

# Blockchain in Digital World: Establishing New Trust Models in the Recruiting Domain

Anastasiia Gurzhii<sup>1\*</sup> and Najmul Islam<sup>1</sup>

<sup>1</sup> Lappeenranta–Lahden teknillinen yliopisto LUT, Yliopistonkatu 34, 53850 Lappeenranta, Finland

## Abstract

Blockchain technology is generating significant interest in various industries, especially in the area of credential verification during the hiring process. This manuscript examines the challenges faced by both job seekers and employers in credential verification and presents requirements for developing a blockchain-based credential verification platform. Through a series of interviews and workshops with credential holders, career experts, hiring managers, and business owners, we empirically validated the relevance of blockchain for optimizing verification processes. Our findings underscore the need for a user-centered approach that engages not only businesses and HR departments, but also individuals and certificate issuers in implementing blockchain-based systems. The study concludes with recommendations to address the complexities of credential verification aimed at reducing the burden on applicants and increasing confidence in the hiring process.

## Keywords

Blockchain, recruiting, credential verification, long-term sustainability

## 1. Problem Definition

Blockchain has been around since 2008 and while academia is focusing on the theoretical frameworks with benefits and finding areas where Blockchain can be adopted [1, 2, 3], companies resolve local problems and propose solutions that cannot be implemented broadly [4]. Theoretically, Blockchain can be adopted in different domains and it has been gaining more attention worldwide in recent years [5], but the experts' viewpoints from industries should be studied as well. This can help to provide a better collaboration and fulfil the gap between academia and the real business world. To make Blockchain more attractive, technological awareness should be increased, and different viewpoints should be studied to understand whether it can solve problems that are typical in traditional systems in various fields.

To identify the main challenges and gaps, I conducted an SLR on the topic of Blockchain for digital transformation. The main findings revealed, that despite the perceived benefits from Blockchain adoption, several challenges occur and should be taken into consideration. For example, all industries' struggles are linked to data management and confidentiality. Governments are seeking to control industries and all innovative solutions should comply with legal privacy requirements (e.g., European Union General Data Protection Regulation (GDPR)) and it can be a barrier for completely decentralized platforms [6]. Thus, companies will choose more proven data services that governments accept. While the speed of most common technologies, such as ERP or cloud solutions, grab the market share and evolve so fast, Blockchain is nowhere near that [7]. The technology is relevant for narrow problems and a special application is required. But still, there is no specificity about Blockchain sustainability in the long term. There is no unified ecosystem with clearly written rules, standards and regulations [8]. Regardless of the number of industries that implemented Blockchain, continuous development and more experiments are required to unleash its potential [9]. Additionally, the risks related to early development stages and lack of experience with such large-scale solutions should be discovered more [6].

<sup>1</sup>The 15<sup>th</sup> International Conference on Software Business (ICSOB 2024), November 18-20, 2024, Utrecht, the Netherlands

\*Corresponding author.

✉ anastasiia.gurzhii@lut.fi; najmul.islam@lut.fi

ORCID 0000-0003-2187-7509; 0000-0003-2236-3278



© 2024 Copyright for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

Potential Blockchain customers also miss opportunities because of the perceived technological complexity [10]. Blockchain is not a panacea for all companies and with this rush they can neglect other existing possibilities that suit better for their case [11]. Experts with higher managing positions support Blockchain less and are claimed to be more sceptical about new technologies benefits [9]. They are ready to adopt it only when benefits and effectiveness are vivid [12] and compliance with legal regulations is established. Consequently, reputation and experience are the most common sources of trust in industries [13] and in the beginning, a lot of effort is needed to overcome all issues.

At the same time, the application of blockchain in the identity verification and management domain has gained significant attention in recent years [14, 15], and self-sovereign identity (SSI) on the blockchain is seen as a possible solution for handling private identity details, yet research gaps do still exist. According to statistics from the European Union [16], more than 23 million non-EU citizens are living in the EU member states. In addition, as per the report, every year on average more than 4.2 million people immigrate to one of the EU countries and 2 million people emigrate from the EU. These numbers are expected to grow due to ongoing wars and conflicts in various parts of the world and the labor shortage in Europe. A recent report [17] states that there would be over 40 million people needing to import different certificates from or to EU countries by 2028.

Overall, it is essential to contribute to the understanding and development of blockchain-based credential verification systems by identifying key requirements, challenges and opportunities for their implementation, especially in the recruiting industry. The existing gap between theoretical foundations and practical applications could be addressed by emphasizing the importance of cross-industry collaboration, regulatory compliance and technological awareness. The study uses a mixed-method approach, combining qualitative and quantitative methods to comprehensively analyze the topic.

## 2. Knowledge Gaps

The increasing demand for efficient, reliable, and secure credential verification systems has led to the exploration of innovative solutions. Traditional methods, often paper-based and manual, are time-consuming, error-prone, and vulnerable to fraud. Digital solutions have emerged but still face trust, data security, and regulatory challenges [18]. Especially, the need for preserving privacy and ensuring compliance with data protection regulations, such as the General Data Protection Regulation (GDPR), has become paramount [19, 20]. In the context of credential verification, privacy preservation is particularly crucial since the data involved often contain personal and sensitive information that could lead to identity theft or other malicious activities if mishandled [21].

A verification service could also be implemented with non-blockchain solutions, for example, with current web technologies and relational databases. However, relying on a public blockchain has the following advantage over a traditional solution: it is not dependent on a single company. First, most of the prior literature on blockchain-based self-sovereign identity is conceptual in nature and thus lacks practical design guidelines for actual implementations and empirical evidence from industry experts [15, 22]. Consequently, there is also a lack of blockchain implementations, and their impacts and challenges in the real world are still not well understood, especially in the recruiting domain. Second, according to the preliminary findings, some Blockchain solutions are being used but are not yet available to the majority. Even though the technology is popular and there is a lot of information, it is mostly theoretical, and the emphasis is more on creating a problem that blockchain can solve, rather than the other way around. This leaves a certain imprint and suggests that more research should be done among those who use the technology preferably over a longer period. Consequently, the manuscript aims to identify the requirements for implementing blockchain-based credential verification solutions and answer the following research questions:

1. RQ1: How can a blockchain-based user credential verification system improve trust, transparency, and integrity?
2. RQ2: What are the factors that influence the technology adoption in the recruiting domain?
3. RQ3: What factors should be taken into account during blockchain-based solutions development and adoption in the recruiting domain?

### 3. Research Method

While the purpose of this work is to create new knowledge and supplement existing findings with new evidence, mixed methods will be used. The chosen research design will be both qualitative and quantitative. Such a combination helps compare collected data, to find contradictions between findings. At the same time, the reflection of participants’ points of view and their experiences will be grounded in the final paper. Methodological flexibility is another reason because it can be adaptable for many study designs and helps elucidate more data than only in one research. The research is strong because its objective is the development of new solution concepts. For a design-based framework the eight components of an information systems design theory [23]. For empirical data that will be collected from specialists utilizing the BRT (behavioural reasoning theory) [24]. To analyze the collected data and classify issues the Gioia method is used [25]. Through the use of frameworks such as behavioral reasoning theory (BRT), Gioia method for data classification, and design-based information systems theory, the study provides a robust and adaptable approach to create innovative, reliable, and scalable blockchain solutions.

### 4. Timeline

The expected graduation time is February 2026 at the latest. Figure 1 presents the estimated plan for the remaining PhD time.

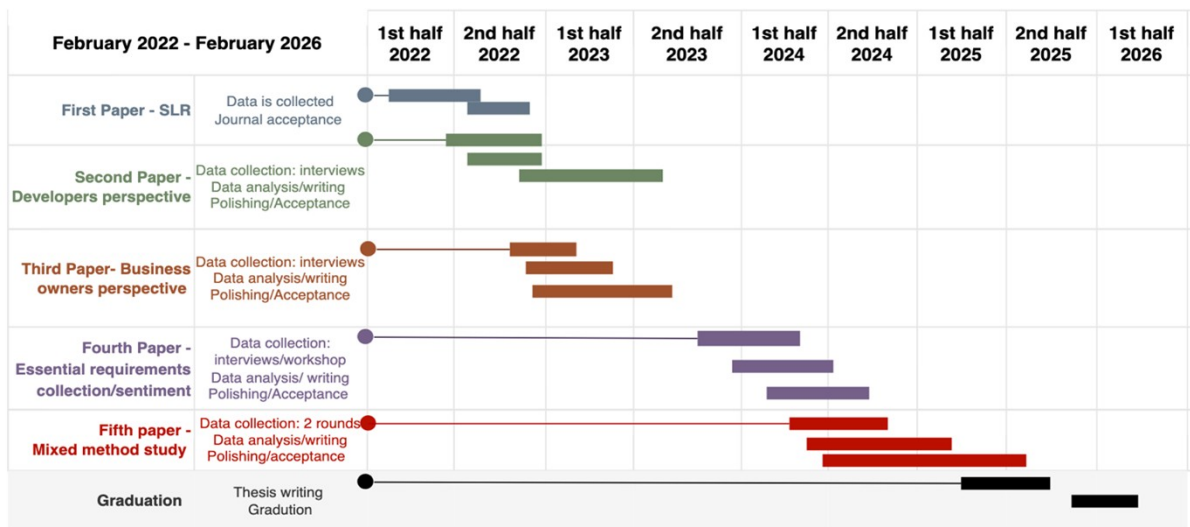


Figure 1: PhD process timeline

The estimated schedule is for four years. The results trajectory is on a half-year basis and will be updated every six months. I plan to create a manuscript out of 5 papers. While one paper is a systematic literature review, three papers are qualitative, the fifth one will focus on quantitative data analysis.

### 5. Preliminary results

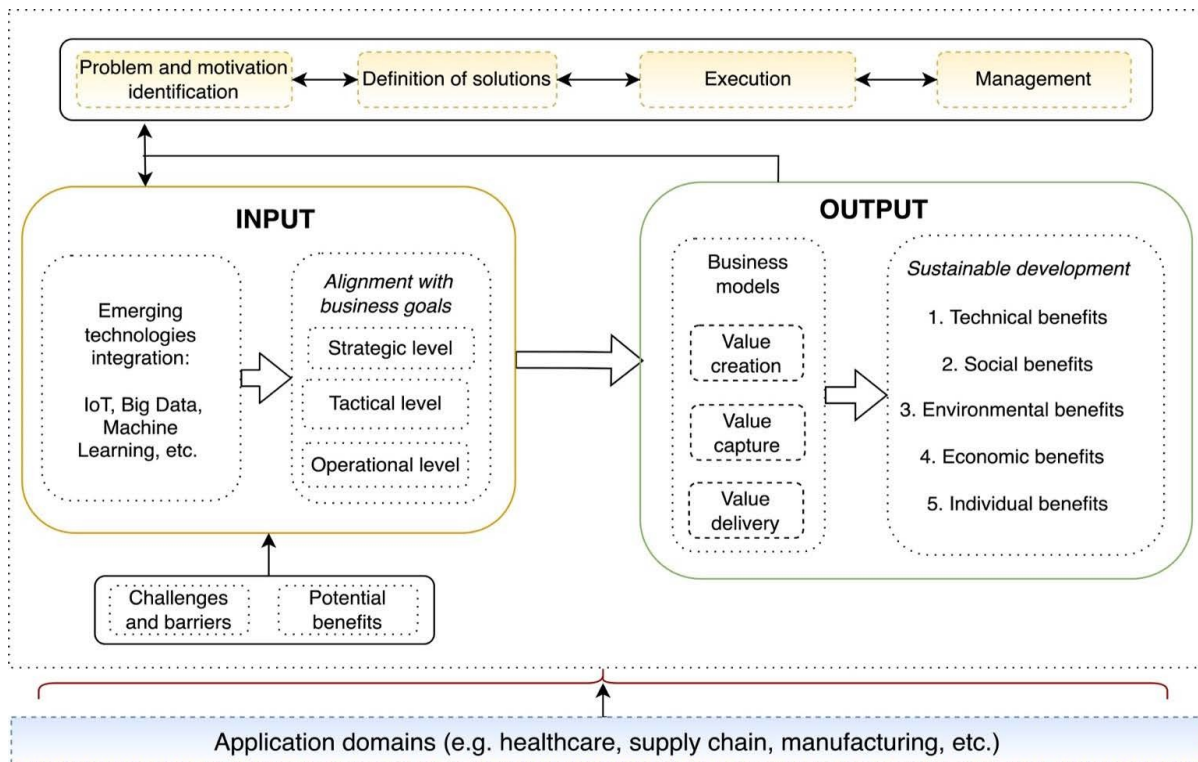
There are 4 papers so far. Table 1 presents the publication plan. The last and the biggest one is still in progress.

Table 1: Articles list

Article	Topic	Publication date	Source
1	Blockchain Enabled Digital Transformation: A Systematic Literature Review [26]	07.2022	IEEE Access
2	Blockchain Adoption Decision-Making Process in Business: An Empirical Study [27]	11.2023	I3E 2023 Conference
3	Understanding the Challenges Surrounding Decentralized Applications: An Empirical Study [28]	11.2023	I3E 2023 Conference
4	Designing a Blockchain-Based Credential Verification System for Improving Global Mobility of Workforce	-	ICSOB 2024

### 5.1. Systematic literature review

The future growth and development of blockchain will depend on how well management models are adapted to the specific needs of individual companies and their ability to remain flexible. Based on the current review, research in this field is scattered across various transdisciplinary areas.



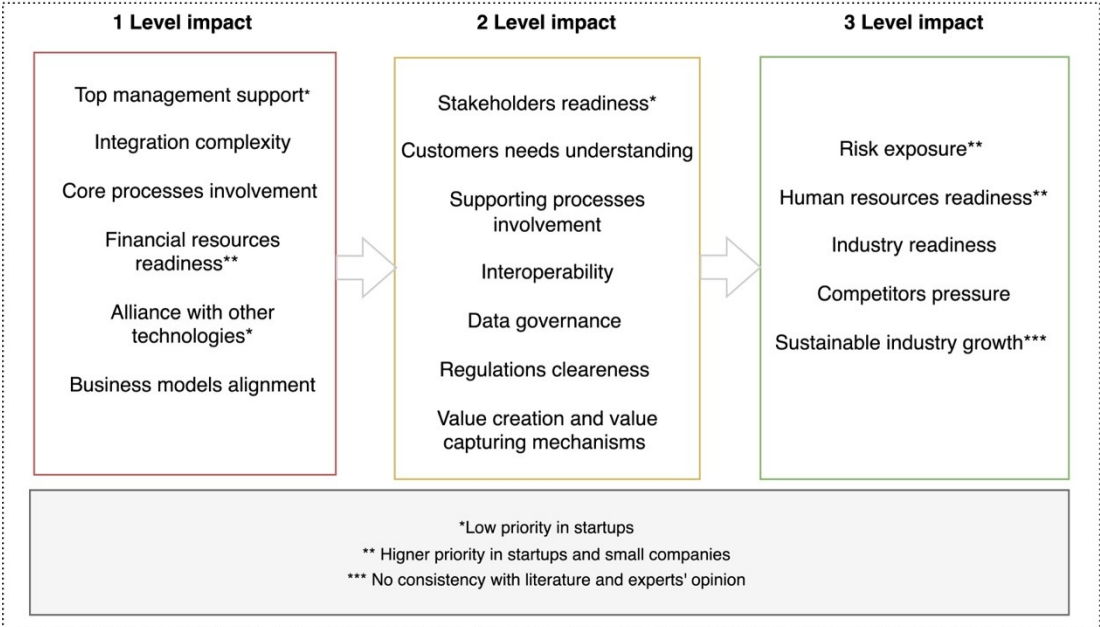
**Figure 2:** Comprehensive framework for blockchain in digital transformation

The increasing focus on blockchain’s role in digital transformation has sparked interest among researchers. The key themes identified include: 1. challenges and barriers; 2. perceived benefits; 3. drivers of digital transformation: emerging technologies. These themes were further broken down into sub-themes to provide a more nuanced perspective. The in-depth literature review emphasizes the critical role that digitalization plays in facilitating the transition to blockchain technologies.

First, it is important to identify the business process that requires digital transformation using blockchain with an appropriate motivation and identify the specific problem that should be addressed. It provides an awareness of the problem and the importance of resolving the problem with blockchain. Second, developing the blockchain solution that solves all the complexities of the problem identified earlier and should satisfy all the business goals (Strategic, Tactical, Operational Level). A solution can be developed based on any new technology, including blockchain, taking into account its potential benefits and barriers. Third, the solution must be implemented to establish the required functionality and conduct activities such as experiments or simulations to see how well the developed solution solves the problem. Fourth, in the management phase, all processes and interactions in the organization are changed to facilitate the digital solution. At this stage, the decision makers in the company must determine whether to make adjustments and go back to previous steps or move forward.

### 5.2. Blockchain-based solution adoption process: evidence from business

In this study, we identified the key dimensions that business professionals consider before adopting blockchain at the corporate level and developed a decision-making framework to support the adoption process. Our research led to several conclusions [27].



**Figure 3:** Blockchain adoption decision-making framework

First, we contributed new empirical insights, emphasizing the need for a broader perspective when approaching blockchain adoption. Second, through data analysis using the Gioia method, we identified five core dimensions and 18 sub-dimensions related to blockchain utilization. The framework was validated through a second round of interviews with five experts, revealing that the decision-making process and prioritization of these dimensions vary depending on factors such as company size and blockchain awareness. Third, a deeper understanding of business perspectives highlights numerous areas for potential improvement in the adoption process.

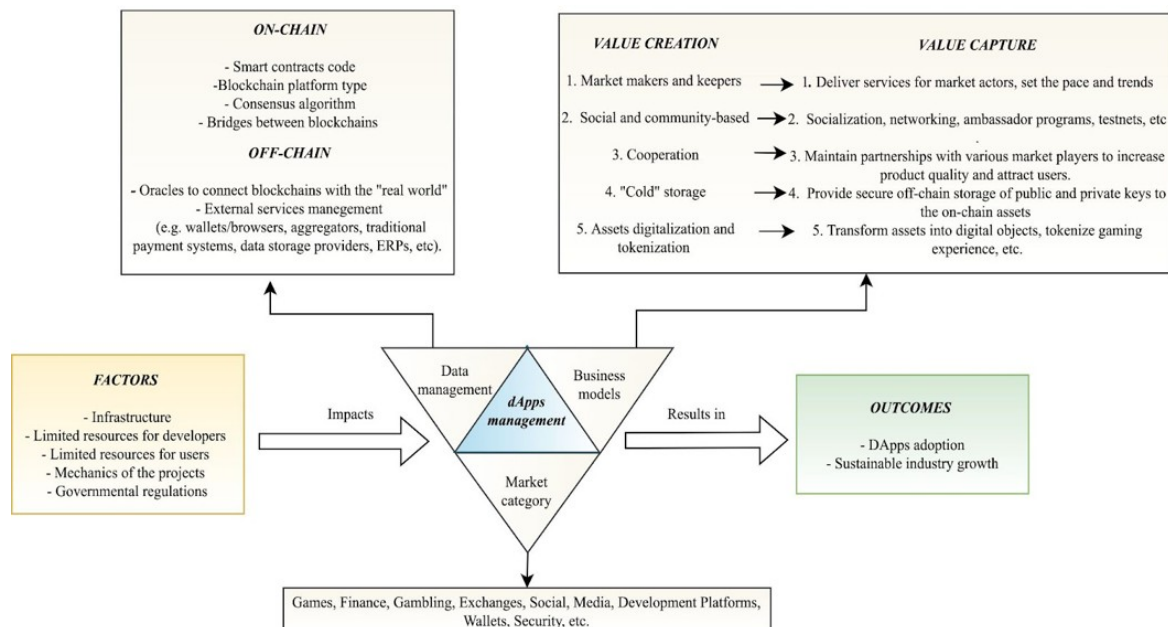
Afterwards, we provide a detailed description of all dimensions and their prioritization according to experts' comments. We divide impact factors into 3 levels to explain the most crucial ones for practitioners. For example, we found that top management support and the technology integration complexity are considered highly important ones, while industry readiness and competitors' pressure do not hinder business people from blockchain adoption. Second, under the prior research, we identified that there is no clear answer when to use blockchain at the corporate level. Our results revealed that it is highly important to consider all dimensions in specific requirements, challenges,



and potential benefits of blockchain adoption. This results could support the adoption process of blockchain-based systems in recruiting domain as well.

### 5.3. Challenges surrounding blockchain-based application

Investigating the development of decentralized applications (dApps) from the developers' perspective is important because developers are the primary architects that translate the theoretical principles of blockchain into functional systems. Understanding their perspectives, challenges, and decision-making processes can shed light on practical barriers such as usability, scalability, and regulatory compliance that are often overlooked in conceptual studies. In the context of credential verification, this perspective is particularly valuable for identifying the technical and design considerations needed to balance decentralization, data security, and user privacy while complying with standards such as GDPR. In addition, feedback from developers can help provide practical frameworks and best practices to help create more efficient, reliable, and user-friendly dApps. By focusing on their experiences, the research can help bridge the gap between the theoretical potential of blockchain and its real-world applications, advancing knowledge on how to effectively implement and maintain blockchain-based systems in sensitive areas such as credential verification. The study of existing dApps has led to several key conclusions [28].

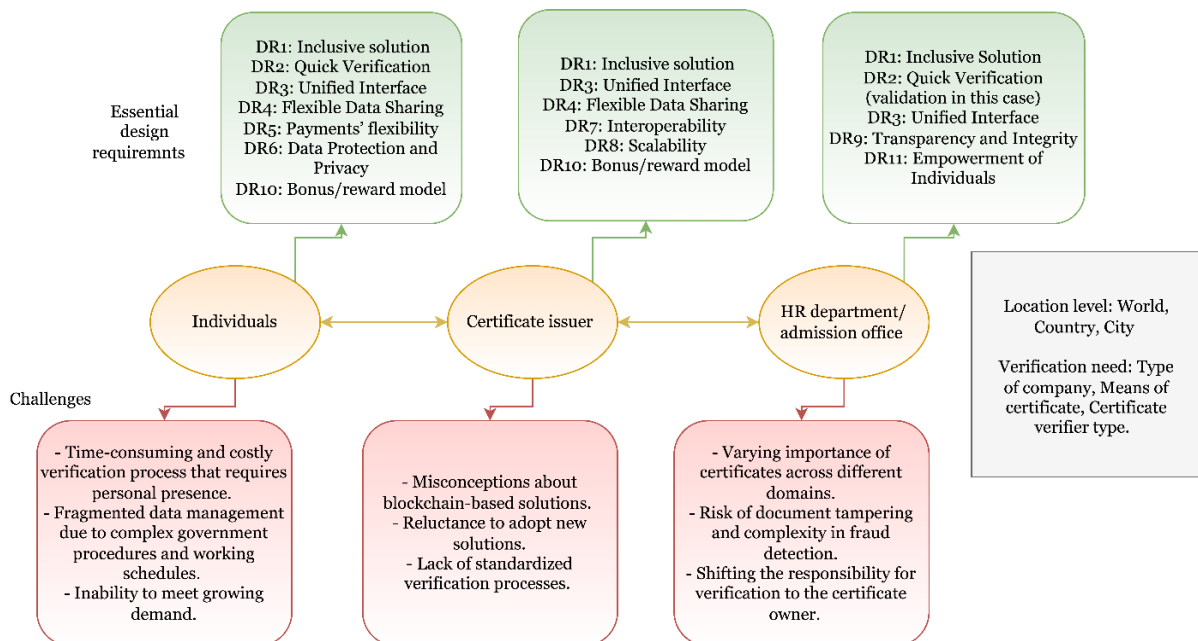


**Figure 4:** Conceptual framework of dApps management

First, even though the decentralized applications (dApps) sector is gaining momentum, it remains underdeveloped. A significant portion of the population lacks sufficient knowledge of blockchain technology, which some developers take advantage of by creating low-quality projects. Second, the lack of government involvement and standardized regulations has created an open space in which low-quality projects can flourish. This environment allows small, low-budget teams to demonstrate their potential and gain market share in various sectors. Third, while progress is uneven, it is still progress. A closer look at the market reveals many areas for improvement and a surprisingly small group of developers focused on building high quality products. Finally, the maturity level of dApps' user interface currently ranges from "user-hostile" to "developer-centric", with little attention paid to "user-centricity". It will likely take several years for this area to fully mature, and there is significant room for improvement.

## 5.4. Essential requirements for a blockchain-based solution in the recruiting domain

This paper is currently accepted but has not published yet. Blockchain technology has recently attracted significant attention in various fields. In this study, we investigated the challenges faced by job seekers and employers in the recruitment process in relation to credential verification and identified the key requirements for developing a blockchain-based credential verification platform. Our research has led to several key findings. First, we empirically validated the importance of blockchain-based verification systems for credential holders and career professionals. Second, the data collected through interviews and workshops allowed us to formulate key design requirements to guide the development of future systems. Third, a closer examination of HR managers' and business owners' views on verification processes revealed that there is a heavy burden on applicants.



**Figure 5:** A framework for scoping blockchain-based verification solutions

This underscores the need to focus not only on the interests of businesses and HR departments but also on engaging individuals and certificate issuers in the adoption of blockchain-based verification systems.

## 5.5. Reasons that affect the adoption intention in the recruiting domain

This study is currently in progress. For now, there are 293 responses from experts that somehow involved in the recruiting process. The main objective of the paper is to analyze values, reasons for and against that affect the adoption intention of blockchain-based credential verification solutions.

## 6. Expected contribution

Ideas, that will be presented in the manuscript are relatively new and still, there is limited empirical evidence from specialists in various EU countries from the recruiting domain. The findings may supplement existing studies and increase the trust among blockchain users. When the technology implementation has a positive impact on the companies' operational capabilities as well as business transformation (e.g. in the supply chain), some blockchain features (e.g. traceability, transparency, decentralization, etc.) will attract users and encourage them to discover more about the technology in other spheres. But at the same time, it can weaken the position because of full traceability and data transparency. That is why future practitioners can use the results as a basis for development,

adoption and establishing trust. The findings are aimed to be universal and not limited to one industry. A new perspective may increase the number of research that is linked with actual cases, not a plain intention to adopt the technology considering possible limitations. My proposed research project is significant, current and will influence theory as well as policy. Shortly, the expected contribution is:

1. Empirical Validation of Blockchain in Credential Verification.
2. Identification of essential Design Requirements.
3. Practical Recommendations for System Development based on the comments from industry experts.

## References

- [1] L'Hermitte, C., and Nair, N. C. "A blockchain-enabled framework for sharing logistics resources during emergency operations". *Disasters*, 45(3), (2020) 527–554.  
<https://doi.org/10.1111/disa.12436>.
- [2] Du, X., Qi, Y., Chen, B., Shan, B., and Liu, X. "The Integration of Blockchain Technology and Smart Grid: Framework and Application". *Mathematical Problems in Engineering*, (2021), 1– 12.  
<https://doi.org/10.1155/2021/9956385>.
- [3] Ebinger, F., and Omondi, B. "Leveraging Digital Approaches for Transparency in Sustainable Supply Chains: A Conceptual Paper". *Sustainability*, 12(15), (2020) 6129.  
<https://doi.org/10.3390/su12156129>.
- [4] Mattila J. The blockchain phenomenon-the disruptive potential of distributed consensus architectures. URL: <http://www.brie.berkeley.edu/wp-content/uploads/2015/02/Juri-Mattila-.pdf>.
- [5] Bektenova, G. S. Are Regtech, Fintech, Blockchain the Future? FinTech and RegTech: Possibilities, Threats and Risks of Financial Technologies. (2018).  
<https://doi.org/10.18502/kss.v3i2.1525>.
- [6] Andoni, M., Robu, V., Flynn, D., Abram, S., Geach, D., Jenkins, D., McCallum, P., and Peacock, A. Blockchain technology in the energy sector: A systematic review of challenges and opportunities. *Renewable and Sustainable Energy Reviews*, 100, (2019), 143–174.  
<https://doi.org/10.1016/j.rser.2018.10.014>
- [7] Kend, M., and Nguyen, L. A. Big Data Analytics and Other Emerging Technologies: The Impact on the Australian Audit and Assurance Profession. *Australian Accounting Review*, 30(4), (2020), 269–282. <https://doi.org/10.1111/auar.12305>
- [8] Lakshmi Naga, M. V. N., and Sai Sricharan, Y. V. N. Blockchain: Single Source of truth in Shared Services? An Empirical Paper on the Relevance of Blockchain for Shared Services. *International Journal of Recent Technology and Engineering (IJRTE)*. (2019).  
<https://www.ijrte.org/wp-content/uploads/papers/v7i6/F2763037619.pdf>.
- [9] Yang, C. C. Development of an integrated model of a business excellence system. *Total Quality Management and Business Excellence*, 20(9), (2009), 931–944.  
<https://doi.org/10.1080/14783360903181610>.
- [10] Knauer, F., and Mann, A. "What is in It for Me? Identifying Drivers of Blockchain Acceptance among German Consumers". *The Journal of the British Blockchain Association*, 3(1), (2020), 1–16. [https://doi.org/10.31585/jbba-3-1-\(1\)2020](https://doi.org/10.31585/jbba-3-1-(1)2020)
- [11] Lohmer, J., and Lasch, R. "Blockchain in operations management and manufacturing: Potential and barriers". *Computers and Industrial Engineering*, (2020), 149, 106789.  
<https://doi.org/10.1016/j.cie.2020.106789>.



- [12] Liang, T. P., Kohli, R., Huang, H. C., and Li, Z. L. "What Drives the Adoption of the Blockchain Technology? A Fit-Viability Perspective". *Journal of Management Information Systems*, 38(2), (2021), 314–337. <https://doi.org/10.1080/07421222.2021.1912915>.
- [13] Qian, X. A., and Papadonikolaki, E. "Shifting trust in construction supply chains through blockchain technology". *Engineering, Construction and Architectural Management*, 28(2), (2020), 584– 602. <https://doi.org/10.1108/ecam-12-2019-0676>.
- [14] Monrat, A. A., Schelén, O., and Andersson, K. "A survey of blockchain from the perspectives of applications, challenges, and opportunities". *IEEE Access*, 7, (2019), 117134-117151.
- [15] Ahmed, M. R., Islam, A. K. M. M., Shatabda, S., and Islam, S. *Blockchain-Based Identity Management System and Self-Sovereign Identity Ecosystem: A Comprehensive Survey*. *IEEE Access*, 10, (2022), 113436–113481.
- [16] Quality report of the European Union Labour Force Survey 2019 – 2021 edition. URL: <https://ec.europa.eu/eurostat/en/web/products-statistical-reports/-/ks-ft-21-003>.
- [17] Identify Verification Industry worth \$21.8 billion by 2028. URL: <https://www.marketsandmarkets.com/PressReleases/identity-verification.asp>
- [18] Ismagilova, E., Hughes, L., Rana, N. P., and Dwivedi, Y. K. "Security, privacy and risks within smart cities: Literature review and development of a smart city interaction framework". *Information Systems Frontiers*, (2020), 1-22.
- [19] Haque, A. B., Islam, A. K. M. N., Hyrynsalmi, S., Naqvi, B., and Smolander, K. "GDPR compliant blockchains-a systematic literature review". In *IEEE Access*. Vol. 9, (2021) 50593–50606.
- [20] Li, H., Yu, L., and He, W. "The impact of GDPR on global technology development". *Journal of Global Information Technology Management*, 22(1), (2019) 1-6.
- [21] Bélanger, F., and Crossler, R. E. "Privacy in the digital age: a review of information privacy research in information systems". *MIS quarterly*, (2011) 1017-1041.
- [22] Schardong, F., and Custódio, R. "Self-Sovereign Identity: A Systematic Review, Mapping and Taxonomy". *Sensors*, 22(15), (2022) 5641.
- [23] Gregor, S. and Jones, D. "The anatomy of a design theory. *Journal of the Association for Information Systems*", 8(5), (2007) 1.
- [24] Claudy, M.C., Garcia, R. and O'Driscoll, A. "Consumer resistance to innovation—a behavioral reasoning perspective". *J. of the Acad. Mark. Sci.* 43, (2015) 528–544 <https://doi.org/10.1007/s11747-014-0399-0>
- [25] Gioia, D. A., Corley, K. G., and Hamilton, A. L. Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods*, 16(1), (2013), 15–31. <https://doi.org/10.1177/1094428112452151>
- [26] A. Gurzhii, A. K. M. N. Islam, A. K. M. B. Haque and V. Marella, "Blockchain Enabled Digital Transformation: A Systematic Literature Review," in *IEEE Access*, vol. 10, (2022), 79584-79605, 2022, doi: 10.1109/ACCESS.2022.3194004.2
- [27] Gurzhii, A., Islam, N., Tuape, M. "Blockchain Adoption Decision-Making Process in Business: An Empirical Study". *New Sustainable Horizons in Artificial Intelligence and Digital Solutions. I3E 2023. Lecture Notes in Computer Science*, (2023) 14316. [https://doi.org/10.1007/978-3-031-50040-4\\_13](https://doi.org/10.1007/978-3-031-50040-4_13)
- [28] Gurzhii, A., Islam, N., Marella, V. "Understanding the Challenges Surrounding Decentralized Applications: An Empirical Study". *New Sustainable Horizons in Artificial Intelligence and Digital Solutions. I3E 2023. Lecture Notes in Computer Science*, (2023), 14316. [https://doi.org/10.1007/978-3-031-50040-4\\_21](https://doi.org/10.1007/978-3-031-50040-4_21)