Journal for ReAttach Therapy and Developmental Diversities
eISSN: 2589-7799
2023 January; 6 (1s): 105-113

The Psychological Impact of Adopting a Healthcare Blockchain system- Pros and Cons

[1]Dr. K. D. V. Prasad, [2]Dr. Ridhi Rani, [3]Dr. Rita Rani, [4]Dr. Reetuja Deshpande, [5]Dr. Pooja Kulkarni

[1]Assistant Professor (Research), Symbiosis Institute of Business Management, Hyderabad
Symbiosis International (Deemed University), Pune, India.
[2]Assistant Professor, Symbiosis Institute of Business Management, Hyderabad, Symbiosis International (Deemed University), Pune, India.
[3]Senior Consultant Radiation Oncologist & Palliative Care Incharge, Centre Principal investigator NCDIR. Mahavir Cancer Sansthan and Research Centre, Patna, Bihar, India. **Orcid id 0000-0001-6730-5421**
[4]Assistant Professor, Department of Business Administration and International Business,
MIT Arts Commerce and Science College, Alandi, Pune, Maharashtra, India.
[5]Assistant Professor, Department of Computer Science and Technology, Vishwakarma University, Pune, Maharashtra, India.

Received: 26-October-2022
Revised: 29-November-2022
Accepted: 30-December-2022

ABSTRACT

This research aims to provide a quantitative examination of blockchain technology in healthcare in order to better understand its potential applications and draw clearer conclusions about its potential pros and cons.The study employed the use of a simple random sampling method by the researcher. The entire sample size for this study is 387 personnel working in hospitals. The study's data gathering went smoothly, though, because 387 personnel working in hospitals were chosen at random. After researching the pros and cons of blockchain psychological impact on healthcare sector is studied. Prior to distribution, the questionnaire is mapped out and checked for reliability. In this article, experts from many fields who are at the vanguard of blockchain conceptualization, development, and implementation offered their perspectives. The findings will aid scientists in pinpointing healthcare applications most suited for blockchain technology.Even while the use of blockchain technology in healthcare is still in its infancy at present, its potential benefits are enormous. Technology has not been widely implemented in the healthcare industry just yet, but this is expected to change. Few studies have been conducted on the topic, highlighting the need for greater investigation into practical applications.

Keywords: Blockchain, Psychological, Healthcare, Industry

1. INTRODUCTION

The healthcare business faces a significant challenge in regards to the management & secure retrieval of the massive volumes of personal health data created by its day-to-day activities (Zhang, Xue, & Huang, 2016).Wearables and other healthcare monitoring technology create enormous volumes of unique health data. Data about people's health is notoriously difficult to obtain, is not standardised amongst systems, and is difficult to analyse, apply, and disseminate(Cai & Zhu, 2016). They come from various places and are stored in a few centralised IT systems, which makes it difficult to manage and share(Ismail & Materwala, 2020). It takes a lot of time and energy to request, deliver, receive, and compile patient data. When stored and retrieved securely, this information empowers healthcare systems to provide more complete portraits of their patients, leading to better care, more effective communication, and better health outcomes(Shahnaz, Qamar, & Khalid, 2019). Further issues plaguing the healthcare sector(Tariq, Qamar, Asim, & Khan, 2020). Recent public health emergencies have brought into sharp focus the healthcare system's inability to communicate with one another. Finally, healthcare data security is a major concern in the healthcare sector(Dorri, Kanhere, & Jurdak, 2017). Many hospitals and other medical facilities use antiquated legacy information technology systems to hold patients' sensitive medical data, making them easy targets for ransomware and other forms of cybercrime(Kotz, Gunter,

Kumar, & Weiner, 2016). The concept of patient-driven interoperability, in which individuals take charge of their own health data interchange, has recently gained traction. Patient privacy, data integrity, quality, and accuracy are only some of the problems with today's healthcare information systems(Chukwu & Garg, 2020). There are significant problems in the healthcare system, and professionals are looking to new technologies to find solutions. Therefore, there is a pressing need for cutting-edge technology that can aid in the transition to interoperability that is focused on the needs of individual patients. Patients should be at the core of the healthcare ecosystem, and blockchain technology can help alleviate some of the interoperability problems that have arisen(Singh & Madaan, 2022). Existing literature on the topic of blockchain technology in the healthcare sector is scant. There is a lack of comprehensive reviews of existing applications in the literature. As blockchain technology develops, it will be important to determine if the blockchain-enabled healthcare system actually helps people get healthier and reduces their risk of developing chronic diseases(Shi, He, Li, Kumar, & Khurram, 2020).

2. REVIEW OF LITERATURE

One of the most transformative technologies of our century is blockchain. In addition to streamlining operational and regulatory verification, it also increases traceability and visibility across the supply chain for a wide range of businesses(Sangpetch & Sangpetch, 2016). By doing this, pending transactions become a complex numerical conundrum. In order to create a block, miners (humans) use computers to solve a puzzle and generate a hash, which is a string of letters and numbers that is completely unique to that block(Agbo, Mahmoud, & Eklund, 2019).Changing the information in even one block might cause a cascade of events that stops the blockchain in its tracks(Conoscenti, Vetro, & De Martin, 2016). As soon as the data is processed by the blockchain, all of the computers in the network confirm simultaneously, establishing an unchangeable digital record(Chowdhury, Colman, Kabir, Han, & Sarda, 2018). To whom and how new blocks are added to a blockchain is a matter left to the discretion of each individual blockchain implementation(Anjum, Sporny, & Sill, 2017). Blockchain's main benefits are the increased transparency and security that come from being able to do business on an immutable peer-to-peer network. Bitcoin and other cryptocurrencies, as well as financial transactions, have made extensive use of blockchain(Kshetri, 2017). As suggested by (Raval et. Al, 2017) the field of healthcare is one that is experiencing rapid growth right now. Current medical facilities, which provide the most cutting-edge therapeutic services available, employ a sizable amount of medical, paramedical, and care staff. This is because these facilities provide an extensive range of therapeutic services. Managing this significant amount of human resource activity in these hospitals are a high priority assignment because they require assistance with human resources around the clock. The Human Resource Management department of rehabilitation centres hopes to find employment in a field that possesses certain outstanding qualities.According to Nigar et al. (2018), a framework for an intelligent children's healthcare system based on the Internet of Things (IoT) has been identified. This system protects children from diseases, monitors their development, keeps records, and encourages healthy eating habits through the use of mHealth and edutainment features.According to the findings of Fatima, A. (2021), there are various problems that have not been fully resolved with the implementation of blockchain technology in certain service sectors. The Blockchain Technology seems to be the solution to these problems quickly. The distributed trust and cryptographically protected data that is time stamped that blockchain technology is built on is at the technology's core.There are many interoperability problems in healthcare, and blockchain has the potential to play a pivotal role in resolving some of these issues and shifting the focus back to the patients. Improves safety, privacy, and interoperability; can make patients the focal point of the healthcare system. To recap, blockchain can be used in medical data management systems, mobile applications, and remote monitoring to let individuals keep more control over their own health information.

3. RESEARCH GAP

In the healthcare sector, several companies have already begun developing and distributing blockchain solutions. These organisations' blockchain-based platform and software offers a variety of solutions, including aiding the healthcare industry in securing digital record storage, enhancing the sharing and use of medical data, safeguarding record integrity, and addressing drug traceability and counterfeiting. Later section provides a

summary of several blockchain pro and cons involved in the health care industry that offer proprietary blockchain solutions for various use cases.

4. OBJECTIVES OF THE STUDY

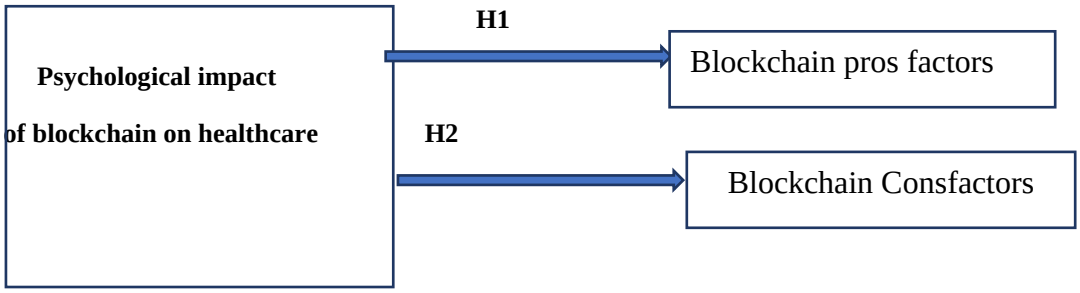
- To identify the blockchain pros factors that influence the psychological impact of adopting a healthcare blockchain system.
- To identify the blockchain cons factors that influence the psychological impact of adopting a healthcare blockchain system.
- To quantitatively assess the blockchain pros and cons factors that influence the psychological impact of adopting a healthcare blockchain system.

Hypothesis of the study

- H01: There is no significant blockchain pros factors that influence the psychological impact of adopting a healthcare blockchain system.
- Ha1: There is significant blockchain pros factors that influence the psychological impact of adopting a healthcare blockchain system.
- H02: There is no significant the blockchain cons factors that influence the psychological impact of adopting a healthcare blockchain system.
- Ha2: There is significant the blockchain cons factors that influence the psychological impact of adopting a healthcare blockchain system.

5. RESEARCH METHODOLOGY

The study employed the use of a simple random sampling method by the researcher. The entire sample size for this study is 387 personnel working in hospitals in Pune, Maharashtra. The study's data gathering went smoothly, though, because 387 personnel working in hospitals were chosen at random. After researching the pros and cons of blockchain psychological impact on healthcare sector is studied. Prior to distribution, the questionnaire is mapped out and checked for reliability.



6. RESULT AND DISCUSSION

Table 1: Age distribution

Age	Frequency	Percentage
18-25	39	10.07%
26-35	76	19.63%
36-45	90	23.25%
46-55	123	31.78%
Above 55	59	15.24%

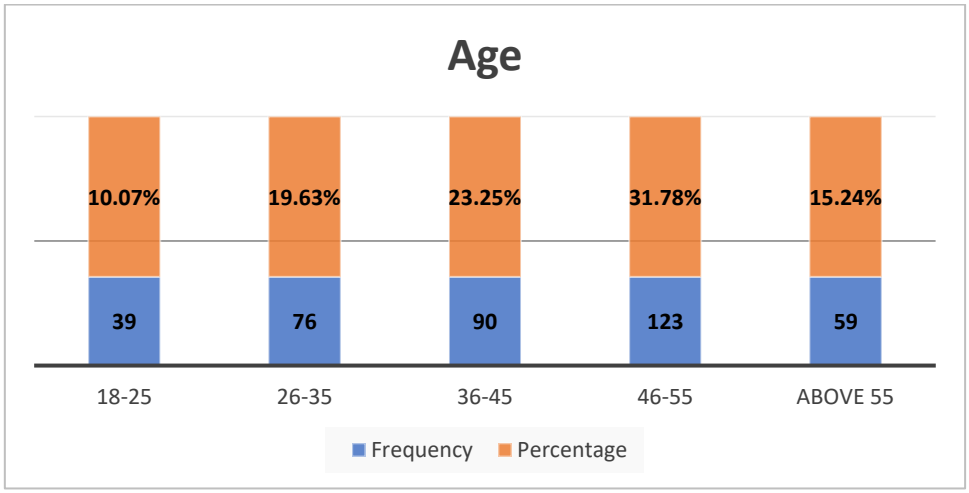


Table 1 stated the age distribution analysis and documented that the majority of employees working the organisations were of the age of 46-55 years (n=123, 31.78%) followed by 36-45 years (n=90, 23.25%). The employees above 55 years of age (n=59, 15.24%) are found to be least in the study.

Table 2:Gender

Gender	Frequency	Percentage
Male	126	32.55%
Female	261	67.44%

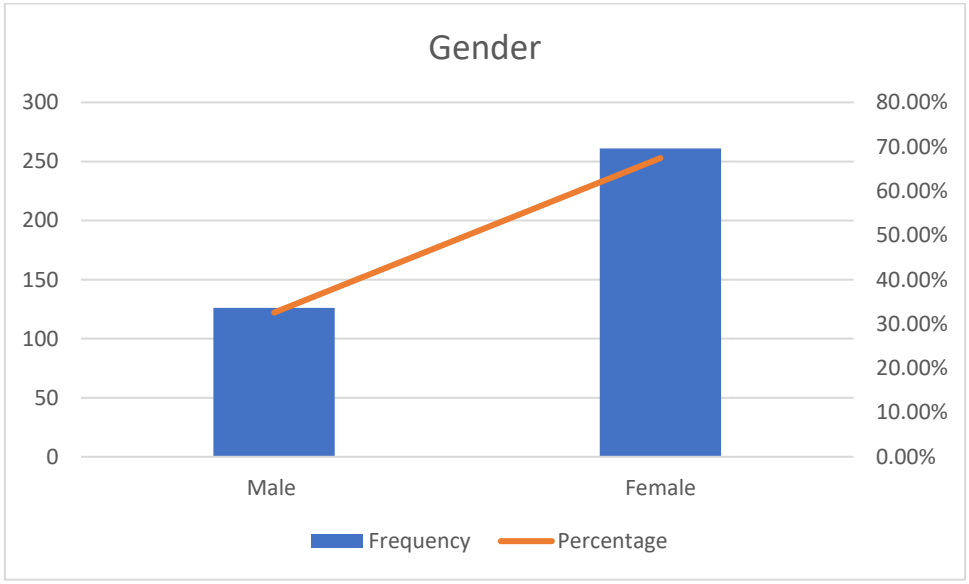


Table 2 found the gender analysis and documented that majority of respondents in the study were Female (n=261, 67.44%). Only male participated in the study were few (n=126, 32.55%).

Table 3: Marital Status

Marital Status	Frequency	Percentage
Single	117	30.23%
Married	150	38.75%
Others	120	31%

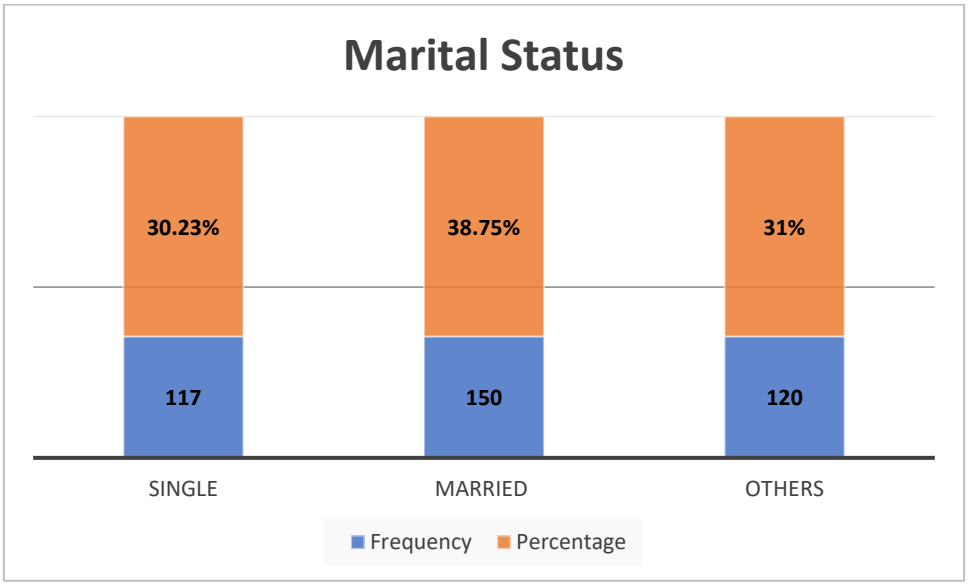


Table 3 documented the marital status and stated that majority of respondents were married (n=150, 38.75%) followed by single (n=117, 30.23%). Others found to be least (n=120, 31%) in the study.

Table 4: Educational Qualification

Educational Qualification	Frequency	Percentage
10th	57	14.72%
12th	74	19.12%
Graduation	77	19.89%
PG & Higher	56	14.47%
Professional degree	123	31.78%

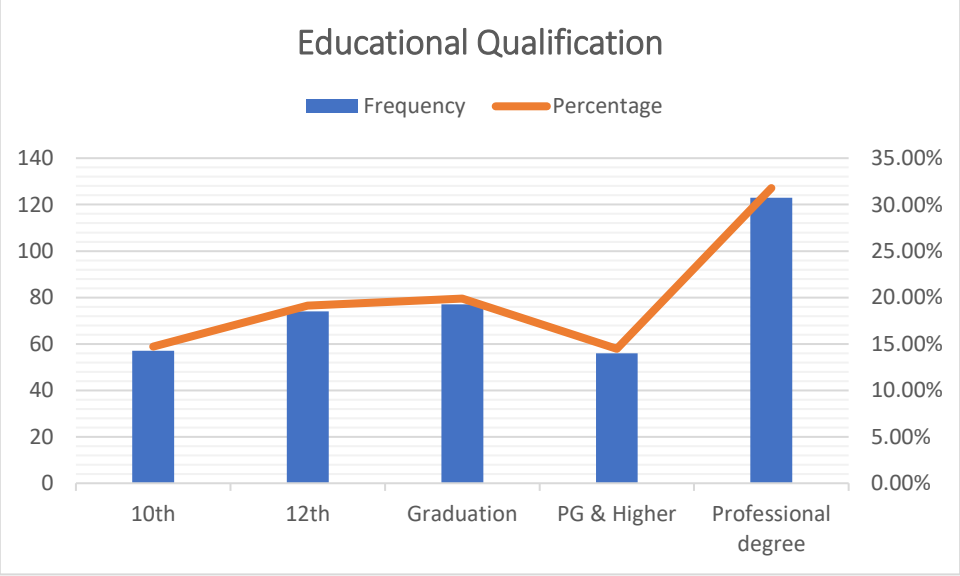


Table 4 stated the educational qualification and documented that majority of respondents holding professional degree (n=123, 31.78%) followed by Graduation (n=77, 19.89%). PG and Higher qualification found to be least in the study (n=56, 14.47%).

Table 5: Annual income

Annual income	Frequency	Percentage
Up to 1,00,000	96	24.80%
1,00,001 - 2,00,000	88	22.73%
2,00,001 - 5,00,000	79	20.41%
5,00,001 – 10,00,000	73	18.86%
Above 10,00,000	51	13%

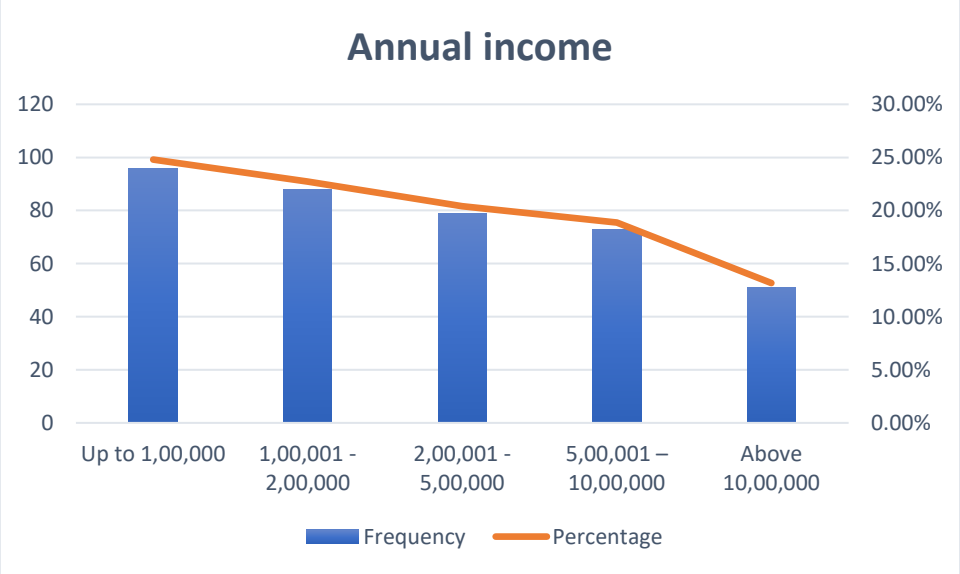


Table 5 documented the annual income and stated that up to Rs. 100000 is the annual income of the majority of respondents (n=96, 24.80%) followed by Rs. 100001-200000 (n=88, 22.73%). Above 1000000 (n=51, 13%) annual income found to be least in the study.

Table 6: Reliability test

S.No.	Factors understudy	Cronbach Alpha	Items
1.	**Blockchain Pros**	9.12	6
2.	**Blockchain Cons**	8.34	5

Table 6 stated the reliability test and stated that the Blockchain Pros (CA=9.12, N=6) estimated Cronbach alpha value is the most followed by Blockchain Cons (CA=8.34, N=5).

Table 7: Descriptive test (Blockchain Pros)

S.No.	Blockchain Pros Factors understudy	Mean	Standard deviation
1.	Patient empowerment	4.79	.132

2.	Compliance tracking	3.56	.542
3.	Revenue management	4.12	.761
4.	Security clinical trials	4.76	.345
5.	Transfer of funds	4.24	.975
6.	Smart Contract control check	3.23	.789

Table 7 documented the estimation of Blockchain Prosfactors understudy and documented that Patient empowerment(mean =4.79 and standard deviation=.132) influence the most as Blockchain Pros factors followed by Security clinical trials(Mean =4.76 and standard deviation=.345). Smart Contract control check(Mean =3.23 and standard deviation=.789) found to be the least Blockchain Prosfactor under the study.

Table 8: Descriptive test (Blockchain Cons)

S.No.	Blockchain Cons Factors understudy	Mean	Standard deviation
1.	Technical challenges	4.75	.056
2.	Organisational challenges	3.78	.067
3.	Government regulations	4.78	.964
4.	Adoption for transformation	4.79	.026
5.	Environmental challenges	3.98	.785

Table 8 documented the estimation of Blockchain Cons factors understudy and documented that Adoption for transformation(mean =4.79 and standard deviation=.026) influence the most as Blockchain Cons factors followed by Government regulations (Mean =4.78 and standard deviation=.964). Environmental challenges (Mean =3.98 and standard deviation=.785) found to be the least Blockchain Cons factor under the study.

Table 11: t test (Blockchain Pros)

S.No.	Blockchain Pros Factors understudy	T test
1.	Patient empowerment	134.234
2.	Compliance tracking	178.011
3.	Revenue management	123.523
4.	Security clinical trials	112.021
5.	Transfer of funds	179.321
6.	Smart Contract control check	129.343

Table 11 documented the estimation of Blockchain Pros factors understudy and documented that Transfer of funds (t=179.321) influence the most as Blockchain Pros factors followed by Compliance tracking (t=178.011). Security clinical trials (t=112.021) found to be the least Blockchain Pros factor under the study.

Table 10: t test (Blockchain Cons)

S.No.	Blockchain Cons Factors understudy	T test
1.	Technical challenges	102.453
2.	Organisational challenges	179.321
3.	Government regulations	123.897
4.	Adoption for transformation	116.123
5.	Environmental challenges	124.021

Table 10 documented the estimation of Blockchain Cons factors understudy and documented that Organisational challenges (t=179.321) influence the most as Blockchain Cons factor followed by Environmental challenges (t=124.021). Technical challenges (t=102.453) found to be the least Blockchain Cons factor under the study.

Hypothesis testing:

The findings of an existing study documented that the null hypothesis "(There is no significant blockchain pros factors that influence the psychological impact of adopting a healthcare blockchain system; there is no significant blockchain pros factors that influence the psychological impact of adopting a healthcare blockchain system)" was rejected and the alternative hypothesis "(There is significant blockchain pros factors that influence t the psychological impact of adopting a healthcare blockchain system) was accepted". This was accomplished by applying descriptive statistics and the t test.

Social implications

The transition to a blockchain-based healthcare system has begun, but only a handful of successful use cases have been documented so far. Due to a lack of reporting, we only have fragmented information at best, with results that are frequently anecdotal and, most importantly, not rigorously tested. In this article, experts from a wide variety of fields who are working at the cutting edge of blockchain research and development discussed their perspectives. This will aid academics in determining which parts of the healthcare system might benefit most from implementing blockchain technology.

7. CONCLUSION AND RECOMMENDATIONS

This literature review discovered that while exploratory research into blockchain's potential healthcare applications is in its infancy, the number of proposed solutions is expanding at an exponential rate. In this study, we saw how blockchain technology's novel techniques for decentralised administration, heightened security, and an indelible audit trail position it as a potential game-changer.In addition to discussing potential healthcare uses for blockchain technology, this study also discussed their potential use cases. The outcome demonstrates that blockchain has the potential to boost healthcare's "access control, interoperability, provenance, and data integrity."Because of its decentralised design, transparent information structure, and immutable record keeping and storage across all participating users, blockchain technology has the potential to assist in reducing the costs associated with these activities. According to the findings of the article, this technology has the potential to make family health management more accessible, to increase patient engagement, to guarantee the availability of patient information, to facilitate direct and secure communication between patients and clinicians, and even more. In addition, blockchain technology can be used to monitor the delivery of drugs and contribute to the deciphering of the human genome. A successful deployment of blockchain technology in the healthcare industry will need a shift in the connections that currently exist between medical professionals, their patients, and the pharmaceutical industry. Prior to the implementation of a blockchain-based reform of the healthcare system, it is required to first settle concerns regarding blockchain technology as well as concerns regarding legal and regulatory issues. The use of blockchain technology to the medical industry, despite the fact that it is only in its infancy at this point, possesses immense promise. The utility of the technology is anticipated to rise over the course of the next several years, despite the fact that it has not yet been widely applied in the healthcare industry. Since there are not many studies on the subject, additional research into the topic's practical applications is required for any future studies on the subject.

REFERENCES

[1]. Agbo, C., Mahmoud, Q., & Eklund, J. (2019). Blockchain Technology in Healthcare: A Systematic Review. Healthcare, 7(2), 56. https://doi.org/10.3390/healthcare7020056

[2]. Anjum, A., Sporny, M., & Sill, A. (2017). Blockchain Standards for Compliance and Trust. IEEE Cloud Computing, 4(4), 84–90. https://doi.org/10.1109/MCC.2017.3791019

[3]. Cai, Y., & Zhu, D. (2016). Fraud detections for online businesses: a perspective from blockchain technology. Financial Innovation, 2(1). https://doi.org/10.1186/s40854-016-0039-4

[4]. Chowdhury, M. J. M., Colman, A., Kabir, M. A., Han, J., & Sarda, P. (2018). Blockchain Versus Database: A Critical Analysis. Proceedings - 17th IEEE International Conference on Trust, Security and Privacy in Computing and Communications and 12th IEEE International Conference on Big Data Science and Engineering, Trustcom/BigDataSE 2018, 1348–1353. https://doi.org/10.1109/TrustCom/BigDataSE.2018.00186

[5]. Chukwu, E., & Garg, L. (2020). A systematic review of blockchain in healthcare: Frameworks, prototypes, and implementations. IEEE Access, 8, 21196–21214. https://doi.org/10.1109/ACCESS.2020.2969881

[6]. Conoscenti, M., Vetro, A., & De Martin, J. C. (2016). Blockchain for the Internet of Things: A systematic literature review. Proceedings of IEEE/ACS International Conference on Computer Systems and Applications, AICCSA, 0. https://doi.org/10.1109/AICCSA.2016.7945805

[7]. Dorri, A., Kanhere, S. S., &Jurdak, R. (2017). Towards an optimized blockchain for IoT. Proceedings - 2017 IEEE/ACM 2nd International Conference on Internet-of-Things Design and Implementation, IoTDI 2017 (Part of CPS Week), 173–178. https://doi.org/10.1145/3054977.3055003

[8]. Fatima, A. (2021). Drivers in the Adoption of Blockchain Technology in the Select Services Sector of India. Kaav International Journal of Economics , Commerce & Business Management, 8(2), 28-34. https://www.kaavpublications.org/abstracts/drivers-in-the-adoption-of-blockchain-technology-in-the-select-services-sector-of-india

[9]. Ismail, L., &Materwala, H. (2020). Blockchain paradigm for healthcare: Performance evaluation. Symmetry, 12(8). https://doi.org/10.3390/SYM12081200

[10]. Kotz, D., Gunter, C. A., Kumar, S., & Weiner, J. P. (2016). Cover Feature Security Threats Health It Privacy and Security Challenges. Computer, 22–30. Retrieved from http://seclab.illinois.edu/wp-content/uploads/2016/07/kotz2016privacy.pdf

[11]. Kshetri, N. (2017). Blockchain's roles in strengthening cybersecurity and protecting privacy. Telecommunications Policy, 41(10), 1027–1038. https://doi.org/10.1016/j.telpol.2017.09.003

[12]. Nigar, N., & Uddin, M. N. (2018). An Intelligent Children Healthcare System in the Context of Internet of Things. Kaav International Journal of Science, Engineering & Technology, 5(4), 93-101. https://www.kaavpublications.org/abstracts/an-intelligent-children-healthcare-system-in-the-context-of-internet-of-things

[13]. Raval, M. M., & Gopalan, D. S. (2017). Challenges Faced by HR Professionals in the Healthcare Industry. Kaav International Journal of Economics , Commerce & Business Management, 4(4), 833-835. https://www.kaavpublications.org/abstracts/challenges-faced-by-hr-professionals-in-the-healthcare-industry

[14]. Sangpetch, O., &Sangpetch, A. (2016). Internet of Things Technologies for HealthCare, 71–76. https://doi.org/10.1007/978-3-319-51234-1

[15]. Shahnaz, A., Qamar, U., & Khalid, A. (2019). Using Blockchain for Electronic Health Records. IEEE Access, 7, 147782–147795. https://doi.org/10.1109/ACCESS.2019.2946373

[16]. Shi, S., He, D., Li, L., Kumar, N., & Khurram, M. (2020). Applications of blockchain in ensuring the security and privacy of electronic health record systems: A survey Shuyun. Computers & Security, 1(January), 1–20.

[17]. Singh, A., &Madaan, G. (2022). Blockchain Technology in Electronic Healthcare Systems. In Blockchain Technology in Corporate Governance: Transforming Business and Industries (pp. 1–23). Scrivener Publishing LLC. https://doi.org/10.1002/9781119865247

[18]. Tariq, N., Qamar, A., Asim, M., & Khan, F. A. (2020). Blockchain and smart healthcare security: A survey. Procedia Computer Science, 175(2019), 615–620. https://doi.org/10.1016/j.procs.2020.07.089

[19]. Zhang, J., Xue, N., & Huang, X. (2016). A Secure System for Pervasive Social Network-Based Healthcare. IEEE Access, 4(c), 9239–9250. https://doi.org/10.1109/ACCESS.2016.2645904