams often do not encompass a wide range of specializations. This finding contrasts with literature emphasizing the benefits of team heterogeneity in dynamic environments (Knight et al., 1999).
Analysis of Bitcoin price returns and volatility confirms the market's high performance and significant uncertainty. The average monthly price return prior to ICO launches is 26%, reflecting the investment boom in the crypto market during that period.
Concluding the descriptive analysis, token sales typically last approximately 43 days, with exceptions such as the Gnosis ICO, which concluded in just one day.

4.2 Factor Analysis

To address statistical issues arising from high correlations among social activity variables (see Table 3), we conducted a factor analysis. Prior to analysis, we assessed the suitability of the data using the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. As indicated in Table 4, Bartlett's test was significant, and the KMO measure exceeded 0.5, confirming the adequacy of our sample data for factor analysis.

Table 3: Correlation matrix between social activity variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lg_FacebookFollowers (1)	1						
Lg_FacebookLikes (2)	0.573***	1					
Lg_FacebookPosts (3)	0.524***	0.537***	1				
Lg_TwitterFollowers (4)	0.401***	0.718***	0.685***	1			
Lg_TwitterTweets (5)	0.291***	0.277***	0.514***	0.340***	1		
Lg_BitcoinTalkPosts (6)	0.178***	0.200***	0.437***	0.297***	0.863***	1	
Lg_BitcoinTalkViews (7)	0.996***	0.574***	0.531***	0.404***	0.296***	0.184***	1

Table 4: Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity to test appropriateness of factor analysis

	Measure of factor analysis applicability	Measured value
1.	KMO test	0.583
2.	Bartlett test of sphericity	
	Chi-square	2491.956
	Degrees of freedom	21
	p-value	0.000

Thus, we proceeded to extract factors from the variables. Specifically, we grouped our seven social activity variables into three distinct factors (eigenvalues > 1) that capture the maximum information from the original variables. Table 5 presents the factor loading matrix, employing Varimax Rotation. This matrix illustrates the relationships between each variable and each factor, with values (loadings) indicating the correlations.

Table 5: Descriptive statistics and Shapiro-Wilk test of normality for the different measures

Variable	Visibility	Gen_Interaction	Spec_Interaction
FacebookFollowers	**0.955**	0.268	0.113
FacebookLikes	**0.956**	0.265	0.108
FacebookPosts	0.400	**0.676**	0.099
TwitterFollowers	0.341	**0.601**	0.380
TwitterTweets	0.137	**0.954**	0.162
BitcoinTalkPosts	0.150	0.177	**0.935**
BitcoinTalkViews	0.044	0.153	**0.887**

Primary loadings for each observed variable are in bold

The first factor primarily incorporates *FacebookFollowers* and *FacebookLikes*, labeled '*Visibility*' as these variables effectively proxy the exposure of projects in online media. The second factor includes *FacebookPosts, TwitterFollowers*, and *TwitterTweets*, representing the level of interaction between project initiators and users across social media platforms not specific to any particular interest area. We labeled this factor *Generic_Interaction* to denote general user-producer interaction. Lastly, the third factor incorporates *BitcoinTalkPosts* and *BitcoinTalkViews*, which reflect the level of interaction of ICOs with the niche community of cryptocurrency enthusiasts. We labeled this factor *Spec_Interaction* to denote specialist user-producer interaction.

4.3 Probit model: ICO's success factors

We estimated a probit model with *Success* as the dependent variable, which takes the value of one if the ICO is successful and zero otherwise. To validate H1, we included three variables (*Visibility*, *Spec_Interaction*, and *Gen_Interaction*) derived from factor analysis of online media activity. H2 was represented by a single variable, *GitHub*. H3 was examined using variables *TeamSize*, *Advisor*, *Expert*, and *HHI*. Additionally, four control variables were included: *PriceReturn*, *PriceVolatility*, *ICOVolume*, and *Duration*.

Table 6: Probit Model

	Estimate	SE	tStat	pValue	
Intercept	0.27953	0.35451	0.78851	0.43040	
H1					
Visibility	0.28735	0.11880	2.41885	0.01557	***
Gen_Interaction	0.13180	0.10455	1.26079	0.20742	

Spec_Interaction	0.24805	0.11179	2.21893	0.02649	***
H2					
GitHub_dummy	0.11262	0.23977	0.46970	0.63857	
H3					
TeamSize	0.03593	0.03111	1.16454	0.24855	
Advisor_dummy	0.15311	0.37668	0.41458	0.68473	
Expert_dummy	0.59598	0.32418	1.83853	0.06599	**
HHI	0.00015	0.00008	1.99323	0.04624	***
Control variables					
PriceReturn	-0.89768	0.32108	-2.79587	0.00518	***
PriceVolatility	0.00044	0.00016	2.81582	0.00486	***
ICOVolume	-0.03102	0.02064	-1.50891	0.13365	
Duration	0.00098	0.00566	0.27396	0.78412	

Dependent variable: Success - Number of observations: 208 - * p < 0.10; ** p < 0.05; *** p < 0.01

The model partially validates H1: the variables *Visibility* and *Spec_Interaction* showed a statistically significant positive coefficient at 95%, while *Gen_Interaction*, despite having a positive coefficient, did not achieve statistical significance. This partial validation suggests that the visibility of ICO projects in social networks and the interaction with specialized online channels of communication positively influence the likelihood of ICO success. Conversely, interaction on generalist social platforms does not significantly impact the performance of the funding campaign. According to Pierrakis and Bhimireddy (2024), this phenomenon may stem from the technical nature of ICOs, which require specialized knowledge typically found in niche cryptocurrency communities. Engaging with these communities on specialized platforms enhances investor engagement and confidence.

The variable *GitHub* did not exhibit statistical significance, leading us to reject H2. This finding contradicts previous studies (Adhami et al., 2018; Belitski and Boreiko, 2022) which suggested that utilizing crowdsourcing platforms like GitHub could predict ICO success. However, our result is in line with Fisch (2018) who found that revealing code on GitHub does not significantly influence the amount of funding raised. According to signaling theory, this is unsurprising, as revealing the code does not involve a significant cost if potential investors are unable to differentiate between high- and low-quality code. Fisch (2018) argues that merely disclosing source code on GitHub does not substantially impact ICO funding; rather, it is imperative to assess the actual interactions occurring within the repository, with the number of defect fixes being a proposed metric for evaluation.

Furthermore, H3 received partial validation. The *Expert* variable shows a statistically significant positive coefficient at the 90% confidence level, indicating that team members with experience in previous ICO campaigns increase the probability of ICO success. This suggests that prior experience brings valuable insights and credibility to ICO projects, reassuring potential investors and enhancing strategic decision-making. Interestingly, the HHI variable yielded unexpected results. Despite hypothesis H3 predicting a negative effect due to team homogeneity, the coefficient for HHI is statistically significant at 95% with a positive effect on ICO success. This suggests that teams with more homogeneous skill sets may communicate effectively, make coordinated decisions, and maintain team cohesion, thereby positively influencing ICO outcomes.

Analyzing the control variables, the model confirms that Bitcoin price trends significantly influence investor decisions. The *PriceReturn* variable has a statistically significant negative coefficient at 99%, indicating that ICOs are more likely to succeed when Bitcoin prices perform poorly in the month preceding the ICO launch. In fact, most of the ICOs set the price of their token in other major cryptocurrencies like Bitcoin (Fisch, 2019), thus when the Bitcoin/dollar rate is low, the token is more convenient. Conversely, the *PriceVolatility* variable, while statistically significant at 99%, shows a coefficient close to zero, indicating minimal impact on ICO success probability. Lastly, the *Duration* variable was not significant in the model, implying that the length of the ICO campaign does not

significantly affect its success, as exemplified by rapid fundraising successes such as Gnosis, which raised nearly $300 million in just 15 minutes.

5 Conclusion

ICOs represent a revolutionary phenomenon that has disrupted the traditional fundraising landscape for small enterprises seeking capital to finance innovative ventures (Ante et al., 2018).
This study investigates the determinants of ICOs' success during the early and peak stages of market expansion, characterized by regulatory uncertainty. We have identified multiple critical factors that contribute to a robust framework for crafting successful ICO campaigns, thereby complementing and enhancing the existing literature on this subject (Ahmad et al., 2023; Albrecht et al., 2020; Campino et al., 2021; Fisch, 2019; Howell et al., 2020; Roosenboom et al., 2020).
Our findings underscore the importance of project visibility on online media platforms in mitigating information asymmetry and conveying the project's readiness to face market challenges. Moreover, in line with previous findings (Lyandres et al., 2022; Pierrakis and Bhimireddy, 2024), specialized communication channels tailored for cryptocurrency and blockchain discussions emerge as more effective for engaging with the target audience, whereas interaction on generalist social media platforms does not significantly impact ICO success rates.
Additionally, our study provides statistical evidence affirming the pivotal role of human capital in shaping project outcomes: the presence of experienced team members significantly enhances the likelihood of ICO success. Interestingly, while the hypothesis regarding team heterogeneity predicted a negative impact, our results show a modest positive effect, suggesting that cohesive teams with similar skill sets may communicate more effectively and make coordinated decisions, thereby bolstering project success.
On the other hand, our analysis reveals that the use of crowdsourcing platforms for project co-creation, such as GitHub, does not significantly influence ICO performance. This lack of significance can be attributed to two primary factors. Firstly, our current measure is limited, as it only registers the presence of a public repository without considering the depth or breadth of community involvement (Fisch, 2019). Consequently, this binary approach fails to capture the true extent of development activity or community engagement. Secondly, GitHub activity may have a more pronounced effect on a project's long-term viability rather than its short-term ICO performance. Indeed, our research focuses on immediate funding success, which may not be significantly influenced by the technical development as reflected on GitHub. Therefore, future research should delve deeper into these aspects, investigating comprehensive GitHub engagement metrics and examining long-term project outcomes beyond immediate ICO funding success.
The findings hold substantial implications for practitioners, guiding ventures in leveraging social media channels strategically to enhance ICO campaign success. This involves utilizing generic platforms to increase project visibility and reach a broader audience of potential investors. However, effectively engaging with the niche community of experienced blockchain technology investors proves most effective when conducted through professional social media platforms. Moreover, we highlight the significance of team members with previous active roles in other campaigns, providing insights into their contribution to campaign effectiveness. This understanding assists managers in forming well-rounded teams. Our findings emphasize the value of individuals with a proven track record of active and effective participation in previous campaigns. Future research could further explore how these experienced individuals continue to influence ICO teams and impact campaign outcomes.

References

Adhami, S., G. Giudici, and S. Martinazzi. 2018. 'Why Do Businesses Go Crypto? An Empirical Analysis of Initial Coin Offerings'. *Journal of Economics and Business* 100 (November):64–75.

Ahlers, G.K.C., D. Cumming, C. Günther, and D. Schweizer. 2015. 'Signaling in Equity Crowdfunding'. *Entrepreneurship Theory and Practice* 39 (4): 955–80.

Ahmad, M. F., O. Kowalewski, and P. Pisany. 2023. 'What Determines Initial Coin Offering Success: A Cross-Country Study'. *Economics of Innovation and New Technology* 32 (5): 622–45.

Albrecht, S., B. Lutz, and D. Neumann. 2020. 'The Behavior of Blockchain Ventures on Twitter as a Determinant for Funding Success'. *Electronic Markets* 30 (2): 241–57.

Amsden, R., and D. Schweizer. 2018. 'Are Blockchain Crowdsales the New "Gold Rush"? Success Determinants of Initial Coin Offerings'. *SSRN Electronic Journal*, January.

Ante, L., P. Sandner, and I. Fiedler. 2018. 'Blockchain-Based ICOs: Pure Hype or the Dawn of a New Era of Startup Financing?' *Journal of Risk and Financial Management* 11 (4): 80.

Belitski, M., and D. Boreiko. 2022. 'Success Factors of Initial Coin Offerings'. *The Journal of Technology Transfer* 47 (6): 1690–1706.

Benedetti, H., and L. Kostovetsky. 2021. 'Digital Tulips? Returns to Investors in Initial Coin Offerings'. *Journal of Corporate Finance* 66 (February):101786.

Bourveau, T., E. T. De George, A. Ellahie, and D. Macciocchi. 2022. 'The Role of Disclosure and Information Intermediaries in an Unregulated Capital Market: Evidence from Initial Coin Offerings'. *Journal of Accounting Research* 60 (1): 129–67.

Buccafurri, F., G. Lax, S. Nicolazzo, and A. Nocera. 2015. 'Comparing Twitter and Facebook User Behavior: Privacy and Other Aspects'. *Computers in Human Behavior* 52 (November):87–95.

Buyl, T., C. Boone, W. Hendriks, and P. Matthyssens. 2011. 'Top Management Team Functional Diversity and Firm Performance: The Moderating Role of CEO Characteristics: TMT Functional Diversity and CEO Characteristics'. *Journal of Management Studies* 48 (1): 151–77.

Campino, J., A. Brochado, and A. Rosa. 2021. 'Initial Coin Offerings (ICOs): The Importance of Human Capital'. *Journal of Business Economics* 91 (8): 1225–62. https://doi.org/10.1007/s11573-021-01037-w.

Cordova, A., J. Dolci, and G. Gianfrate. 2015. 'The Determinants of Crowdfunding Success: Evidence from Technology Projects'. *Procedia - Social and Behavioral Sciences* 181 (May):115–24.

Courtney, C., S. Dutta, and Y. Li. 2017. 'Resolving Information Asymmetry: Signaling, Endorsement, and Crowdfunding Success'. *Entrepreneurship Theory and Practice* 41 (2): 265–90.

Deng, H., R. H. Huang, and Q. Wu. 2018. 'The Regulation of Initial Coin Offerings in China: Problems, Prognoses and Prospects'. *European Business Organization Law Review* 19 (3): 465–502.

Dissanayake, I., J. Zhang, and B. Gu. 2015. 'Task Division for Team Success in Crowdsourcing Contests: Resource Allocation and Alignment Effects'. *Journal of Management Information Systems* 32 (2): 8–39. https://doi.org/10.1080/07421222.2015.1068604.

Domingo, R. S., J. Piñeiro-Chousa, and M. A. López-Cabarcos. 2020. 'What Factors Drive Returns on Initial Coin Offerings?' *Technological Forecasting and Social Change* 153 (April):119915.

Facebook. 2018. Updates to Our Prohibited Financial Products and Services Policy. Retrieved March 24, 2024, from https://bit.ly/2lD1kKB

Fisch, C. 2019. 'Initial Coin Offerings (ICOs) to Finance New Ventures'. *Journal of Business Venturing* 34 (1): 1–22.

Fisch, C., M. Meoli, and S. Vismara. 2022. 'Does Blockchain Technology Democratize Entrepreneurial Finance? An Empirical Comparison of ICOs, Venture Capital, and REITs'. *Economics of Innovation and New Technology* 31 (1–2): 70–89.

Florysiak, D., and A. Schandlbauer. 2022. 'Experts or Charlatans? ICO Analysts and White Paper Informativeness'. *Journal of Banking and Finance* 139 (March):106476.

Freedman, S., and G. Z. Jin. 2017. 'The Information Value of Online Social Networks: Lessons from Peer-to-Peer Lending'. *International Journal of Industrial Organization* 51 (March):185–222.

Howell, S. T, M. Niessner, and D. Yermack. 2020. 'Initial Coin Offerings: Financing Growth with Cryptocurrency Token Sales'. Edited by Jiang Wei. *The Review of Financial Studies* 33 (9): 3925–74.

Jin, L., K. Madison, N. D. Kraiczy, F. W. Kellermanns, T. R. Crook, and J. Xi. 2017. 'Entrepreneurial Team Composition Characteristics and New Venture Performance: A Meta–Analysis'. *Entrepreneurship Theory and Practice* 41 (5): 743–71.

Knight, D., C. L. Pearce, K. G. Smith, J. D. Olian, H. P. Sims, K. A. Smith, and P. Flood. 1999. 'Top Management Team Diversity, Group Process, and Strategic Consensus'. *Strategic Management Journal* 20 (5): 445–65.

Lechler, T. 2001. 'Social Interaction: A Determinant of Entrepreneurial Team Venture Success'. *Small Business Economics* 16 (4): 263–78.

Lu, C., S. Xie, X. Kong, and P. S. Yu. 2014. 'Inferring the Impacts of Social Media on Crowdfunding'. In *Proceedings of the 7th ACM International Conference on Web Search and Data Mining*, 573–82. New York New York USA: ACM.

Lyandres, E., B. Palazzo, and D. Rabetti. 2022. 'Initial Coin Offering (ICO) Success and Post-ICO Performance'. *Management Science* 68 (12): 8658–79.

Lyandres, E., and D. Rabetti. 2023. 'Initial Coin Offerings: A Review'. *SSRN Electronic Journal*.

Mollick, E. 2014. 'The Dynamics of Crowdfunding: An Exploratory Study'. *Journal of Business Venturing* 29 (1): 1–16.

Momtaz, P. P. 2020. 'Initial Coin Offerings'. Edited by Renuka Sane. *PLOS ONE* 15 (5): e0233018.

Ofir, M., and I. Sadeh. 2019. 'ICO vs IPO: Empirical Findings, Information Asymmetry and the Appropriate Regulatory Framework'. *SSRN Electronic Journal*.

Owen, R., D. Deakins, and M. Savic. 2019. 'Finance Pathways for Young Innovative Small□ and Medium□size Enterprises: A Demand□side Examination of Finance Gaps and Policy Implications for the Post□global Financial Crisis Finance Escalator'. *Strategic Change* 28 (1): 19–36.

Pierrakis, Y., and N. Bhimireddy. 2024. 'Giving Coins for Free: Does Digital Outsourcing of Technical and Advisory Support Influence the Success of Initial Coin Offerings (ICOs)?' *Strategic Change* 33 (2): 67–77.

Roosenboom, P., T. Van Der Kolk, and A. De Jong. 2020. 'What Determines Success in Initial Coin Offerings?' *Venture Capital* 22 (2): 161–83.

Staniewski, M. W. 2016. 'The Contribution of Business Experience and Knowledge to Successful Entrepreneurship'. *Journal of Business Research* 69 (11): 5147–52.

Tiwari, M., A. Gepp, and K. Kumar. 2020. 'The Future of Raising Finance - a New Opportunity to Commit Fraud: A Review of Initial Coin Offering (ICOs) Scams'. *Crime, Law and Social Change* 73 (4): 417–41.

Unger, J. M., A. Rauch, M. Frese, and N. Rosenbusch. 2011. 'Human Capital and Entrepreneurial Success: A Meta-Analytical Review'. *Journal of Business Venturing* 26 (3): 341–58.

Vismara, S. 2016. 'Equity Retention and Social Network Theory in Equity Crowdfunding'. *Small Business Economics* 46 (4): 579–90.

White, G. R. T. 2017. 'Future Applications of Blockchain in Business and Management: A Delphi Study'. *Strategic Change* 26 (5): 439–51.

Wu, Y., L. Ding, X. Song, and J. Chen. 2023. 'Top Management Team Heterogeneity and the Performance of Cross-Border M&A'. *SAGE Open* 13 (2): 21582440231182649.

Yeh, J.-Y., and C.-H. Chen. 2020. 'A Machine Learning Approach to Predict the Success of Crowdfunding Fintech Project'. *Journal of Enterprise Information Management* 35 (6): 1678–96.

Zaid, A. A. M., and A. R. C. Hussin. 2024. 'Understanding Crowdfunding via Social Media: A Review of the Relevancy of Previous Studies'. *International Journal of Academic Research in Business and Social Sciences* 14 (1): Pages 1131-1147.