administrative sciences

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# Evaluation of Blockchain-Based Crowdfunding Campaign Success Factors Based on VASMA-L Criteria Weighting Method

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**Abstract:** When investing in blockchain-based crowdfunding campaigns, choosing the right one is difficult. Therefore, it is important to recognize success factors that express the value of the specific campaign. This study is aimed at determining the success factors impacting the investors' decision to fund blockchain-based crowdfunding campaigns and ranking them according to their importance in decision-making. An online survey was employed to collect expert opinions. The modification of the visual analogue scale matrix for criteria weighting methodology called VASMA-L was presented in this study to rank the list of the predetermined factors. To reduce the uncertainties in the decision-making process and the cognitive overload of the survey respondents, all the predetermined success factors were split into two smaller groups and assessed as those that fit both traditional and blockchain-based crowdfunding models and those that are specific only to the blockchain-based crowdfunding model. The main findings disclose that the three factors with the highest VASMA weights are from the first group. This means that when selecting the specific crowdfunding campaign to invest in, investors use common factors rather than those specific to blockchain-based crowdfunding. Only investor preferences were chosen and analyzed for successful blockchain-based crowdfunding campaign investment in this research. The VASMA-L methodology might help compare several criteria groups and select the most important ones. In addition, this weighting methodology might help investors to choose the most thrilling blockchain-based crowdfunding campaigns to fund.

**Keywords:** blockchain-based crowdfunding; blockchain-based crowdfunding campaign; success factors; VASMA weighting; VASMA-L; funding; risk



**Citation:** Venslavienė, Santautė, Jelena Stankevičienė, and Ingrida Leščauskienė. 2023. Evaluation of Blockchain-Based Crowdfunding Campaign Success Factors Based on VASMA-L Criteria Weighting Method. *Administrative Sciences* 13: 144. https://doi.org/10.3390/admsci13060144

Received: 28 April 2023
Revised: 26 May 2023
Accepted: 27 May 2023
Published: 30 May 2023



## 1. Introduction

In the past few years, blockchain-based crowdfunding has emerged as a noteworthy economic phenomenon, particularly in 2017/18, providing an important means of financing ventures. This new form of crowdfunding is represented by Initial Cryptoasset Offerings (ICOs) and, more recently, Security Token Offerings (STOs). The blockchain-based crowdfunding model is a very new topic in literature, thus there are not many available literature sources to define blockchain-based crowdfunding. According to Hartmann et al. (2019), blockchain-based crowdfunding has unique characteristics that distinguish it from traditional crowdfunding. Therefore, success factors that impact investments in traditional crowdfunding may not necessarily apply to blockchain-based crowdfunding. Understanding the similarities and differences between the various crowdfunding models and identifying success factors is crucial in designing successful blockchain-based fundraising campaigns and evaluating investments for potential investors.

In the previous study (Venslavienė et al. 2021), success factors for traditional crowdfunding were discussed. By applying the VASMA weighting method, the essential success

factors of traditional crowdfunding campaigns for investors were identified. Continuing that research, this paper will be dedicated to blockchain-based crowdfunding success factors and the comparison between traditional crowdfunding and blockchain-based crowdfunding success factors. This study is aimed at determining the success factors impacting the investors' decision to fund blockchain-based crowdfunding campaigns and ranking them according to their importance in decision-making. The modified VASMA weighting method was selected to calculate and compare results. This modification is called the VASMA-L weighting method.

The remaining study is organized as follows: Section 1 describes blockchain-based crowdfunding and structures the success drivers of blockchain-based crowdfunding found in the literature. The methodology will be introduced in Section 2. Section 3 will present the VASMA-L method application. Finally, the results, discussion, limitations, and conclusions are given.

## 2. Literature Review

### *2.1. Blockchain in Finance*

Blockchain technology can potentially disrupt the global financial system and change the nature of investments (Cai 2018; Fanning and Centers 2016). In addition, a blockchain effectively splits the need for a centralized agent, which is usually provided by financial intermediaries. This trust element essential in the blockchain is the main reason why blockchain technology can potentially transform financial services, and it sometimes may completely eliminate the need for intermediaries (Cai 2018; de Filippi 2016; Pompella and Costantino 2021). Blockchain technology has the potential to revolutionize equity crowdfunding for investors. Typically, crowdfunding platforms are centralized, meaning that contracts and other information are stored on the platform and only accessible to a select few. However, as Baber (2020) notes, the features of blockchain-based crowdfunding, such as anti-tampering, anti-fraud, and decentralized ledger systems, can ensure the security of information and data. By leveraging blockchain technology, the need for extensive paperwork, postage, registration, authorization, and certification can be eliminated, making the crowdfunding platform more accessible to investors worldwide through digital or smart contracts that recognize and secure their rights. In addition, blockchain technology is transparent and can enhance the trust and credibility of crowdfunding platforms among both funders and fundraisers.

Blockchain enables the establishment of decentralized crowdfunding platforms that can work autonomously. Nevertheless, the decentralized character of the crowdfunding platform is only one side of the coin. The real innovation introduced by the blockchain can be better observed when one looks at how the project is being funded (de Filippi 2016).

### *2.2. Blockchain-Based Crowdfunding*

Although blockchain-based crowdfunding campaign models are similar to traditional crowdfunding, the regulatory environment for this innovation is still underdeveloped in most countries, and global standardization remains elusive (Hartmann et al. 2019). This is partly due to the existence of three different types of tokens that reflect unique features: utility-type, payment-type, and investment-type tokens (Hacker and Thomale 2018). These tokens often take a hybrid form in cryptoassets. Utility tokens, for example, are crucial for accessing products offered by a platform, protocol, or network, and participants must hold them to participate. Consequently, utility token offerings are similar to reward-based crowdfunding models.

Blockchain-based crowdfunding involves currency and security tokens that are similar to financial crowdfunding models, such as equity crowdfunding. Payment tokens, which are similar to fiat money, like Bitcoin, are usable but have high transaction costs that make a Bitcoin exchange impractical. Therefore, Bitcoin is more commonly viewed as an asset than as a mainstream medium of exchange. On the other hand, security tokens represent a wide range of financial instruments.

In addition, security tokens can be classified into two primary categories: fully on-chain security tokens and a hybrid form that combines off-chain and on-chain features. Fully on-chain security tokens exist only in digital form and are stored on a distributed ledger. Their lack of clear connection with the "real world" makes them difficult to regulate, and, as a result, some early-stage blockchain companies are exploring hybrid security token models that link on-chain tokens to off-chain contracts in an attempt to address the regulatory challenges in most countries.

### *2.3. Success Factors for Blockchain-Based Crowdfunding*

In order to consider the specific success factors for blockchain-based crowdfunding, we reviewed the relevant literature for equity crowdfunding and blockchain-based crowdfunding following a snowballing approach. Comparing both types of crowdfunding and their success factors, it was found that not all the factors have been studied in both categories. Some factors appear to be specific to and essential for only one crowdfunding category. Five success factors were identified for both traditional and blockchain-based crowdfunding: industry, location, team size, social network presence, and early investments. Industry influences the success of equity crowdfunding, as campaigns might attract more or less attention from investors depending on the sector. This aligns with another study, where technology, games, and design investments were considered the most by investors (Venslavienė and Stankevičienė 2021). On the other hand, in blockchain-based crowdfunding, ICO valuations are not different across industries (Fisch 2019). The location factor also influences both types of crowdfunding because projects with better location might attract early backers faster, and those backers have a higher social network. Moreover, some studies also show the importance of location from the favorable regulatory environment perspective for blockchain-based crowdfunding (Adhami et al. 2018; Fenu et al. 2018). The venture's location does not impact the ICO rating (Fisch 2019). While team size looks important for equity crowdfunding, there is little evidence that team size positively correlates with ICO success (Amsden and Schweizer 2018; Cerchiello et al. 2019; Fenu et al. 2018; Fisch 2019). Moreover, several papers on social networks influenced the success of both equity and blockchain-based crowdfunding (Cerchiello et al. 2019; Colombo et al. 2015; Mollick 2013; Vismara 2016; Zheng et al. 2017). The fifth success factor—early investments—was discussed in some studies and found to have a positive correlation for success in both traditional crowdfunding and blockchain-based crowdfunding (Lee et al. 2019; Lukkarinen et al. 2016; Vulkan et al. 2016). The last very important success factor for both types of crowdfunding is the share of retained equity or token factor. While several authors add the importance of equity retention in traditional crowdfunding (Ahlers et al. 2015; Ralcheva and Roosenboom 2016; Vismara 2016), blockchain-based crowdfunding projects have just started to sell equity, such as security tokens. However, there is almost no reliable analysis of that kind of token offering. On the contrary, it was found that retaining tokens can positively affect ICO success (Amsden and Schweizer 2018; Lee et al. 2019).

Finally, 15 success factors that are exceptional only to blockchain-based crowdfunding were discovered in the literature. These factors are as follows: tokens allowing contributors to access a specific service (or to share profits), using Ethereum, number of tokens issued, ICO bonus/discounts, KYC/pre-registration, presale, accepting multiple currencies (digital and Fiat), well-connected CEO, loyal CEO, and presence on GitHub. The last six factors are not very specific to blockchain-based crowdfunding but can also be applied to other crowdfunding models. The whole list of 21 success factors is summarized in Table 1.

**Table 1.** Success factors for crowdfunding found in the literature.

| Success Factor | Crowdfunding Type | | Author |
|---|---|---|---|
| | Financial | Blockchain-Based | |
| Industry | x | x | (Davies and Giovannetti 2018; Fisch 2019; Mamonov and Malaga 2018) |
| Location | x | x | (Adhami et al. 2018; Agrawal et al. 2015; Choo et al. 2015; Fenu et al. 2018; Mamonov and Malaga 2018; Ralcheva and Roosenboom 2016) |
| Team size | x | x | (Ahlers et al. 2015; Amsden and Schweizer 2018; Cerchiello et al. 2019; Fenu et al. 2018; Fisch 2019; Frydrych et al. 2014; Mamonov and Malaga 2018; Ralcheva and Roosenboom 2016; Stam and Schutjens 2005) |
| Social network | x | x | (Amsden and Schweizer 2018; Cerchiello et al. 2019; Davies and Giovannetti 2018; Mollick 2013; Vismara 2016; Zheng et al. 2017) |
| Early investments | x | x | (Agrawal et al. 2015; Colombo et al. 2015; Davies and Giovannetti 2018; Kuppuswamy and Bayus 2013; Lee et al. 2019; Lukkarinen et al. 2016; Polzin et al. 2018; Vulkan et al. 2016) |
| Share of retained equity/token | x | x | (Ahlers et al. 2015; Amsden and Schweizer 2018; Lee et al. 2019; Ralcheva and Roosenboom 2016; Vismara 2016) |
| Tokens allow contributors to access a specific service (or to share profits) | | x | (Adhami et al. 2018) |
| Using Ethereum | | x | (Amsden and Schweizer 2018; Fenu et al. 2018; Fisch 2019) |
| Number of tokens issued | | x | (Amsden and Schweizer 2018; Fisch 2019) |
| ICO Bonus/discounts | | x | (Adhami et al. 2018; Lee et al. 2019; Mamonov and Malaga 2018) |
| KYC/Pre-registration | | x | (Lee et al. 2019) |
| Presale | | x | (Adhami et al. 2018; Amsden and Schweizer 2018; Lee et al. 2019) |
| Accepting multiple currencies (digital and Fiat) | | x | (Amsden and Schweizer 2018; Lee et al. 2019) |
| Well-connected CEO | | x | (Amsden and Schweizer 2018) |
| Loyal CEO | | x | (Kuppuswamy and Bayus 2013) |
| Presence on Github | | x | (Amsden and Schweizer 2018; Fisch 2019) |
| Average analyst rating | | x | (Fenu et al. 2018; Lee et al. 2019) |
| White paper availability | | x | (Adhami et al. 2018; Cerchiello et al. 2019) |
| White paper content | | x | (Amsden and Schweizer 2018; Cerchiello et al. 2019; Fisch 2019) |
| Multi-language white paper | | x | (Lee et al. 2019) |
| The code source is available | | x | (Adhami et al. 2018; Fisch 2019) |

## 3. Methodology and Data

Sometimes survey creators offer overly complicated surveys with too many response options or too many items to discuss. This makes reading the survey difficult for people and can encourage poor survey-taking behavior, like straightlining or randomly selecting

responses, because they want to escape the survey (Cho 2022). In other words, respondents cannot concentrate on long and complex survey questions, especially if they are tired, bored, or distracted by unpredictable circumstances (Baušys et al. 2021). Moreover, survey construction also depends on the data origins. Reips (2002) analyzed the psychometric aspects of internet-based experiments and suggested that different survey items should be presented on separate pages when unrelated questions are being assessed. However, the researcher also highlighted that if the same variable's various aspects are being analyzed, all these aspects should be intentionally evaluated on a single page. While people are better able to making comparative judgements than absolute ones, matrix questions are frequently employed in online data collection processes (Sung and Wu 2018). However, because of the cognitive load of human memory, precaution should be taken in presenting long matrix questions in online surveys.

Thorndike et al. (2009) conducted a study to find out whether the participants respond differently to online questionnaires presenting many items on a single webpage compared to questionnaires presenting only one item per page. A matrix question consisting of 21 lines was analyzed in this study. Participants seeking self-help treatment on the Internet for social phobia, depression, or panic disorder completed both questionnaires. According to the results, participants preferred questionnaires that show only one item per page, even though it took more time for them to complete the survey. This experiment shows that a matrix question of 21 items might be too long for survey participants.

Toepoel et al. (2009) also analyzed how the number of items placed on a single webpage affects survey results. Four different situations were analyzed, when one, four, ten, and forty questions (items) were presented on a single screen. Results of the experiments revealed that putting more items on a screen increases item non-response levels. However, it also reduces the survey duration and provides more judicial appraisals. While the necessity of webpage scrolling was detected as the feature most negatively impacting survey results, the authors of this study suggested that placing four to ten items with a single header on the page might be the optimal decision, preventing scrolling while also allowing respondents to answer the multiple-item questions. For the sake of accuracy, it should be mentioned that the matrix questions employed by Toepoel et al. (2009) were constructed using a five-point Likert scale, which requires more width and length than the matrix questions composed of visual analogue scales that are going to be used in this study.

By summarizing the above information, we can see that matrix questions are beneficial for collecting information about the different features of the same latent variable and reducing the survey time. However, the length of the matrix questions might negatively affect the survey results. Shortening the matrix questions might be a solution to better data quality; however, it must be done consciously; since it is a frequent case, insights on the importance of large parameter sets are necessary, and such a splitting might increase information uncertainties. Thus, a data processing technique capable of reducing these uncertainties of this type is required.

The VASMA (visual analogue scale matrix for criteria weighting) methodology was recently proposed by (Lescauskiene et al. 2020) to analyze data collected via matrix questions consisting of visual analogue scales (VAS scales). This survey-based criteria weighting methodology combines objective entropy weights and subjective criteria weights calculated by the WASPAS-SVNS multi-criteria decision-making technique to reflect the psychometric features of the VAS scales. Moreover, VASMA does not require the respondent to answer all the questions in the VAS matrix and exploits the non-response data information for the objective weight calculations. The multi-criteria decision-making approach WASPAS-SVNS is used for the calculation of the subjective weights' in the VASMA methodology. Recently, the WASPAS SVNS method as well as other multi-criteria decision methods (Liao et al. 2022; Jencova et al. 2022; Baležentis 2022; Lukyanova et al. 2022; Ginevičius 2023) have been used for various multi-criteria decision-making tasks (Bausys et al. 2020; Baušys et al. 2020; Friesner et al. 2016; Mardani et al. 2020; Zavadskas et al. 2019), and its application possibilities continue to grow. The WASPAS-SVNS application in the VASMA criteria weighting

methodology is constructed to reflect the psychometric features of the matrix questions consisting of the VAS scales and analysis of both the ordinal and nominal information of the criteria valuations.

However, the original VASMA weighting technique was applied in study cases where 12 to 14 items in total had to be assessed according to their importance to the analyzed problem of crowdfunding campaign selection (Lescauskiene et al. 2020; Venslavienė et al. 2021). When matrix questions consisting of 14 or fewer VAS scales do not require scrolling, the size of the matrix question does not affect the quality of the survey data. Nevertheless, there are many situations in life when the larger sets of related criteria must be assessed for research purposes. Thus, in this paper, we propose adapting the VASMA methodology, which can be applied to analyze and compare the importance of the criteria of the large parameter sets. This adaptation is called VAS-MA-L and is explained further.

### *3.1. The VASMA-L Methodology Suitable for Large Criteria Sets*

VASMA-L is a modified weights method, where weights are calculated from a large criteria set, splitting it into smaller data sets and later combining them to compare criteria importance. Below, the entire procedure for this method is described.

*Step 1.* Split the initial criteria set $C^0$ into criteria subsets $C^1, C^2, \ldots C^g$, where $C^0 = \{c_1; c_2 \ldots c_N\}$, and $C^0 = C^1 + C^2 + \cdots + C^g$. For instance, if g = 3 and N is the total number of the analyzed criteria, then $C^1 = \{c_1; c_2 \ldots c_d\}, C^2 = \left\{c_{d+1}; c_{d+2} \ldots c_f\right\}$, and $C^3 = \left\{c_{f+1}; c_{f+2} \ldots c_N\right\}$. Because of the possible cognitive overload of the human memory, the amount of the criteria in each of the subsets is recommended to be $10 \pm 4$ items.

*Step 2.* Determine the importance $q^1, q^2, \ldots q^g$ for each of the subset $C^1, C^2, \ldots C^g$. All the determined weights should follow the rule $q^1 + q^2 + \ldots + q^g = 1$. An expert-based methodology like SWING, DR, or even AHP can be employed for this purpose.

*Step 3.* For each of the subset $C^1, C^2, \ldots C^g$, create a separate VAS matrix question and include all of them in the same survey. Each of the matrix questions should be presented one after the other, with a clear title distinguishing them in between.

*Step 4.* Spread the survey among the respondents of the target group and record the data collected from each of the matrix questions into the separate decision matrices $R^1, R^2, \ldots R^g$.

*Step 5.* For each of the $R^1, R^2, \ldots R^g$, calculate the non-normalized VASMA weights $M^1, M^2, \ldots M^g$.

Clean the data and update the decision matrix R. Since survey respondents are not required to assess all the criteria in the analyzed VAS matrix question, answers with some of the non-response levels should not be deleted without additional consideration.

Check the internal reliability of the data recorded into the decision matrix R. If appropriate, continue the calculations.

Calculate the objective weights $W_l$ for each of the criteria $l$ belonging to the analyzed data set by applying the information entropy theory:

$$\widetilde{E}_l(p) = \frac{\sum_{k=1}^{100} p_{kl} log_2(p_{kl})}{log_2\left(\frac{1}{100}\right)}; l = 1, 2, \ldots L, 0 \leq \widetilde{E}_l(p) \leq 1 \quad (1)$$

$$W_l = 1 - \widetilde{E}_l(p);\ l = 1, 2, \ldots L, 0 \leq W_l \leq 1 \quad (2)$$

Calculating of the subjective weights $S_l$ for each of the criteria l belonging to the analyzed data set and applying the WASPAS-SVNS multi-criteria decision-making technique and the psychometric features of the VAS scales, Lescauskiene et al. (2020) explain the mathematics of subjective weights.

Calculate the non-normalized VASMA weights $M_l$ for each of the criteria $l$ belonging to the analyzed criteria subset and multiply them by the importance $q$ of this subset.

$$M_l = qS_lW_l \quad (3)$$

*Step 6*. Calculate the global VASMA weights. Combine local VASMA weights calculated separately from each of the decision matrices $R^1, R^2, \ldots R^g$ into a single set of VASMA weights $M^0$ consisting of N items. For the previous example, when g = 3 and $C^1 = \{c_1; c_2 \ldots c_d\}, C^2 = \left\{c_{d+1}; c_{d+2} \ldots c_f\right\}, C^3 = \left\{c_{f+1}; c_{f+2} \ldots c_N\right\}$, the set $M^0$ can be described as

$$M^0 = M^1 \cup M^2 \cup M^3 = \left\{M_1; M_2 \ldots M_d; M_{d+1}; M_{d+2} \ldots M_f; M_{f+1}; M_{f+2} \ldots M_N\right\} \quad (4)$$

*Step 7*. Normalize global VASMA weights $M'_n$

$$M'_n = \frac{M_n}{\sum_{n=1}^{N} M_n}, n = 1, 2, \ldots N. \quad (5)$$

All of the data collection and processing steps required to employ the VASMA-L methodology for the survey-based preferences elicitation process are shown in Figure 1.

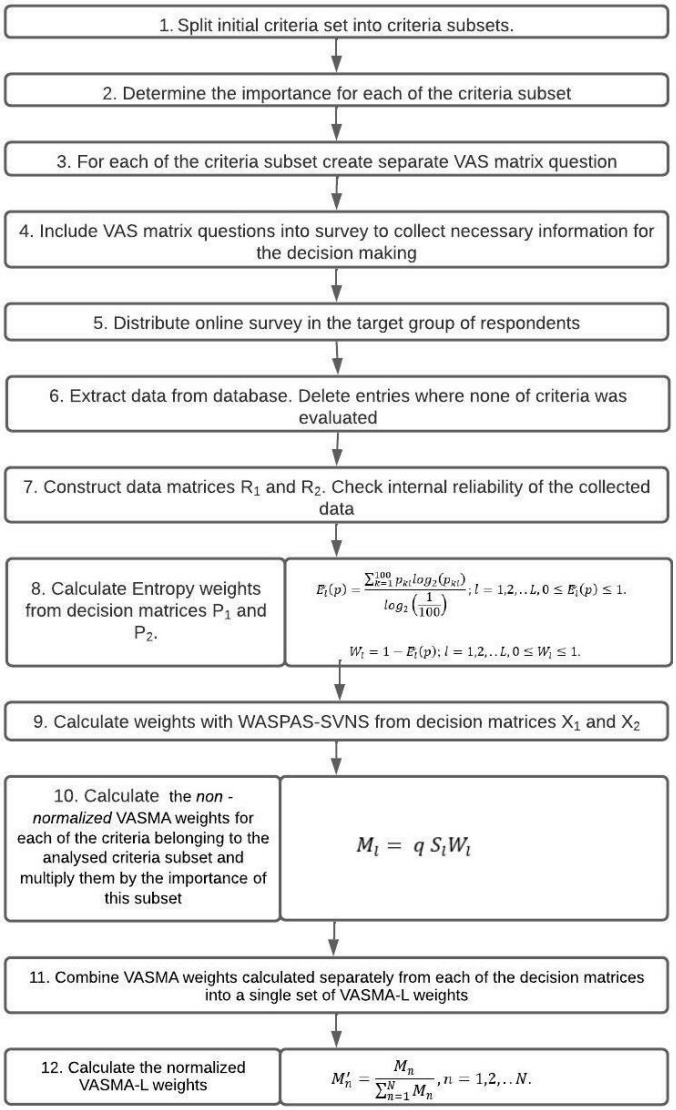


**Figure 1.** VASMA-L methodology suitable for the survey-based criteria weighting case when the large criteria sets should be assessed.

### 3.2. Data

Initially, the data was collected from various literature to collect all relevant success factors for blockchain-based crowdfunding. All found success factors were summarized in Table 1. Some success factors were merged due to their similarity. The final success factor list of the 18 most important success factors was used in the survey of the target group of respondents. Moreover, success factors were split into two groups according to their relevance to the specific crowdfunding type. According to the literature, we grouped six success factors that fit both financial and blockchain-based crowdfunding types. For the second success factor group, we took success factors that specifically fit blockchain-based crowdfunding, 12 success factors in total. The split should be done due to the fact that it is hard for respondents to evaluate all 18 success factors at once, and all criteria items should fit in one screen without the necessity of scrolling (Baušys et al. 2021; Lescauskiene et al. 2020). The final groups of success factors are given in Tables 2 and 3. These two lists of success factors will be used in survey matrix questions, and they perfectly fit onto one screen: a computer desktop or a mobile device (Toepoel et al. 2009).

**Table 2.** The adjusted final success factors list for financial and blockchain-based crowdfunding.

| Success Factor | Financial and Blockchain-Based Crowdfunding |
|---|---|
| industry | x |
| location | x |
| team size | x |
| social network | x |
| early investments | x |
| share of retained equity/token | x |

**Table 3.** The adjusted final success factors list for blockchain-based crowdfunding.

| Success Factor | Blockchain-Based Crowdfunding |
|---|---|
| Tokens allow contributors to access a specific service (or to share profits) | x |
| Using Ethereum | x |
| Number of tokens issued | x |
| ICO Bonus/discounts | x |
| KYC/Pre-registration | x |
| Presale | x |
| Accepting multiple currencies (digital and Fiat) | x |
| Well-connected and loyal CEO | x |
| Presence on GitHub | x |
| Average analyst rating | x |
| White paper availability, content, and multi-language | x |
| The code source is available | x |

It is planned to combine results from both groups to find out the importance of specific success factors for the whole success factor group.

### 3.3. Blockchain-Based Crowdfunding Campaign Criteria Evaluation Based on VASMA-L Methodology

Blockchain-based crowdfunding and cryptocurrencies have become novel and fascinating opportunities for investors worldwide. An increasing number of such crowdfunding campaigns have attracted specific attention from investors. However, it is unclear how to find the best blockchain-based crowdfunding campaigns to invest in. Since a high variety of criteria impact the decision to invest, the best option would be to ask the blockchain investors what criteria they consider the most important. Therefore, an eight-question survey was created for the target group of respondents. Two VAS matrices were placed

as the third and fifth questions, where respondents were asked to indicate the importance of specific factors when selecting a blockchain-based crowdfunding campaign to invest in. Six and twelve criteria (eighteen in total) adapted from the analysis were presented in VAS matrices.

Overall, 36 expert individuals answered the online survey. Two respondents were removed in the data cleaning phase, as one was marked as an outlier, and the other did not evaluate very many factors. The demographic profile of respondents is given in Table 4, and the proof of expert knowledge is revealed in Table 5.

**Table 4.** Demographic profile of survey respondents.

| Category | % |
|---|---|
| Male | 74% |
| Female | 24% |
| I don't want to disclose it | 3% |
| <24 | 6% |
| 25–30 | 29% |
| 31–35 | 15% |
| 36–40 | 18% |
| 41–50 | 24% |
| >51 | 9% |
| Secondary | 6% |
| Professional | 3% |
| Bachelor | 38% |
| Masters | 41% |
| Doctor | 12% |

**Table 5.** Expert respondents' knowledge of blockchain-based crowdfunding.

| Variable | Answer | % |
|---|---|---|
| Do you know what blockchain-based crowdfunding is? | Yes | 100% |
| | No | 0% |
| Have you ever invested in blockchain-based crowdfunding campaigns? | Yes | 91% |
| | No | 9% |

The demographic profile of respondents (Table 4) shows that the blockchain-based crowdfunding investors are mainly males (74%) aged from 25 to 30 years old. Moreover, these investors have high levels of education, such as bachelor's or master's degrees. When considering the knowledge about blockchain-based crowdfunding (Table 5), all respondents knew what blockchain-based crowdfunding is. Additionally, 91% of respondents had tried at least once to invest in blockchain-based crowdfunding campaigns. Finally, they were asked to mention some blockchain-based crowdfunding platforms if they know of any. The most popular platform Tecra Space was mentioned four times, three platforms (Bitfund, Coinlist, and Kickstarter) were mentioned two times, and four platforms (Revolut, Binance, Crypto.com, and Huobi) were mentioned once.

### *3.4. Data Extraction*

Since there were two success criteria groups, the data were collected from two VAS matrices and automatically transformed to the data matrices $R_1$ and $R_2$, where columns characterize the set of criteria, and rows represent the respondent's ID (Table 6). Values with $r_{nl} = 0$ were considered as cases with non-response values.

**Table 6.** Criteria evaluation converted from VAS matrices to data matrices $R_1$ and $R_2$.

| ID | C11 | C12 | C13 | C14 | C15 | C16 | CR1 | CR2 | CR3 | CR4 | CR5 | CR6 | CR7 | CR8 | CR9 | CR10 | CR11 | CR12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 82 | 60 | 33 | 74 | 86 | 57 | 77 | 66 | 29 | 40 | 88 | 68 | 94 | 23 | 62 | 77 | 88 | 69 |
| 2 | 68 | 25 | 40 | 79 | 70 | 61 | 50 | 60 | 52 | 50 | 40 | 50 | 89 | 83 | 54 | 50 | 70 | 50 |
| 3 | 62 | 31 | 18 | 13 | 45 | 75 | 59 | 27 | 69 | 63 | 73 | 28 | 15 | 70 | 43 | 59 | 40 | 60 |
| 4 | 77 | 40 | 36 | 37 | 70 | 83 | 66 | 57 | 81 | 68 | 20 | 52 | 21 | 69 | 33 | 40 | 21 | 69 |
| 5 | 82 | 39 | 32 | 41 | 64 | 41 | 84 | 63 | 79 | 68 | 64 | 72 | 68 | 63 | 34 | 33 | 38 | 64 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 30 | 71 | 28 | 30 | 30 | 38 | 71 | 68 | 36 | 71 | 30 | 34 | 77 | 25 | 75 | 26 | 30 | 32 | 66 |
| 31 | 71 | 34 | 30 | 28 | 31 | 63 | 70 | 32 | 66 | 74 | 32 | 72 | 35 | 72 | 36 | 71 | 41 | 73 |
| 32 | 67 | 29 | 28 | 31 | 29 | 72 | 68 | 25 | 66 | 34 | 30 | 72 | 35 | 78 | 32 | 71 | 28 | 70 |
| 33 | 67 | 31 | 29 | 29 | 28 | 62 | 71 | 36 | 69 | 31 | 24 | 78 | 33 | 67 | 37 | 30 | 27 | 72 |
| 34 | 90 | 39 | 68 | 85 | 57 | 19 | 85 | 71 | 21 | 58 | 33 | 13 | 94 | 84 | 68 | 77 | 58 | 37 |

Data descriptive statistics from VAS matrices were found using one of the statistical software packages and are presented in Table 7. As given, the factors were evaluated by all 34 respondents that are analyzed in this study.

**Table 7.** Descriptive statistics of selected factors from the survey.

| No | Factor | Mean | Median | SD | Count |
|---|---|---|---|---|---|
| C11 | Industry | 68.71 | 68 | 7.93 | 34 |
| C12 | Location | 35.44 | 35 | 7.68 | 34 |
| C13 | Team size | 33.82 | 32 | 8.07 | 34 |
| C14 | Social network | 38.18 | 33 | 15.61 | 34 |
| C15 | Early investments | 47.12 | 36 | 18.96 | 34 |
| C16 | Share of retained equity/token | 67.65 | 72 | 15.20 | 34 |
| CR1 | Tokens allow contributors to access a specific service (or to share profits) | 67.18 | 67.5 | 7.06 | 34 |
| CR2 | Using Ethereum | 40.59 | 37 | 12.85 | 34 |
| CR3 | Number of tokens issued | 65.56 | 67 | 11.63 | 34 |
| CR4 | ICO Bonus/discounts | 57.35 | 66 | 16.56 | 34 |
| CR5 | KYC/Pre-registration | 37.91 | 35 | 14.16 | 34 |
| CR6 | Presale | 64.53 | 68 | 13.88 | 34 |
| CR7 | Accepting multiple currencies (digital and Fiat) | 40.82 | 35 | 19.13 | 34 |
| CR8 | Well-connected and loyal CEO | 65.47 | 68 | 11.81 | 34 |
| CR9 | Presence on GitHub | 35.35 | 33.5 | 9.62 | 34 |
| CR10 | Average analyst rating | 38.35 | 32.5 | 14.93 | 34 |
| CR11 | White paper availability, content, and multi-language | 34.91 | 31.5 | 13.29 | 34 |
| CR12 | The code source is available | 66.06 | 69 | 13.35 | 34 |

Despite the fact that all respondents evaluated all the factors, the reliability of the data was checked. Here, Cronbach's alpha was used to control the internal reliability of the collected data. The total Cronbach's alpha reliability coefficient was 0.8071. This means that the total internal reliability of the collected data is very high. Normally, it is considered to have reliable data if Cronbach's alpha is 0.70 or above.

## 4. Results

Calculation of the entropy, the WASPAS-SVNS, and VASMA-L weights: Entropy weights describe the objective part of the VASMA weights. To calculate entropy weights, first, decision matrices P1 and P2 should be built from data matrices $R_1$ and $R_2$. The detailed description and matrix P construction and entropy weights calculation are provided in Lescauskiene et al. (2020).

The final measures of entropy weights and their ranks are shown in Tables 8 and 9.

**Table 8.** Entropy weights calculated from survey data for selected criteria from the first C1 criteria group.

| Entropy Weights | C11 | C12 | C13 | C14 | C15 | C16 |
|---|---|---|---|---|---|---|
| El (p) | 0.5981 | 0.5897 | 0.5804 | 0.5975 | 0.6048 | 0.6705 |
| $W_l$ | 0.4019 | 0.4103 | 0.4196 | 0.4025 | 0.3952 | 0.3295 |
| Rank | 4 | 2 | 1 | 3 | 5 | 6 |

**Table 9.** Entropy weights calculated from survey data for selected criteria from the second CR criteria group.

| Entropy Weights | CR1 | CR2 | CR3 | CR4 | CR5 | CR6 | CR7 | CR8 | CR9 | CR10 | CR11 | CR12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| El (p) | 0.6085 | 0.6495 | 0.5625 | 0.6368 | 0.6406 | 0.6440 | 0.5765 | 0.6373 | 0.5908 | 0.5841 | 0.6103 | 0.5943 |
| $W_l$ | 0.3915 | 0.3505 | 0.4375 | 0.3632 | 0.3594 | 0.3560 | 0.4235 | 0.3627 | 0.4092 | 0.4159 | 0.3897 | 0.4057 |
| Rank | 6 | 12 | 1 | 8 | 10 | 11 | 2 | 9 | 4 | 3 | 7 | 5 |

The subjective part of the VASMA weights is covered by the WASPAS-SVN multi-criteria decision-making approach. To calculate subjective weights, decision matrices X1 and X2 should be shaped from data matrices R1 and R2. An explanation of the matrix X construction and how variables are found is given in (Lescauskiene et al. 2020; Venslavienė et al. 2021).

The final estimates of WASPAS-SVNS weights and their ranks are given in Tables 10 and 11.

**Table 10.** WASPAS-SVNS weights calculated from survey data for selected criteria from the first C1 criteria group.

| WASPAS-SVNS Weights | C11 | C12 | C13 | C14 | C15 | C16 |
|---|---|---|---|---|---|---|
| S(Qi) | 0.7822 | 0.596 | 0.5863 | 0.6353 | 0.6893 | 0.7881 |
| Rank | 2 | 5 | 6 | 4 | 3 | 1 |

**Table 11.** WASPAS-SVNS weights calculated from survey data for selected criteria from the second CR criteria group.

| WASPAS-SVNS Weights | CR1 | CR2 | CR3 | CR4 | CR5 | CR6 | CR7 | CR8 | CR9 | CR10 | CR11 | CR12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S(Qi) | 0.7766 | 0.68 | 0.77 | 0.75 | 0.69 | 0.77 | 0.70 | 0.78 | 0.67 | 0.69 | 0.68 | 0.77 |
| Rank | 1 | 11 | 4 | 6 | 9 | 5 | 7 | 2 | 12 | 8 | 10 | 3 |

To calculate the global VASMA weights, the importance of each of the criteria sets C1 and CR was determined previously.

This is necessary since respondents assess criteria set C1 and CR through the VAS matrices presented in the separate webpage. While local VASMA weights are calculated from each matrix and allow for comparison of the criteria importance, comparing the individual parameters belonging to the separate criteria groups cannot be straightforward. To avoid inaccuracies and errors in the survey results, determination of the importance of the analyzed criteria sets is required to calculate global VASMA weights from VAS criteria matrices separately and not evaluate and compare criteria from different VAS matrices together.

Three experts representing the decision-makers, investors, and blockchain experts distantly participated in determining the importance of the criteria sets C1 and CR. Their assessments and the calculated DR weights are presented in Table 12.

**Table 12.** Importance of the criteria sets calculated by the direct rating (DR) methodology.

| Criteria Set | Expert1 | Expert2 | Expert2 | DR Weight | Normalized DR Weight | Criteria Set |
|---|---|---|---|---|---|---|
| C1 | 100 | 100 | 100 | 100 | 0.58 | C1 |
| CR | 80 | 60 | 75 | 72 | 0.42 | CR |

Finally, the global VASMA weights were calculated by applying Equations (3)–(5) of the VASMA-L methodology. The global VASMA weights and their ranks are presented in Table 13.

**Table 13.** Final VASMA-L weights and their ranks.

| No | Criteria | VASMA-L | Rank |
|---|---|---|---|
| C11 | Industry | 0.0779 | 1 |
| C12 | Location | 0.0606 | 6 |
| C13 | Team size | 0.0609 | 5 |
| C14 | Social network | 0.0633 | 4 |
| C15 | Early investments | 0.0675 | 2 |
| C16 | Share of retained equity/token | 0.0643 | 3 |
| CR1 | Tokens allow contributors to access a specific service (or to share profits) | 0.0542 | 9 |
| CR2 | Using Ethereum | 0.0425 | 18 |
| CR3 | Number of tokens issued | 0.0603 | 7 |
| CR4 | ICO Bonus/discounts | 0.0486 | 15 |
| CR5 | KYC/Pre-registration | 0.0442 | 17 |
| CR6 | Presale | 0.0491 | 13 |
| CR7 | Accepting multiple currencies (digital and Fiat) | 0.0530 | 10 |
| CR8 | Well-connected and loyal CEO | 0.0501 | 12 |
| CR9 | Presence on GitHub | 0.0487 | 14 |
| CR10 | Average analyst rating | 0.0514 | 11 |
| CR11 | White paper availability, content, and multi-language | 0.0474 | 16 |
| CR12 | The code source is available | 0.0560 | 8 |

The results show that the most important criteria are industry (C11), early investments (C15), and share of retained equity/token (C16), as they have the highest ranks and the highest VASMA-L weights (0.0779, 0.0675, and 0.0643). Moreover, these three criteria fall into the first criteria group. Conversely, the least important criteria are considered to be using Ethereum (CR2), KYC/pre-registration (CR5), and white paper availability, content, and multi-language (CR11), with VASMA-L weights 0.0425, 0.0442, and 0.0474, respectively.

## 5. Discussion

Using a visual analogue scale (VAS) matrix in online surveys, ranking information and importance value can be collected from a single question. In this study, the VAS matrix question was employed to identify the primary success factors that influence investors' decisions to invest in blockchain-based crowdfunding campaigns. The results demonstrated that participants were able to evaluate and compare factors more effectively when they were presented with all of them in a single question. The research drew data from both online survey responses and expert evaluations, with the online survey specifically targeting investors in blockchain-based crowdfunding campaigns.

Moreover, expert evaluation was applied before the survey due to the factor group split and the importance of every success factor sub-group of blockchain-based crowdfunding campaigns. The expert evaluation revealed that the first criteria subgroup, which is valid for both financial and blockchain-based crowdfunding, is more important than the second sub-criteria group. The three most important factors with the highest weights and ranks fall in the first sub-criteria group. However, it is common for one criteria group to be more important than the other, and survey organizers understand that. That is why

two separately assessed criteria sets should be joined carefully by employing the specific weights for the separate data sets. The modified weighting methodology VASMA-L helped compare two criteria groups together and evaluate them.

Results show that industry is the most important success factor to consider when selecting a blockchain-based crowdfunding campaign to invest in. Depending on the industry, specific crowdfunding campaigns might be more or less interesting to investors. This aligns with another study, where some campaign industry categories were chosen the most by investors (Venslavienė and Stankevičienė 2021). However, in blockchain-based crowdfunding, ICO valuations are not different across industries (Fisch 2019). Another very important success factor is early investments. Some studies find that early investments positively impact investment choices in both traditional and blockchain-based crowdfunding (Lee et al. 2019; Lukkarinen et al. 2016; Vulkan et al. 2016). The third most important success factor, according to the VASMA-L weighting method, was the share of retained equity/token. This is in line with the literature, where it is discussed that a share of retained equity or token might influence the success of both financial crowdfunding and blockchain-based crowdfunding (Cerchiello et al. 2019; Colombo et al. 2015; Mollick 2013; Vismara 2016; Zheng et al. 2017).

In conclusion, this research has identified three key success factors for investors in blockchain-based crowdfunding campaigns. These success criteria, as determined by the highest VASMA-L methodology rankings, can be helpful in guiding practical investment decisions in both financial and blockchain-based crowdfunding campaigns. Additionally, this modified methodology can be applied to various sets of criteria. The findings of this research also make a significant contribution to the academic literature on blockchain-based crowdfunding campaign success factors, as there are currently limited academic studies on this topic. The unique methodology utilized in this research, which selects success factors from diverse criteria groups for investment in crowdfunding campaigns, is a major strength of this study.

## 6. Limitations

There are some limitations in this research. Blockchain-based crowdfunding can be seen from project owner, platform, and investor perspectives. In this research, only the investor perspective was analyzed. Also, blockchain-based crowdfunding is a very specific investment form and is not very popular among investors. So, due to investors' lack of knowledge, there was a very limited number of respondents. Furthermore, next time, experts could evaluate different criteria subgroups differently or as equally important by giving another weight to criteria subgroups. It would be interesting to check how the results change due to the expert opinions on criteria subgroups.

## 7. Conclusions

Blockchain-based crowdfunding has become an important strategy to finance endeavors and economic phenomena. Blockchain-based crowdfunding, being a new form of crowdfunding, is usually characterized by ICOs (Initial Cryptoasset Offerings) and STOs (Security Token Offerings). Frequently, blockchain-based crowdfunding and traditional crowdfunding not only have lots of similarities but also have some differences as well. Consequently, the success factors that affect investments in traditional crowdfunding may not work for blockchain-based crowdfunding. It is crucial to know what success factors impact investors' decisions to invest in one or another crowdfunding model, successful blockchain-based fundraising campaigns, and their evaluation. Therefore, the most crucial issue is to choose the proper criteria that show the value of the specific blockchain-based crowdfunding campaign.

Intending to determine possible success factors for blockchain-based crowdfunding campaigns, we looked mainly at traditional crowdfunding literature and tried to compare it to blockchain-based crowdfunding. We were able to find some literature discussing blockchain-based crowdfunding success factors as well. According to the existing literature

on success factors of crowdfunding campaigns, they can be split into two groups: those valid for both traditional and blockchain-based crowdfunding models and those specific only to the blockchain-based crowdfunding model. Overall, six success factors are from the first group, and 15 success factors are only exceptional for blockchain-based crowdfunding. The whole list of 21 success factors was summarized in this research. Due to their similarity, the list of success factors was shortened to 18 success factors and applied to the survey. The list was split into two groups and used in two survey questions, as it is too hard for respondents to evaluate all of them at once.

This study used the modified VASMA-L weighting methodology to determine the main criteria affecting investors' decisions to invest in blockchain-based crowdfunding campaigns. Initially, the VASMA weighting methodology combines entropy weights and the WASPAS-SVNS multi-criteria decision-making method for one criteria group. Two criteria groups for evaluation were needed, so the VASMA-L methodology was introduced in this research. The results showed that industry, early investments, and share of retained equity/token impact investors' decisions the most when they choose to fund blockchain-based crowdfunding campaigns. These three factors fall into the group of factors that fit both traditional and blockchain-based crowdfunding models. This means that investors do not consider factors that are specific only to blockchain-based crowdfunding. Conversely, the least important criteria are using Ethereum, KYC/pre-registration, and white paper availability, content, and multi-language. They gained the lowest VASMA-L weights.

In the future, it would be interesting to apply this weighting methodology to more criteria groups or other aspects of blockchain-based crowdfunding, such as blockchain-based crowdfunding platforms, and see whether these criteria remain equally important.

**Author Contributions:** Conceptualization, S.V., J.S. and I.L.; methodology, S.V., J.S. and I.L.; software, S.V.; formal analysis, S.V., J.S. and I.L.; investigation, S.V., J.S. and I.L.; resources, S.V., J.S. and I.L.; writing—original draft preparation, S.V., J.S. and I.L.; writing—review and editing, S.V., J.S. and I.L.; visualization, S.V., J.S. and I.L. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

Adhami, Saman, Giancarlo Giudici, and Stefano Martinazzi. 2018. Why do businesses go crypto? An empirical analysis of initial coin offerings. *Journal of Economics and Business* 100: 64–75. [CrossRef]

Agrawal, Ajay, Christian Catalini, and Avi Goldfarb. 2015. Crowdfunding: Geography, Social Networks, and the Timing of Investment Decisions. *Journal of Economics and Management Strategy* 24: 253–74. [CrossRef]

Ahlers, Gerrit K. C., Douglas Cumming, Christina Günther, and Denis Schweizer. 2015. Signalling in Equity Crowdfunding. *Entrepreneurship: Theory and Practice* 39: 955–80. [CrossRef]

Amsden, Ryan, and Denis Schweizer. 2018. Are Blockchain Crowdsales the New "Gold Rush"? *Success Determinants of Initial Coin Offerings*. [CrossRef]

Baber, Hasnan. 2020. *Blockchain-Based Crowdfunding*. Singapore: Springer, pp. 117–30. [CrossRef]

Baležentis, Tomas. 2022. The Kernel-Based Comprehensive Aggregation PROMETHEE (PROMETHEE-KerCA) Method for Multi-Criteria Decision Making with Application to Policy Modelling. *Journal of International Studies* 15: 63–77.

Baušys, Romualdas, Birutė Juodagalvienė, Rytė Žiūrienė, Ina Pankrašovaitė, Juozas Kamarauskas, Ana Usovaitė, and Dovydas Gaižauskas. 2020. The residence plot selection model for family house in Vilnius by neutrosophic WASPAS method. *International Journal of Strategic Property Management* 24: 182–96. [CrossRef]

Bausys, Romualdas, Giruta Kazakeviciute-Januskeviciene, Fausto Cavallaro, and Ana Usovaite. 2020. Algorithm selection for edge detection in satellite images by neutrosophic WASPAS method. *Sustainability* 12: 548. [CrossRef]

Baušys, Romualdas, Ingrida Leščauskienė, and Rokas Semėnas. 2021. Participant trustworthiness analysis in the game-based urban planning processes by PROMETHEE-mGqNN approach. Infinite Study. *Journal of Civil Engineering and Management* 27: 427–40. [CrossRef]

Cai, Cynthia Weiyi. 2018. Disruption of financial intermediation by FinTech: A review on crowdfunding and blockchain. *Accounting and Finance* 58: 965–92. [CrossRef]

Cerchiello, Paolo, Paolo Tasca, and Anca Mirela Toma. 2019. ICO Success Drivers: A Textual and Statistical Analysis. *The Journal of Alternative Investments* 21: 13–25. [CrossRef]

Cho, Sarah. 2022. 4 Tips for Writing Matrix Questions with Examples | SurveyMonkey. Available online: https://www.surveymonkey.com/curiosity/4-tips-for-writing-matrix-questions/ (accessed on 25 May 2022).

Choo, Jaegul, Chandan K. Reddy, and Vineeth Rakesh. 2015. Project recommendation using heterogeneous traits in crowdfunding. *Proceedings of the International AAAI Conference on Web and Social Media* 9: 337–46.

Colombo, Massimo G., Chiara Franzoni, and Cristina Rossi-Lamastra. 2015. Internal social capital and the attraction of early contributions in crowdfunding. *Entrepreneurship: Theory and Practice* 39: 75–100. [CrossRef]

Davies, William E., and Emanuele Giovannetti. 2018. Signalling experience & reciprocity to temper asymmetric information in crowdfunding evidence from 10,000 projects. *Technological Forecasting and Social Change* 133: 118–31. [CrossRef]

de Filippi, Primavera. 2016. Blockchain-based crowdfunding: What impact on artistic production and art consumption? *Observatório Itaú Cultural* 19: 1–10. Available online: https://ssrn.com/abstract=2725373 (accessed on 25 May 2022).

Fanning, Kurt, and David P. Centers. 2016. Blockchain and Its Coming Impact on Financial Services. *Journal of Corporate Accounting & Finance* 27: 53–57. [CrossRef]

Fenu, Gianni, Lodovica Marchesi, Michele Marchesi, and Roberto Tonelli. 2018. The ICO phenomenon and its relationships with the Ethereum smart contract environment. Paper presented at the IWBOSE 2018–2018 IEEE 1st International Workshop on Blockchain Oriented Software Engineering, Campobasso, Italy, March 20; pp. 1–7. [CrossRef]

Fisch, Christian. 2019. Initial coin offerings (ICOs) to finance new ventures. *Journal of Business Venturing* 34: 1–22. [CrossRef]

Friesner, Daniel, Faith Valente, and Carl S. Bozman. 2016. Using Entropy-Based Information Theory to Evaluate Survey Research. *Journal of Marketing Development and Competitiveness* 10: 32–48.

Frydrych, Denis, Adam J. Bock, Tony Kinder, and Benjamin Koeck. 2014. Exploring entrepreneurial legitimacy in reward-based crowdfunding. *An International Journal of Entrepreneurial Finance* 16: 247–69. [CrossRef]

Ginevičius, Romualdas. 2023. Assessment of the Effectiveness of Investment in R&D by European Union Countries. *Amfiteatru Economic* 25: 251–64.

Hacker, Philipp, and Chris Thomale. 2018. Crypto-securities regulation: ICOs, token sales and cryptocurrencies under eu financial law. *European Company and Financial Law Review* 15: 645–96. [CrossRef]

Hartmann, Felix, Gloria Grottolo, Xiaofeng Wang, and Maria Ilaria Lunesu. 2019. Alternative Fundraising: Success Factors for Blockchain-Based vs Conventional Crowdfunding. Paper presented at the IWBOSE 2019—2019 IEEE 2nd International Workshop on Blockchain Oriented Software Engineering, Hangzhou, China, February 24; pp. 38–43. [CrossRef]

Jencova, Sylvia, Petra Vasanicova, Beata Gavurova, and Radovan Bacik. 2022. Financial Position of Companies Operating in Food Processing Industry of Slovakia by Using Multidimensional Scaling. *Economics & Sociology* 15: 253–73.

Kuppuswamy, Venkat, and Barry L. Bayus. 2013. Crowdfunding creative ideas: The dynamics of project backers in Kickstarter. *Journal of Chemical Information and Modelling* 53: 1689–99. [CrossRef]

Lee, Jongsub, Tao Li, and Donghwa Shin. 2019. The Wisdom of Crowds in FinTech: Evidence from Initial Coin Offerings. *SSRN Electronic Journal*. [CrossRef]

Lescauskiene, Ingrida, Romualdas Bausys, and Edmundas Kazimieras Zavadskas. 2020. VASMA Weighting: Survey-Based Criteria Weighting Methodology that Combines ENTROPY and WASPAS-SVNS to Reflect the Psychometric Features of the VAS Scales. *Symmetry* 12: 1641. [CrossRef]

Liao, Huchang, Jiayi Wang, Xingli Wu, Ruey-Huei Yeh, and Samer Khouri. 2022. A Multi-Criteria Decision-Making Model Based on Online Consumer Reviews Under Interval-Valued Probabilistic Linguistic Environment. *Transformations in Business & Economics* 21: 370–94.

Lukkarinen, Anna Jeffrey E. Teich, Hannele Wallenius, and Jyrki Wallenius. 2016. Success drivers of online equity crowdfunding campaigns. *Decision Support Systems* 87: 26–38. [CrossRef]

Lukyanova, Milyausha, Vitaliy Kovshov, Zalilova Zalilova, and Niaz Faizov. 2022. Modeling the Expansion of Agricultural Markets. *Montenegrin Journal of Economics* 18: 127–41. [CrossRef]

Mamonov, Stanislav, and Ross Malaga. 2018. Success factors in Title III equity crowdfunding in the United States. *Electronic Commerce Research and Applications* 27: 65–73. [CrossRef]

Mardani, Abbas, Mahyar Kamali Saraji, Arunodaya Raj Mishra, and Pratibha Rani. 2020. A novel extended approach under hesitant fuzzy sets to design a framework for assessing the key challenges of digital health interventions adoption during the COVID-19 outbreak. *Applied Soft Computing Journal* 96: 106613. [CrossRef]

Mollick, Ethan. 2013. The dynamics of crowdfunding: An exploratory study. *Journal of Business Venturing* 29: 1–16. [CrossRef]

Polzin, Friedemann, Helen Toxopeus, and Erik Stam. 2018. The wisdom of the crowd in funding: Information heterogeneity and social networks of crowdfunders. *Small Business Economics* 50: 251–73. [CrossRef]

Pompella, Maurizio, and Lorenzo Costantino. 2021. Financial Innovation and Technology after COVID-19: A few Directions for Policy Makers and Regulators in the View of Old and New Disruptors. *Ekonomika* 100: 40–62. [CrossRef]
Ralcheva, Aleksandrina, and Peter Roosenboom. 2016. On the Road to Success in Equity Crowdfunding. *SSRN Electronic Journal*. [CrossRef]
Reips, Ulf-Dietrich. 2002. Standards for Internet-Based Experimenting. *Experimental Psychology* 49: 243–56. [CrossRef] [PubMed]
Stam, Erik, and Veronique Schutjens. 2005. The Fragile Success of Team Start-Ups. Available online: https://www.econstor.eu/handle/10419/20007 (accessed on 25 May 2022).
Sung, Yao-Ting, and Jeng-Shin Wu. 2018. The Visual Analogue Scale for Rating, Ranking and Paired-Comparison (VAS-RRP): A new technique for psychological measurement. *Behaviour Research Methods* 50: 1694–715. [CrossRef] [PubMed]
Thorndike, Frances P., Per Carlbring, Frederick L. Smyth, Joshua C. Magee, Linda Gonder-Frederick, Lars-Göran Ost, and Lee M. Ritterband. 2009. Web-based measurement: Effect of completing single or multiple items per webpage. *Computers in Human Behavior* 25: 393–401. [CrossRef]
Toepoel, Vera, Marcel Das, and A. van Soest. 2009. Design of Web Questionnaires: The Effects of the Number of Items per Screen. *Field Methods* 21: 200–13. [CrossRef]
Venslavienė, Santautė, and Jelena Stankevičienė. 2021. Forecasting Crowdfunding Platform Revenues Using Arima Model. Paper presented at the International Scientific Conference "Contemporary Issues in Business, Management and Economics Engineering", Vilnius, Lithuania, May 13–14.
Venslavienė, Santautė, Jelena Stankevičienė, and A. Vaiciukevičiūtė. 2021. Assessment of Successful Drivers of Crowdfunding Projects Based on Visual Analogue Scale Matrix for Criteria Weighting Method. *Mathematics* 9: 1590. [CrossRef]
Vismara, Silvio. 2016. Equity Retention and Social Network Theory in Equity Crowdfunding. *Small Business Economics* 46: 579–90. [CrossRef]
Vulkan, Nir, Thomas Åstebro, and Manuel Fernandez Sierra. 2016. Equity crowdfunding: A new phenomena. *Journal of Business Venturing Insights* 5: 37–49. [CrossRef]
Zavadskas, Edmundas Kazimieras, Romualdas Bausys, and Ingrida Mazonaviciute. 2019. Safety evaluation methodology of urban public parks by multi-criteria decision making. *Landscape and Urban Planning* 189: 372–81. [CrossRef]
Zheng, Zibin, Shaoan Xie, Hongning Dai, Xiangping Chen, and Huaimin Wang. 2017. An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends. Paper presented at the 2017 IEEE 6th International Congress on Big Data, BigData Congress, Honolulu, HI, USA, June 25–30; pp. 557–64. [CrossRef]