Blockchain-Based Solution for Effective Employee Management

Yuli Nurhasanah, Dita Prameswari, and Olivia Fachrunnisa

Abstract The Fourth Industrial Revolution (IR 4.0) aims to disrupt business in various sectors like manufacturing, services, mining, fashion, etc., with the use of digital technology, one of them blockchain. The use of blockchain in the human resource management function will help collaboration between parties in updating employee skills and knowledge. Information generated from the blockchain process can also be used as a source of policy makers to set competency standards among employees. In addition, HR blockchain will run an automated process to make consensus between the parties involved. The purpose of this article is to develop a blockchain framework for managing employee performance and career progression in a particular organization. The blockchain design will focus on improving and developing the quality of the workforce, especially for sharing information between employees and managers. This will facilitate the process of identifying and analyzing employee skills, knowledge, and attitude data. In addition, data transparency and access opportunities by employees and company managers will exist without being misused. This will make managers easily track records of each employee's performance items, which in turn can be used to develop employee careers.

Keywords Blockchain · Employee management · Employee performance

Y. Nurhasanah · D. Prameswari · O. Fachrunnisa (✉)
Department of Management, Faculty of Economics, Universitas Islam Sultan Agung, Jl. Kaligawe Raya KM. 4, Semarang 50117, Indonesia
e-mail: olivia.fachrunnisa@unissula.ac.id

Y. Nurhasanah
e-mail: yulinurhasanah@std.unissula.ac.id

D. Prameswari
e-mail: prameswari@std.unissula.ac.id

1 Introduction

Currently, Industry 4.0 brings innovation and smart manufacturers, in which one of them is digital transformation. Digital transformation also becomes an inevitable necessity, including encouraging disruption in the HR world. Utilization of this technological revolution is one of the prerequisites for improving organizational management. To deal with an era of disruption, organizations need skill up or continue to develop the required skills. There is no denying that business will be affected by the rapid advancement of technology. The Internet, automation, and artificial intelligence are changing the way business operates. This becomes important as the social implications of these changes become more widespread. As a result, the HR team will play an important role to help companies navigate the business into new fields.

The skill gap will become more acute along with the development of technology and the struggle for talent. Considering this is important for companies to immediately understand what advantages they have and what they will need in the future. The HR field is currently undergoing a rapid transformation. From the beginning, it was considered as a support function, and now, the HR team has become an important tool in digital transformation. HR leaders began to apply digital culture in their respective organizations by utilizing tools and applications to support successful transformation. At a certain point, technological innovation influences not only HR technical competence but also stimulates HR "technology knowledge" within the organization, namely the form of basic assumptions and HR perspective on internal processes and relationships between organizational units [7].

At present, HR in the company is the most valuable asset. HR development is an effort made to form quality personnel by having skills, work abilities, and work loyalty to a company or organization. Quality human resources will help the company to further develop and achieve company goals. The HR development of the company is a means for employees to develop their potential and increase employee knowledge in certain fields. This will affect the individual performance productively [5].

In an effort to increase work productivity, a number of things are related to HR development, namely by using a technology called blockchain. Blockchain is a database that serves to store a collection of data that continues to grow or increase. Blockchain is a potential technology behind the bitcoin cryptocurrency because it could be able to solve a problem in achieving end-to-end transparency [4]. Blockchain is often associated with digital currency bitcoin, because it was originally created to monitor bitcoin transactions. Over time, blockchain technology has evolved and has now entered the HR industry because companies have begun to use blockchain to facilitate HR functions [13].

In addition, blockchain could have a major potential on both sides of the employment relationship, that is from the ability in maintaining and controlling access to a comprehensive and trustworthy of blockchain-based record of their education, skills, training and performance in the workplace. Individuals would be able to turn their skills, training, and experience into genuine value if they were provided to access "value passport" in organization. By applying data analytically, companies would

be able to match individuals to the roles accurately and effectively. This could be particularly relevant, as skills requirements have changed in the fourth of industrial revolution.

Blockchain's ability in supporting behavioral and cultural changes under way in organizations and the workforce is necessary. The benefits of the individual's highly portable and up to date "value passport" will become all the greater—both to themselves and employers—as the trend toward the gig economy continues and younger people change jobs more frequently or opt for portfolio careers. Also, with the younger generation generally being more relaxed than their predecessors about sharing personal information, blockchain provides them with the opportunity to do this in a more secure and trustworthy way.

In blockchain technology, data created by one server can be replicated and verified by another server. Therefore, the blockchain is often likened to a bank master cash book that contains all customer transaction data. With blockchain, a transaction no longer needs to depend on one server, because the transaction will be applied to the entire network [11]. Because the nature of the network is peer to peer, blockchain users can also avoid various frauds that can occur due to data modification or hacking [10]. Each of these blocks contains hashes from the previous block. In this, systems are interrelated and if there is an effort in changing data in one block, it must change the data in the other block. Each block protected by cryptography is interconnected to form a network [8].

Data is increasingly valuable in business in the midst of technological developments as it is today. With a data-driven approach, data collection in business has an important role as a fuel for various improvisations [2]. One transformation carried out with data is to use analysis to evolve the role of HR (Human Resource) or Human Resources (HR) in the company. It can also have an impact on the pace of company development. In a data-driven approach, data analysis is indeed a central role as the main reference for decisions taken by the HR department. Utilization includes finding out the reasons for employee turnover, choosing who is worthy of holding the next leadership, and some other effectiveness in managing talent.

Ideally, companies or businesses identify employees who need training to optimize their performance and make the company successful. Data analysis enables offering HR insights into initiative programs that can help improve HR, for example, such as rewards and training programs. By storing data across its network, blockchain eliminates the risk that comes with centralized data. Decentralized blockchain can use ad hoc messages that pass and distribute the network. Data stored on blockchain is generally considered to be undamaged. While centralized data is more controlled, manipulation of information and data is common. By decentralizing it, the blockchain makes data transparent for everyone involved [1].

This article aims to discuss how the blockchain works and can help managers to improve the quality of employee performance in the company, so that employees can develop according to their abilities and company desires.

2   Blockchain for Employee Performance

Basically, blockchain is a distributed database system that recording a transactional data or other information which secured by cryptography and governed by a consensus mechanism [14]. Specifically, in processing and verifying transactions on the ledger, blockchains use cryptography so the data encryption and coding in a blockchain could improves transparency, efficiency, and trust in sharing an information [9].

Based on [12] stated that there are four main facets of a blockchain. First, it has been designed to distribute and synchronise across networks, it encourages businesses to share data and it is ideal for multi-organisational business networks, such as supply chains or financial consortia. Second, in blockchains, there are smart contracts which is an agreement made by participants in advance and stored in the blockchain. The used of a smart contract is intended to facilitate digitally, verify or enforce the terms that have negotiated in a contract that allowing for transactions credibly without of third-party interventions as they are automatically. To verify a valid transaction, the third characteristic of the blockchain is built P2P networks, whereby there must be agreeableness between all relevant parties which serves to keep inaccurate or potentially fraudulent transactions out of database. And the last, transactions that have been agreed and recorded cannot be changed as provides provenance of assets, which it means that for any asset is possible to know of its existence, where it has been happened throughout its lifetime.

Blockchain takes the general ledger with transaction details, and distributes it to P2P network instead of placing it on a particular organizations central server, so that it can be managed together and solve high costs of management and gacking problem [4]. Blockchain technology was implemented firstly in 2009 that blockchain as the underlying platform designed in solving the problem "double-spending" for bitcoin that is how to transfer digital value without relying on a trusted third party. However, the attributes that make blockchain technology essential and used for bitcoin can solve a variety of other problems [6].

At companies, blockchain can be used to help managers improve employee performance. Some of them are in the process of identifying and analyzing data; it is to improve the quality of human resources and company performance using a blockchain on employee performance related to their respective fields of work. Based on Wang et al. [15], by adopting blockchain technology, it will improving security. Meanwhile, management system in organizations become more open and it could be effective solution for employee management. These are the following details employee performance data that will be managed on the blockchain.

2.1 Human Resources Department

In the HRD field, there are a number of things that can be done with blockchain:

Quality orientation
The ability to perform some tasks completely, on time, and also having an excellent quality of work and performance, even above established quality standards. With blockchain, HR can use it to record and map the skills and abilities of employees in the company such as knowing who employees have the right competencies for a project.

Problem-solving skills
The ability in analizing a problem, identify the source of the problem and the relationship between various factors of the problem, and then formulate alternative solutions that are relevant and applicable.

Planning skills
The ability to prepare planning of work in a systematic and well-scheduled manner, to allocate resources based on the results of planning, and monitoring to ensure that the work plan can run effectively and efficient.

Teamwork
The ability to coordinate and communicate with various parties involved, formulate common goals and share tasks to achieve the work goals that have been planned, and respect each other's opinions and input to improve team performance.

Self learning capacity
The ability to carry out learning activity processes both independently and in groups shows an adequate interest in continuing to develop self-skills and be proactive to share knowledge among fellow employees.

2.2 Marketing Department

There are a number of things that can be done using the blockchain in the marketing development field and are as follows:

- Data on sales growth compared to the previous year;
- Customer satisfaction score;
- Total new product development;
- Market share and distribution of products/ services;
- Average hours to completely resolve customer complaints;
- ROI (Rate of Investment) of the marketing program.

2.3 *Finance Departement*

In the finance department, things that can be included in the blockchain system include:

- Recording transactions;
- Financial reporting and analysis;
- Funding;
- Transparent business audits.

3 How to Work Blockchain in Improving the Quality of Employee Performance

The use of blockchain technology in the company and supply chain management field. Data and results of employee performance above will be recorded in the blockchain system. Previously, employees would be given their respective servers to get an account in the blockchain to enter employee performance data that had been done, so that each employee could input themselves what had been done in the company, so managers and other employees could see what performance results have been done and can evaluate what are the deficiencies and errors so that the employee concerned can fix it and produce maximum performance.

In using the blockchain itself, all employees have a blockchain server and account so that it will be easy to enter data on the performance results of each, for example, financial statements and sales transactions must always be input in the system in order to reduce employee dishonesty in funding reports. Data in the blockchain cannot be replaced because every server will have a copy, so that it will reduce the level of fraud and fraud at work.

All of information in a digital ledger has been stored in a data block; so everything that has been recorded in the blockchain cannot be changed by a unique cryptographic identifier (or "hash"). Each subsequent data block includes the hash of the previous block to create a chain that connects all the way back to the first data block (hence the "blockchain"). If data in any block in the chain is then unreasonably changed in any version of the ledger node, the hash for it and each subsequent block must change, making the modified ledger easily identified as an invalid version. That invalid version is then rejected by consensus among the nodes [6]. Therefore, every week managers will evaluate employee performance by looking at the data on the blockchain, so that their quality of work would be better and improved.

By using the blockchain, all employees and leaders in the company can find out the results of each performance. All employees can learn from the data that has been stored in the blockchain, so that not only focus on the field of work but also understand other fields of work. That way, employees will indirectly gain knowledge other than their field of work, and in the evaluation will also be done sharing of performance reports contained in the blockchain, each employee can provide criticism and

suggestions for the data that has been reported in the blockchain, and it will be a learning and new knowledge for all employees.

Existing and passing data on the blockchain network will be encrypted and stored copies to all blockchain network owners based on an agreement (consensus). The incoming data will later be guarded by a blockchain whose nodes are installed on several parties, so that it cannot be tampered with by anyone, and is protected from various forms of data misuse due to modified data, server down, or hacked accounts [3]. Transaction history that has been locked into a block will make it easier for managers to track and track every item, data and lost and lack of resources.

Based on the existing research said that by building a model of human resource management based on blockchain technology can provide effective information for human decision making especially for employee management. This model is more applicative and valid for HRM. Meanwhile, blockchain is the best solution in problem solving and security, also promote the use efficiency and effect of HRM information [15]. That way, managers or leaders of companies can assess their employees by looking at the results of company performance on the blockchain, can also find out the shortcomings of each field of work and the company can make training and development of employees about the field of work that is still lacking so that employee performance in the company can improve. However, it is also important to get to know the people who will manage the blockchain at the company. Must look for the most quality and understand the culture of the company. Likewise, with those who become the liaison of the company, they should be familiar with the programming language.

4 Conclusion

With the ownership of data for each field of work in the blockchain network, each employee can find out the results of each other's performance. And all employees can share to find out work experience in the company, exchange ideas among fellow HR, and in that way, the company can determine what HR development is in an effort to improve the quality of HR performance. And also the blockchain can be used to change a company's system by referring to the performance results that have been listed in the blockchain network, for example, in a field of work, there are deficiencies and challenges related to performance, then automatically repairing the existing system in it to develop employee potential.

In essence, the blockchain here as a means to provide facilities for employees to share information so that employees in the company have equal knowledge and skills and are not unequal to each other. Moreover, it can increase the profitability and credibility of the company. With blockchain, data is stored securely, cannot be changed, and companies do not need to waste a lot of time. With this blockchain technology, it will be easier to identify if there is a fraud in one of the supply chain processes.

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