IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138

INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

An International Open Access, Peer-reviewed, Refereed Journal

Optimizing Project Timelines with Strategic Vendor Management and Blockchain-Enabled LEAP Collaboration

Abhishek Goyal
Independent Researcher

Abstract—In today's world, it is very important that all the related supplies for operations are managed well, which is specifically important in the LEAP functioning, based on the project needs. This paper seeks to analyse the agility of incorporating blockchain with VMI and strategic vendor management to tackle related issues like inefficiency, misunderstanding, and invisibility. Real-time tracking, automation, and improvement on accountability foster efficient project timelines and better project decisions due to Blockchain's decentralised and immutable structure. Strategic vendor management enhances these benefits by promoting strong relationships, vendor goals and organisation objectives and managing risks. The paper includes emerging issues in blockchain technology including scalability, integration and consumption of power, and their possible resolutions. Further research avenues include examining the link of AI with blockchain, energy-oriented approaches, and sectoral perspectives to unfold the disruptive potential of blockchain in supply chain and vendor ecosystems at their fullest.

Keywords—*Blockchain, Vendor-Managed Inventory (VMI), Supply Chain Management, LEAP Collaboration, Strategic Vendor Management, Project Timelines, Smart Contracts, Transparency, Scalability, Artificial Intelligence (AI).*

I. INTRODUCTION

Supply chain management is a highly dynamic and complex process in the current integrated global economy involving multiple players, countless just-in-time processes, and enormous information assets [1][2]. The use of blockchain solutions that imply decentralised, reliable, and transparent system applications has become widely spread in industries that are based on high levels of trust and data credibility [3]. Once used only in the financial sphere, blockchain is already actively used in many industries: energy[4], government, IoT[5][6], healthcare[7][8], and SCM[9][10]. However, when combined with systems such as Vendor-Managed Inventory (VMI), it has enormous advantages in terms of visibility, security, and information sharing with all the network members.[11][12] It helps organisations like Law, Engineering, Accounting, and Procurement (LEAP) where various stakeholders, including suppliers and project managers, can share and receive clear and verified information[13][14].

In the LEAP organisations, the networking of the different actors implies coordination to achieve project objectives as well as the alignment of the interests of the actors for the performance improvement [15][16]. The initial engagement of stakeholders also helps in aligning the goals of stakeholders where risk and return have to be dealt with in a cooperative manner [17]. It also promotes effective risk management within the project and improves decision-making across various phases of a project. Nevertheless, supervision deficiencies can result in coordination failures, most apparent in large projects such as construction projects where time and cost overruns can Trigger costly implications[18][19]. It is notable here that the strategic vendor management has a central role to manage the vendors' ambition with the project goals such that the quality of the product as well as the service level do not suffer from extra time delays [20][21].

Vendor relationship management and supply chain systems through VMI with integration of blockchain can transform the way business is done. Due to the real-time exposure of inventory records, demand data, and supply chain processes, blockchain VMI systems can minimise costs, increase effectiveness, and optimize the relationship between the vendor and the retailer. Used in industries that involve project-based activities and where time and cost are of the essence, the application of this technology helps the stakeholders to monitor progress more closely and thus enhance the timescales[22]. The combination of blockchain and VMI alongside LEAP collaboration gives a holistic approach towards strategic vendor management within the project environment while deepening efficiency, reliability, and productivity on behalf of all project stakeholders[23]. This paper explores how blockchain-enabled LEAP collaboration, combined with strategic vendor management, can optimise project timelines and improve overall project outcomes.

A. Structure of the paper

The paper's structure is as follows: Section II provides an overview of strategic vendor management and its role in optimising project timelines. Section III explains how blockchain improves LEAP collaboration, focusing on components. Section IV delves into streamlining project timelines with blockchain and vendor strategy. In section V, the author discusses literature review and included other studies. Lastly, section six provides a conclusion before discussing the future direction of the study.

II. Overview Of Strategic Vendor Management And Project Timelines

The management of the vendors and important timelines of the projects are critical factors that would shape the business in a competitive environment [24]. Vendor management encompasses purchasing strategies such as the choice of suppliers, contracting, procurement, and averting supply risks for normal operations with an aspiration towards better costs[25]. However, following project schedule guarantees achievement of goals within the budget and scope hence leading to high customer satisfaction, organizaonal image and competitiveness in the market [26]. Combined, these create efficiencies, minimise risk and allow businesses to capture opportunities that pave the way towards sustainable growth [27].

A. Strategic Vendor Management

Strategic vendor management is a useful and sensible approach to working with business partners to create proper cooperation and results in line with an organisation's strategic plan [28]. It centres on developing effective partnerships with vendors who create and provide value, encourage change, and align their products with your company goals and needs. The key strategies that can elevate vendor management to new heights and ensure long-term success for CIOs are shown in Figure 1.

Fig. 1. Key strategy of vendor management[29]

1) Collaborate Closely with Stakeholders

This is important because by working with other stakeholders one has to satisfy their needs and expectation hence improving on the service delivery. For instance, usability may for project managers, security for IT teams, and cost for the finance teams [30]. Involving all the stakeholders from the beginning helps identify a vendor that best fits the organisation's purpose and helps in implementing those changes.

2) Create Clear Strategies & Policies

Having goals set and documenting policies provide a standard when it comes to dealing with vendors. These include protocols for the selection, reporting, and measurement of performance levels. The planning and training help meet changes in business requirements, and proper appraisal minimises drift.

3) Choose the Right Vendors

This paper calls for careful selection of the right vendor to ease organizational success. These can be established as quality requirements, reliability requirements, or cost requirements [31]. Proposals, references or site visits must be conducted for the assessment of capabilities. Having selected the right partner, specific objectives and goals should also be defined as the partnership should contribute to achievement of the organization's strategic objectives[32].

4) Proactively Manage Relationships

Ensuring that operations go as planned creates efficiency; identifying challenges and solving them before they arise is efficient. The question here is that cooperation is fostered by structured check-ins thus improving the quality of service, the conditions under which it is delivered, and the objectives. This prevents the occurrence of risks and handling of disruptive incidents.

5) Establish Clear Communication Channels

Having clear lines of communication reduces confusion and helps to fast-track issue resolution. Set standards of communication which may include email communication, or any provided vendor's web interface, set schedules for updates and share the communication plan with everyone involved. This keeps information flowing at the right time, thus supporting a good relationship with vendors.

6) Automate Vendor Onboarding

Vendor management which began with the on-boarding process is made easier by automating the flow of submitting information and the compliance tests. This helps in lessening errors increasing the flow of onboarding and at the same time giving real time information concerning the onboarding process. Through automation, it is possible to have a strict compliance and an organized process that triggers the admission of new vendors into an organization.

7) Continuously Monitor Performance

Data collection focuses on aspects such as SLA, response rates among other factors through performance control. Successful implementation of a quality service delivery system is the key to avoiding these problems and boost the standards of service delivery. This make the vendor to be accountable and has good relationship with the organisation.

B. Optimize Project Timelines and Their Steps

In the current dynamism that is characteristic of the business environment, timing is central to the success of any project. It makes work be done effectively and within time and also makes sure that resources are rightly used to achieve project-set goals [33]. It is for these reasons that one has to make sure that the significance of project timeline is appreciated. Project scheduling can be defined as the most important process in relation to the necessary arrangement of different activities and measures within a given project[34][35]. It demands information about the client's needs, goals of the project, and potential limitations. Thus, efficient resource distribution and time management are good predictors of project performance and attaining targeted goals and objectives. Steps to Optimize Project Timeline are:

- **Identify Potential Roadblocks:** Again to avoid any interruptions address issues such as limited resources, divergent priorities or outside dependencies.
- **Address Resource Constraints:** Assess human resource and other resources required in the development process and ensure that you start organising early so that you may not be let down later.
- **Manage Conflicting Priorities:** Have good communication skills and be able to schedule properly in organisations that may have dozens of projects, which can cause a conflict of priorities.
- **Plan for External Dependencies:** There must be identification of third party deliveries like vendors and there must be contingency plan whereby in case of a delay then what has to be done [36].

III. Fundamentals Of Blockchain-Enabled Leap Collaboration

Dramatic advances in technology have avalanched in brand-new structures of organising collaboration within and among industries. Particularly noteworthy is the Blockchain-Enabled LEAP (Ledger-Enhanced Agile Process) Collaboration. This concept enables trust, transparency and efficiency in collaboration through the use of blockchain technology [37][38] When organisations incorporate the blockchain within the LEAP frameworks, they obtain enhanced scalability besides improved integrity and decentralised decision-making. The LEAP

framework also pays much attention to the flexibility of the processes facilitated and the collaboration involved. Originally conceived for software development, LEAP principles emphasize cyclical refinement, change sensitiveness and team autonomy[39]. Its integration with blockchain strengthens these qualities by introducing.

Fig. 2. Qualities of blockchain

- **Secure Communication Channels:** Preserving data that has to be exchanged between the participants and making it changed by unauthorised people impossible.
- **Streamlined Workflows:** Smart contracts automate repetitive tasks, reducing manual intervention.
- **Improved Accountability:** Blockchain's transparency ensures that all stakeholders are held responsible for their actions.

A. Key Components of Blockchain-Enabled LEAP Collaboration

The key components of blockchain-enabled LEAP (Learning, Education, and Academic Processes) collaboration can be broken down as follows shown in Figure 3:

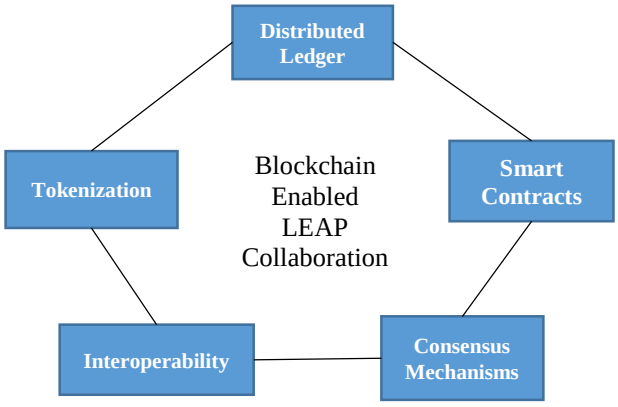

Fig. 3. Key Components of Blockchain-Enabled LEAP Collaboration

- **Distributed Ledger:** A distributed ledger technology known as blockchain is created when the blockchain is spread out across all nodes in a network. To ensure the highest level of redundancy and fault tolerance the replica of the blockchain is maintained at all nodes.
- **Smart Contracts:** Smart contracts are other programs that could run independently within the blockchain. Smart contracts effectively eliminate the need for middlemen to effect agreements hence enables the implementation of a particular agreement in a trust-less and a decentralised manner. These are developed using programming languages specific to blockchain.
- **Tokenization:** The process of tokenisation entails converting physical assets or rights into digital tokens and then placing them on the blockchain. The process of tokenisation makes it possible to represent value on the blockchain and build DApps. Bitcoin and Ethereum's Ether are two well-known examples of cryptocurrencies.
- **Consensus Mechanisms:** To ensure that all nodes are working towards the same, agreed-upon state of the blockchain, a consensus mechanism is used. This system checks that every node in the network agrees that a transaction is legitimate and adds it to the blockchain in the correct sequence.
- **Interoperability:** The capacity for various blockchain networks to converse and collaborate without any hitches is known as interoperability. The expansion of blockchain technology's possible uses and the development of interoperability are two of the most important factors in the ecosystem's overall health.

B. Implementation Challenges

The key challenges associated with implementing blockchain-enabled leap collaboration include scalability, interoperability, security, regulatory barriers, high costs, adoption gaps, energy consumption, and privacy concerns[40][41]. The paper describes their impacts, such as inefficiencies, legal uncertainties, and trust issues, while proposing mitigation strategies like adopting layer-2 solutions, regulatory engagement, and privacy-preserving techniques. This structured approach aids in addressing barriers to successful blockchain integration and collaboration shown in Table I.

TABLE I. IMPLEMENTATION CHALLENGES AND MITIGATION STRATEGIES FOR BLOCKCHAIN-ENABLED LEAP COLLABORATION

Challenge	Description	Impact	Mitigation
Scalability Issues	Blockchain networks face limitations in handling large transaction volumes.	Slower transaction times and reduced efficiency as usage grows.	Implement layer-2 solutions, such as sidechains or off-chain processing.
Interoperability	Varying protocols across blockchain platforms hinder cross-platform integration.	Limited integration with existing systems and collaboration across networks.	Use standardisation frameworks and cross-chain technologies like Polkadot or Cosmos.
Security Concerns	Vulnerabilities such as 51% attacks and smart contract exploits.	Potential breaches or financial losses undermining system trust.	Conduct regular security audits, use robust encryption, and develop secure smart contracts.
Regulatory Barriers	Inconsistent and unclear regulations across regions and industries.	Legal uncertainties hindering adoption and collaboration.	Engage with regulators and ensure compliance with regional laws and standards.
High Initial Costs	Significant investment is required for infrastructure and skilled personnel.	Limited adoption by smaller organisations due to financial constraints.	Leverage consortium blockchains or cloud-based BaaS solutions to lower upfront costs.
User Adoption & Skill Gaps	Resistance to new technology due to lack of understanding or expertise.	Slow integration and reduced effectiveness of collaboration.	Offer training programs, workshops, and user-friendly interfaces.
Energy Consumption	High energy requirements for consensus mechanisms like Proof of Work (PoW).	Environmental concerns and increased operational costs.	Transition to energy-efficient mechanisms like Proof of Stake (PoS) or delegated PoS.
Data Privacy Concerns	Blockchain's transparency may conflict with privacy requirements.	Difficulty in meeting data protection regulations like GDPR.	Incorporate privacy-preserving techniques like zero-knowledge proofs or permissioned blockchains.

IV. STREAMLINING TIMELINES WITH BLOCKCHAIN AND VENDOR STRATEGY

Streamlining timelines in project management is crucial for ensuring efficient execution and timely delivery of deliverables across various industries[42]. The conventional approaches to schedule management of a project project often come with various problems as like as time slip, communication problems, resource driven problems and problems in dealing with the vendors [43]. These challenges are well handled by blockchain technology since it is decentralised, transparent, and can also track every transaction in real-time, helping implement smart contracts to enhance workflow and engagement of multiple players[44][45]v. There is no doubt that through deploying blockchain into vendor management, accountability is boosted besides achieving the intended goals of improving the time of executing projects through reducing delay caused by some vendors[46].

A. Blockchain for Improved Transparency and Traceability

Blockchain enhances transparency and traceability by using a decentralised, immutable ledger to track every project step in real-time. This ensures stakeholders access the same accurate data, reducing miscommunication and bottlenecks caused by outdated information[47]. Verifiable tracking aligns all parties, contributing to more predictable timelines[48].

B. Smart Contracts for Automation and Efficiency

Smart contracts are computer programs that perform actions pre-specified when specific criteria are met, for instance, making payments or proceeding to project stages when a particular task is accomplished [49]. This cuts on the cost of administration, enhances quick processing of decisions, and compliance to time lines. Smart contract-deployed performance indicators, or SLAs, assist in tracking the performance of vendors, boosting project performance.

C. Decentralization for Reduced Single Points of Failure

Blockchain decentralises data and its control and thus brings less reliance on single entities, which causes many getaway from point delays. As it is distributed in nature it provides better protection against events such as cyberattacks or technical malfunctions, helps in providing better disaster recovery and continuity [50].

D. Collaborative Vendor Strategy

The application of blockchain in vendor collaboration engenders trust because it makes all records of interaction transparent and visible. This enhances means lyhoffosting, efficient harmonisation and cooperation to ensure that meant timelines are met. Vendor data such as historical performance data and sales that are stored in the blockchain also improves other areas of selection such as efficiency of operations [51].

E. Faster Payment and Settlements

Payments can now be made instantly and securely through blockchain and there is no need to go through long financial procedures. Its records are transparent hence cutting down on instances of payment disputes and leads to faster resolution of conflicts to allow for compliance with project schedules [52].

F. Supply Chain Optimization

Real-time tracking done through Blockchain allows for efficient delivery of materials and helps avoid any hold-up in production. Thus, its capacity to confirm product source optimises inventory and minimises time to make a product available, allow more efficient supply chain and project schedule [53].

1)Benefits of Streamlining Timelines

The respective adjustments of timelines with technology such as automation and blockchain have several derivative benefits that are favourable for the result of a project. Efficiency is gained due to less manual intervention and faster execution, as assured real-time updates ensure. It minimises inefficiencies, fraud, and disputes that become causes for excessive project expenditure [54]. Furthermore, with real-time monitoring and permanently recorded data, this is further enhanced through risk management; such conditions can be detected early enough a preparations to counter such occurrences are made[55]. Good relationships between stakeholders are also facilitated because streamlined processes ensure transparent operations and automated contract enforcement that do away with ambiguity and create trust. In addition, proper access to real-time and immutable information is used to make effective decisions since the information from stakeholders usually directly affects on-time and timely project delivery.

- **Efficiency Gains:** Automation and real-time updates reduce manual intervention and increase the speed of execution.
- **Cost Savings:** Reducing inefficiencies, fraud, and disputes leads to direct cost savings across the project lifecycle.
- **Risk Mitigation:** Real-time monitoring and immutable records allow for earlier identification of potential delays, enabling proactive mitigation strategies.
- **Improved Relationships:** With transparent processes and automated enforcement of contracts, relationships between vendors and stakeholders improve, as there is no ambiguity.
- **Enhanced Decision-Making:** Having access to real-time, accurate, and immutable data allows for better decision-making, improving the overall project delivery.

V. LITERATURE REVIEW

Discuss the important literature on blockchain technology's use in SVM that has come before in this section.

This paper Lahjouji, Alami and Hlyal, (2021) examines the contribution supply chain that uses a VMR-based blockchain technology, resulting in a genuine, trustworthy, and transparent environment. They propose a new model for managing the relationships between the supplier, the worldwide alliance, and the local humanitarian service provider using blockchain technology and smart contracts in order to accomplish this goal. They suggest a new VMR architecture tailored to the supply chain for humanitarian aid. A working smart contract and a use-case VMR application are shown [56].

This paper Bedin, Capretz and Mir, (2021) presents the specifics of how permissioned blockchain networks may safely support collaborative business models, resulting in fruitful business partnerships. The article explains how permissioned blockchain networks, a kind of blockchain that is more focused on businesses, may be used in conjunction with cooperative business models and an emphasis on business relationships to create value. The study's claims are backed up by real-world examples of firms using permissioned blockchains to strengthen relationships with their partners. The use cases outline specific business objectives and the ways in which corporations want to achieve them via partnerships, all while making use of blockchain technology [57].

This article Guggenberger, Schweizer and Urbach, (2020) is to build a software prototype utilising Hyperledger Fabric and conduct research based on design science to determine how and to what degree blockchain might enable information exchange for vendor controlled inventories. They were able to draw from both theoretical frameworks and actual experiences thanks to our close collaboration with a prominent German healthcare technology company. They add to the existing body of supply chain knowledge with our findings, which describe how organisations use decentralised technology like blockchain to promote information exchange, and which They call the decentralised information hub model[58].

In this paper, Omar et al., (2020) provide a smart contract-based, blockchain-based method for reshaping VMI supply chain processes. Our proposal is a general framework that may automate procedures, information sharing, and comprehensive algorithms that record interactions among supply chain players. It uses Ethereum smart contracts and decentralised storage systems. The Remix environment was used for developing and testing the smart contract code. We detail the supply chain participants' financial and safety-related expenditures. A blockchain-based approach to VMI in supply chains offers a practical, cost-effective, trustworthy, and transparent way for all parties involved to communicate[22].

This research Angrian and Sahroni, (2019) create an Android-based system for managing vendors and doing electronic procurement. We are hoping that the built system may make the procurement process more flexible and convenient while also shortening the cycle time and making vendor selection easier. The created system was validated against these three criteria by data measurement and documentation review. The study concludes by summarising the test results and drawing the conclusion that the proposed e-procurement and vendor management system achieves those criteria [59].

In Kolb et al., (2018) delivers a first demonstration of a blockchain solution based on VMI that assesses its feasibility and use. The only thing they've done so far is draw a functional sequence diagram of the information flow that smart contracts provide between VMI parties during transactions. However, no blockchain-based solution that aims to create a fully functional VMI solution from end to end has been found in the current literature. While several articles have used the Ethereum platform to construct smart contracts, none of them have addressed the topic of how the contract's many parties agree on price. So, the purpose of this article is to lay out a framework for blockchain-based VMI operations that takes the whole picture into account. The paper also discusses the cost and security analysis incurred with the implementation of such a system [60].

TABLE II. SUMMARY OF THE RELATED WORK FOR THE PROJECT TIMELINES WITH STRATEGIC VENDOR MANAGEMENT AND BLOCKCHAIN

Author(s) and Year	Objective/Focus	Technology /Platform Used	Key Contributions	Limitations /Gaps	Future Work
Lahjouji, Alami, and Hlyal (2021)	Investigate VMR-based blockchain for the donation supply chain.	Blockchain and Smart Contracts	VMR framework for donation supply chains with smart contracts.	Limited to donations; lacks broader applicability.	Extend to other supply chains; integrate AI analytics.
Bedin, Capretz, and Mir (2021)	Examines permissioned blockchain networks for collaborative business models.	Permissioned Blockchain	Use of permissioned blockchain for business alliances.	Focused on permissioned networks; lacks scalability.	Explore hybrid blockchain for scalability and security.
Guggenberger, Schweizer, and Urbach (2020)	Analyses blockchain's role in vendor-managed inventory (VMI) and information sharing.	Hyperledger Fabric	Decentralised hub model for VMI using Hyperledger Fabric.	Limited to healthcare; lacks industry generalisation.	Apply hub model in other sectors; improve scalability.
Omar et al. (2020)	Proposes a blockchain-based framework for VMI supply chain operations.	Ethereum Smart Contracts and Decentralized Storage	Ethereum-based VMI framework with cost/security analysis.	Focused on Ethereum; lacks cross-platform study.	Develop cross-platform frameworks with advanced storage.
Angrian and Sahroni (2019)	Develops a vendor management and e-procurement system using Android.	Android Platform	Android-based vendor management for procurement efficiency.	No blockchain or multi-platform integration.	Add blockchain for security; ensure multi-platform support.
Kolb et al. (2018)	Evaluates practicality of blockchain-based VMI using a proof-of-concept.	Ethereum Smart Contracts	Proof-of-concept for VMI using blockchain smart contracts.	Incomplete implementation; lacks pricing mechanisms.	Create full VMI blockchain with pricing integration.

VI. CONCLUSION AND FUTURE WORK

Supply chain management is undergoing a sea change as a result of blockchain technology, which is paving the way for more trust, efficiency, and transparency in the international trade system. Problems like data silos, exposure to fraud, and ineffective conventional supply chains are things it aims to fix. Some of the long-standing problems that blockchain technology has the potential to solve include inventory optimisation, smart contracts, and traceability. This review of the research has shown the adoption of blockchain technology with Vendor-Managed Inventory (VMI) systems and strategic vendor management frameworks, especially for project-based organisations such as LEAP (Law, Engineering, Accounting and Procurement) based organisations. Applying blockchain creates transparency and immutability that help to improve cooperation, decrease time to complete projects, and control the work of participants. Blockchain strategic vendor management includes proactive communication, performance monitoring, and process automation that enhance blockchain implementation and result in increased project performance, timelines adherence and overall risk reduction.

For future work, researchers have to attempt to address scalability and Interoperability issues to support blockchain integration in different platforms and larger systems. Studying the interaction of AI and blockchain technology can improve the prediction of VMI utilisation and optimise control and decision-making. Besides, there is a place in addressing environmental issues, for example, energy-efficient consensus algorithms – the Proof of Stake (PoS). Hence, there is a need for sector-specific case studies in different industries including healthcare and construction industries. Lastly, understanding compliance, privacy, and the need for proper design to ensure the adoption of blockchain will be vital in the continued evolution of blockchain to revolutionise supply chain and vendor relationships.

REFERENCES

[1] J. Thomas and V. Vedi, “Enhancing Supply Chain Resilience Through Cloud-Based SCM and Advanced Machine Learning: A Case Study of Logistics,” *J. Emerg. Technol. Innov. Res.*, vol. 8, no. 9, 2021.

[2] J. Thomas, “The Effect and Challenges of the Internet of Things (IoT) on the Management of Supply Chains,” *Int. J. Res. Anal. Rev.*, vol. 8, no. 3, pp. 874–878, 2021.

[3] A. A. Taleizadeh, I. Shokr, I. Konstantaras, and M. VafaeiNejad, “Stock replenishment policies for a vendor-managed inventory in a retailing system,” *J. Retail. Consum. Serv.*, 2020, doi: 10.1016/j.jretconser.2020.102137.

[4] M. R. S. and P. K. Vishwakarma, “An Efficient Machine Learning Based Solutions for Renewable Energy System,” *Int. J. Res. Anal. Rev.*, vol. 9, no. 4, pp. 951–958, 2022.

[5] Mani Gopalsamy, “An Optimal Artificial Intelligence (AI) technique for cybersecurity threat detection in IoT Networks,” *Int. J. Sci. Res. Arch.*, vol. 7, no. 2, pp. 661–671, Dec. 2022, doi: 10.30574/ijsra.2022.7.2.0235.

[6] M. Gopalsamy, "Artificial Intelligence (AI) Based Internet-ofThings (IoT)-Botnet Attacks Identification Techniques to Enhance Cyber security," *Int. J. Res. Anal. Rev.*, vol. 7, no. 4, pp. 414–420, 2020.

[7] M. S. Rajeev Arora, Sheetal Gera, "Impact of Cloud Computing Services and Application in Healthcare Sector and to provide improved quality patient care," *IEEE Int. Conf. Cloud Comput. Emerg. Mark. (CCEM), NJ, USA, 2021*, pp. 45–47, 2021.

[8] M. T. Arora, Rajeev and Kumar, Shantanu and Jain, Nitin and Nafis, "Revolutionizing Healthcare with Cloud Computing: Superior Patient Care and Enhanced Service Efficiency," *SSRN*, 2022, doi: http://dx.doi.org/10.2139/ssrn.4957197.

[9] M. T. Moleli and A. De La Harpe, "Reduction of the Causes of Stock-Outs in Erp Supply Chain Management by Prioritization of the Causes," in *2019 IEEE 10th International Conference on Mechanical and Intelligent Manufacturing Technologies, ICMIMT 2019*, 2019. doi: 10.1109/ICMIMT.2019.8712073.

[10] R. Arora, "Mitigating Security Risks on Privacy of Sensitive Data used in Cloud-based Mitigating Security Risks on Privacy of Sensitive Data used in Cloud-based ERP Applications," *8th Int. Conf. "Computing Sustain. Glob. Dev.*, no. March, pp. 458–463, 2021.

[11] R. Arora, S. Gera, and M. Saxena, "Mitigating Security Risks on Privacy of Sensitive Data used in Cloud-based ERP Applications," in *2021 8th International Conference on Computing for Sustainable Global Development (INDIACom)*, 2021, pp. 458–463.

[12] M. Gopalsamy, "Advanced Cybersecurity in Cloud Via Employing AI Techniques for Effective Intrusion Detection," *Int. J. Res. Anal. Rev.*, vol. 8, no. 01, pp. 187–193, 2021.

[13] J. van den Bogaert and W. van Jaarsveld, "Vendor-managed inventory in practice: understanding and mitigating the impact of supplier heterogeneity," *Int. J. Prod. Res.*, 2022, doi: 10.1080/00207543.2021.1983222.

[14] R. Bishukarma, "The Role of AI in Automated Testing and Monitoring in SaaS Environments," *IJRAR*, vol. 8, no. 2, 2021, [Online]. Available: https://www.ijrar.org/papers/IJRAR21B2597.pdf

[15] R. Bishukarma, "Adaptive AI-Based Anomaly Detection Framework for SaaS Platform Security," *Int. J. Curr. Eng. Technol.*, vol. 12, no. 07, pp. 541–548, 2022, doi: https://doi.org/10.14741/ijcet/v.12.6.8.

[16] Mani Gopalsamy, "Enhanced Cybersecurity for Network Intrusion Detection System Based Artificial Intelligence (AI) Techniques," *Int. J. Adv. Res. Sci. Commun. Technol.*, vol. 12, no. 01, pp. 671–681, Dec. 2021, doi: 10.48175/IJARSCT-2269M.

[17] Sushil, "Small Steps for a Giant Leap: Flexible Organization," *Global Journal of Flexible Systems Management*. 2017. doi: 10.1007/s40171-017-0163-7.

[18] C. G. Heaps, "Long-range Energy Alternatives Planning (LEAP) system. [Software version: 2018.1.6]," *Stockholm Environment Institute*. 2016.

[19] S. Bauskar, "BUSINESS ANALYTICS IN ENTERPRISE SYSTEM BASED ON APPLICATION OF ARTIFICIAL INTELLIGENCE," *Int. Res. J. Mod. Eng. Technol. Sci.*, vol. 04, no. 01, pp. 1861–1870, 2022, doi: DOI : https://www.doi.org/10.56726/IRJMETS18127.

[20] T. Costello, "Vendor management," *IT Prof.*, 2013, doi: 10.1109/MITP.2013.101.

[21] K. V. V. and S. G. Jubin Thomas , Piyush Patidar, "An analysis of predictive maintenance strategies in supply chain management," *Int. J. Sci. Res. Arch.*, vol. 06, no. 01, pp. 308–317, 2022, doi: DOI: https://doi.org/10.30574/ijsra.2022.6.1.0144.

[22] I. A. Omar, R. Jayaraman, K. Salah, M. Debe, and M. Omar, "Enhancing vendor managed inventory supply chain operations using blockchain smart contracts," *IEEE Access*, 2020, doi: 10.1109/ACCESS.2020.3028031.

[23] K. Kristensen, J. Krogstie, D. Ahlers, and M. Mehrpoor, "LEAP Collaboration System," in *Taking the LEAP: The Methods and Tools of the Linked Engineering and Manufacturing Platform (LEAP)*, 2016. doi: 10.1016/B978-0-12-805263-1.00005-0.

[24] R. Goyal, "THE ROLE OF BUSINESS ANALYSTS IN INFORMATION MANAGEMENT PROJECTS," *Int. J. Core Eng. Manag.*, vol. 6, no. 9, pp. 76–86, 2020.

[25] J. Thomas, H. Volikatla, V. V. R. Indugu, K. Gondi, and D. S. Gondi, "Machine Learning Approaches for Fraud Detection in E-commerce Supply Chains," *Innov. Comput. Sci. J.*, vol. 8, no. 1, 2022.

[26] Y. Li, Z. Wei, and Y. Liu, "Strategic orientations, knowledge acquisition, and firm performance: The perspective of the vendor in cross-border outsourcing," *J. Manag. Stud.*, 2010, doi: 10.1111/j.1467-6486.2010.00949.x.

[27] M. N. Yoon and P. Brett-MacLean, "Project timeline," in *Art-Medicine Collaborative Practice: Transforming the Experience of Head and Neck Cancer*, 2019. doi: 10.1515/9783035608786-098.

[28] F. D. Ariyanti, A. Russell, and L. Setiawan, "Vendor management system improvement using PDCA and optimizing transporter vendor selection using fuzzy analytical hierarchy process," in *IOP Conference Series: Earth and Environmental Science*, 2021. doi: 10.1088/1755-1315/794/1/012077.

[29] E. P. Robinson and R. K. Satterfield, "Designing distribution systems to support vendor strategies in supply management chain," *Decis. Sci.*, 1998, doi: 10.1111/j.1540-5915.1998.tb01359.x.

[30] D. Ushakov and K. Shatila, "THE IMPACT OF INVENTORY CONTROL PRACTICES ON COST REDUCTION: THE CASE OF LEBANESE RETAIL COMPANIES," *EUrASEANs J. Glob. socio-economic Dyn.*, 2021, doi: 10.35678/2539-5645.5(30).2021.16-25.

[31] V. K. Y. Nicholas Richardson, Rajani Pydipalli, Sai Sirisha Maddula, Sunil Kumar Reddy Anumandla, "Role-Based Access Control in SAS Programming: Enhancing Security and Authorization," *Int. J. Reciprocal Symmetry Theor. Phys.*, vol. 6, no. 1, pp. 31–42, 2019.

[32] I. Ali, A. Fügenschuh, S. Gupta, and U. M. Modibbo, "The LR-type fuzzy multi-objective vendor selection problem in supply chain management," *Mathematics*, 2020, doi: 10.3390/math8091621.

[33] R. Goyal, "Software Development Life Cycle Models: A Review Of Their Impact On Project Management," *Int. J. Core Eng. Manag.*, vol. 7, no. 2, pp. 78–87, 2022.

[34] J. Goldman *et al.*, "Experiential Learning in Project-Based Quality Improvement Education: Questioning Assumptions and Identifying Future Directions," *Acad. Med.*, 2020, doi: 10.1097/ACM.0000000000003203.

[35] K. Patel, "Quality Assurance In The Age Of Data Analytics: Innovations And Challenges," *Int. J. Creat. Res. Thoughts*, vol. 9, no. 12, pp. f573–f578, 2021.

[36] F. A. Nordin, W. M. Dahalan, I. A. A. Bakar, and N. A. Q. A. Q. Peter, "Development of Project Management Timeline and Material Buyout Application to Ship Construction Planning: A Review," in *Advanced Structured Materials*, 2022. doi: 10.1007/978-3-030-89992-9_7.

[37] P. R. da Cunha, P. Soja, and M. Themistocleous, "Blockchain for development: a guiding framework," *Information Technology for Development*. 2021. doi: 10.1080/02681102.2021.1935453.

[38] R. Goyal, "THE ROLE OF REQUIREMENT GATHERING IN AGILE SOFTWARE DEVELOPMENT: STRATEGIES FOR SUCCESS AND CHALLENGES," *Int. J. Core Eng. Manag.*, vol. 6, no. 12, pp. 142–152, 2021.

[39] V. Dua, "IT & mobile tower infrastructure industry collaboration - Leap towards green, smart & sustainable future," *Mod. Appl. Sci.*, 2012, doi: 10.5539/mas.v6n12p37.

[40] A. Mohammad and S. Vargas, "Challenges of Using Blockchain in the Education Sector: A Literature Review," *Applied Sciences (Switzerland)*. 2022. doi: 10.3390/app12136380.

[41] K. Patel, "An Analysis of Quality Assurance Practices Based on Software Development Life Cycle (SDLC) Methodologies," *J. Emerg. Technol. Innov. Res.*, vol. 9, no. 12, pp. g587–g592, 2022.

[42] A. P. A. Singh, "Streamlining Purchase Requisitions and Orders : A Guide to Effective Goods Receipt Management," *J. Emerg. Technol. Innov. Res.*, vol. 8, no. 5, pp. g179–g184, 2021.

[43] H. S. Chandu, "A Survey of Memory Controller Architectures: Design Trends and Performance Trade-offs," *Int. J. Res. Anal. Rev.*, vol. 9, no. 4, pp. 930–936, 2022.

[44] M. Z. Hasan, R. Fink, M. R. Suyambu, and M. K. Baskaran, "Assessment and improvement of elevator controllers for energy efficiency," in *Digest of Technical Papers - IEEE International Conference on Consumer Electronics*, 2012. doi: 10.1109/ISCE.2012.6241747.

[45] M. Z. Hasan, R. Fink, M. R. Suyambu, and M. K. Baskaran, "Assessment and improvement of intelligent controllers for elevator energy efficiency," in *IEEE International Conference on Electro Information Technology*, 2012. doi: 10.1109/EIT.2012.6220727.

[46] G. Paré, J. Marsan, M. Jaana, H. Tamim, and R. Lukyanenko, "IT vendors' legitimation strategies and market share: The case of EMR systems," *Inf. Manag.*, 2020, doi: 10.1016/j.im.2020.103291.

[47] M. Z. Hasan, R. Fink, M. R. Suyambu, M. K. Baskaran, D. James, and J. Gamboa, "Performance evaluation of energy efficient intelligent elevator controllers," in *IEEE International Conference on Electro Information Technology*, 2015. doi: 10.1109/EIT.2015.7293320.

[48] C. Sim, H. Zhang, and M. L. Chang, "Improving End-to-End Traceability and Pharma Supply Chain Resilience using Blockchain," *Blockchain Healthc. Today*, 2022, doi: 10.30953/bhty.v5.231.

[49] A. P. A. Singh, "STRATEGIC APPROACHES TO MATERIALS DATA COLLECTION AND INVENTORY MANAGEMENT," *Int. J. Bus. Quant. Econ. Appl. Manag. Res.*, vol. 7, no. 5, 2022.

[50] P. Sood, P. Palsania, S. Ahuja, S. Kumar, K. Khatter, and A. Mishra, "Decentralised Collaborative DocuPad Using Blockchain," in *2022 IEEE Delhi Section Conference, DELCON 2022*, 2022. doi: 10.1109/DELCON54057.2022.9752853.

[51] T. Dasaklis and F. Casino, "Improving Vendor-managed Inventory Strategy Based on Internet of Things (IoT) Applications and Blockchain Technology," in *ICBC 2019 - IEEE International Conference on Blockchain and Cryptocurrency*, 2019. doi: 10.1109/BLOC.2019.8751478.

[52] H. Natarajan and M. Balakrishnan, "Real-time retail payments system or faster payments: Implementation considerations," *J. Payments Strateg. Syst.*, 2020, doi: 10.69554/oejb5155.

[53] L. G. Papageorgiou, "Supply chain optimisation for the process industries: Advances and opportunities," *Comput. Chem. Eng.*, 2009, doi: 10.1016/j.compchemeng.2009.06.014.

[54] S. A. and A. Tewari, "Security Vulnerabilities in Edge Computing: A Comprehensive Review," *Int. J. Res. Anal. Rev.*, vol. 9, no. 4, pp. 936–941, 2022.

[55] S. A. and A. Tewari, "AI-Driven Resilience: Enhancing Critical Infrastructure with Edge Computing," *Int. J. Curr. Eng. Technol.*, vol. 12, no. 02, pp. 151–157, 2022, doi: https://doi.org/10.14741/ijcet/v.12.2.9.

[56] M. Lahjouji, J. El Alami, and M. Hlyal, "Blockchain application to improve Vendor management replenishment in Humanitarian supply chain," in *2021 3rd International Conference on Transportation and Smart Technologies, TST 2021*, 2021. doi: 10.1109/TST52996.2021.00008.

[57] A. R. C. Bedin, M. Capretz, and S. Mir, "Blockchain for Collaborative Businesses," *Mob. Networks Appl.*, 2021, doi: 10.1007/s11036-020-01649-6.

[58] T. Guggenberger, A. Schweizer, and N. Urbach, "Improving Interorganizational Information Sharing for Vendor Managed Inventory: Toward a Decentralized Information Hub Using Blockchain Technology," *IEEE Trans. Eng. Manag.*, 2020, doi: 10.1109/TEM.2020.2978628.

[59] B. Angrian and T. R. Sahroni, "Development of vendor management and e-Procurement systems using android platform," in *IOP Conference Series: Materials Science and Engineering*, 2019. doi: 10.1088/1757-899X/528/1/012082.

[60] J. Kolb, D. J. Hornung, F. Kraft, and A. Winkelmann, "Industrial application of blockchain technology - Erasing the weaknesses of vendor managed inventory," in *26th European Conference on Information Systems: Beyond Digitization - Facets of Socio-Technical Change, ECIS 2018*, 2018.