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BLOCKCHAIN TECHNOLOGY IN HUMAN RESOURCES MANAGEMENT
AND HOW IT CONTRIBUTES TO EMPLOYEE MOTIVATION

Bachelor Thesis

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I have written this Research paper/Bachelor Thesis independently. Any ideas or data taken from other authors or other sources have been fully referenced.

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Introduction

The world has seen rapid technological growth since the first industrial revolution and this growth has followed an exponential upwards trajectory since the 1970s (World GDP Growth Rate, 2022). Currently, the world is experiencing the fourth industrial revolution where traditional business practices are being continuously automated by using smart technology. According to Marr (2018), the fourth industrial revolution can be characterized by a phenomenon called *the Internet of things*. It allows for organizations to automate and connect different operations in various ways. Examples of this modern phenomenon are as follows (Characteristics of Internet of Things, 2021):

- a connected supply chain that is automatically and autonomously responsive to sudden problems;
- connected devices and software across organisations allowing companies to access extreme quantities of data for process improvement;
- self-executing actions once certain conditions are met.

According to Worldbank (2019), blockchain technology can accelerate progress towards positive technological development in the fourth industrial revolution, however, many severe technical and regulatory problems are slowing down the mainstream adoption of this new technology. (Salah, Hafez, Ahmed, Kamal & EIDahshan, 2020)

Blockchain is primarily known for its use as the underlying technology of cryptocurrencies. Despite its original use case as a backbone of cryptocurrencies, many transformative solutions in other areas are being developed and exercised at a fast pace. (Hayes, 2021) Human Resources Management, going further – HRM - is one of the areas where blockchain has the potential to radically improve current practices (Suk Yi, 2020).

By innovatively leveraging blockchain technology, countless security-enhancing, process automating, and employee engagement boosting solutions can be created to accelerate the technological advancement of the HRM industry, however, in the year 2022 many of these solutions exist only in theory because of the technical, regulatory, cost, trust, and mainstream adoption challenges (Brown, 2021). In addition, most of the literature around blockchain technology places its focus on the finance/banking industry since these industries have been leveraging blockchain technology the most. Research about the use of blockchain in HRM is limited since the blockchain technology, and more specifically, its use in HRM is a relatively new phenomenon.

The author could not locate a single paper whose primary focus is the use of blockchain

to improve employee motivation, however, a small number of papers about the use of blockchain in HRM discuss employee motivation briefly. This conclusion is made based on the findings of the author, these findings are as follows: from 40 reviewed scientific papers about the use of blockchain in HRM, only 9 mentioned issues of employee motivation and only 3 of them allocated more than a paragraph of text on the issue (this includes every freely accessible paper discussing the use of blockchain in HRM. Papers which focused on the purely technical explanation of blockchain in HRM were not reviewed.

Papers were searched and found in the following databases: EBSCO, JSTOR, Emerald, ScienceDirect, Scopus, and Google Scholar. Keywords used were “Blockchain,” “Smart contracts,” “Human Resource Management,” “Employee motivation,” “Data management,” “Resume verification,” “Performance management,” “Training and development.” “Payroll and compensation,” and various combinations of these keywords.

It is important to note, that many of these 40 papers discussed solutions that would, in theory, affect employee motivation, however, the benefits of using blockchain as a tool to increase employee motivation haven't been deliberately discussed anywhere in freely accessible academic literature

Early adopters of blockchain-utilizing HR solutions exist, but they haven't been examined in academic literature from the perspective of employee motivation. It is difficult to gain insight into the rather scattered discussion of blockchain-powered employee motivation solutions in the current literature and this paper will attempt to change that.

This research aims to describe how the use of blockchain technology could positively impact employee motivation. In addition, this research provides a surface level explanation of all of the necessary terminological and conceptual context necessary to understand this topic.

To achieve this aim, the following tasks are raised for the research:

- ❖ Describe what is blockchain technology and introduce its characteristics and possibilities.
- ❖ Review academic literature and extract key employee motivators.
- ❖ Categorize the areas of HR where blockchain is being currently utilized and describe how the use of blockchain improves solutions from the categorized areas.
- ❖ Explain the research methodology and methods used in the empirical part of the research.
- ❖ Analyze the categorized HR areas and describe how the added blockchain benefits translate to improved work conditions for employees.

- ❖ Using previous findings and results from interviews – analyze how the improved work conditions for employees impacts their motivation.

This research will not place its primary focus on analyzing how the talked-about technologies function in technical detail, but rather explain and analyze what they can or cannot achieve. In the broader context, this paper can be regarded as a surface-level analysis, however, it will dive further into analyzing the impact of blockchain technology on employee motivation than the currently existing literature.

1. Theoretical review and analysis of blockchain technology and key employee motivators

1.1. Function, characteristics and use cases of blockchain technology

In an increasingly digitized world, the need for trusted, safely stored, easily accessible, efficient, and verifiable transactions is rising. Both transactions of capital and transactions of digital information demand ever-so advancing safety and efficiency measures to fight with perpetually appearing threats. Examples of information transactions between two or more parties are the exchange of personal data, verification procedures and trusted exchange of information with external parties. (Characteristics of Internet of Things, 2021) So far, entities have either hired external intermediaries or used time and resources to deal with these issues securely and efficiently. Blockchain technology has the potential to severely transform traditional approaches for dealing with both monetary and information transactions by automation of processes, reduction of time and cost and, therefore, improvement of efficiency. The next section will give an overview of what is blockchain technology. (Fernandez-Carames & Fraga-Lamas, 2018)

Put simply, a blockchain is a chain of blocks that contains information. It was first described by Stuart Haber and W. Scott Stornetta in 1991 and it was originally made to create immutable digital documents that cannot be tampered with (corrupted, manipulated or changed). This concept stayed unnoticed until the year 2009 when a yet unidentified person or a group of people, under the pseudonym Satoshi Nakamoto, created the first cryptocurrency – Bitcoin. (Gupta, 2017)

To understand how blockchain functions, the concept of a distributed ledger technology, from now onwards – DLT – must be understood. According to (Frankenfield et al., 2021) “A distributed ledger is a database that is consensually shared and synchronized across multiple sites, institutions, or geographies, accessible by multiple people. It allows transactions to have public "witnesses." The participant at each node of the network can access the

recordings shared across that network and can own an identical copy of it. Any changes or additions made to the ledger are reflected and copied to all participants in a matter of seconds or minutes.” The key characteristic of DLT is its decentralized nature, meaning, intermediaries or central authorities are not necessary - manipulation of data inside a DLT is nearly impossible because of its technical structure. Furthermore, data inside of a DLT, unless the distributed ledger is private and requires verified access, is accessible to everyone and everywhere and, finally, DLT is the technology that is highly utilized by the blockchain - cryptocurrencies use the blockchain as their distributed ledger. Further technical comparisons between blockchain technology and DLT are beyond the scope of this paper. (Rauchs et al, 2018)

Let’s take a simplified look at how a ‘block’ in blockchain functions. Thousands of blockchains exist and each of them contains unique characteristics, however, all of them share key components. Each block of a blockchain contains data about the sender, the receiver and the information being sent. The information being sent varies across different blockchains. In the case of Bitcoin, the information is the number of Bitcoins being transacted. In HRM, the information inside a block could be personal, financial, or other sensitive information about a process or an employee. In addition to sender, receiver and contents information, each block also carries its unique identification code called a hash code. A hash code is a part of the security mechanism making the blockchain safe and immutable. Hash code is calculated with complex mathematical formulas, and the hash changes if information about the sender, receiver or contents of a block have been tampered with, manipulated, or changed. Lastly, each block contains the hash code of the previous block which makes all the blocks in a blockchain uniquely connected. If the hash code of a block is tampered with, then all of the existing blocks in the blockchain will automatically have to recalculate their hash codes which will be detected by the blockchain and the manipulation will be automatically removed. Despite this safety characteristic, modern computers can calculate millions of hash codes per second. Theoretically, a hacker could manipulate information in a block/s and then use modern computers to recalculate every other hash code of a block in the specific blockchain, therefore, fooling the system into thinking that the manipulation is verified and can be successfully added to the blockchain. To mitigate this issue, other, advanced safety measures exist. One of them is a technology following the previously described - distributed ledger concept (DLT). Once someone joins the blockchain with their unique input which is resembled in a block, they gain access to the full history of every blockchain transaction that took place in the specific blockchain. This means that if a hacker would like to tamper or manipulate transactions of a blockchain, they would have to change every hash code of every block in every computer which

is using the particular blockchain. This has proven to be an unbreakable safety mechanism which is partially why the blockchain has exploded in popularity. On top of this, other safety measures exist, however, they change across different types of blockchains and exploring that is beyond the scope of this paper and will contribute nothing in terms of exploring blockchain's contribution to employee motivation. (Nofer, Gomber, Hinz & Schiereck, 2017)

A surface-level functionality of the blockchain technology has been explained. The next paragraphs will describe the unique characteristics that blockchain technology provides and what benefits these characteristics add to various processes and business functions. Moreover, practical examples will be given.

Smart contracts

Smart contracts are digital programs that are stored on the blockchain. This program contains a set of rules and is programmed to execute these rules once certain, programmed actions have been completed by a user of the smart contract. To illustrate how smart contracts work, an example of a vending machine will be used. Let's imagine that the functionality of a vending machine is a smart contract. A vending machine is programmed to push out products once money is received. The contract is waiting for the first action to be completed which, from the side of the user, is putting money into the vending machine. The smart contract recognizes that a certain action has been completed – input of money – which allows for the smart contract to execute the next action – the machine allows the user to choose a product. Once a product is chosen the smart contract completes the last action which is pushing out the product. After that, the smart contract has been completed and can be used again. (Christidis & Devetsikiotis, 2016) To add to the previous example, after the transaction is completed, the user of the vending machine cannot choose to return the product or to get the money back. The actions cannot be tampered with or changed, just like smart contracts.

Since smart contracts are stored on a blockchain, their key characteristics are similar to those of the blockchain: secure, transparent, free of intermediaries, autonomous and decentralized. The unique sub-characteristics of each smart contract may vary.

Day by day, new solutions utilizing smart contract technology are appearing and being used in various industries. Smart contract solutions are being actively created and increasingly used in such industries as financial services, supply chains, taxes, insurance, digital identities, the arts, gaming, gambling, and more. To illustrate how smart contracts offer solutions to different industries, view Table 1. The industries displayed in Table 1 were chosen according to the global Blockchain Market Report (2021), and Liu (2022)—whose analysis illustrates

that the biggest industries utilized by the blockchain are finance and supply chain industries.

Table 1

Use cases of smart contracts in the finance and supply chain industries

Authors	Title	Industry	Blockchain solutions
Chang, et al 2020	How Blockchain can impact financial services – The overview, challenges and recommendations from expert interviewees	Finance	It allows for decentralized, transparent, autonomous and often non-inflationary currencies. All transactions can be permanently traced on the blockchain and are immutable. Benefits: removal of the whole banking bureaucracy necessary to accommodate payments. Example use case: sending remittances without almost any fees because of the absence of bureaucracy necessary to facilitate such a service. Countless other applications of blockchain exist in the finance industry.
M Queiroz, Bonilla and Telles, 2019	Blockchain and supply chain management integration: a systematic review of the literature	Supply chains	Products go through many different logistical layers when coming from origin to destination. Every step of this process could be permanently traced on the blockchain. Local failures of tracing systems could be reduced, abusing refund systems would become more difficult alongside other risk removing errors that occur in the logistics industry. All of this and more would help in increasing transparency, security, sharing and analyzing data, removing risk and, for these reasons, increasing profits.

Notes: Only some of the key takeaways from the analysed papers are described in the table

Source: *compiled by the author*

Interoperability

Apart from Bitcoin, thousands of other blockchains exist, each with their own unique characteristics and proposed solutions. Different blockchains have their own protocols, governance models, and rules. Information/data/tokens/capital cannot be exchanged between two different blockchains without a *blockchain bridge*. A blockchain bridge "is a connection that allows the transfer of tokens and/or arbitrary data from one chain to another." The ability to exchange data between different blockchains is called interoperability and blockchain bridges are often called interoperability protocols. Interoperability is crucial for mass adoption of blockchain technologies. It is the ability to share information across various blockchains and in an increasingly interconnected world, the ability for blockchains to 'communicate' with one another must not be looked over.

Examples illustrating the importance of interoperability:

- Finance. Transferring tokens or other arbitrary data across different blockchains;
- Healthcare. Seemingly sharing protected and verified patient data across healthcare ecosystems and subsectors of the industry;
- HRM. Connecting employee reward systems with various external reward providers. Seamlessly receiving rewards once certain smart-contract determined conditions are met by an employee.

Immutability

Once information is added to the blockchain it can never be changed. All past transactions are visible by every participant of the blockchain or by those with access when it comes to private blockchains. Immutability applies to smart contracts, since the conditions and outcome of a finished smart contract can never be changed or tampered. (Coita, 2019)

Obvious advantages of immutability are security and transparency between parties who are engaged in a smart contract or exchanging information, capital or any other arbitrary data.

Decentralized data

In a decentralized storage system, data is cryptographically encrypted and instead of it being stored in a single centralized location – it is stored across multiple locations, in other words, nodes. These nodes are run by organizations or individuals who have agreed to share their extra disk space. In return, they receive a reward which usually is a small amount of tokens of the specific blockchain that the decentralized data is stored on. (Wang et al, 2017)

Some advantages of decentralized storage are:

- no single point of failure - if one node fails, the system keeps running;
- data immutability and better overall security;
- no third party access of the data that is being exchanged between network users;
- faster transfer of data, lower bandwidth necessary;
- most importantly, cheaper storage - since data is stored across multiple voluntary nodes, it is cheaper to store it.

Self-sovereign identity

A self-sovereign-identity allows people to digitally present and authenticate a set of verifiable credentials, just like a physical ID or any other card would. A self-sovereign identity grants users with the possibility to self-manage their digital identities without depending on

centralized parties to store, verify and maintain their data. Below are advantages of a self-sovereign identity (Baars, 2016):

- users do not rely on central authorities to verify their data;
- immutable, secure and stored in a decentralized way, meaning, that for a hacker to steal a million identity records which are stored decentrally, they would have to hack a million computers instead of hacking a single centralized data base;
- a trusty peer-to-peer channel is created between ID owner, ID issuer and ID verifier, not even the issuer of the self-sovereign identity has access to the data being exchanged.

In a business context, each employee could be connected to a self-sovereign identity and their performance data, compliance data, legal data, payroll, audit and much more could be interconnected under a single identity. This would make handling various employee data more efficient, and reduce the level of bureaucracy in an organization.

Smart transactions

Using the blockchain technology for payments has many advantages and use cases. As previously established, the decentralized nature of blockchain technology often removes the necessity for intermediaries. To facilitate payments – an intermediarie is almost always necessary and blockchain exists to challenge that. The most prominent example being the remittences industry which is highly profitable and takes unfair fees from those sending money overseas to their families. Blockchain can facilitate these payments almost for free. (Suk Yi, 2020).

In a more organizational context, blockchain transactions have also proven to be useful. Exchange of funds can be a part of smart contracts where funds are automatically sent when certain predetermined conditions have been met. In this fashion, payroll and many other interorganiational expenses can be automated through the use of cheap, secure and automated transactions. (Khmelnitski, Odintsov & Koncheva, 2019)

Tokenization

The scarcity of digital assets was impossible to prove until the invention of blockchain technology - a token solves this problem. A token can be described as an undisputable proof of ownership stored in a digital format. In other words, safely transferring the ownership rights of an asset to a blockchain. In this case an asset is a token.

Tokenization, in short, is the process of different parties exchanging these tokens and this concept can be applied for an indefinite number of use cases. A token can represent physical

goods, real estate, a service, equity, promise of future use of a service, internal currency of an organization, employee data, or anything else. Cryptocurrencies are the first and most common form of tokens that can be used to store value, make purchases and perform other actions. (Narayan & Tidström, 2020)

As established in the previous paragraph, the utility of tokens stretches beyond cryptocurrencies. Two other prominent use cases exist. The example most relevant for this paper is the example of *a tokenized platform*.

- A tokenized asset.

It could be a proof of real estate ownership or proof of gold ownership, even on a micro transaction scale. Tokenizing assets removes a lot of bureaucracy from expensive exchanges of property. For example, if a building is digitized and represented by a token, then the process of selling the building would become significantly faster and cheaper since only the token has to be transferred. A tokenized asset can also be luxury goods to bring an extra layer of security, verification and transparency. Countless other use cases exist. (Kaur & Oza, 2020)

- A tokenized platform.

The same concept of representing an asset with a token, except the tokens are used, exchanged and sold on a platform where all users have voluntarily assigned value to the token because of the benefits that the platform provides to its users. A tokenized platform has its own blockchain and the currency of this blockchain is its tokens. Characteristics that apply to the majority of tokenized platforms are (Gaur, 2019):

- services provided by the platform can only be accessed by using the tokens;
- the tokens must be exchangeable for fiat currencies or anything else that users of a platform will find valuable;
- the tokens must be scarce, finite and must have the ability to appreciate in value;
- the tokens are tradable on exchange platforms.

The purpose of a tokenized platform is to enhance the growth and network effects of an organization. Tokenization is most suited for platforms whose success depends on creating a network, an interactive ecosystem of users. Tokenization is often used to incentivize users and producers of platforms to collaborate in mutual value generation for the network. Since users and producers of a particular platform will have the ability to acquire tokens by using the platform, and since these tokens are appreciating and can be exchanged for real value – then there is an extra incentive to use the platform, apart from its main purpose.

When a platform is tokenized, an economy is created where tokens are the currency of the economy. Let's look at how an organization could be tokenized. As an example, let's look how Uber could be potentially tokenized. Note that the description is severely simplified and many technical aspects that make tokenization possible have been left out: (Kaur & Oza, 2020)

1. Financing the network.
 - a. As drivers join the platform, they receive a tokenized stake in the platform in exchange for their contribution as a driver.
 - b. The tokens can be purchased on exchanges, therefore, investors can purchase the tokens, thereby, driving up their value.
 - c. Users – people looking for a ride – will exchange their fiat currency for tokens to pay for rides.
2. Token use.
 - a. Drivers are awarded tokens for providing Uber services.
 - b. Riders pay for tokens and use them for rides.
 - c. Many reward and incentive structures can be built into a tokenized economy. Drivers with good reviews could receive extra tokens. Drivers can also be rewarded with anything else that Uber has allowed to be exchangeable for tokens, for example, a free repair for their cars.
3. Supply-side growth.
 - a. If the platform succeeds in generating network effects then the token will appreciate in value because the amount of tokens that will ever exist on the particular platform is finite or predictably inflationary, and since the service of the company can only be used by using tokens then more adoption will automatically mean the appreciation of token value.
 - b. If a token appreciates – it will incentivize even more drivers to join the platform.
4. Demand-side growth.
 - a. With more drivers on the platform it also becomes more useful for the riders which, again, will increase adoption.
5. A sustainable platform.
 - a. Drivers benefit from the growth of their platform since they are awarded with tokens which appreciate as the platform grows.

The tokenized platform model is highly incentivizing for early users since the value of tokens they receive at the infancy stage of the platform can increase significantly. The

possibilities for tokenizing platforms are endless and it is up to entrepreneurs and managers to evaluate whether their business is suitable for tokenization.

The surface-level overview of the functionality and key characteristics of blockchain technology have been explained, and examples of use cases have been given. The next step is to review current blockchain-powered HRM solutions and extract those that will play a role in increasing employee motivation. But before that, a brief overview of the HRM industry and its attempts to increase motivation will be given. Furthermore, motivation theories that are relevant for this paper will be introduced and then, finally, blockchain-powered employee motivation solutions will be introduced which will be further analysed in the empirical part of the research.

1.2. Key employee motivators

This section will examine various studies of employee motivation to draw a conclusion on the factors which play the most significant role in increasing employee motivation.

Shortly about the relevance of employee motivation. Employee motivation has been broadly discussed in academic literature and it has been established that motivated employees will help an organization in numerous ways – increased commitment, higher levels of creativity, smaller turnover rates, higher innovation levels and much more – all of which are increasing profits as a result (Parmar et al., 2017). The HR departments across the world are continuously searching for new ways of improving employee motivation as it is directly connected with the success of the organization. Some global trends are making it especially challenging to keep employees engaged. Here are examples of global trends which negatively impact employee motivation:

- shifts in society that are pronounced in the labour market. Higher levels of uncertainty will demotivate employees and increase turnover rates. Events like the Covid-19 pandemic and recent military conflicts accelerate difficulties in the global markets which often increase the levels of uncertainty, which as a result, demotivates employees (Urichuck, n.d);
- surplus of job openings and a shortage of filled positions. Although the full extent of this phenomenon is still being studied, some researchers propose that factors contributing to the shrinking workforce are unpleasant employee treatment during the pandemic, unsatisfactory benefits, lack of work-life balance and lack of specialists in niche industries (Hitka et al., 2021);
- amongst the less academically studied reasons is also a slowly shifting global perception of what a job should be – people are no longer looking for just paying their

bills – there are signs of a lack of meaning in the workforce and people are increasingly looking for alternatives that would give them more flexibility, meaning and satisfaction from working (Fleming, 2021).

These and many more global and local trends which contribute to the lack of employee motivation are becoming increasingly relevant. For these reasons, studying new ways to leverage modern technologies to help with employee motivation is an important research area.

In the world of HRM, there is a consensus that the role of the Human Resources department is slowly shifting from an administrative one to a strategic one (Lemmergaard, 2009). This shift is made possible with technological advancements and digitization of processes within the industry as well as globally. Streamlining and automating various administrative tasks saves an organization time and resources. The shift towards HR being a strategic department allows for employees to spend less time on mundane and routine-like tasks and more time on creating competitive advantages through a company's workforce. Administrative work is something that organizations need to engage in to abide by rules, laws and regulations, however, strategic work is necessary for progress and for creating a competitive advantage.

Not long ago, HR processes such as employee onboarding/offboarding, access to apps and tools, expense claims, payroll, taxes, time management, benefits, and performance tracking were all performed manually. (Balasundaram and Venkatagiri, 2020) In today's HRM environment, most of these processes can be performed semi-automatically or often – fully autonomously. This leaves a lot of time for the HR managers to focus on the strategic part of their role. According to Greer (2003), who has written a 748-page long summary of the existing literature on strategic HR, there are 6 main categories of strategic HR practices. These are planning, staffing, appraisal, compensation, training, and development. Continuing with Greer's analysis, a successful execution of these practices depends on

- group-oriented, long-term appraisal systems;
- generalized skill development and broad career paths;
- compensation approaches accentuating internal equity;
- flexible compensation packages including stock ownership;
- participative decision making.

Later in this paper, it will be seen how blockchain plays an innovative role in improving some of the listed processes specified by Greer (2003).

Regarding employee motivation. To choose which blockchain-powered employee

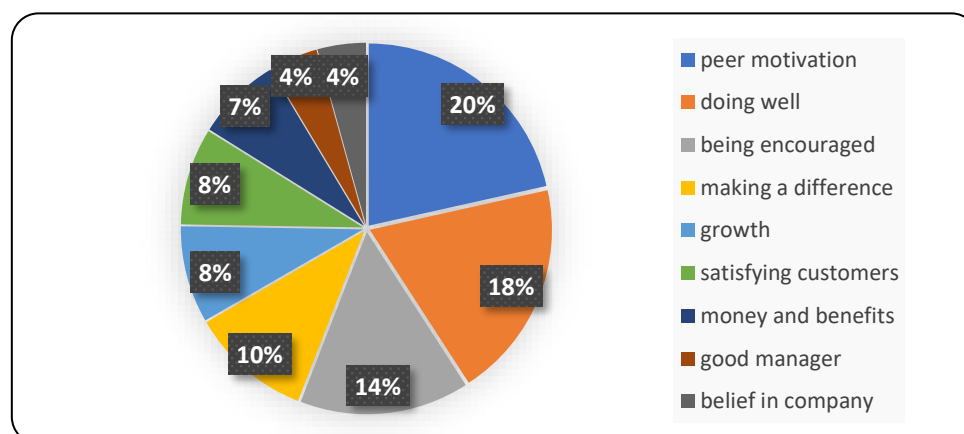
motivation enhancing solutions to further analyze in the empirical part of this paper, it is necessary to gain an understanding of what factors, in general, motivate employees. The proceeding text until the next section will examine this issue.

In their extensive literature review of HR processes impacting employee motivation, Raudeliūnienė & Meidutė-Kavaliauskienė (2013) concluded that the HR department has to motivate employees through five dimensions: material factors, recognition factors, self-expression factors, social factors, and security factors. The researchers also conducted a relatively small survey of 218 respondents, asking about what motivates them. From the most motivating to the least, these factors were: social factors, recognition factors, security factors, self-expression factors, and material factors.

To further explore what motivates employees, the author looked at an older study by Wiley (1995), which reviewed what motivates employees according to over 40 years of motivation surveys. These factors are as follows, ranked from most motivating to least motivating: good wages, full appreciation for work done, job security, promotion and growth in the organization, and, lastly, interesting work. It can be observed that there is an overlap between the more recent 2013 study and the 40-year summary of motivation surveys, which ended in 1995. However, the overlap exists only in the factors themselves and not in the order of importance in which they were ranked by the researchers.

In addition, the largest modern employee motivation study led by Lipman (2014) was also examined. The study questioned over 200000 respondents in more than 500 organizations asking about what motivates them in the workplace. See the results in Figure 1.

Figure 1. Factors affecting employee motivation



Source: data from a study done by Lipman (2014), illustrated in the figure by the author

The more recent studies done by Raudeliūnienė & Meidutė-Kavaliauskienė (2013) and Lipman (2014) have both ranked social factors as the most motivating factor according to the

surveys. One study called it social factors, the other – peer motivation. These are not entirely overlapping concepts, however, social factors is an umbrella term under which peer motivation can be placed. Similarly, recognition and self-expression factors, or the Lipman equivalent – doing well, being encouraged, making a difference – were ranked relatively high. A noticeable difference can be seen by comparing the new studies with the older – Wiley (1995) study. While Wiley concluded that good wages are the most motivating factor based on 40 years of surveys, in the modern surveys - material factors, money & benefits were ranked relatively low, which, of course, does not discredit the importance of material factors.

Lastly, similar results have been observed by many other researchers and studies. For example, an internationally recognized leadership expert Wilson (2020) concluded that the five areas where businesses should place their focus to efficiently motivate employees are:

- increasing communication;
- offering challenging work;
- recognizing achievement;
- boosting team spirit;
- increasing independence.

These findings are not only similar to the findings of Raudeliūnienė & Meidutė-Kavaliauskienė (2013), Wiley (1995) and Lipman (2014), but also to the research of Greer (2003) which was described in the beginning of this section.

Similar results are also visible when reviewing Herzberg's (1959) Two-Factor Theory of Motivation. Herzberg talked about hygiene factors and motivational factors. These are similar to the newer findings as Herzberg concluded that pay, benefits, status and security – hygiene factors – and recognition, opportunities, responsibility – motivational factors – play a significant role in motivating employees and therefore increasing profits.

Lastly, according to Stam (2019), the motivation of employees benefits from efficient work processes and minimized friction in their daily operations. This is primarily because the removal of friction benefits the momentum and productivity of employees. And increased productivity leads to employees performing better which is a key motivator.

To conclude, research shows that in the modern age social factors and self-expression factors such as peer motivation, shared goals, encouragement, and challenging work – play the largest role in motivating employees. Amongst these, encouragement, especially data-driven objective and empirical feedback to employees is, arguably, the biggest modern employee motivator out there. In addition, material factors such as good wages and benefits - have always

played an important role in motivating employees, however, less so in the recent decades. Also, phenomena like goal-oriented teamwork, participative decision making and equal opportunities for all employees have been found to greatly increase the motivation of employees. These characteristics will be helpful when further analyzing blockchain-powered HR solutions which have the potential to increase employee motivation.

1.3. The use of blockchain in the HRM industry

The author has identified 5 main categories of blockchain use cases in HRM and an additional ‘other’ category. The following paragraphs explain the methods used to identify these categories. These categories are:

- data management;
- payments;
- recruitment;
- performance management;
- engagement.

Two methods of research were used to extract these categories. The first method was a thorough overview of 40 scientific papers discussing the use of blockchain in HRM. There was a lot of overlap in the analyzed literature – the same or similar blockchain solutions for the HRM industry were continuously raised. This trend was seen not only in the 40 reviewed academic papers but in many non-scientific sources as well, such as video interviews with experts and journal articles. The 5 categories of use cases are not displayed exactly as written in the reviewed papers because different terminology was often used for the same or very similar concepts – that is expected and normal since the topic is still new and developing. Each of the five categories can be further divided into multiple sub-categories, however, only solutions which increase employee motivation will be further divided into sub-categories, alongside being explained, and analyzed more thoroughly in the empirical part of the research.

In addition, the author has identified 15 startups or already established enterprises which are using blockchain to tackle HRM issues. All 15 of these startups fall under at least one of the above mentioned five categories. Companies were identified using several methods of research. Firstly, simple web browsing where the author identified multiple websites with extensive lists of blockchain startups. In addition, in the interviews which were conducted for the empirical part, the author asked industry experts to name their competitors or other companies in the space. This list is incomplete because of insufficient research methods. The author identified 32 blockchain-utilizing companies in the HR space, however, 15 of them have

been inactive for at least 2 years. Lastly, this is a highly volatile market, therefore, many of these companies are likely to go bankrupt in the nearby future. See Table 2.

Table 2

List of blockchain-utilizing companies operating in the HRM space

Area Companies	Data			Performance	
	Management	Payments	Recruitment	Management	Engagement
Job.com	+		+		
Peoplewave	+		+	+	
WurkNow	+	+	+	+	
NYNJAGroup					
Bounties Network	+	+	+	+	
Gospel technology	+				
Vault platform	+				
laborX		+	+		
paymentX		+			
eXo Platform	+	+		+	+
Zinc	+				
Whappy	+	+		+	+
THX Network		+		+	+
Meeds	+	+	+	+	+

Source: *compiled by the author*

The following paragraphs will give a short overview of each of the five categories.

Data management

Countless applications of blockchain can be used in data management. For example, it can be leveraged by the supply chain industry, see short explanation in Table 1, page X of this paper. Furthermore, sensitive data could be stored on the blockchain and efficiently exchanged between parties by simply granting access to a private blockchain. Agreements between parties where data is exchanged could be made more transparent because of the data's immutability. Also, data breaches are happening even in the most highly secured and protected organizations, and the technical qualities of storing data on the blockchain can offer greater assurances against such occurrences. (Cheng et al., 2017)

In addition, because of the benefits, decentralized data storage offers – storing and sharing data using the blockchain is faster and cheaper when compared to cloud storage. This, for example, is utilized by various communication and video conferencing solutions.

Payments

It is HR's job to uphold the conditions in the contract once the terms of employment are outlined prior to hiring. The old model necessitates manual execution of requirements that may have an impact on an employee's benefits package which can result in errors. Instead, HR can

use blockchain technology to effortlessly deliver employee benefits. Blockchain could provide a more stable approach to pay and compensation by applying predetermined wage increases for recognized skills or essential competencies. (English & Nezhadian, 2017) There are smart contract solutions available that leverage blockchain to automate and secure payments to employees, contractors, and vendors (Top crypto payments startups, 2021). When a specific number of hours of work or a task is completed, the smart contract pays the employee, contractor, or vendor the correct amount by deploying the allocated piece of remotely and autonomously executable code. This code is linked to a bank transfer from the company's account to the contractor's account, which allows for the execution of the payment. The smart contract ensures that work is accomplished and that payments are made in a timely and accurate manner to the employee, contractor, or vendor. By allowing businesses to create their own enterprise currency, blockchain is changing the expense reimbursement industry. Organizations will cut costs associated with the current expense reimbursement process by developing an individualized cryptocurrency unique to their company: processing fees will be eliminated, international exchange rates will be automatically considered, and in-house HR staff will be reduced. This is appealing to both sides in the transaction and allows corporate mobility, as corporations can now readily repay across many jurisdictions. (Tai-Hoon et al, 2016) Even in expense reimbursement, blockchain improves the employee experience. Reimbursing employees in its current form can be a time-consuming process. Employees are frequently forced to wait for paperwork and checks to clear. It can also cause HR problems and waste time and resources. (Viriyasitavat & Hoonsopon, 2019)

Recruitment

Recruitment benefits from the blockchain supported self-sovereign identity solutions. In an ideal world, every candidate applying for any job would have their entire work history verified and encrypted on the blockchain allowing recruiters to save resources on background checks and avoid unsuccessful hires caused by resume fraud. After conducting a survey, Morris (2020) concluded that 30% of applicants 'bend the truth' in their resumes and 80% of these cases are never found out. Furthermore, the younger generations, such as millennials and gen Z'ers, lie the most, therefore, this trend of lying on CVs is unlikely to shift any time soon. Blockchain offers a solution to this problem. A resume or any other credential could be stored on a blockchain platform where all the information has been verified by universities, previous employers, and organizations. Once information is placed on a resume which is stored on a blockchain, it could not be changed, and the inputs would stay there forever. Demand for such

a technology is present since people are switching jobs with an increasingly growing frequency and the process of verification is long and costly, therefore, if a technology guarantees that an applicant is honest, then this technology would be beneficial for organizations. (Ingold & Langer, 2021)

Some recruitment solutions are attempting to save not only verified credentials, but detailed performance indicators from each workplace an employee has worked at, thereby providing potential employers with a completely transparent and detailed view of an employee's work history. Other solutions are allowing freelancers to compete for a predetermined task, and the best or fastest result gets awarded. This process is secured by smart contracts.

Performance management and Engagement

According to Furnham et al (2009), the key to sustaining employee motivation is the provision of objective feedback, for example, data-driven dashboards. This overlaps with the review of literature in section 1.2., where phenomena like encouragement, recognition of achievements and increased independence were all ranked high in terms of impact on employee motivation. Blockchain solutions in performance management are directly connected with objective and empirical feedback granted to all employees in an equitable manner. The next paragraph illustrates how it would work in practice.

A system of to-be-performed tasks/actions or key performance indicators could be stored on the blockchain. Once these predetermined tasks are completed, the system automatically recognizes which employee or group of employees performed these tasks. (Michailidis, 2021) Over time this could create a database of executed/poorly executed/partially executed/skipped/... tasks, therefore, recording the past actions and performance of each employee. As a result, the process of proving one's contribution to the company could be streamlined and automated. If a manager wants to reward an employee or if an employee wants to ask for a raise, now they have objectively verifiable proof which is stored on the blockchain and time, which would otherwise be spent by manually evaluating and checking the performance of employees, can be now saved. Countless versions and utilization examples can be created with these concepts. Performance management and compensation & payroll can work together since employees can meet predetermined tasks stored on the blockchain and get automatically paid because the blockchain has recognized their positive input. (Sifah, Cobblah & Xia, 2020)

The positive incentives that blockchain-powered performance management solutions offer are similar to those already explained in the previous – Compensation & Payroll section. Employees have more control over their work, and they can more objectively see what needs to be done to get a raise. This makes communication more transparent and increases employee independence. It would become easier for managers to encourage and compliment employees since the blockchain shows their progress or shortcomings. Guaranteed bonuses, once conditions are met, will allow for transparent, flexible, objective, and predictable growth of employees and ultimately – the organization they are working for. Blockchain-powered performance management systems can also be created in a group-oriented way, where people collectively can move towards meeting goals. For example, ideas could be published on a company's private blockchain, then employees can vote for the best idea and the author of the idea gets rewarded. (Sifah, Cobblah & Xia, 2020)

2. Empirical research of the blockchain's contribution to employee motivation

2.1. Methods used

After describing the function and characteristics of blockchain technology, after introducing to key employee motivators, and after categorizing the areas of HR where the blockchain is being currently utilized – it is finally time to focus on how the use of blockchain in HR contributes to motivated employees. Information used in the empirical part of the research is findings from the literature review, analysis of the websites and functions of companies from Table 2, and interviews with executives from companies mentioned in Table 2. Amongst the interviewees were two CEO's, one co-founder, one CTO and one software developer. The following steps will be taken.

Analyze the categorized HR areas and describe how the added blockchain benefits translate to more favourable conditions for employees in their work.

Most of the blockchain-utilizing solutions are not inventing new practices, rather they are using the blockchain technology to improve already existing areas of HR. For example, engagement solutions can increase employee motivation regardless of whether the blockchain technology is used or not. For this reason, it is important to describe how exactly the use of blockchain contributes to improved work conditions for employees, instead of looking at the overall benefits that these solutions provide.

Extract categories of benefit that are directly created by the use of blockchain.

When the direct benefits from blockchain technology to employee work conditions will

be synthesized – three categories of benefit will be extracted. These categories of benefit will be unique to blockchain technology and the benefits added from these categories are impossible or difficult to replicate by the use of traditional HR practices.

Analyze and describe the impact of the previously mentioned categories of benefit on employee motivation.

Use the knowledge gained in all previous sections of the paper, analysis of company websites, and results from the interviews to describe how the unique characteristics of the blockchain technology can potentially impact employee motivation. The impact on employee motivation will be estimated by reviewing how blockchain technology benefits the work conditions of employees and then matching key employee motivators from section 1.2. to the observed benefits. All of the results have been discussed with industry experts and although there were only 5 interviews – a saturation of similar information was present. Generally speaking, the interviewees agreed with the results, however, noted their lack of detail. This paper encompasses a very diverse set of information, therefore, the results are general and exploration of further detail is a possible direction for future research.

2.2. Benefits to employee work conditions added by the blockchain technology

Figure 2 combines multiple elements of analysis. Firstly, it is a synthesis of section 1.2., secondly, all of the companies mentioned in Table 2 were analyzed and the benefits of their solutions have been presented in this table, and lastly, the conducted interviews contributed to the making of this table.

Figure 2. Benefits to employee work conditions added by blockchain technology

Area	Benefits to employee work conditions added by the blockchain technology
Data management	<ul style="list-style-type: none"> - An immutable digital identity for workers connected with their relevant data and past actions. - Blockchain verification of all current and past employee data. - Storing credentials digitally and securely, forgery proof credential management. - Blockchain verification of participants, for example, in a video conference or a project. - Decentralizing data storage, thereby, significantly decreasing risks of any fraud.
Recruitment	<ul style="list-style-type: none"> - Employees record their professional history on a blockchain where it is immutable and verified, therefore, providing a forgery proof resume to potential employers. - Removing bureaucracy involved in the job application process. - A tokenized recruitment process incentivizing activity on recruitment platforms. - Smart contract protected, pre-determined rules for collaboration between employers and employees/freelancers/temporary workers/...
Payments	<ul style="list-style-type: none"> - Using smart contracts to automatically pay employees once a time period has passed or predetermined tasks have been completed.

	<ul style="list-style-type: none"> - Set predetermined wage increases and reward structures with smart contracts. - Reduce organizational bureaucracy in processes like expense reimbursement, accounting procedures, and more. - Significantly reduce the cost of payments across different jurisdictions. - Significantly lower transaction fees. - Increase trust between creditors and debtors by securing and automating payments using smart contracts.
Performance management	<ul style="list-style-type: none"> - Recording the history of employee performance indicators on the blockchain and providing employees with recognition once certain predetermined milestones have been achieved. - Making objective decisions about employee management based on blockchain verified data about employee performance, compliance, engagement and other data. - Streamlining the process of evaluating employees, therefore, reducing the necessity for some of the managerial work which is currently performed manually. - Make the process of advancing in an organization more transparent since career progression can be coded into smart contracts.
Engagement	<ul style="list-style-type: none"> - Tokenize employee engagement by allocating points to employees when they show engagement and allow for employees to exchange these points for tokens which can then be exchanged for perks or actual fiat currency. - Combine gamification of processes and tokenization of engagement to create a strong incentive for employees to be proactive and contribute to the organization. - Create internal company stores where items, services and perks that can be purchased using tokens of the specific organization that employees have earned in the tokenized engagement programmes. - Partner with external parties to offer their products/services as rewards for employees which they can purchase with points earned in the tokenized engagement economy.

Source: synthesis of company websites from Table 2, literature review and interviews

2.3. Contribution of blockchain technology to employee motivation

After looking at the results of Table X, after looking at the solutions of companies from Table X, and after thorough discussions with 5 industry experts – the author has concluded that the direct contribution of blockchain technology to employees in their work can be divided into three categories of benefit. These categories are:

- giving control to employees over their data;
- removal of friction;
- capturing employee engagement.

This section will explore these categories and describe their implications on employee motivation.

2.3.1. Giving control to employees over their data.

Employees can store their credentials, work experiences, detailed performance indicators and other relevant data on the blockchain. It would take the form of a self-sovereign identity on which information and credentials about an individual are stored. Information stored in the self-sovereign identity of employees will have been verified by universities, past employers... This allows for employees to have a transparent work and qualifications history that can be presented to potential employers with no chance of it being fraudulent. In addition, if all data of employees is encrypted and immutably stored on a blockchain then it can demand for organizations to act objectively when making various decisions about their employees. Employees would have objective proof to combat unethical or biased decisions both in the job application process and internally in an organization.

A transparent record of an employee's professional history

The benefit of easily verifying the past experience of job applicants is undeniable from the perspective of recruiters. Time and resources are being spent in the recruiting processes and any mitigation of this cost will be deemed as valuable by businesses. Having that said, could a transparent record of an employee's professional history be a significant motivator to the employee him/herself?

- A more desirable candidate for recruiters

In the modern recruitment market, artificial intelligence is being increasingly leveraged to match job-seekers and employers. An AI software autonomously screens resumes, motivation letters or any other information provided by the candidate and looks for relevant keywords, key competencies and other, relevant for the specific job, metrics. Although this technology works and is being actively used, it is susceptible to errors. As previously established, employees lie or twist information on their resumes to seem more desirable to the recruiter. Obviously, AI software cannot detect which information is true or false, and this has proven to be a large-scale problem since a failed hire is incredibly expensive for a business.

If an individual has their professional history recorded, verified and encrypted on a blockchain in the form of a self-sovereign identity, then it would provide a recruiter with transparency and confidence when making an offer. A job-seeker would be able to get more suitable offers and enjoy a better employee to company fit.

Generally speaking, the benefits mentioned in the previous paragraph are trivial and the author with the help of interviews with experts did not identify any significant boost that a transparent record of an employee's professional history could provide to their motivation. However, there might be indirect effects that could influence motivation.

Firstly, as already mentioned, the costs associated with recruitment are very high for businesses. If blockchain verified resumes would become more mainstream, then the cost of recruiting would significantly decrease. This cost-saving could potentially result in higher wages for employees. This is highly speculative as businesses are highly likely to simply increase their profit margins with the saved resources instead of increasing the wages of their workers.

Secondly, a high turnover rate is a problem for any organization. Failed hires are not the only factor contributing to a high turnover rate. Employees voluntarily leaving an organization is a common occurrence. With blockchain verified credentials the likelihood of an employee voluntarily leaving an organization would potentially decrease, however again, this is highly speculative and no objective data or proof currently exists to support such a claim. In addition, any potential motivation boost to employees that could occur because of a more advanced job matching software cannot be measured.

Lastly, there could be negative implications to a certain group of employees if credentials stored on a self-sovereign identity become required on a mainstream level. Employees who have the skills but do not have the qualifications for a particular position will be automatically excluded from a candidate pool. This could unproportionally harm members of the third world who have acquired their skills in untraditional ways, for example, through books or the internet.

To conclude, storing the professional history of employees on the blockchain will have trivial effects on employee motivation and will primarily save recruiting costs for businesses.

- An improved recruitment process for freelancers

The motivation of freelancers and temporary workers could be significantly improved as a result of digital credentials. As people move across organizations, as the recruitment markets become increasingly more liquid and as the world is experiencing a shift towards decentralization – the necessity for quick verification of qualifications is in high demand. In the previous paragraphs, it was established that the traditional workforce looking for a long-term relationship with a business does not significantly benefit from storing their credentials digitally, however, it is not the case for freelancers and temporary workers.

The freelancer and temporary worker market is becoming increasingly saturated as more and more employees look for freedom and remote work opportunities. Countless freelancing platforms exist where individuals look for freelancing services. Most of these platforms do not screen their freelancers and those platforms which do, take high fees from both the freelancer and the employer. Blockchain verified freelancer credentials would allow

them to escape from fees taken by platforms and increase their credibility in the eyes of potential employers. Again, this is a process of removing intermediaries. If employers would know with certainty that a freelancer is equipped with the skills they claim to have, they would be much more likely to hire since the demand for verified freelancers is much higher than for unverified ones.

Lastly, if a freelancer's relevant credentials are stored on the blockchain in the form of a self-sovereign identity, then an employer can verify their credentials without even having direct access to them. Information stored on a self-sovereign identity is tokenized, which implies that software can verify the credibility of information without revealing it to the verifier itself. This implies that employees could be sure of the legitimacy of the freelancers they hire without actually seeing the personal information of the freelancer. The freelancers can choose which information to disclose to the recruiter – this could be qualifications and credentials, however, personal information, which is mandatory to make a contract, could be verified but not disclosed.

All of these factors are aligned with some of the key employee motivators from section 1.2. They are the following.

- Money and benefits. Freelancers earn more as they lose dependence on expensive platforms to verify their credentials.
- Satisfying customers. Employers will be more satisfied with an objectively verifiable set of credentials.
- Security. Freelancers do not have to worry about all of their clients having detailed personal information about them.

2.3.2. Removal of friction

Many of the benefits to employee work conditions added by the blockchain technology simply make operations more efficient, whether it is through speeding up processes, removal of intermediaries, reduction of cost, increased interconnectivity or other ways. In short, by leveraging the unique blockchain characteristics – friction can be removed from mundane, routine-like processes and systems. By removing friction and speeding up operations, the workforce as a whole can spend less time on administrative tasks and more on the actual objectives that a particular organization has set for itself. Friction in the workspace can harm the organizational momentum and harm the productivity of employees. Harming employee momentum in the workspace can have a significant impact on employee motivation, therefore, the mitigation of friction made possible by the blockchain technology will be further analyzed.

Streamlining processes

- Payroll and benefits

The HR department spends a significant amount of time and resources on payroll processing. Varying currencies, jurisdictions, local laws and other complications can make this process time-consuming and costly. Blockchain can not only streamline and automate this process but also directly reduce the costs of transactions, especially in payments across varying jurisdictions. Unfortunately, employees are not likely to feel the benefits of these cost savings as businesses will prioritize profit over passing the cost-saving down to employee wages.

By utilizing smart contracts, predetermined wage increases could be programmed into the employee development journey. Replacing aspects of management with lines of code on a smart contract is a more objective, transparent and predictable growth strategy for employees. Managers can be counterproductive to their organizations, therefore, digitizing managerial decisions can improve the quality of decisions about employee development. Furthermore, intuitive reward and benefit structures could be built into smart contracts. Employees could have objective measures that they have the voluntary possibility to complete – and if they do, a bonus is automatically sent to their blockchain wallet. This would bring transparency and clarity to the way extra work is awarded in organizations. These benefits translate to employee motivation in the following ways.

- Increased communication. The communicator in this case being the smart contract which will make objective and transparent decisions about employee growth. As discovered in section 1.2., employees highly value transparency and compensation approaches that accentuate equity.
- Increased independence, money & benefits and employee growth. Regarding employee growth and compensations - workers no longer have to rely on the biased, subjective and often intuitive decisions made by managers. Growth progression and mechanisms of collecting benefits are transparent and built into code. Employees become more independent and gain control over their progression and the salary they receive.
- Recognized achievement, being encouraged, and employee status. Once again, with intuitive employee recognition programmes built into smart contracts employees can be recognized and encouraged by lines of code. Moreover, non-monetary rewards like boosting an employee's status can be programmed into a smart contract after a set of predetermined tasks have been completed.

- Removal of friction and reduced bureaucracy. Employees mitigate the resistance between them and the recognition of their work. It becomes transparent and objective.

- Recruitment

With the combination of credentials stored on self-sovereign identities and smart contracts – the bureaucratic process of hiring an employee or a freelancer can be almost completely automated. There are multiple levels of verification that must be performed in order to legally admit an employee and smart contracts can autonomously complete these verification steps, thereby making an easy and frictionless recruitment process. Once again, freelancers and temporary would be the most prominent beneficiaries of this technology as they are shifting jobs regularly and the speed of changing jobs directly affects their salary and well-being.

- Removal of friction, reduced bureaucracy, money. Freelancers can enjoy a seamless recruitment process which increases the number of jobs they can take in a given time. This way, friction is reduced and a better momentum can be established, all of which will also result in higher pay.

Frictionless collaboration and communication

- Advantages of decentralized data storage and sharing.

The cheap, fast and low-bandwidth data storage and sharing advantages that decentralized data provides can be utilized in multiple business areas, primarily to enhance smooth collaboration and communication. Beowulf has several daughter companies all focusing on some form of communication solutions for organizations. By hosting video conferences, chatrooms, and data sharing platforms on the blockchain – Beowulf is able to achieve a much cheaper and faster exchange and storage of data than competitors which rely on centralized cloud storage. Employees enjoy high-quality video calls and interactive conferences where large data files have to be regularly shared or showcased.

- Reduced friction when collaborating with teammates or other stakeholders.
More efficient data sharing. Increased momentum in the work of employees

2.3.3. Capturing employee engagement

Through the possibilities offered by tokenization, it is now possible to capture employee efforts that have previously been looked over. Tokenization of engagement offers organizations a way to weigh and measure additional employee efforts and incentivize the continuance of these efforts by awarding employees with tokens that they earn by completing predetermined tasks or by being proactive.

Platform tokenization is not necessary to take advantage of blockchain technology when it comes to capturing engagement. Various performance management techniques that utilize blockchain technology can bring objectivity to employee growth.

Tokenizing engagement

- Incentivizing engagement

As already explained, tokenizing engagement can be a powerful tool for incentivizing employees to be proactive, engaged and motivated to do extra work. Organizations can create their own cryptocurrency or use an already existing blockchain made for engagement tokenization purposes. Then companies can create engagement programmes where employees are awarded points for certain activities that promote collaboration, engagement, extra work or anything else beneficial for an organization. These points can be exchanged for tokens. In section 1.1. the characteristics of tokens were explained – tokens can be exchanged for fiat currency or internal company rewards.

Interviews were conducted with the CEO of Whappy and the CEO of THX Network – both companies utilizing blockchain technology to gamify and tokenize the experience and engagement of employees. In addition, an interview with a CTO from eXo platform was conducted. The CTO of eXo platform is also a co-founder of Meeds – a solution attempting to create decentralized global tokenization of engagement. Discussions about the implications of their solutions on employee motivation were conducted. Incentivizing engagement through tokenization checkmarks almost all of the key employee motivators discussed in section 1.2.

Table 3

How tokenizing engagement contributes to employee motivation

Employee motivator	Comments
Promoting internal equity	Since the rewards and benefits are awarded in exchange of tokens/points and points are attained according to objective measures which are the same for everyone – internal equity is maximized and all bias and subjectivity is eliminated
Flexible compensation packages	It is up to the organization to decide what benefits to provide in exchange for tokens. Some examples from already existing businesses entail the following rewards: a lunch with CEO, free lunch, free company products, monetary rewards, training programmes, sports activities, option to work on a project.
Long-term appraisal systems	According to the characteristics of tokenization – if a tokenized business is growing in value – then the value of the token will appreciate with it. If an employee is awarded with tokens and an employee holds on to the tokens then

	they can significantly appreciate in value.
Increased independence and recognized achievement	As already mentioned, if a growth path is transparent and predictable, it gives control to employees over their work. In addition, the reward structures are autonomously recognizing achievement by the allocation of points.
Peer motivation and encouragement	Employees are periodically allocated with a set number of points each month to be given to their colleagues. Such systems incentivize collaboration and a positive attitude.
Increased communication, good managers	Both transparent communication and objective managers can be partially replaced with lines of code in the form of smart contracts.
Offering challenging work, making a difference and doing well	Employers can be innovative with the allocation of points and allow for their employees to push boundaries of what they are capable of, if they choose to do so. Rewarding innovation, creativity or extraordinary effort can all be programmed into smart contracts.
Belief in company	If employees work in a transparent organization with a clear career progression then that would, arguably, increase their belief in the company

Notes: Only some of the key takeaways from the analysed papers are described in the table

Source: *compiled by the author*

There are multiple challenges associated with successful implementation of a tokenized engagement economy into a business. Both from the interviews and websites of companies the following conclusions have been made.

The most important aspect of allocating points for engagement is weighing how many points should be allocated for which activity, and more generally, which activities to even provide points for completing. The effectiveness of a tokenized engagement programme depends on the successful implementation of a point-system. For this reason, companies like whappy.it, exoplatform.com, and meeds.io have extensive guides for a successful implementation of gamification and point allocation strategies.

When discussing the matter with experts, a recurring thought was observed – tokenization of engagement can be counterproductive if the points are not allocated fairly and in alignment with employee performance.

Tokenization of engagement is the area of this paper which is the closest to being actively practised in the world of HR. No mainstream adoption of a particular aspect of blockchain technologies is necessary for tokenization of engagement to work properly.

Conclusion

This paper was attempting to establish a connection between the use of blockchain technologies in HRM and its implications on employee motivation. A surface-level explanation of blockchain technology and relevant terminology was introduced. Furthermore, a review of key employee motivators was done according to over 50 years of studies. Then, after a thorough literature review, the author identified 5 areas of HRM where the blockchain is being utilized. The potential utility of blockchain technology in these areas was explained. Later on, in the empirical part of the research, the author compiled a table of the benefits to employee work conditions that blockchain-utilizing solutions provide. From these benefits, three categories were derived. These categories were *giving control to employees over their data*, *removal of friction* and *capturing employee engagement*. These categories were analyzed and their potential impact on employee motivation was described and the results were approved by industry experts.

The contribution to employee motivation from giving control to employees over their data is speculative. Generally speaking, the only beneficiarie is a freelancer who deeply values privacy desires an anonymous verification of their personal information by their employers. However, once the technology of storing and verifying credentials on the blockchain becomes more mainstream – the market as a whole could experience more accurate job-matching capabilities.

Removal of friction is a less speculative contributor to employee motivation. The capabilities of blockchain technology to remove intermediaries is reducing unnecessary resistance. In the case of HR, the intermediarie is a biased and subjective manager and an employee can be evaluated by smart contracts.

Lastly, the tokenization of engagement has proven to be the biggest contributor to employee motivation.

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Resümee

Käesolevas töös püüti luua seos plokiahela tehnoloogia kasutamise vahel personalijuhtimises ja selle mõju töötajate motivatsioonile. Tutvustati plokiahela tehnoloogia ja asjakohase terminoloogia pinnapealset selgitust. Lisaks tehti ülevaade töötajate peamistest motivatsiooniteguritest vastavalt üle 50 aasta kestnud uuringutele. Seejärel tuvastas autor pärast põhjalikku kirjanduse läbivaatamist 5 personalijuhtimise valdkonda, kus plokiahelat kasutatakse. Selgitati plokiahela tehnoloogia võimalikku kasulikkust nendes valdkondades. Hiljem koostas autor uuringu empiirilises osas tabeli, millist kasu pakuvad plokiahelat kasutavad lahendused töötajate töötingimustele. Nendest eelistest tuletati kolm kategooriat. Need kategooriad olid kontrolli andmine töötajatele nende andmete üle, hõõrdumise kõrvaldamine ja töötajate kaasatuse hõivamine. Nende kategooriaid analüüsiti ja kirjeldati nende võimalikku mõju töötajate motivatsioonile ning tulemused kiideti heaks valdkonna ekspertide poolt.

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