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THE ALGORITHM OF DIGITAL CONTRACT WITH FEATURES OF A SMART- CONTRACT ON A COMMODITY MARKET

Abstract. Today the smart-contract technology is no longer a theoretic process. A lot of financial transactions as well as legal obligations are being already transferred in blockchain environment all over the world daily. However, there are still indefinite perspectives such technology on commodity market applications what confirms a rare practical implementation of smart-contracts in real working projects on the market. For example, there is both lack of literature on using smart-contracts in the food supply chains and only a few even blockchain based projects working on agricultural market all over the world.

The content of the article consists of theoretical background of recent research in this domain and emphasises the overall likelihoods of developing such tool in future trading transactions. Also, the authors propose some most obvious algorithm of using smart-contract in commodity sectors and describe its basic features. In particular, for research purposes the algorithm of smart-contract might be modelled in Google Sheet environment with using typical coded scripts and mathematical formulas for sequential step-by-step execution in smart contract operations. The gained algorithm might be discussed and further developed in the following stages of scientific research to contribute its implementation on different sectors of an economy.

Keywords: smart-contract, blockchain in commodity market, algorithm of a smart-contract

1. INTRODUCTION

The problem statement. The well-known blockchain technologies do not occupy the expected major role in modern economy as they was imposed to in the beginning of creation especially in internet of things market (IoT) or commodity sector such as food industry.

Analysis of recent studies and publications. In the recent research [1] it was supposed that the advantage for using de-centralized energy supply market on smart-contracts could save 47.55% of price for kWt for industrial customers. Some experiment of energy peer-to-peer projects were already implemented [2]. Furthermore, according to other survey [3], the average contract efficiency in a food industry is able to rise by more than 50% with using smart-contracts. In addition, based on other research [4] the role of digital platforms in agriculture sector will be larger in future with the likelihood of more than 65%.

The article's goal. The dedicated research tries to conceptually formulate the features of blockchain based smart contract and propose to demonstrate its characteristics in demonstration, scientific or practical purposes with using simplified algorithms on the base of any other digital platforms such as Google Sheets or standard PHP web protocol with preserving key features of blockchain based smart-contract. Overall, the result is supposed to contribute in developing the blockchain technology and reveal the opportunities with alternative available approaches.

2. THE RESULTS AND DISCUSSION

2.1. *The overall scheme of trading platform on a commodity market*

The basic concept of trading interrelations through any digital intermediary occurs between market operators (on example raw material market), such as big-sized companies

(BSC), small-middle enterprises (SMEs), private entrepreneurships (PE) and their consumers in a following relation (Figure 1).

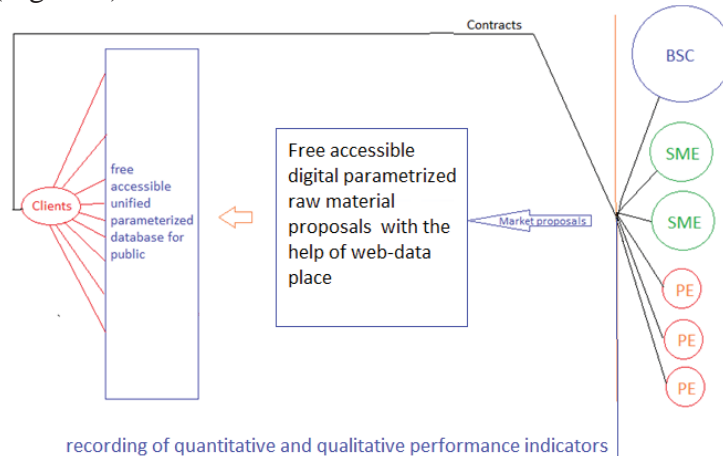


Figure 1. Schematic view of work via trading digital platform

2.2. The proposed algorithm of a typical smart-contract for commodity markets

The typical algorithm of smart-contract on blockchain, on the example of food sector, can function on following logic dependency (Figure 2).

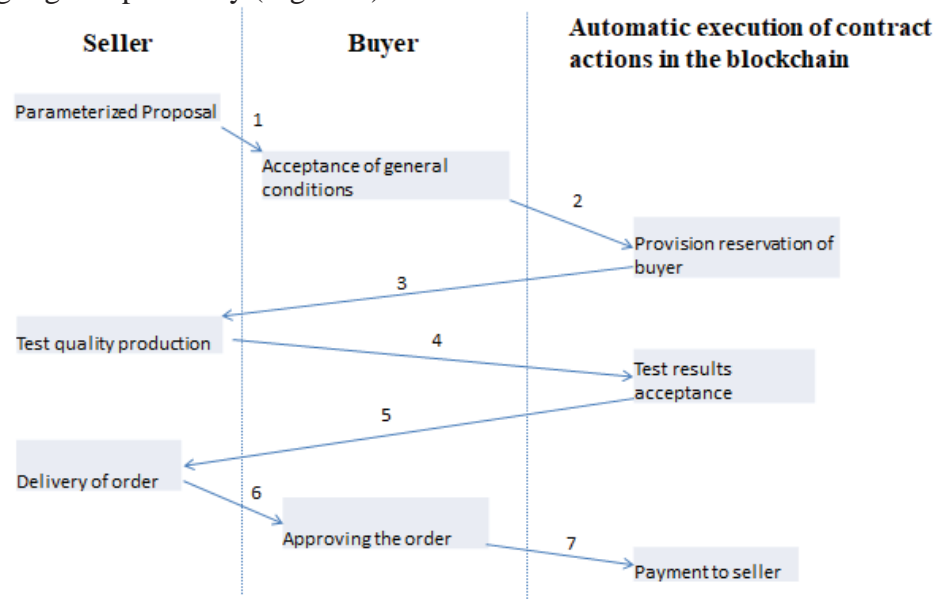


Figure 2. Schematic view of trading transaction 'seller-buyer' upon a smart-contract

2.3. The proposed key coding scripts and formulas for execution trading acts in modelled smart-contracts

The sequence of data changes in a smart-contract is achieved through a timeline scale. The timeline might be assured with two ways by reaction on dependable data along contract processing or current time dependency. For example, the first type of time forming is possible to code with Google Sheet Script as (here, for cells in column 3):

```
function onEdit(e) {
  var cell;
```

```
cell = e.range.getColumn() ; // we get a cell from the active column (we
work on the resulting column)
switch(cell)
{
case 3:
var DayDataRange, DayBallsRange, DayDataTime;

RangeInitialize(e,DayDataRange,DayBallsRange,DayDataTime,SumTimeDay);
break;
}}
```

The current time can be written as active function:

=NOW()

Also, the major smart-contract transactions can be formulated with 'If (yes or no)' function (Figure 3):

	B	C	D	E	F
1	<i>The algorithm of blockchain-based contract between two agents simulated on Google Sheet</i>				
2					
3	Signing the Contract:	Yes	20.6.19, 11:06		Product:
4	The contract succeeded:	Yes	20.6.19, 11:25		Contract value, Eur:
5	Contract duration:	00:18:16			

Figure 3. The basic information of the smart-contract between two parties

For example, some cells are processing with the simple mathematic formula coded in the cells. For example, the cell C3 is described as:

=IF(AND(C12="Yes",E12="Yes"),"Yes","No")

The cell C4 is written as:

=IF(AND(C31="yes",E31="yes"),"Yes",IF(OR(K16<>"",K21<>""),"No",""))

The united cell CD5 is coded as:

=IF(AND(C3="Yes",C4="No"),N1-D3,IF(AND(C3="Yes",C4="Yes"),D4-D3,""))

Upon the similar way there is possible to code any contract operation with guaranteed automated result.

CONCLUSIONS AND PROSPECTS FOR FURTHER RESEARCH

After analyzing the actual literature upon the issue we can state that blockchain based technologies are enough perspective in particular smart-contract in commodity sectors. Aggregated studies show that the approximately similar results about savings around by 50% and more on using blockchain technologies in different product markets. In addition, different operators on food market are quite positive on exploitation internet platforms in future.

As a result, the authors show the typical model of simple algorithms in alternative platform such as Google Sheets or classical PHP protocol with preservation key features of blockchain based smart contracts to use it in demonstration purposes for future research or launching pilot projects to test advantages of the technology in real practice.

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МОДЕРНІЗАЦІЯ РИНКІВ ПОХІДНИХ ФІНАНСОВИХ ІНСТРУМЕНТІВ УКРАЇНИ В УМОВАХ ТРАНСФОРМАЦІЇ МІЖНАРОДНОГО РЕГУЛЯТОРНОГО ЗАКОНОДАВСТВА

Анотація. Досліджені проблеми гармонізації і імплементації до національного законодавства нових нормалей міжнародних фінансових ринків і оновленого еталону відсоткової ставки. Сформульовані основні положення парадигмальної платформи трансформації національного ринку похідних фінансових інструментів (ПФІ)

Ключові слова: похідний фінансовий інструмент, кредитний ризик, еталон відсоткової ставки

1. ВСТУП

Розвинений ринок капіталу є ключовим фактором сталого розвитку реального сектору економіки, особливо в часи несприятливої світової економічної кон'юнктури. Ефективна мобілізація, розподіл, перерозподіл і використання фінансових ресурсів забезпечуються обігом на ринку капіталу широкого спектру фінансових інструментів, ПФІ з наявними ліквідними схемами торгівлі, погашення та виплати доходу для суб'єктів ринків капіталу. В умовах пришвидшеної трансформації світового фінансового ринку до нових післякризових стандартів визначення ціни капіталу, розвиток і гармонізація національного фінансового ринку, на даний час, визначає майбутню конкурентоспроможність економіки України [1] – [6].

Постановка проблеми. З 2010 року відбувається поетапна імплементація міжнародного законодавства щодо регулювання фінансових ринків, яке вже не використовує індикативну відсоткову ставку Libor у якості орієнтиру для короткострокових відсоткових ставок на міжбанківському ринку. З 2021 року, згідно власного рішення, FSA не буде її обчислювати і оприлюднювати. Ціноутворення кредитів, облігацій, інструментів фінансового ринку, ПФІ буде відбуватися за новим еталонним стандартом зі зміною інститутів і методів його обчислення [2], [6]. Актуальною є проблема вжиття заходів щодо переходу від Libor до нового еталонного стандарту відсоткової ставки.

Аналіз останніх досліджень і публікацій. У процесі трансформації фінансової системи законодавство щодо оцінювання кредитного ризику контрагента ПФІ транзакції грає вирішальну роль для визначення цін фінансових інструментів. Теоретичний фундамент використання кредитних експозицій учасників транзакцій з ПФІ було