International Journal of Information Management 39 (2018) 1–4

Contents lists available at ScienceDirect

International Journal of Information Management

journal homepage: www.elsevier.com/locate/ijinfomgt

Case Report

Digital enablement of blockchain: Evidence from HNA group

Wenchi Ying, Suling Jia, Wenyu Du*

School of Economics and Management, Beihang University, China

ARTICLE INFO

Keywords:
Blockchain
Digital enablement
IS implementation
Empirical study,

ABSTRACT

Blockchain, the distributed ledger underlying bitcoin, has attracted much attention and stimulated rich discussions. However, extant discussions are mostly conceptual expositions, and empirical evidence of how to use the technology is limited. This case analysis fills this gap by conducting a study on Hainan Airlines (HNA) group, a large conglomerate, which has successfully implemented a blockchain-enabled E-commerce platform to offer employees flexible benefits. The case study unveils that blockchain of value in three ways: 1) issuing cryptocurrency, 2) protecting sensitive information, and 3) eliminating institutional intermediaries. These findings provide a reference point for IT and general managers who intend to use blockchain to digitally enable their organizations further.

1. Introduction

Blockchain is an emerging digital technology that has the potential to disrupt many industries and organizations, and is forcing these industries and organizations to rethink their strategies and capabilities (Schatsky & Muraskin, 2015). Blockchain originates from bitcoin, a cryptocurrency and a peer-to-peer payment system. Blockchain is the distributed ledger used to record bitcoin transactions. Although blockchain and bitcoin are often used interchangeably, bitcoin is in fact just one of many applications of blockchain. Recently, blockchain has attracted attention in its own right, because people have begun to realize that the potential of blockchain goes beyond bitcoin, and the most significant implications of blockchain are those within the walls of organizations (Schneider et al., 2016).

These implications are afforded by key characteristics of blockchain, such as security, reliability, transparency, and immutability. All these characteristics are underpinned by the technical structure of blockchain (Fig. 1).

A block contains information regarding a transaction. Much of this information is stored in the transaction details section. A block also contains a hash number, which is generated based on the transaction information. Should there be any change to this transaction information, the hash number will be significantly different. Therefore, where data in one block are tampered with, modifications can be easily spotted. A block contains not only its own hash number but also the hash number of the previous block. Because of this link, blocks connect with each other and form a chain.

Blockchain is a distributed database whose duplicates are deployed at multiple computers in the blockchain network, known as nodes. There is no central authority in the network, and the network is maintained by the participating nodes. For example, updating information in the database requires the consensus of the participants. This distributed means of storing and managing information is more secure, because it is not subject to a single point of failure. This distributed approach is also more trustworthy because any change to the ledgers will be known to the public.

Given the revolutionary nature of blockchain, it has attracted much attention and stimulated many discussions. However, existing discussions are mostly theoretical expositions and empirical evidence of how to use the technology is limited (Schneider et al., 2016). An important reason is that although many organizations are aware of the potential of blockchain, few have concrete initiatives to implement this technology (Businesswire, 2016).

Our study adopts a case study approach (Pan and Tan, 2011), we conducted a case analysis of Hainan Airlines (HNA) group, which has successfully implemented a blockchain-enabled E-commerce platform that offers flexible benefits to employees. This study reveals that blockchain enables organizations in three ways: 1) to issue cryptocurrency, 2) to protect sensitive information, and 3) to eliminate institutional intermediaries.

2. Case background

HNA Group was founded in 1993 as a local airline operator in Hainan province, China. In the past two decades, the company has transformed from an airline operator to a multi-national conglomerate

* Corresponding author.
E-mail addresses: yingwenchi@buaa.edu.cn (W. Ying), jiasuling@buaa.edu.cn (S. Jia), duwenyu@buaa.edu.cn (W. Du).

https://doi.org/10.1016/j.ijinfomgt.2017.10.004
Received 17 October 2017; Accepted 23 October 2017

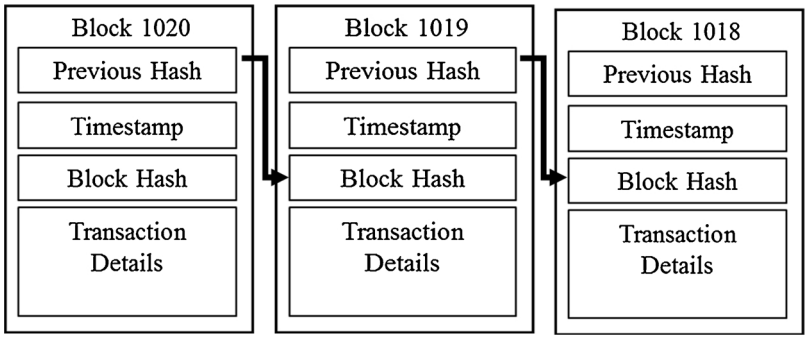

Fig. 1. Technical Structure of Blockchain.

that covers airlines, airports, tourism, hotels, logistics, real estate, and finance. In 2016, the HNA group reaped revenues of over USD 29 billion, placing it 353rd among the 2016 *Fortune 500* Companies.

HNA has over 400 subsidiaries and 180,000 employees. Designing and implementing employee benefit plans that are favored by employees are important tasks for the Human Resource (HR) department. Previously, subsidiaries ran their own employee benefit plans. However, due to the limited scale, these plans often suffered from limited options. For example, some subsidiaries provided employees with gift cards at shopping malls, while others provided employees with certain goods. In both cases, employees did not have many options, and therefore, their experiences were not satisfactory.

Some subsidiaries chose to give employees cash so that employees could have more options. However, when employee benefits were cashed out, 20% would be deducted for tax and this affected the employee experiences as well.

To address this problem, HNA first consolidated employee benefit plans at the headquarters level, and then requested that the headquarters HR launch flexible benefit plans. Flexible benefit plans are a common HR practice among multi-national corporations. A feature of such plans is that employees have more benefit options and do not have to choose from a limited pool of options (Barringer and Milkovich 1997).

To enrich benefit options, the HR department solicited help from the procurement department, which is responsible for managing HNA's 15,000 suppliers. Each supplier offers a set of products that can be sold to HNA employees as an employee benefit. The price will also be competitive, because suppliers can give HNA employees a bulk purchase discount.

At that time, the procurement department was also planning to experiment with blockchain. Managers of the procurement department saw this invitation from the HR department as an opportunity to conduct such an experiment. With the help of blockchain, the procurement department built an internal E-commerce platform, where employees could use their benefit points to purchase a wide range of goods offered by suppliers.

3. Implementation of blockchain-enabled E-commerce platform

With the help of an E-commerce platform, employees had more options to claim their benefits, and suppliers also had an additional channel to sell their products. The implementation of such a win–win arrangement extended across three phases. In the first phase, the procurement department issued digital coins which participants could use to carry out transactions. In the second phase, the procurement department invited suppliers to join the platform. In the third phase, the procurement department integrated the platform with 3rd party E-commence platforms, such as JD.com, to bring in more products from these 3rd parties. Next, we will discuss each of the three phases in further detail, and the roles that blockchain played in these phases.

3.1. Issuing digital coins on the E-commerce platform

To facilitate transactions on the E-commerce platform, the procurement department assigned each participant (i.e. employees and suppliers) a digital wallet. A wallet is an address on the blockchain which can be used to identify the participant and track transactions related to the participant.

When distributing benefits, the HR department deposited digital coins in the employees' digital wallets. These coins were known as benefit coins. Employees could use these coins to purchase goods on the E-commerce platform. After each transaction, the coins were transferred from the employee's wallet to the supplier's wallet. When a supplier withdrew money, coins would be deducted from its wallet and equal amount of money would be sent to its bank account. Currently, one benefit coin equals one RMB.

As compared to the traditional approach of distributing employee benefits, such as gift cards, employees had more options. Moreover, because employees used digital coins instead of cash to make purchases, they did not need to pay tax. Therefore, employee experiences were significantly enhanced.

A primary challenge in issuing digital coins was to build trust around the coins. As Mr. Qin, general manager of the procurement department, noted:

> *"How to convince suppliers that our coins are trustworthy is a key challenge. Even for central banks, people may not entirely trust them, because there are risks of excess money being issued or records being tampered with. A. Blockchain provides an alternative approach that can reduce such risks and create trust."*

On the blockchain-enabled E-commerce platform, all the transactions were recorded by the blockchain network. The transactions were stored in various nodes, and any update of the transactions required the consensus of all the nodes. In doing so, all the transaction records related to the digital coins became publicly visible and could not be modified by any central authority with ill intentions. Meanwhile, because records were stored in various nodes instead of a single location, the risk of records being tampered with was also reduced.

To ensure that all digital coins on the platform could be redeemed and no excess coins were issued, the HR department, when depositing money to employees' wallets, first deposited an equal amount of RMB in a capital pool. This capital pool was managed by a 3rd party company, designated by the government.

3.2. Inviting suppliers to the E-commerce platform

To enrich the product options on the E-commerce platform, the procurement department invited all the suppliers to join. Many suppliers were interested in joining because this increased their customer base.

To participate in an E-commerce platform and transact with a seller, a customer needs to register his/her information on the platform so that the seller can verify his/her identity. However, subsidiaries were