

The Model of Crowdwork System Based on Blockchain Technology in the Creative Industry

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Abstract: With the increasing number of internet users, the opportunity for the crowdwork system will be wide open for freelancers looking for work and for job providers looking for freelancers for their projects, especially in the creative industry. Trust is an issue in the existing crowdwork system. The users still do not know each other, so malicious actions can arise between users. For example, a job provider rejects work results from workers, even though the work results meet the job provider's expectations. As a result, the job provider receives the results of the work for free. Blockchain technology is here to solve the problem of trust in the crowdwork system. This research produces a model of a crowdwork system based on blockchain technology. The initial stage for building a blockchain-based crowdwork model is determining the components. The seven components found are trust, autonomy, actor, user reputation, management, technology, and business processes. After the components are identified, the next step is to build a value chain model along with business processes based on the components identified in the previous stage. After the value chain is built, the next step is to build a prototype of the blockchain-based crowdwork model. This research is expected to be a reference for other researchers to describe the model design of crowdwork system based on blockchain technology, so that trust issues can be resolved in the crowdwork system.

Keywords: Crowdwork System, Blockchain Technology, Value Chain Model, Prototype Model, Creative Industry

Introduction

A crowd work system is an innovation that can be done with the use of the internet. Crowdwork has become a measurement for a company to leverage external sources/labor and domain experts in recent years (Tan *et al.*, 2019). In the past, companies preferred to find permanent employees for all jobs in their business units. Because of the problem of higher costs for human resources, companies began thinking of sending freelancers to work on projects. By hiring freelancers, companies do not need to spend on costs such as employee insurance, basic salary per month, and so on. The company only pays employees according to the skills and projects the worker is working on. Crowdwork systems accommodate the needs of companies related to human resources, especially freelancers.

Our current labor market is affected by massive changes such as digitalization, automation, and globalization, which have led to new ways to generate income. By utilizing crowd working, many people (called crowds/crowd workers) do individual work for a company in a way like freelancers who work alone. This new way of working is a recent development, but it has already gained acceptance, appreciation, and relevance quickly (Jäger *et al.*, 2019).

Freelancer is not a new thing in Indonesia. In the past times, there have been many Indonesian people who have worked as freelancers. They become translators, consultants, writers, and so on. The problem is the profession of freelancers in Indonesia used to be underestimated because they were less prestigious and did not provide sufficient social security such as insurance or pension. However, along with the development of technology, especially the

internet and social media, the profession of freelancers is now gaining recognition. More companies need freelance services, especially small family-based companies (Anggrian and Antonius, 2016).

Crowd work continues to grow very quickly. Crowd work utilizes internet technology to be able to get contributions from workers digitally based on demand (Howe, 2006). Crowd work has several related terminologies, including crowdsourcing, human computing, citizen science, open innovation, collective intelligence, participatory sensing, and so on. The terminology is used to describe the phenomenon to utilize crowds to complete work in various forms (Kittur, *et al.*, 2013; Ipeirotis, 2010; Howe, 2009; Erickson *et al.*, 2012; Anya, 2015; Cefkin *et al.*, 2014). Crowdwork is a job that is managed by the organization and is done by paid and distributed crowd workers in various locations. For this reason, relationships between people, organizations, technology, and work activities need to be managed well (Anya, 2015).

Trust is an important factor that needs to be considered in the crowd work system. In the crowd work system, the job provider does not know the worker (and vice versa). This is reinforced by research conducted by Sugiarto *et al.* (2020); Ye and Kankanhalli (2017) which state that trust plays an important role in crowd work, such as unfair assessments, and malicious clients who get the work of workers without making payments. According to Du and Mao (2018), problems in the crowd work process occur because of the uncertainty that affects the trust of the parties involved in the crowd work. The problem that occurs is the uncertainty about the parties who are invited to cooperate, especially regarding the integrity of each party. This happened because each party does not know each other. Other problems that occur include uncertainty about requirements that are constantly changing, where the client or job provider has difficulty expressing requirements clearly. According to Du and Mao (2018), crowd working makes it difficult to gain client trust because there has never been interaction or face-to-face before. Third-party institutional mechanisms should be in place for trust building. Intermediaries play a significant role in building trust. Klinger and Lease; Silberman, Irani, and Ross also stated the trust problem in the crowdwork system. The problem of trust in the employer occurs in the crowd work system, namely the employer does not make payments when the work has been completed by the crowd worker. When a worker collects his work through one of the crowd work platforms (such as amazon mechanical Turk), the workers have no guarantee that they will get paid for what they do. The website provides a statement that employers will only pay if they are satisfied with the results of the crowd workers' work. The worst thing that happens is that job providers with bad intentions post as many jobs as possible on the platform

with high pay to attract workers. Then, the employer accepts the results of the work and gives rejection of the results of the crowdworker's work, so that the workers receive the results of the work for free (free). The rejected work reduces the level of work acceptance of the workers. From previous research, it can be concluded that there is a trust gap among crowd work system users which is due to malicious users or users who do not know each other.

The transparent, immutable, and distributed nature of blockchain can be a solution to overcome the problem of trust in the crowd work system. As stated by De Filippi *et al.*, (2020), who said that blockchain technology emerged as a response to the trust crisis in the 2008 financial crisis. (Shala *et al.*, 2020) said that blockchain technology and trust are considered efficient measures. Therefore, blockchain-based crowd work can be used as a solution so that the problem of trust in the crowdwork system can be resolved. This research focuses on how the value chain in a blockchain-based crowdwork system can overcome the problem of trust.

This study discusses a model of crowd work systems using blockchain technology. The first step is to identify seven components of the blockchain-based crowd work system found through systematic literature review techniques, namely trust, business process, actor, management, user reputation, autonomy, and technology. These components then be combined with the value chain in the blockchain-based crowd-work system. The next step is building a prototype of a blockchain-based crowd work based on the value chain model that has been designed.

Materials and Methods

There are 4 activities carried out to produce model and prototype of blockchain-based crowdwork website system as drawn in Fig. 1.

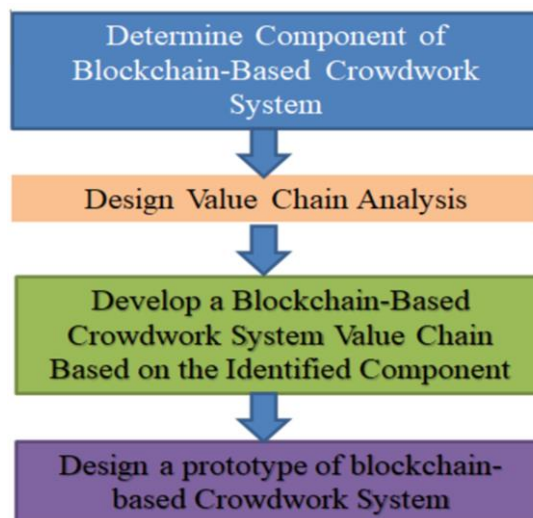


Fig. 1: Four activities to create Crowdwork system

Determine the Component of a Blockchain-Based Crowdwork System

The first thing that needs to be done is to determine the components in the blockchain-based crowdwork system which is done through a systematic literature review of papers from reputable journals. The literature review method used was adapted from Tranfield and Smart (2003). The stages to do a systematic literature review in this research are identifying the source of literature, keywords for searching the literature, criteria of inclusion and exclusion from identified paper, extracting the data and finally analyzing findings.

Design Value Chain Analysis

In designing and analyzing the value chain in a blockchain-based crowd work system, the steps that must be taken include determining the main processes, supporting processes, and strategic processes (Zamora, 2016). The theory of three value creation technologies and logic evolved into value configuration analysis, a method for analyzing firm-level competitive advantage based on value chain analysis. The value chain, the value shop, and the value network are all founded on value creation logic: The value chain focuses on converting inputs into products; the value shop focuses on addressing and resolving customer issues; and the value network focuses on connecting customers.

Develop a Blockchain-Based Crowdwork System Value Chain Based on the Identified Component

After the main components are identified and the value chain analysis is carried out, the next step is to map the main components to the analyzed value chain.

Design a Prototype of a Blockchain-Based Crowdwork System

To design a prototype, the initial stage analyzes the use case and database of the blockchain-based crowd work system. The next stage is designing the user interface. The blockchain used in this research is a private blockchain with Multichain products.

Theoretical Foundation

Blockchain

Blockchain has been documented for a variety of initiatives, including cryptocurrencies and Internet of Things (IoT) applications, among others (Ghiro *et al.*, 2021). As a result, the concept of blockchain appears hazy, as it's difficult to comprehend that the same technology can power applications with vastly diverse requirements and performance and security characteristics. In general, a blockchain can be thought of as a distributed system that includes:

- A Peer-to-Peer (P2P) network made up of all nodes that read or write transactions in the blockchain collaboratively and
- A consensus protocol is a set of regulations that all nodes agree on and implement, and which governs which and how new transactions can be added to the blockchain (Ghiro *et al.*, 2021)

Crowd Work

Crowdwork is a phenomenon of both the digital economy and the modern IT era. It has the potential to significantly alter the way businesses create value. Crowdworkers are not just single individuals but also organize themselves into formal or informal groups and organizations to collaborate on corresponding tasks (Durward *et al.*, 2016).

Trust

Trust-in-technology is a new field of study that examines trust in technology rather than trust in people. While previous research has discovered that trust in technology can predict important outcomes, little research has been conducted to investigate the impact of unmet trust in technology expectations on trusting intentions (Lankton and McKnight, 2013).

Value Chain

The concept of "value chain" was introduced by Porter (1985) to describe the full range of activities, which are required to bring a product or service from conception, through the different phases of production, distribution to consumers, and final disposal after use. As the product moves from one player in the chain to another, it is assumed to gain value (Hellin and Meijer, 2006). As such, the value chain can be used as a tool to disaggregate a business into major activities, thereby allowing the identification of sources of competitive advantage (Brown, 1997). This concept has, over the years, been the object of fast-growing literature in economics and management (Abecassis-Moedas, 2006). Value chain analysis has been employed to examine and evaluate entire industries and industry clusters, as well as specific systems within firms.

Component of Blockchain-Based Crowdwork System

Based on the results of the literature review, there are seven components of a blockchain-based crowd work system, namely.

Trust

Consumers' level of comfort, confidence, and security when utilizing technology is referred to as trust. In the case of blockchain technology adoption, trust is a critical component for maintaining a client connection. Due to its

decentralized storage of data records, blockchain can foster trust. The idea of blockchain is that it eliminates the need for traditional intermediaries to ensure trust and execute transactions (Gong *et al.*, 2021).

Autonomy

Crowd workers who are self-employed are referred to be autonomous. They are not employed by crowdsources and have complete control over when and where they labor (Durward *et al.*, 2020).

Actor

Blockchain applications that employ Smart Contracts to validate a variety of processes, such as individual properties, are used to define contractual agreements between internet participants, whether they are businesses or people (Chen and Zhu, 2017).

User Reputation

Many platforms use user reputation-based methods to prevent free-riding and fake reporting. Nonetheless, these solutions rely on users' desire to maintain a single identity on a site (Gong *et al.*, 2021).

Management

The coordination and administration of tasks to achieve a goal is referred to as management. Management may be exposed to organizational learning (Beer *et al.*, 2005).

Technology

Smart contracts on blockchains, as a complementary technology, provide a general-purpose programmable infrastructure for deploying and running these programs. Companies are able to automate the terms of the agreement by using smart contracts. Blockchain technology, a distributed peer-to-peer linked structure, could be used to solve the problem of maintaining transaction order and avoiding double spending (Casino *et al.*, 2019).

Business Process

Each business process instance could be kept on the blockchain and the workflow routing could be handled by a smart contract, streamlining and automating intra organizational processes and lowering costs. Since the applications and transactions on blockchains were introduced, they have caused significant disruptions to traditional business processes (Weber *et al.*, 2016).

Results

The value chain is analyzed in 3 processes, namely the main process, the supporting process, and the strategic process. The main process is divided into 2 crowd work

categories, namely the commission-based project and contest categories.

Main Process

As seen in Fig. 2, there are 8 main activities on the commission-based project crowd work system.

Registration Process

There are 2 roles of users: Workers and job providers. Workers register themselves on the platform. Worker registration is divided into 2 categories:

- Free member : Do not get benefits like paid members
- Paid member : Get benefits, such as promoted worker and so on

Job providers register themselves on the platform. Job provider registration is divided into 2 categories:

- Free member : Do not get benefits like paid members
- Paid member: Get benefits, such as the "workers recommendation" feature

Workers and job providers have the same user ID. Workers can play the role of job provider (or vice versa) by pressing the "change role" button. To become a paid member, the member must make a payment. Payment is made through a payment gateway and blockchain system.

Upload Portfolio

Registered workers can upload their work portfolios. Registered job providers can post projects. When the job provider finishes posting the project, the "worker recommendation" feature appears. This feature can only be accessed by job providers with paid members. Job providers can select workers from the list of workers that appears in the employee recommendation feature.

Search and Select Portfolio

After the employee has entered the portfolio, the job provider can perform a portfolio search/selection (if you want to search/select workers manually/independently). Job providers select workers according to the desired portfolio. The job provider can communicate with the worker he wants through the chat feature. Workers can also search for projects that have been posted by job providers. Job providers select workers who apply for projects. If interested in the portfolio of workers who apply for the project, the job provider can communicate further through the chat feature.

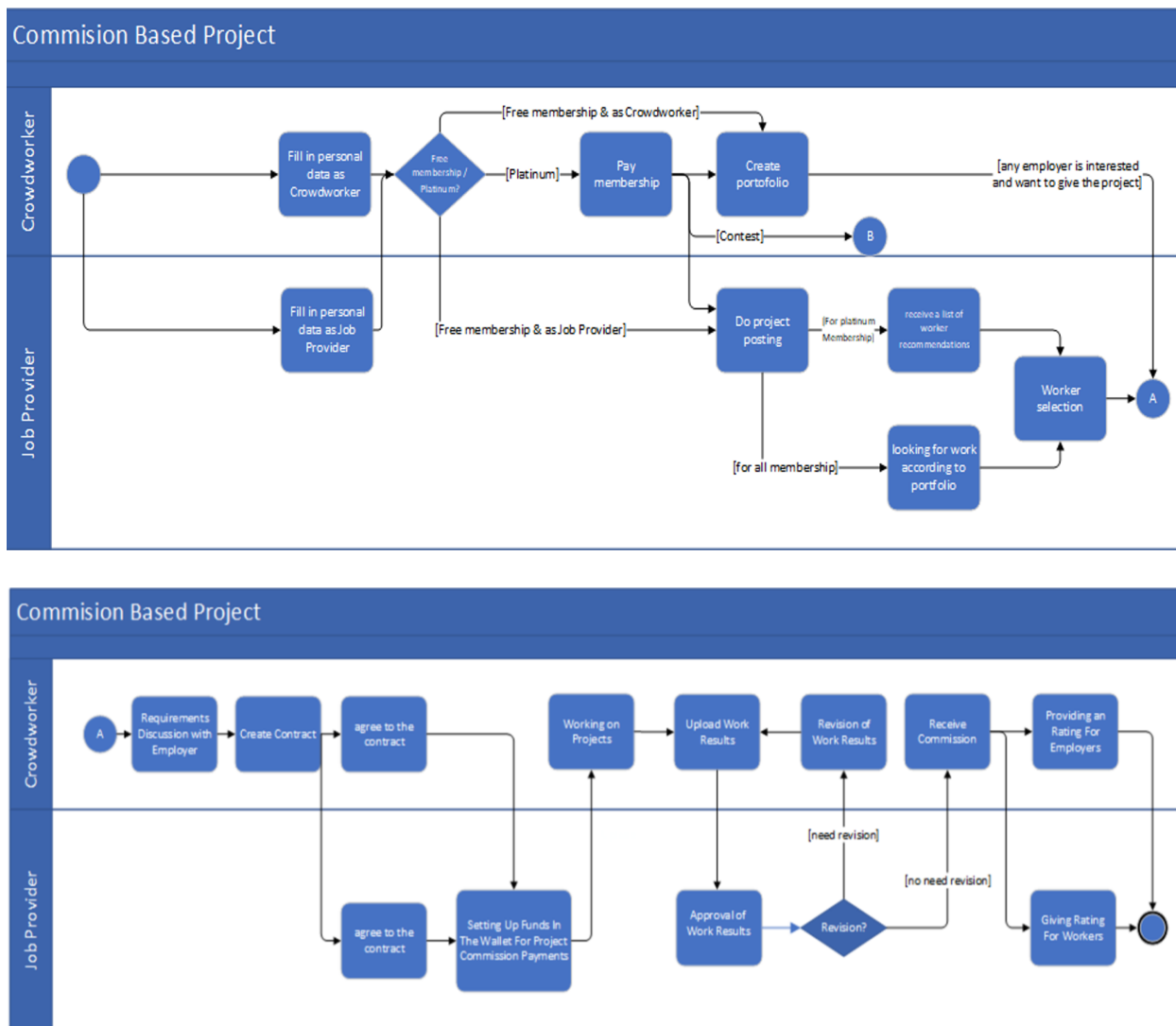


Fig. 2: Main business process of commission-based project Crowdwork system

Requirement Discussion and Agreement

Job providers discuss project requirements with workers via the chat feature. After the requirements discussion is completed, the worker/job provider makes a contract according to the results of the requirements discussion agreement. The details of the contract data are as follows:

- a . Job provider requirements details
- b . Timeline
- c . Cost (project fee and service fee)
- d . Revision amount

After the contract is discussed and made, the worker and the job provider approve the contract. Both parties must approve and then proceed to the next process.

Commission Payment

After the contract is approved by both parties (employee and job provider), the job provider pays according to the price stated in the contract. Workers must prepare funds in the wallet for the project fee. The funds in the wallet are held by the system until the work is completed by the worker and the work product is approved by the job provider.

Job Processing and Delivery

Workers start working on the project according to the requirements stated in the contract. After the work is done, the worker uploads the results of the work on the web. If the work is an image/pdf/text/ppt, then it can only be read-only and there is a watermark. If the result of the work is an application, then what is

displayed is a demo video of the application that has been watermarked and is also read-only.

Job Approval

After the worker uploads his work, the job provider approves the work result from the worker. Job providers can approve or reject. If the work is rejected by the job provider, the worker can improve the work results up to the specified number of revisions.

Commission Payment Acceptance

After the results of the project work have been approved by the job provider, the funds held in the wallet are forwarded to the workers as project commission payments.

As seen in Fig. 3, there are 7 main activities on the contest-based project crowdwork system.

Create Contest

After the job provider registers on the platform, the job provider can create or post contests on the web that contain descriptions of requirements, prizes, and deadlines for collecting work results.

Payment of Prize to the Platform

Job providers make prize payments to the system by holding funds, meaning that the funds in the wallet are held for prizes that are given to the winner.

Join the Contest

Workers join the contest by pressing the "join contest" button. After that, the detailed requirements of the contest appear.

Workers then work on the results of the work in accordance with the contest requirements. After completion of work, workers submit their work products to the web. If the work results are in the form of images/pdf/text/ppt, then the work can only be read-only and there is a watermark in the work. If the result of the work is an application, then what is displayed is a demo video of the application that has been watermarked and is read-only.

Work Assessment

The job provider evaluates the work of the worker's product. This assessment is in the form of a number 0-10 and the job provider can provide written comments regarding his work.

Performance Assessment

After the work is completed and commission payments are continued, the job provider can provide a rating in the form of a star rating and testimonials to employees regarding the results of their work. Employees can also provide star ratings and testimonials to the job

provider. This assessment is carried out in a two-way assessment. Each rating given is averaged and appears as the rating score of the worker/job provider. This score has an impact on the reputation of the worker/job provider.

Winner Announcement

The system provides recommendations to job providers regarding contest winners (as seen from the highest score). The point here is the system displays a list of contest participants/workers who got the highest score. The decision of the winner of the contest remains in the hands of the job provider.

Receiving Prizes

Winners get prizes according to the nominal money stated in the contest information. Prizes held by the system are passed on to the winning contestant/participant. Every contest must have a winner unless the contest is canceled with the reason "no participant submitted their work until the specified deadline". If the submission deadline is reached and there are no workers/participants who submit the contest, the job provider can extend the deadline or cancel the contest. If the contest is canceled because no one has entered the contest, the prize money held by the system is returned to the job provider.

Supporting Process

Information Technology (IT) Management

A solid IT management system undoubtedly carries out a strategy by facilitating IT as a Service (ITaaS). The chief information officer or chief technology officer is in charge of this operation. The IT management process's objectives are to raise the value of IT within the enterprise and to produce profits for the system. A system that is both effective and efficient is critical and technology must help to achieve this goal.

Human Resource Management (HRM)

HRM refers to a company's attempts to manage employees to improve their performance. When a firm employs a new employee, for example, it wants to locate someone who truly meets the company's requirements. This is likely because employees that fit into the company's culture and standards are more suited, more adaptive, and last longer than those who do not. Employees that are highly engaged are more productive and produce higher-quality work. That instance, if the employer has a system in place to ensure that employees are highly engaged with the company, it shows that he has correctly managed his workforce. HRM can play a role in this situation. Human Resources (HR) can provide management with tools, training, and administrative processes.

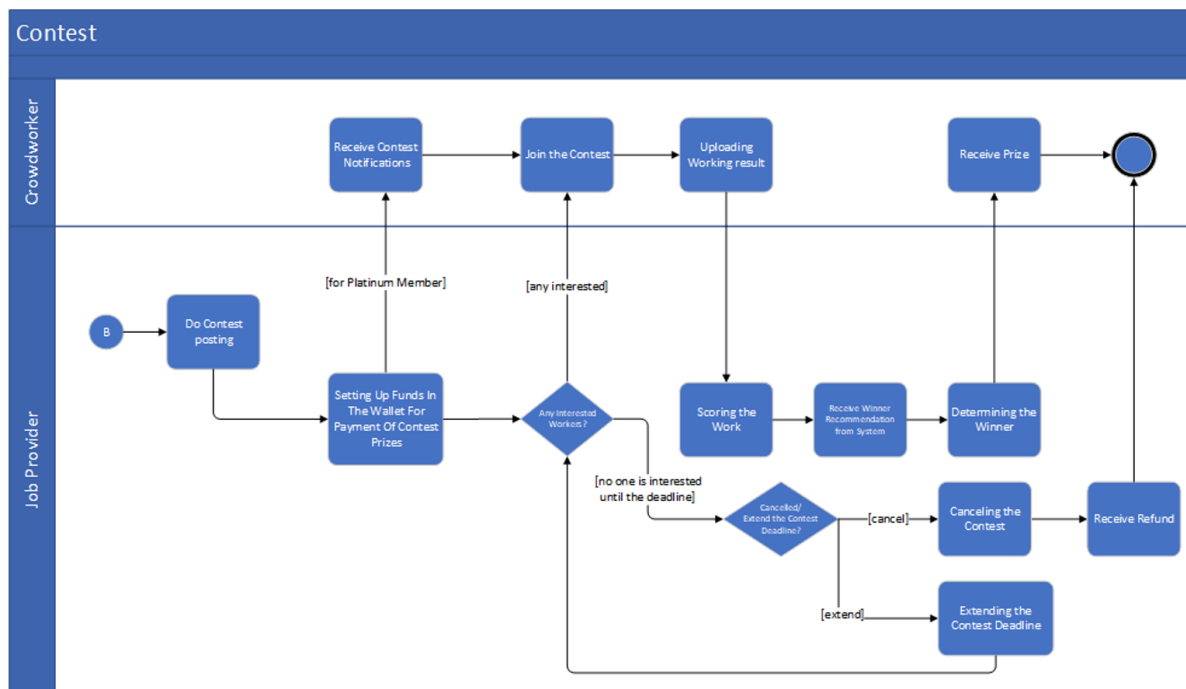


Fig. 3: Main business process of contest-based project Crowdwork system

Customer Relationship Management (CRM)

Customer relationship management is the process of dealing with customers and it usually entails the development, improvement, and maintenance of effective customer relationships. To better serve its consumers, the company handles information and builds a database about them. CRM systems are commonly used to support marketing, sales, and customer service.

General Affairs (GA)

GA oversees several aspects of the business's operations. GA is also in charge of various aspects of the company's acquisition of goods and services, as well as purchasing and asset maintenance.

Finance Management

Planning, budgeting, evaluating, administering, controlling, looking for, and storing sources of funds controlled by an organization or firm are all examples of financial management activities. Financial management activities in a firm regulate the major activities or company activities connected to obtaining working capital funding, using and allocating sources of finances, and managing company assets to fulfill company goals.

Strategic Process

- Identify vision and mission
- Define values and objectives
- Determine compliance and budgeting process

Value Chain of Blockchain-Based Crowdwork System Based on Identified Component

As seen in Fig. 4, actors in this value chain are workers and job providers. Workers and job providers are in their respective places so that they work with a high level of autonomy. The technology proposed in this value chain uses blockchain including its infrastructure (servers, blockchain cloud, and blockchain storage). The business process consists of main, supporting, and strategic processes. There is a relationship of trust between actors and the crowd work platform, especially in relation to running the business process. Between the main process and the strategic process, it needs to have good management, so that the business process can run well. Business processes and trust have an impact on user reputation.

Prototype Model of Crowdwork System

To develop a prototype design of a blockchain-based crowd work system, use case diagrams are made to determine the functional requirements of the application being developed. It can be seen in Fig. 5.

The RASCI Model was built to determine user access role for each functionality of the developed system. (R = Responsible, A = Accountable, S = Support, C = Consulted, I = Informed). The RASCI Model is described as seen in Table 1. There are 18 system functionalities. This system functionality is divided into 2 roles (job provider and worker) based on their responsibility.

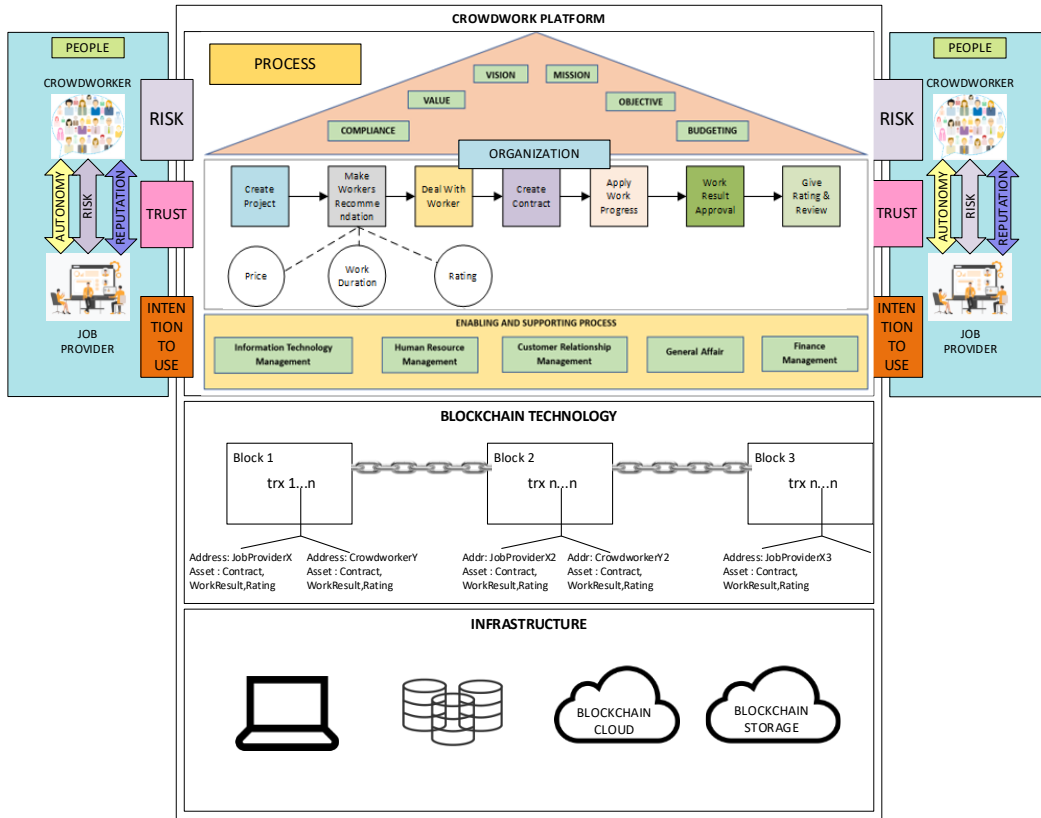


Fig. 4: Value chain of blockchain-based Crowdwork system

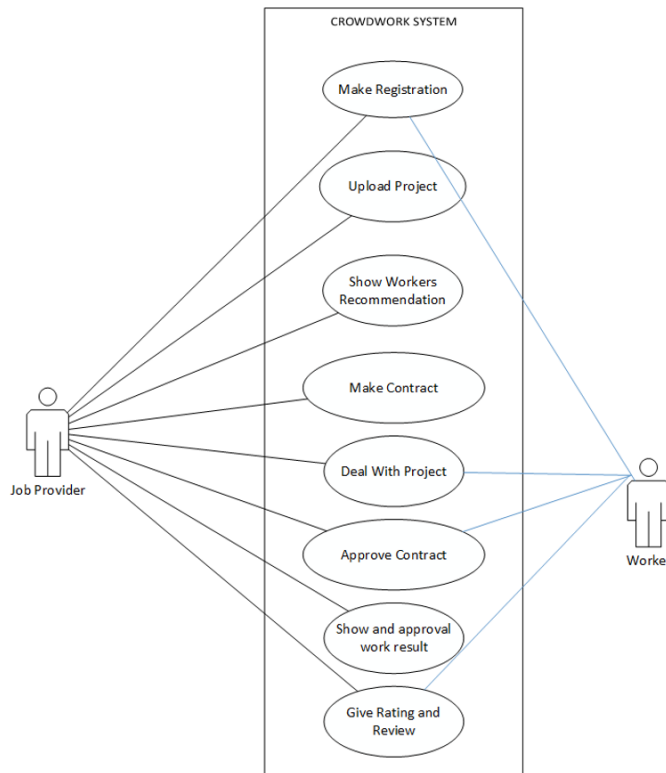


Fig. 5: Use case diagram of Crowdwork system

Table 1: RASCI model of Crowdwork system

	System functionality	Job Provider	Crowdworker
1	Make registration	R, I	R, I
2	Upload portfolio	I	R
3	Upload project	R	I
4	Search project		R, I
5	Show workers recommendation	I	
6	Search workers portfolio	R, I	
7	Discuss requirements	R, A, S, C, I	I
8	Deal with project	R, I	R, I
9	Make contract	R, A, S, C, I	A, S, C, I
10	Approve contract	R, A, S, C, I	R, A, S, C, I
11	Hold funds for project payment	R, I	
12	Submit work result	A, C, I	R
13	Make approval for work result	R	I
14	Receive project payment		R, I
15	Give rating and testimonial	R, I	R, I

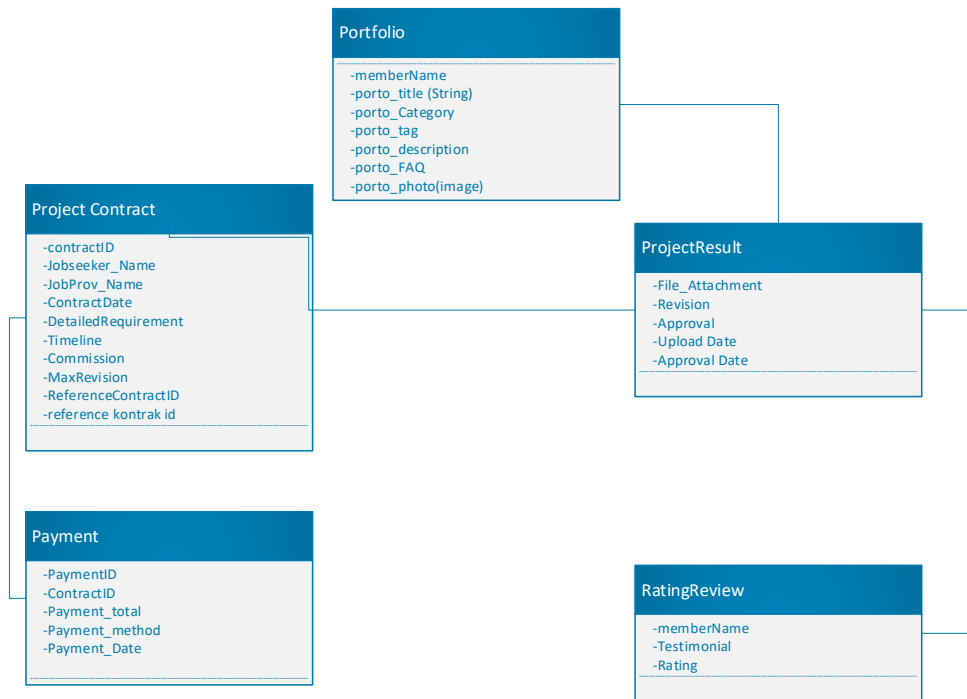


Fig. 6: Data as asset on blockchain for Crowdwork system

Database Design

The database design was also developed to determine the need for data that becomes an asset on the blockchain for the crowdwork system, including contracts, work results, payments, rating reviews, and portfolios. Figure 6 describes the database design of the proposed system. There are 5 blockchain assets in the system: Portfolio, project contract, project result, payment, and rating review. This blockchain-based crowd work system is also equipped with a recommender system, which is a system that provides recommendations for the best workers according to employer criteria. The recommendation

criteria are divided into 3 aspects, namely price, work duration, and worker rating.

Price Aspect

For example, the price range inputted by the job provider when creating the project: 2,000,000 - 3,000,000.

The minimum price is 2,000,000 and the maximum price is 3 million.

So, the difference between the ranges of each score is calculated by the formula = (maximum price - minimum price)/5.

The calculation is as follows (3,000,000 - 2,000,000)/5 = 200,000.

So for each score, the range is 200,000:

- Score 1: >2,800,000-3,000,000
- Score 2: >2,600,000-2,800,000
- Score 3: >2,400,000-2,600,000
- Score 4: >2,200,000-2,400,000
- Score 5: 2,000,000-2,200,000

Work Duration

For example, the employer expects the project to be completed within 20 days. Worker A able to complete the work within 20 days (so it has a difference of 0 days compared to the expected duration of the employer or equal to the expected duration).

Worker B able to complete the work within 15 days (so it has a difference of 5 days compared to the expected duration of the employer or 5 days earlier than expected).

Worker C able to complete the work within 25 days (so it has a difference of 10 days compared to the expected duration of the employer or 5 days longer than expected). The fastest difference in processing time is -5 days. The longest difference in processing time is 5 days.

The formula for calculating the range in each score is (the difference in the fastest duration the difference in the longest duration)/ 5, so the calculation is as follows = $((-5)-(5))/5 = -2$:

- Score 5: >-5 to -3
- Score 4: >-3 to -1
- Score 3: >-1 to 1
- Score 2: >1 to 3
- Score 1: >3 to 5

Employee Rating Aspect

The assessment of the worker's rating aspect is taken from the rating score of the worker stored in the system.

From the three scores on these three aspects, the average value was calculated. The highest average score is then compared between workers who apply for the project. The employee with the highest score is recommended. As shown in the image below, there is the word "Recommended" to the right of the Worker's name (as shown in Fig. 7).

Figure 8 describes a page on the crowdwork system portal that is used for tracing contract data, where users can check contract ownership according to the address of the owner of the contract number. Contracts can be made using the K-ddmmyyyy-xx coding rules, where dd is the date the contract was made, mm is the month the contract was made, yyyy is the 4-digit year the contract was made, and xx is the order number of the contract according to the date it was made.

Figure 9 is the asset data that appears in Multichain from the contracts made. There are some attributes stored in the contract data asset blockchain: quantity, address of job provider, address of worker, the start date of the contract, the end date of the contract, commission, maximum number of revisions, reference number of previous contract (if available), and contract file.

Payments in crowd work are made through a wallet which is also stored as an asset in the blockchain as shown in Fig. 10. When the contract has been agreed by both parties, the employer must provide funds in the wallet according to the contract agreement. The funds are held by a crowd work system. The number of work revisions also has a limit. When the results of the work have been approved by the employer, the funds are forwarded to the worker's wallet. This prevents malicious actions from the employer, where the employer still pays a certain amount of funds when he posts the project on the system.

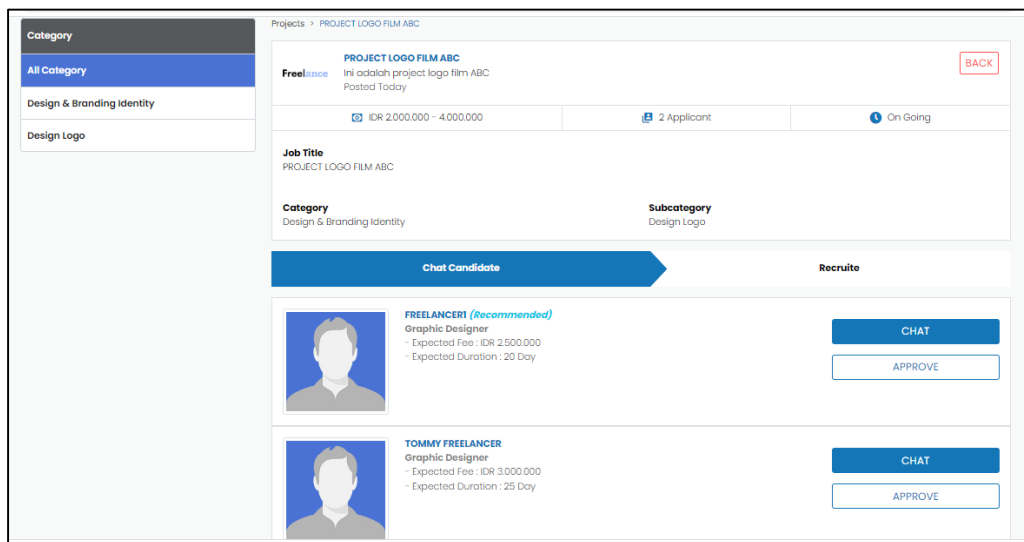


Fig. 7: Recommender system in Crowdwork system

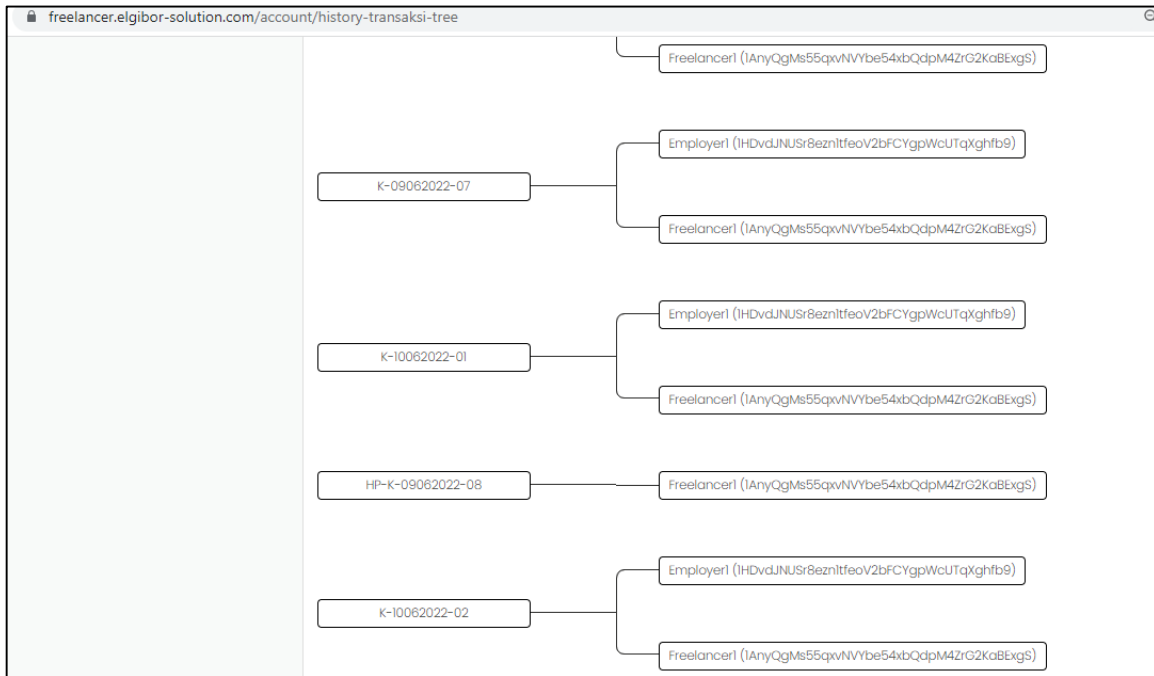


Fig. 8: Tracing contract asset data for Crowdfwork system

freelancer.elgibor-solution.com/multichain/?chain=default&page=issue	
Name	K-29092022-08
Quantity	2
Employer	Employer1(1HDvdJNUSr8ezn1tfeoV2bFCYgpWcUTqXghfb9)
Worker	Freelancer1(1AnyQgMs55qxvNVYbe54xbQdpM4ZrG2KaBE xgS)
StartDate	28-09-2022
EndDate	28-09-2022
Commission	2000000
MaxRevision	2
DetailedContract	Kontrak Freelancer1 Mouthless
Reference	K-29092022-07
files	file_hash: 3c61711578873ff0c961af24bf fae6e538f8fb20de4e20c697c 72c10cbf784af file_link: https://freelancer.elgibor-solution.com/storage/profile-data/2022092912324863351ff06fd37-Kontrak.pdf

Fig. 9: Blockchain of contract asset using multichain in Crowdfwork system

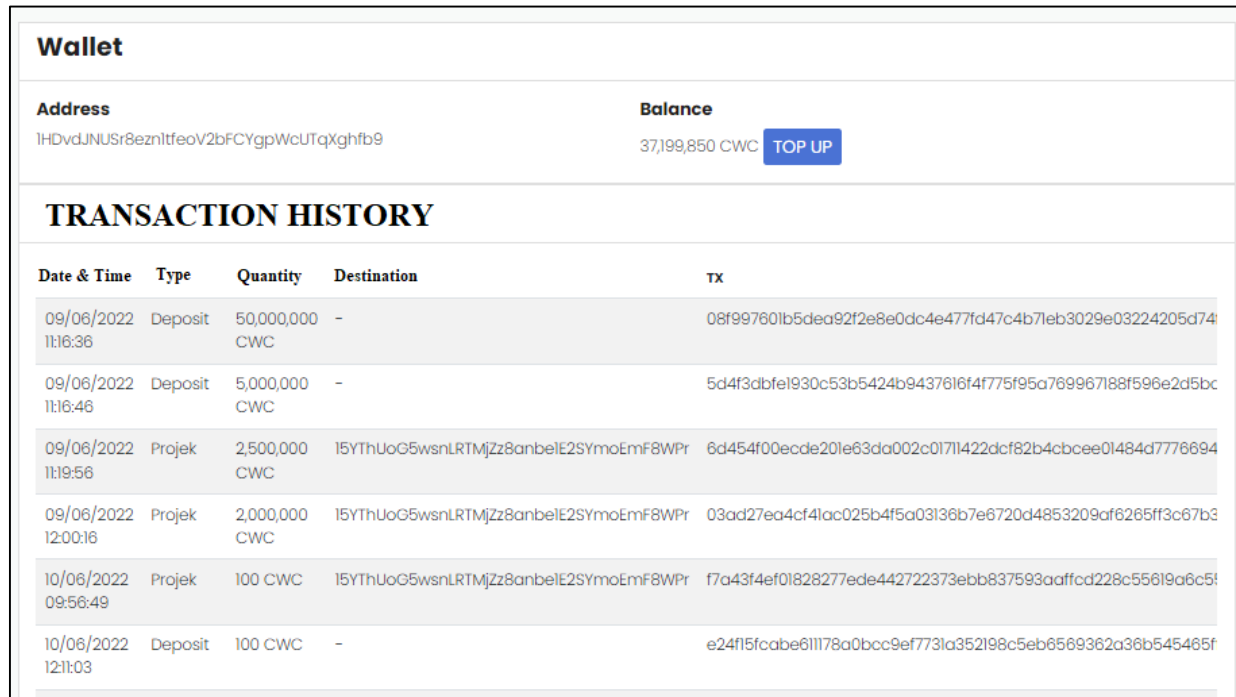


Fig. 10: Payment wallet in Crowdwork system

Discussion

Based on the problems stated in the background, it appears that trust plays an important role in the crowdwork system. This is based on the consideration of users who do not know each other. Technology is needed to support trust in the crowdwork system. For this reason, blockchain equipped with smart contracts impact trust issues in crowdwork systems. All transactions are transparent and immutable (including payment transactions, creation of work contracts, appraisals, and all processes in crowdwork). Through the value chain shown in Fig. 4, the existence of a crowdwork platform in which blockchain technology is present has an impact on the trust of the actors (employers and workers) involved. In addition, good business processes and system control accompanied by trust also have a good impact on the reputation of users. All contracts from the employer/employee is recorded in the smart contract which cannot be changed by the user. If the user makes changes, a new ledger is created, and tracking changes is made to the contract. Likewise, the payment process becomes more transparent. Wallets that use blockchain technology hold commissions/gifts from employers. If the project work is completed or the winner of the contest has been determined, the commission/prize is passed on to the worker/winner. Of course, this makes workers or employers more confident to use the crowdwork system, so that the trust problem is resolved.

Compared to the existing crowdwork system, the system developed in this research already uses blockchain

to overcome trust issues. On a similar system like projects.co.id, users cannot trace contracts that have been made. The system cannot limit the revision of work results. The users can also see the history of payments made through the wallet.

The model and prototype of crowdwork web-based system have been validated using the System Usability Scale approach (Bangor *et al.*, 2009). According to Bangor *et al.* (2009), there are 10 questions:

- Q1 : I think I will use Crowdwork website more often
- Q2 : I don't think Crowdwork website needs to be this complicated
- Q3 : I feel that Web Crowdwork is easy to use
- Q4 : I need help from another person/admin/technician in using this Crowdwork website
- Q5 : I feel that the Crowdwork Website features are working/integrated well
- Q6 : I feel that there are a lot of inconsistencies in this Crowdwork website
- Q7 : I feel that other people will quickly understand how to use Crowdwork website
- Q8 : I find Crowdwork website to be complicated to use
- Q9 : I feel confident in using Crowdwork website
- Q10: I need to learn many things before using Crowdwork website

The 10 questions were then distributed to 30 respondents (15 workers and 15 employers). Table 2 describes the system usability scale test results.

Table 2: System Usability Scale (SUS) test result

Respondents (P)	Question number										Score
	1	2	3	4	5	6	7	8	9	10	
P1	5	2	4	1	4	2	5	1	5	1	90
P2	5	1	5	2	5	1	5	1	4	2	93
P3	5	1	4	1	5	3	5	2	4	2	85
P4	5	1	4	2	5	2	5	2	5	2	88
P5	4	2	4	2	4	3	5	2	4	2	75
P6	4	2	4	1	5	2	5	1	3	2	83
P7	3	1	4	1	4	2	5	1	4	1	85
P8	4	1	5	2	3	2	3	2	4	1	78
P9	4	1	5	2	5	1	4	1	3	2	85
P10	5	1	4	2	3	2	5	2	4	1	83
P11	5	2	4	1	5	2	4	2	4	2	83
P12	4	2	4	1	4	2	4	1	4	2	80
P13	5	1	5	1	4	1	3	1	5	2	90
P14	4	2	4	1	4	2	3	1	4	1	80
P15	4	1	5	2	4	1	4	2	3	1	83
P16	4	2	4	2	5	2	4	2	4	2	78
P17	4	2	4	2	4	1	3	2	4	1	78
P18	4	1	4	1	4	2	4	2	3	2	78
P19	5	2	5	1	4	2	4	2	4	2	83
P20	5	2	3	2	4	2	3	2	4	1	75
P21	4	2	3	1	4	2	4	1	3	2	75
P22	5	2	4	2	4	1	3	2	4	2	78
P23	4	2	3	1	4	2	4	3	5	1	78
P24	5	2	4	1	4	2	3	2	5	2	80
P25	4	2	5	2	4	2	5	2	3	1	80
P26	4	2	4	2	3	2	4	1	4	2	75
P27	5	2	4	2	4	2	4	2	3	2	75
P28	5	2	3	2	4	2	5	2	4	2	78
P29	4	1	5	1	4	2	4	1	4	2	85
P30	5	1	4	2	5	1	4	1	5	1	93
Average Score	81										

Grade	SUS	Percentile range	Adjective	Acceptable	NPS
A+	84.1-100	96-100	Best Imaginable	Acceptable	Promoter
A	80.8-84.0	90-95	Excellent	Acceptable	Promoter
A-	78.9-80.7	85-89		Acceptable	Promoter
B+	77.2-78.8	80-84		Acceptable	Passive

Fig. 11: System usability scale matrix

From Table 2, the average SUS test result score is 81. It means that the model and prototype are acceptable to the respondents. The matrix can be seen in Fig. 11.

Conclusion

From this research, the problem of trust still occurs in the existing crowdwork system. This happens because everyone does not know each other on the

crowdwork platform, so they are vulnerable to malicious actions on the platform. Blockchain technology solves the problem of trust in the crowdwork platform, where all business processes and output systems in the crowdwork system can be accessed by anyone. Through this blockchain technology, all contracts between job provider and workers is recorded. Once an agreement has been reached and recorded by system, it cannot be changed.

From the model generated from this research, it is necessary to implement and measure the impact on crowdwork system users.

Blockchain can have the potential to be able to develop crowdwork for creative industries. However, its use could be underdeveloped if trust among users is low, and people are afraid of the risks of using blockchain-based crowdwork. Therefore, it needs support from various parties so that the use of blockchain can be quickly adopted by the crowdwork system, such as clear regulations from the government regarding the use of blockchain and support for the availability of infrastructure from the government. In addition, there is a need for a community that can support the use of blockchain-based crowdwork in creative industry workers.

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Author's Contribution

Sugiarto Hartono: Designed the research methodology, develop the prototype, and written the manuscript.

Harjanto Prabowo and Achmad Nizar Hidayanto: Advise the research project and suggest system prototype.

Meyliana: Advise the research project, suggest value chain model, and proofreading.

Ethics

The authors confirm that this manuscript has not been published elsewhere and that no ethical issues are involved.

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