

# “Initial Coin Offering (ICO) evaluation model”

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# INITIAL COIN OFFERING (ICO) EVALUATION MODEL

## Abstract

High-tech companies operating in the field of blockchain technology use the Initial Coin Offering (ICO) to raise start-up capital. It is a fairly new, non-standardized and poorly regulated way of collecting start-up funding that can bring high yields to investors in the short term, but investors also have to be ready to take on high risks. The purpose of this article is to define a decision model for the evaluation of ICO projects, which provides a systematic, transparent, methodological approach to making decisions on investing in them. For that purpose, the authors analyzed a number of factors, which directly or indirectly influence the successful implementation of ICO projects, and the researchers extracted the most important among them (model parameters). In order to build the decision model, used a qualitative method for the hierarchical multi-parameter evaluation of DEX, which using symbolic parameters and combining functions in the form of if-then rules ensures the most freely and flexible combining assessment parameters into a uniform model. In the article, the use of proposed decision model was tested in practice on multiple ICO processes. The article details the decision-making process in the case of CargoX, and also summarizes the results of the evaluation of ICOs Tokens.net, BitClave, Neuromation and WePower.

## Keywords

Initial Coin Offering (ICO), blockchain technology,  
multi-parameter, decision model

## JEL Classification

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## INTRODUCTION

Blockchain technology is one of the biggest innovations that have emerged on the Internet in recent years, as it enables the secure and reliable creation and exchange of digital assets (cryptocurrency), as well as the establishment of programmable contracts between clients. The latter was the reason for the emergence and rapid introduction of a completely new way of collecting start-up assets for technology companies, known as ICO (Initial Coin Offering). Prior to this, companies raised funds for their innovative projects in traditional ways, where venture capital funds and business angels played a major role, where the acquisition of capital in the case of companies without prior results and an inexperienced team is extremely difficult. ICO is defined as a poorly regulated process (method) of obtaining start-up funding for companies engaged in blockchain technology (Investopedia, 2018). Companies use the process of the Initial Coin Offering to circumvent a rigorous and precisely regulated process of raising capital demanded by institutional investors in the classical procedures of the public offering of shares. Under the ICO process, a certain percentage of crypto coins are sold to early investors in a project in return for a legal tender or other cryptocurrencies, usually for Bitcoin or Ether. The very concept of fundraising in the early stages is not new; its root is in the capital funding model (Ahlens et al., 2017), in which project supporters receive as a prize for early investing in the project a proportionate share of (share) capital and thus property rights in the company. The key difference lies in the (un) established rules, procedures and regula-

tions, and, lastly, the collected funds. Due to the innovations provided by the blockchain technology, the cost of the ICO process using the cryptocurrency exchange platforms is up to ten times cheaper than the costs of traditional IPO (Initial Public Offering) on the stock market.

The idea, which evolved into the ICO process as we know it today, was first offered by Willett (2012) in January 2012 in a White Paper entitled “The Second Bitcoin White Paper” and posted on the Bitcoin Talk forum. In it, he presented the idea that the existing Bitcoin network could serve as the basic protocol level over which to build new protocol levels (for new cryptocurrency) with their own rules. The first ICO was launched by Willett in 2013 under the name Mastercoin (now called Omni Layer) in which raised together USD 500,000 (Shin, 2017). Another important milestone in the field of ICO process is the creation of Ethereum company, which was founded by Vitalik Buterin at the end of 2013, and the company organized massive sales of Ether tokens and gained over USD 18 million of start-up capital. The Ethereum platform has brought important innovation, programmable smart contracts, among which the most widespread today is ERC-20, as it is widely used by start-up companies to raise new capital. The ERC-20 is a smart contract that allows to create new crypto tokens and execute a transaction with them (transfer a certain token value from one to another Ether wallet) (Howard, 2018).

In investing in ICO projects, we are faced with a number of opportunities, among which the following should be highlighted (InvestItIn, 2017, Medium, 2017, Steemit, 2017): it allows investment in prospective companies at an early stage of their development (they have a high potential for further growth), enables investment for all, including small investors, enables diversification of the portfolio of investments, the area is still very poorly regulated, most countries do not yet have rules for collecting taxes, and last but not least, investors are usually the first users of the crypto tokens, which means they are more closely connected with the company (are part of community, built to support the project).

On the other hand, when investing in ICO projects, there are significant risks that we must anticipate and avoid (InvestItIn, 2017, Medium, 2017, Steemit, 2017): frauds can exploit unregulated legislation in this area and launch false offers of crypto tokens, many amateur projects that due to poor idea, management, lack of knowledge of technology and other factors miserably fail, the long timeframe of project implementation increases the risk that the competitive product will prevail on the market, during the ICO process or later, hacker attacks may occur if not taken into account the relevant security standards, the world of cryptocurrencies is characterized by high volatility, which is especially true for the crypto tokens that have a fairly limited market capitalization at the beginning of its journey.

The extensive survey (news.bitcoin.com, 2018) showed that more than 46% of the projects for which the start-up funds in the ICO process in 2017 were collected collapsed. Some of them did not succeed at the stage of fundraising, since they did not achieve the minimum expected capitalization; in others, it was a classic fraud from the very beginning; or project activities after successful implementation of sales of crypto coins began to fade until the final abandonment of the project and withdrawal from all communication channels. Individual authors (Rosic, 2017) put even more radical thesis that about 99% of all ICO projects will go out of business in the future. This is due to a number of reasons, where, on the one hand, the companies themselves are guilty, because they focus more on getting funds than on the final product, and, on the other hand, also investors who unwisely invest in projects without a thorough analysis and reflection, all with the aim of maximizing and quick earnings.

## 1. LITERATURE REVIEW

In scientific literature, we can find only a few articles that directly or indirectly touch the evaluation of projects financed in ICO process. This is

certainly not surprising, since the area in question is fairly new and has only in the past two years generated greater interest among the general public, as well as the researchers themselves. Nevertheless, there can be some interesting findings, which were

established by various authors. Adhami, Giudici, and Martinazzi (2017) investigate the impact of various factors on the success of ICO process and prove that this is in correlation with the existence of at least a part of the code and the crypto tokens pre-sale, while the correlation with the existence of the white book, the type of tokens and sales bonuses was not confirmed. Yadav (2017), on the basis of interviews of several experts in the crypto field, identifies the following signals, important for investing in ICO process: the local environment (government) relationship to invest in blockchain technology projects, company history, liquidity of issued crypto tokens and their distribution, response of crypto communities on the project, promotional bonuses and paid ads, and the quality of information in the White Paper. In the field of researching signals for investing in companies, the interesting study (Hall & Hofer, 1993) combines the results of several preliminary studies and identifies as many as 28 factors, aggregated into six groups: investor requirements, characteristics of the proposal, characteristics of the company and the team, nature of the proposed transaction, economic environment of the industry and company's strategy.

On the other hand, on the web, there is an unwieldy number of organizations (Icorating, 2018) and individuals – experts (Icobench, 2018) who are engaged in predicting future projects and monitoring current offers of the crypto tokens in ICO process. Many of them also evaluate the ICO process, although there is no standardized set of criteria as a basis for accepting credible assessments. Evaluation is based on more or less defined assessment models, where in some cases they are clearly presented (in addition to the criteria, the formulae for combining partial assessments into the group and evaluation process itself are given); in others, the calculation method itself is not publicly available (the problem of the credibility of the estimates). Furthermore, some models use a smaller number of aspects, where each of the aspects includes a wider context (Kuznetsov, 2018), and some others are dividing the whole problem into more detail and making decisions based on ten and more parameters (Balina, 2018; Steemit, 2017a).

Evaluation models are also distinguished according to whether the criteria are equivalent (Icobench, 2018), or whether one of the variants is calcu-

lated using the weighted sum method, where the weights of individual parameters are set according to the preferences of the authors of the model. So, for example, some models define the maximum possible number of points for each criterion (Token Metrics, 2018), others use integer weights to weigh more important criteria (Icomarketdata, 2018), the third for weights set portions or percentages, where their total sum is 1 (IcoBazzar, 2018) or 100 (Cryptorated, 2018; IcoGuru, 2018). In addition to weighing the criteria, several models also differently value the assessments provided by individual experts, based on their experience and past work (Icobench, 2018). And last but not least, there are models that are not based on their own assessment criteria, but merely combine the estimates of other organizations, which deal with the evaluation of ICO process into a common result. Thus CoinFollow (2018) combines the overall result of eight estimates and CoinGecko (2018) as many as twenty estimates and, in both cases, all estimates are treated equally.

## 2. AIMS

The purpose of this article is to examine the factors that directly or indirectly influence the successful implementation of ICO projects, to build a multi-parameter hierarchical decision model for their evaluation and test the model in practice in a case study of a specific ICO process.

## 3. METHODS

In the previous section, the described models for evaluation ICO process are classified as linearly structured decision models that are characterized by the fact that all parameters are defined on the same level. Some of them have grouped parameters, which indicate a hierarchical arrangement, with the weights still being defined only at the lowest level of the model. From this, the biggest defects of linear methods arise, namely, the limitation to decision problems with a small number of parameters, since people are only able to handle only a limited set of parameters at the same time, on average, only seven (Bohanec, 2006). The limitation is solved using a hierarchical model, where the parameters are arranged in several levels or a

tree. The tree leaves represent the input parameters of the valuation model and the hubs are derived parameters, with the root of the tree being the main output parameter, which gives the final assessment of a particular alternative.

Methods for hierarchical multi-parameter evaluation are divided into quantitative (AHP, MAUT type, etc.) and qualitative (DRSA, DEX, etc.). For quantitative methods, the parameters (input and derived) are continuous (numerical) variables and the aggregation functions are a balanced sum. Qualitative methods, on the other hand, use symbolic parameters with the required value stocks, and the combining functions are defined as tables with the rules if-then. A typical representative of the latter is DEX method (Decision EXpert) (Bohanec & Rajkovič, 1990), which at the conceptual level combines two approaches: several parametric decision analysis (MCDA) (Bohanec, 2013) and expert systems. From the MCDA, DEX borrowed the idea of evaluating alternative decisions using a hierarchically structured model, and from expert systems concepts such as qualitative (symbolic) variables, if-then rules, managing uncertainty, high transparency of models and interpretation of evaluation results. The symbolic expression used by DEX is appropriate in decision-making situations, where we have parameters that are not of a numerical type, but the emphasis is on the subjective judgement in decision-making. DEX integration functions are also generally not linear (defined by the rules if-then), which allows them to more freely define them. However, we must be aware that the DEX method is less sensitive than comparable quantitative methods, which we have to take into account when we compare several alternatives (we can get a lot of the same assessments) (Bohanec, 2012).

We consider the evaluation of ICO process as a decisive problem, where the final result is a decision whether the project is trustworthy and whether we will be involved in it or not. It is not, therefore, a comparison of several different alternatives with the aim of selecting the best, but for a detailed analysis of a particular process in all aspects and criteria, which gives us a credible rating with a sufficiently high level of confidence. The decisive problem we are witnessing involves mostly qualitative parameters, decision-making is largely

subjective, and great flexibility (non-linearity) is recommended for combining functions, and the problem of low sensitivity is not relevant, since we do not compare more alternatives with each other. Due to all of these characteristics, the DEX method was selected as the basic tool in the creation of the model for evaluating ICO process.

The method of analysis gave us the basis for a detailed study of various aspects of the project and the determination of key criteria and measures for their evaluation. The classification of related criteria into common dimensions was carried out using the classification method, which allowed to construct a hierarchical decision tree using the bottom-up approach. In determining the parameters (basic and derived) of the decision model, we had to follow the requirements of fullness, non-redundancy, mutual independence and operability, which emphasize that all essential parameters were taken into account, that there are no unnecessary parameters, that each important decision factor is represented by only one parameter and, finally, that the model is useful in practice (Bohanec, 2012).

## 4. RESULTS

When building a decision model, we first face the challenge of defining the parameters that will be included and will represent the key evaluation criteria (at different levels). On the basis of a comprehensive review of professional literature and websites dealing with the assessment of ICO projects, we have compiled a set of the most commonly used evaluation criteria (Mulders, 2018; Icowatchlist, 2018; Van den Ende, 2017; Cryptosrus, 2017; Morris, 2018; Icrowd, 2017; Steemit, 2017a; Kuznecov, 2018; Cointelegraph, 2018; Stanley, 2018; Yadav, 2017; Rhodes, 2018; Sharma, 2018): the composition of the project group, the activity of the company on social networks and forums, the current stage in which the project is located, a community that supports the project and the frequency of occurrence in the media, the foreseen market capitalization, the format of the crypto tokens distribution, the quality of the white book evaluation, the quality of the program code, the presence of early investors, the industry, market niche, competitors and market characteristics, feedback from the project team, company business model, project



acceptance and ecosystem development, product or service safety and support for standards, user-friendliness and the usability, presence and quality of the technical documentation, the legal aspects and the environment in which the company operates, the founders of the project, their history and motivation.

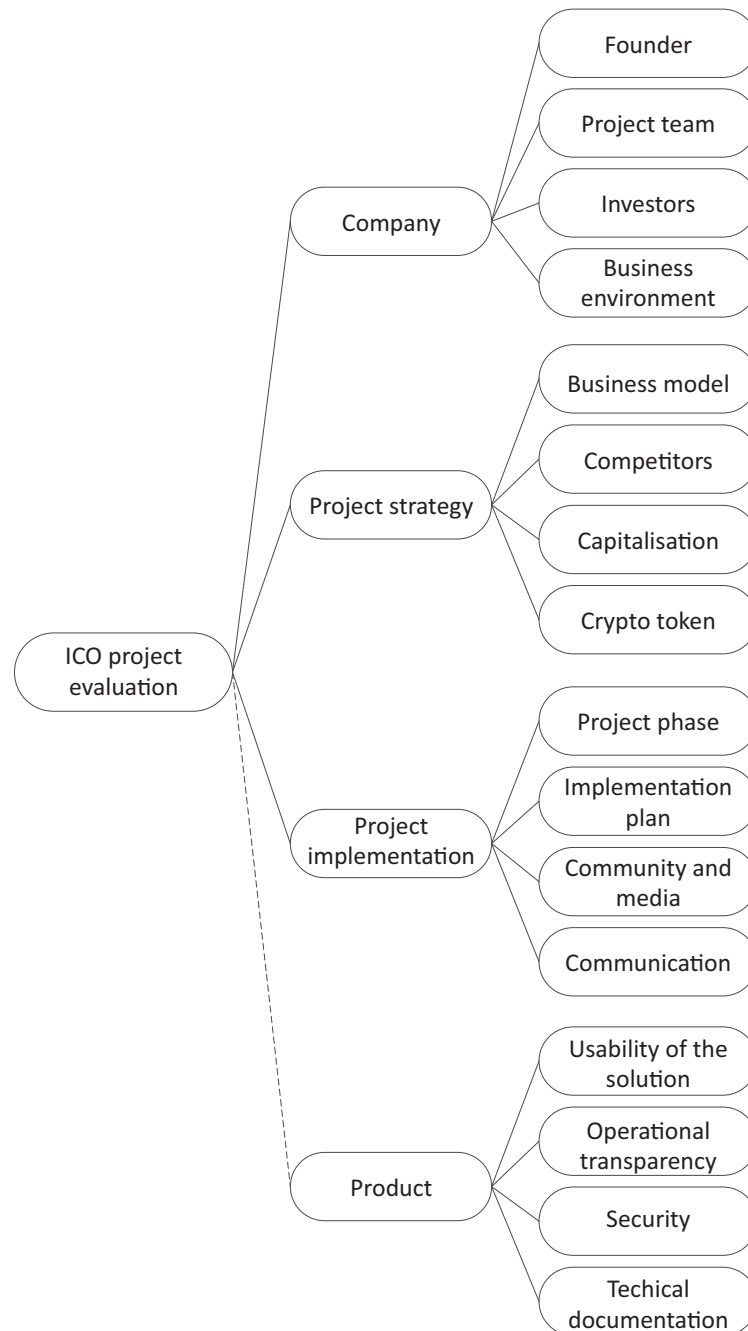
The structuring of the decision model was addressed using a bottom-up approach. After analyzing the dozens of evaluation criteria that were found in the literature, we first defined a set of mutually independent, non-redundant and operational parameters at the lowest level. These were then grouped into several groups in the classification process and performed the aggregating of related parameters into derived on higher hierarchical levels. At the same time, we took into account the recommendations of the authors of the DEX method (Bohanec, 2012), which dictate the defining of the order of the value stocks of parameters from the poor to good ones and the limits of the value stocks of parameters (we use only so many different values that we can distinguish with them between the radically different values of the observed alternative), whereby it should increase from subordinate to superordinate parameters.

The result of the process is a hierarchical decision model that at the highest level includes four dimensions: company, project strategy, project implementation and product (Figure 1). The first dimension (Table 1) includes criteria that give an assessment of the company as a whole from the point of view of its founders, investors, company history, employees and external partners (project team) and the business environment in which it operates. The second dimension (Table 2) allows to evaluate the project strategy for which the funds are collected in the ICO process from the business idea and business model, competitors, the envisaged volume of assets and to the consideration of the reasonableness of the use of the blockchain technology (purpose, applicability of the crypto tokens). The third dimension (Table 3) deals with the operational implementation of the project, identifying the existing situation and analyzing the suitability of the implementation plan, as well as assessing the support from the crypto community and the success of the company's communication with the interested public through different channels. The fourth dimension (Table 4) focuses on the product itself or the service that will result from the project,

in terms of technical perfection, operational transparency and prevention of security risks.

Parameters of the model are organized in three hierarchical levels (Figure 1). At the lowest level, every parameter includes three possible values (poor, medium and good). Parameters at the middle level include four values (poor, satisfactory, medium and good) and parameters at the root five values (poor, satisfactory, medium, good and excellent). Such an approach is in accordance with the recommendations of the DEX method in order to increase the value stocks by setting the parameter in the hierarchy. If-then rules were used to define the model combining functions (Figure 2 shows an example of this type of function at the highest level) and a free access tool for qualitative multi-parameter decision modelling DEXi was chosen to build the model.

Evaluating the dimension parameter "The product" is unfeasible in the time before or during the implementation of ICO process itself, because a tangible, verifiable product rarely exists, which means that we are very limited in obtaining credible information. The question was whether the dimension 'The product' should be retained at all in the model. Our work continued in the direction of developing a time-dependent decision model, where the dimensions are not evaluated simultaneously, but gradually according to the time frame in which the project is located. Thus, at the first contact with the new idea, we begin by assessing "The company" dimension, and "The project strategy" dimension and "The implementation of the project" dimension are evaluated after the publication of the White Paper and related documents, and all three are completed before the ICO process begins. Any information, which is already available to us at this stage for the dimension "The product", is welcome, but it is not decisive in our decision to invest. Only when a company starts to seriously develop a product, it offers us the opportunity to actively monitor this development and evaluate the work done according to the criteria of "The product" dimension (at the same time, of course, we monitor the project according to other criteria). This allows us that in case of deviations from expectations, we leave the project prematurely (with the sale of the acquired crypto tokens in the exchange), thus avoiding a possible bad scenario (project failure and loss of crypto tokens value) in a timely manner.



**Figure 1.** Model for evaluation of ICO projects

**Table 1.** Dimension “The company”

Criterion	Description – criteria
Founder	Who is the founder of the company, what is his past, does already have experience with similar projects, what is his motivation to enter into the crypto world?
Project team	What is the structure of the group, who are leading programmers, engineers, external consultants, finance and marketing specialists, promoters, do they have experience in blockchain technology, on which projects they collaborated in the past, their biographies are verifiable, they have arranged profiles on LinkedIn?
Investors	The company has the support of venture capital, cooperates with business angels, how it has so far acquired capital, who are the main investors?
Business environment	What is the legislation in which the company operates, what are the legal and a regulatory frameworks, what kind of relationship has the state to innovative companies and, in general, the blockchain technology?

**Table 2.** Dimension “The project strategy”

Criterion	Description – criteria
Business model	Is the business idea innovative, has the opportunity to realize in practice, what are the advantages and disadvantages of the business model, to whom the product or service will be intended?
Competitors	How intense is competition in the selected niche market, whether there is a market for a product, who are existing or potential competitors?
Capitalization	What is capitalization (unlimited or hard), how many tokens will be in circulation, how much funds shall be collected, how the tokens will be distributed, who and when will get them, the estimate of the required funds is realistic?
Crypto token	What is the purpose, usefulness of the crypto token, is the blockchain technology essential for the implementation of the project?

**Table 3.** Dimension “The project implementation”

Criterion	Description – criteria
Project phase	At what stage is the current project, are an only web site and a white book created, is there already a prototype, a product with limited functionality is issued, there may be a final product version, already used by large players (corporations, banks, etc.)?
Implementation plan	Is the project implementation plan appropriately distributed by stages, how are the milestones determined, whether they are realistically feasible, is the distribution of tokens related to the project phases?
Community and the media	The project supports a sufficiently broad community (how the project's ecosystem is developed), how strongly the community is active, how often it is mentioned in general and specialized media?
Communication	How active is the company on social networks, specialized forums in the field of crypto technologies, how responsive the company is to the questions, given answers are professional, how the communication works?

**Table 4.** Dimension “The product”

Criterion	Description – criteria
Usability of the solution	How useful a product or service will be, will it be user-friendly?
Operational transparency	Is the project open coded, the insight into the code is enabled (Github), what is the quality of the code (presence of comments, length of methods, modularity, etc.), how often the upgrades are performed?
Security	Whether the security audited of programming code is implemented, who are the auditors, which standards are taken into account?
Technical documentation	In addition to the White Paper, there is an in-depth technical documentation, which areas are described, what kind of technology will be used?

**Evaluation results**

Attribute	CargoX (CXO)	Tokens (DTR)	BitClave (CAT)	Neuromation (NTK)	WePower (WPR)
<b>ICO project evaluation</b>	good	<i>excellent</i>	medium	medium	<i>excellent</i>
<b>Company</b>	<i>good</i>	<i>good</i>	<i>good</i>	medium	<i>good</i>
Founder	<i>good</i>	<i>good</i>	medium	medium	<i>good</i>
Project team	<i>good</i>	<i>good</i>	<i>good</i>	<i>good</i>	<i>good</i>
Investors	<i>good</i>	<i>good</i>	<i>good</i>	medium	<i>good</i>
Business environment	<i>good</i>	<i>good</i>	<i>good</i>	medium	<i>good</i>
<b>Project strategy</b>	<i>good</i>	<i>good</i>	medium	<i>good</i>	<i>good</i>
Business model	<i>good</i>	<i>good</i>	medium	medium	<i>good</i>
Competitors	medium	medium	<i>poor</i>	<i>good</i>	medium
Capitalization	<i>good</i>	<i>good</i>	<i>good</i>	<i>good</i>	<i>good</i>
Crypto token	<i>good</i>	<i>good</i>	<i>good</i>	<i>good</i>	<i>good</i>
<b>Project implementation</b>	medium	<i>good</i>	medium	medium	<i>good</i>
Project phase	medium	medium	medium	medium	medium
Implementation plan	<i>good</i>	<i>good</i>	<i>good</i>	<i>good</i>	<i>good</i>
Community and media	medium	<i>good</i>	medium	medium	<i>good</i>
Communication	<i>good</i>	<i>good</i>	<i>good</i>	<i>good</i>	<i>good</i>

**Figure 2.** Part of the table of the decision rules of the parameter ICO project evaluation – three dimensions



## 5. DISCUSSION

The multi-parametric hierarchical decision model for the evaluation of ICO projects was checked using a case study method of multiple ICO processes carried out at the end of 2017 and the first half of 2018. The full presentation of all decision-making process exceeds the scope of this articles, so we decided to present five cases – one in detail (CargoX), whereas we only summarize the results for other cases (Tokens.net, BitClave, Neuromation and WePower). Below is a comprehensive presentation of the decision-making process in the case of CargoX, which includes a detailed explanation of evaluation of all basic criteria across the three dimensions of the model. This explains how the proposed model can be used in practice. For other four ICO processes, we present the evaluation results and the final decisions regarding investments, and, finally, analyze what was happening with the projects in the period after conclusion of start-up funding.

In January 2018, CargoX collected start-up funds for the project, which aims to develop a smart waybill of lading, based on blockchain technology, with which the company wants to change the logistics industry. The waybill is an important document in logistics, and with its owner is also proved the ownership of the cargo itself. Today waybills are being sent worldwide in many ways, in particular through various courier services using a variety of means of transportation, which is time-consuming and less than cheap, and there is always the risk of damage, destruction or theft during transportation. The goal of the company CargoX is to create decentralized and open protocols, tools and utilities for digital, secure sharing of documents of ownership of the shipments (CargoX, 2017).

Evaluation of the project by dimensions the company, the project strategy and the project implementation took place just before the ICO process was implemented at the beginning of 2018. First, a comprehensive overview of the documentation related to the project was carried out, including the associated White Papers and websites. Subsequently, online reviews were made of the opinions and assessments provided by individuals, experts for investing in ICO projects and compa-

nies, involved in promoting, evaluating and tracking such projects. The obtained information represented the entrance to a thorough analysis and evaluation, where we focused on the criteria defined in the model. In the end, a further critical reflection on all aspects of the CargoX project followed, which added a subjective note to the previous objective analysis (how much we believe in success). Below is a brief summary of the analysis by three dimensions, the results are presented in the DEXi tool table in Figure 3.

The founder and project manager are men with rich experience in logistics, in the past, they were already running the start-up company 45HC.com and were among the finalists for the Slovenian start-up award in 2017. The majority of the development team has already acquired knowledge of logistics within the aforementioned company, which is engaged in providing better services (via a modern web portal) for the transportation of containers, especially for smaller importers. During its existence (from 2015), the company 45HC.com was initially included in the Slovenian development accelerator ABC, and in 2016, the first venture capital was invested by several investors (business angels). The company operates in the framework of Slovenian legislation, which is in the field of blockchain technology and cryptocurrency still totally undefined; the FARS (Financial Administration of the Republic of Slovenia) has only been giving certain rules and guidelines in recent months on how to interpret the existing legislation. Regarding the regulations, things are still quite open and unclear, but the Government of the Republic of Slovenia is aware of the importance of new technology, which is reflected in the statements of ministers and high officials, and last but not least, the government is co-organizer of several meetings in this field. In “The company” dimension, we marked all the parameters with an estimation good.

The business idea is definitely innovative, it solves a specific problem, we do not perceive the technological risks regarding the realization. However, the project’s limit appears, since the product is intended for the narrower circle of users in the field of logistics, that is, it is a niche market and not a generally useful solution. Currently, CargoX has no direct competitors, but news has emerged that

company Maersk, one of the largest players in the shipping industry, plans in cooperation with IBM the development of certain services in blockchain technology. The capitalization of the project is solid and limited to USD 7 million, which is a fairly realistic estimate and should be sufficient to cover all project costs, of which far the largest share is the development followed by marketing and sales. The usefulness of the token itself is not controversial, since it allows quite a few services (transfer of ownership, payment, etc.), and the blockchain technology is the foundation on which the entire platform will be built. However, payment of services will also be enabled with classic payment methods, and not just with the crypto token CXO. In “The Company” dimension, we marked all the parameters except Competitors with an estimate good, and in the latter, we decided for estimate medium, as there is a risk that large logistics companies develop their own solutions, which in the future could endanger the market share of CargoX.

The project was only in the initial phase when the ICO process was carried out (the product or the working prototype did not exist), but in the past, the members of the project team already created and introduced some successful logistics solutions (e.g. portal 45HC.com), which represent good foundations for further work. The project is also appropriately defined with all stages of development; the first results will be visible already in the first quarter of 2018 (standardized protocols for digital document exchange), the test for validation of the concept on the prototype will be implemented with the partners in the second quarter, and the first real customers should start to use the platform in the second half of the year. CargoX is currently not supported by a very wide community, which is also understandable, as it targets a specific business area. In the future, more will need to be invested in the promotion, spreading the idea, communicating the results, so the wider crypto community will get enough positive information and make it easier to decide for investing (through the purchase of CXO tokens on the cryptocurrency exchange, when they will be available). The company regularly publishes news on various social networks, specialized forums, answers questions from the interested community, and uses digital advertising methods.

Dimension “The product”, as said, was not evaluated. At the time of the ICO process, the product was not yet available so that it was not possible to inspect the source code, and technical documentation also wasn’t available. GitHub contained only a repository with a code, which is intended to implement the ICO process (creating and working with the crypto token). There were some screen masks in the White Paper, which provided only a quick look at the application. It was impossible to assess the aspect of usability and security, but 45HC.com portal is exemplary designed and made and that is why we can assume that it is possible for CargoX to follow the same guidelines.

Figure 3 shows that the CargoX project received the estimation good in most dimension parameters of the company and “The project”, while the two dimension parameters of “The project” implementation were estimated medium, which led to the same estimation in the dimension itself. The ICO overall estimation has, according to the usefulness function (Figure 2), resulted in an estimation good, which means that the project is well-designed, taking into account previously presented risks and limitations (which is why it did not get an estimate excellent). If we are aware of them and are ready to take them, then the CargoX project is definitely suitable for investment.

The second ICO process evaluated is Tokens.net. This process represents the development of a next-generation cryptocurrency exchange platform, which will provide a trustworthy, transparent, secure and reliable exchange environment for ERC-20 type tokens and other crypto tokens that are yet to be developed (Tokens.net, 2017). All services will be payable using DTR tokens (Dynamic Trading Rights), which will also allow owners to vote on further development of the platform (e.g. listing of new cryptocurrencies). Evaluation using the decision model awarded the ICO Tokens.net process an Excellent grade (Figure 3), which is not surprising considering the evaluations of basic parameters. One of the main founders is Damian Merlak, an entrepreneur with a rich and successful background in cryptocurrency projects (he is the founder and until recently a co-owner of one of the largest cryptocurrency exchange platforms, primarily Bitcoin, Bistamp). The team is experienced, their business model is verifiable, the busi-

ness environment in Slovenia is favorable to new technologies, capitalization and crypto token are appropriately valued and designed, the plan is feasible, and the community is large (existing clients of Bitstamp platform). The only two criteria that did not receive the highest grade are Project phase (still in early stage) and Competitors, as the number of exchange platforms is constantly growing, resulting in increased competition. Nevertheless, the final Excellent grade indicates that this is an excellent opportunity for investment that should not be missed.

The concept of the BitClave project is to use blockchain technology to build new search engines, with the purpose of eliminating intermediaries in online advertising while ensuring a higher level of personal data security online (BitClave, 2017). The team consists of verifiable personnel with appropriate expertise, the company is located in the Silicone Valley, which provides an excellent business environment, and they received a lot of capital before the ICO process – primarily from larger investors, communication by the company is appropriate, capitalization is appropriate, the token has a clearly defined role, and the White Paper is well devised. The main problems that we observed during evaluation are related to difficulties in verifying the founder's background, questions regarding the appropriateness of the business model, relatively restricted community of potential users during the ICO implementation, and, last but not least, strong competition in the sector, with several companies controlling the global online advertising market (Google, Facebook, Amazon). The main question arising is whether or not enough users will give up existing habits in World Wide Web use and start using alternative ways of looking for information instead of using the tools provided by the aforementioned internet giants. And if that happens, how will these companies react to competition. Because of these risks, we evaluated Competitors category as Poor, with the end result Medium (Figure 3), which in our case does not support the decision to invest.

Neuromation is a platform that enables development of a synthetic data library by using computing power of private and commercial mining services providers (Neuromation, 2018). It is aimed at developing AI models for various industries

that use neuron networks. The main goal of the platform is to become a centre for AI services at an international level, combining global supply and demand in this specific IT segment. The ICO Neuromation process received mixed evaluations, and even though no criterion received the lowest grade, the final result did not exceed Medium (Figure) (insufficient for investments). We consider too many issues are unresolved, potential large investors are currently questionable, the business model is interesting, but its practical implementation remains questionable, the community is quite limited because the platform is intended for a limited circle of potential users (which will undoubtedly widen in the future). This is certainly a bold project that currently has no significant competition, but the question remains: Is it ahead of its time?

As the last, we present the evaluation of the ICO WePower process, whose purpose is to obtain funds for the development of green energy exchange platform, based on blockchain technology (WePower, 2018). The platform aims to bring together green energy buyers and sellers, enabling energy purchases at the lowest possible price. The project is led by a team of experienced professional, is supported by the Lithuanian government, strategic partnerships with several companies in electrical industry and cryptocurrencies have been established, the business model is not questionable, the project is feasible within the projected framework, capitalization is sufficient, the crypto token has a clear role, and the number of potential users is high (primarily focused on the territories of Europe and Australia). However, WePower is not a pioneer in this field, as there are quite a few more or less established competitors (Powerledger, Restart Energy Democracy, etc.). Nevertheless, we believe that there is sufficient room on the market. To summarize: all conditions for successful project implementation are met, as indicated by the final Excellent grade.

After six months of the ICOs processes implementation, we checked how our decision to invest or not in all five ICOs was successful (Figure 4). For this purpose, we conducted a comparative analysis of the CXO, DTR, CAT, NTK and WPR tokens with respect to the cryptocurrency with the largest market share, Bitcoin (BTC). The reason for choos-

48	>=medium	medium	satisfactory:medium	medium
49	>=medium	>=medium	satisfactory	medium
50	<b>good</b>	<=satisfactory	>=medium	medium
51	<b>good</b>	<=medium	medium	medium
52	<b>good</b>	satisfactory	>=satisfactory	medium
53	<b>good</b>	satisfactory:medium	satisfactory:medium	medium
54	<b>good</b>	>=satisfactory	satisfactory	medium
55	medium	<b>good</b>	<b>good</b>	good
56	<b>good</b>	medium	<b>good</b>	good
57	<b>good</b>	<b>good</b>	medium	good
58	<b>good</b>	<b>good</b>	<b>good</b>	<b>excellent</b>

**Figure 3.** Results of the evaluation of the ICOs Cargox, Tokens, BitClave, Neuromation and WePower

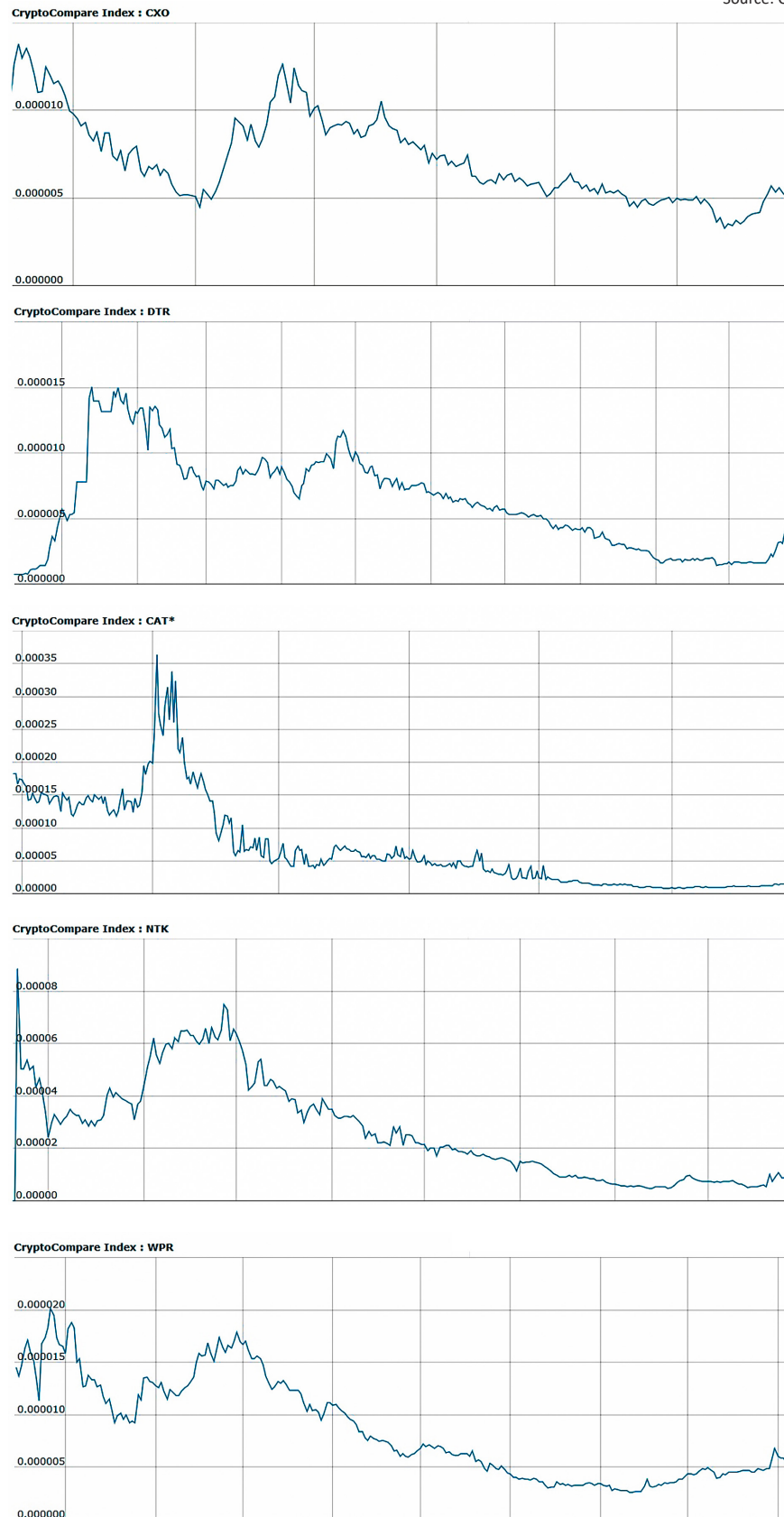
ing the BTC cryptocurrency and not for examples classic currencies such as the euro or the dollar is that our decisive problem does not involve deciding whether to invest in a cryptocurrency or not (here the answer is already basically affirmative), but in which crypto token that is or will be issued in the ICO process. With the decision to invest in the CXO, DTR and WPR tokens, we expect that in the medium or long term the value of the tokens will increase faster than the value of the BTC currency, otherwise, we will at a loss when selling. As shown in Figure 4, CXO has lost more than half of its value since the initial placement on the market, which at first glance indicates that the decision to invest in it was wrong, that is, the decision model did not properly perform its task, or our estimates were inadequate according to individual criteria.

It is important to highlight some of the circumstances that led to this. During the last 6 months, it was extremely unfavorable to invest in the cryptocurrency, for example, with BTC lost 70% of its value against the dollar, and other crypto tokens also 80% and more. Investors generally cooled, and the inflow of new assets could be reduced compared to the last quarter of 2017, as well as turnover. It is known that in case of a decline in the value of the BTC currency, the value of most of the remaining crypto tokens, especially those that are only in the development phase, is also significantly reduced, which is also the case for the CXO token. Figure 4 reveals another interesting point – the CXO value rose the most in April when CargoX presented a prototype solution and started the first tests with the selected business partner. During this period, for only a short time, the relative value of the CXO token has even exceeded the relative value of the BTC currency, which suggests that a similar sce-

nario may also be repeated in the future. If the prototype itself has caused a significant increase in the value of the token, we can assume that when the final version of the application is introduced into production, its value will explode, when it is accepted in logistic circles. We cannot give a final assessment of our decision at this time; we will have to wait for this at least until the end of the year. However, the project, unlike many others, is being developed in accordance with the plan, new versions are under construction, the company concludes new partnerships with customers, and so far we have no reason to worry because we are long-term investors.

If we take a further look at what was happening on the exchanges with the other four projects – or their crypto tokens (Figure 4) – we discover that project Tokens.net, which was evaluated as Excellent, performed excellently. Compared to BTC, the DTR token increased by over 200% in value, and can be categorized as a winner. The reason is that the Tokens.net platform went into production during the summer, meaning that the project was successfully completed. There are still the questions whether or not the exchange platform will manage to establish itself in the future, and what market share will it achieve (this will determine the future value of DTR token). Regarding the second project evaluated as Excellent, WePower, we can see that the WRP token lost 50% of its value compared to BTC, which is not encouraging at first glance. However, we have to point out that the project is being successfully implemented. The first products are currently under testing, and the platform is planned to go into production at the end of 2018. The findings regarding WePower apply also to CargoX – we have to wait at least another

Source: Cryptocompare (2018).



**Figure 4.** Comparison of CXO, DTR, CAT, NTK, WPR indices against BTC after six months of the ICOs processes implementation



half a year for the final evaluation. It all depends on how well the platform is accepted by potential users once it goes into production. The premise is solid, and the implementation will be the deciding factor. The exact opposite is true for BitClave and Neuromation, which we evaluated as Medium and advised against investments. Both tokens (NTK and CAT) lost between 80% and 90% of their value compared to BTC. Our reservations (expressed

with lower evaluations of basic parameters) proved to be justified. While we can still have some hope for Neuromation, with the current situation being the calm before the storm (successful project completion), we can notice that the BitClave project deviated far from its initial goals and is developing (very slowly) into a completely new, unconvincing direction. Investors have already given up, as indicated by the graph in Figure 4 (CAT).

## CONCLUSION

In the article, we defined a multi-parameter decision model for the evaluation of high-technology projects in the field of blockchain technology prior to the initial collection of funds in ICO process. The decision model provides a methodological, structured and analytical approach to making a decision to invest in a specific ICO process. In this way, we avoid an ad-hoc investment approach, characterized by unverified information, decisions based on subjective, emotional preferences, often as a result of the FOMO (Fear of Missing Opportunities) effect. A case study of five ICO projects from different fields, backgrounds, motivations and countries confirmed the appropriateness of using the model, but it should be emphasized that a more credible assessment can be made only by using it on large number ICO projects and over a long period of time (at least one year after the listing an individual ICO token on cryptocurrency exchange). For the beginning, it will be necessary to upgrade the existing case studies in a way that the re-evaluation of projects will be carried out using all four dimensions, including the dimension "The product". In this way, we will get a current assessment of the status of projects, which will be the basis for carrying out a comparative analysis with regard to predictions at the time of the ICO processes.

Further research will go towards improving the decision model (reconsideration of the included parameters, combining functions, etc.) and the preparation of a comprehensive methodology, which will include a more detailed decision-making process, the classification of ICO process according to the type of project and individual situation-adjusted versions of the decision model. We hope that this article, as well as our further work, will help to make better, more meaningful decisions for demanding and risky investments in ICO projects.

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