**** This document is under minor revision and formatting ****
Tiako P.F. (ed) *Competitive Tools, Techniques, and Methods*. Chronicle of Computing. OkIP. CAIS24#19
 https://doi.org/10.55432/978-1-6692-0007-9_16

Prospect for blockchain applications & perspectives: a vision from French Occitanie

Emma Junior Cheukap Djampou, Bernard Kamsu-Foguem

LGP-ENIT (UTTOP) -INPT, Université de Toulouse, 47 Avenue Azereix, BP 1629, 65016 Tarbes, France

ABSTRACT

A blockchain or blockchain, for its part, is a technology for storing and transmitting information without a control body. This document presents the point of view of digital players in Occitanie, which is a French region bordering Spain, on blockchain development projects in different sectors of production of goods and services including energy and health care. The prospects and challenges of blockchain applications are also mentioned.

Keywords: Blockchain, Artificial Intelligence, Industry, Service, Security.

I. INTRODUCTION

Blockchain technology was first applied by economist Satoshi Nakamoto, in the invention of Bitcoin. By extension, a blockchain is a distributed database that manages a list of records protected against tampering or modification by storage nodes; it is therefore a distributed and secure register of all transactions carried out since the start of the distributed system. Blockchain technology is widely used today in innovation companies and even large industries, particularly for its numerous applications in the world of cryptocurrency, through the storage of financial transactions using Bitcoin or any other cryptographic currency, as in the secure and confidential storage of administrative documents or system data. It thus enters the functioning of several industrial sectors and several financial or productive industrial processes such as the supply chain, crowdfunding, the financial sector, stock market transactions, etc.

II. MATERIALS

A significant number of resources were made available to us to identify projects of interest to BIC Crescendo around AI. These resources included two main materials:

- Scientific databases (Google Scholar, ScienceDirect, Elsevier, etc.): These are public databases in which you can find the best educational and scientific resources essential to research. Thanks to these different reliable databases, we were able to clearly define our research area, and we were able to use the different types of articles in the identification of scientific projects around AI and blockchain.
- Meetings with stakeholders in innovation, entrepreneurship and research: Indeed, the identification of innovative projects could be optimized thanks to the various meetings that we could hold with members of the different structures of the company (network of digital experts and fabrication laboratory in particular), with the actors of its partner consortia (Blockchain Commission of the Mêlée Numérique, PRIMES Platform, etc.) and with the various innovation events organized by the BIC Crescendo ("Agile Adour" Event, Event "Entrepreneurship in the feminine way",…). These different meetings allowed us to optimize our identification of interesting project ideas by bringing a more innovative character to them. Thus, thanks to the use of these two resources we could have all the necessary material to identify the different scientific and innovative projects around AI and blockchain

Thus, thanks to the use of these two resources we could have all the necessary material to identify the different scientific and innovative projects around AI and blockchain.

III. METHODS

A working method has been defined based on the filtering of information provided by the different working materials, with the aim of identifying and bringing out ideas for innovative and scientific projects around AI and blockchain. to meet the needs of future calls for projects.

- The filtering of information collected through different phases of a systematic review: that is to say the use of all the resources given with the aim of progressively identifying (so-called "funnel" method). The most relevant databases (ScienceDirect and Google Scholar) and the most relevant resources contained in these databases (journal articles only).
- The writing of a detailed report, in several phases, on the project prospects of the selected sources: the writing of a report which, based on previous results (relevant databases and resources) proceeds to identify the various projects and achievements that have taken place in AI and blockchain in the sectors of activity of the Franco-Spanish partnership.

This is therefore the filtering method which should allow us to identify the different project perspectives around AI and blockchain, likely to respond to future calls for projects and the needs of the Franco-Spanish partnership.

* Corresponding author E-mail: bkamsufo@yahoo.fr

Presented at the 2024 OkIP International Conference
on Automated and Intelligent Systems (CAIS)
in Oklahoma City, OK, USA, and Online, on October 2, 2024

III. Results

A. Theoretical opportunities of blockchains

As a result, blockchain innovations are constantly booming with the aim of promoting blockchain services in several sectors of activity. This is the case of the BLOCK4Coop research project organized by the Interreg consortia of SUDOE and POCTEFA regarding the launch of blockchain in the development of industry 4.0 (aeronautics, metal and construction sectors). This project was based on 4 main objectives, namely:

- Identify needs: Know the development situation, the level of application and the needs of Blockchain technology in industrial companies in South-West Europe.
- Integrate cutting-edge technology: Facilitate the integration of cutting-edge technologies (IoT, Blockchain, BigData) into the industrial sectors of South-West Europe.
- Create a stable collaboration network: Encourage collaboration between government agencies, businesses (especially small and medium-sized enterprises (SMEs)), start-ups, business representatives and technology and knowledge agents.
- Support initiatives: The dissemination and extension of these initiatives by supporting their "exit from the laboratory" to the real contexts of work of the majority profile of small and medium-sized businesses.

B. Practical opportunities of blockchains

We can also cite numerous indications which show the development of blockchain in different sectors of industrial activity, such as:

- Construction industry sector (Kim & Kim, 2024): the authors describe opportunities in construction procurement by studying the extent to which the technology is included into the current project management context. the expected contributions concern (i) reliable data-sharing across project lifecycle/core foundation of effective communication and coordination, (ii) Maximized benefits of entiree supply chain through coordinated & aligned interests/lower costs, increased work efficiency, assured quality of work.
- Agricultural food supply chains (Tang et al. 2024): The work describes the technical, economic, legal, and operational facets of employing blockchain and IoT in the agri-food sector. It underscores the importance of adapting these technologies to fit the diverse socio-economic and infrastructural realities prevalent in African countries. It offers valuable insights to stakeholders in agricultural technology and food safety.
- Energy (Yuan & Wu, 2024): the authors explore the potential for identification the traceability during the green production in combination with blockchain technology. The results indicate that optimizing the use of heat energy and the utilization of resources, but also effectively decreases the energy loss and environmental impact in the production process.
- Blockchain in clinical trials (Castro et al., 2024): the authors show the complexities of integrating blockchain into the sectors of clinical trials and healthcare, explaining the transformative potential of blockchain technology in renovating these areas by tackling challenges and promoting practices of efficient, secure, and transparent research.

IV. Conclusion

In this document, we showed the interest that Blockchain arouses for setting up French-Spanish cross-border projects. Blockchain applications are progressing, but raise certain challenges, including the following points:

- A project to establish a new authentication protocol, applicable to blockchain platforms for managing smart networks, which will thus make it possible to have a new type of authentication system that is less expensive and offers more confidentiality and security.
- A project to optimize the security of IoT data for smart elevators by creating a blockchain platform for the security of this data. The implementation of this project will thus enable the integration of blockchain into intelligent elevator systems.

References

BLOCK4Coop Interreg Sudoe Project, https://block4coop.eu/fr/home-fr/, last accessed September 2024.

Minju Kim, Yong-Woo Kim, Applications of blockchain for construction project procurement, Automation in Construction, Volume 165, 2024, 105550, ISSN 0926-5805, https://doi.org/10.1016/j.autcon.2024.105550.

Andrews Tang, Eric Tutu Tchao, Andrew Selasi Agbemenu, Eliel Keelson, Griffith Selorm Klogo, Jerry John Kponyo, Assessing blockchain and IoT technologies for agricultural food supply chains in Africa: A feasibility analysis, Heliyon, Volume 10, Issue 15, 2024, e34584, ISSN 2405-8440, https://doi.org/10.1016/j.heliyon.2024.e34584.

Bo Yuan, Faguo Wu, Application of thermal energy efficiency utilization based on computer technology in green manufacturing blockchain production traceability, Thermal Science and Engineering Progress, 2024, 102859, ISSN 2451-9049, https://doi.org/10.1016/j.tsep.2024.102859.

Cecilia Castro, Víctor Leiva, Diego Garrido, Mauricio Huerta, Vinicius Minatogawa, Blockchain in clinical trials: Bibliometric and network studies of applications, challenges, and future prospects based on data analytics, Computer Methods and Programs in Biomedicine, Volume 255, 2024, 108321, ISSN 0169-2607, https://doi.org/10.1016/j.cmpb.2024.108321.