A Review Paper on Enhancing the Supply Chain Management in Construction with Artificial Intelligence

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Abstract: The construction industry is being asked by more progressive clients to change its crude ways of working and to adopt more efficient business processes to improve its performance by adopting supply chain management (SCM) practices that have evolved in more advanced industries. This represents a major risk for many companies given the complex nature of construction projects. Artificial intelligence (AI) was introduced to develop and create "thinking machines" that are capable of mimicking, learning, and replacing human intelligence. AI's potential application that has not yet been fully explored is the emerging management philosophy of SCM, which requires the comprehension of complex, interrelated decision-making processes and the creation of intelligent knowledge bases crucial for joint problem-solving.

Keyword: Procurement, Supply chain management, Artificial intelligence, Construction industry

I. Introduction:

Procurement is the acquisition of the materials, supplies or services needed to successfully operate a business or complete a project. In construction, this refers to the goods and services needed to successfully complete a build from start to finish. It also includes supply chain in the process of procuring materials. Procurement is the process of getting the goods your company requires, while supply chain management is the extensive infrastructure needed to get you those goods. Supply chain management should ultimately be considered one of many responsibilities faced by a procurement function. Ultimately, the role of procurement and supply chain management will help businesses maximize profits. This is done by balancing cost reduction, supplier quality, assurance of supply and increasingly unlocking supplier innovation. Supply chain is the network of manufacturers, suppliers, logistics providers and other people involved in getting your product in the hands of a customer. Supply chain incorporates not only raw material gatherers, transportation companies and wholesale warehouses, but also tasks and functions that contribute to moving the following product.

Supply Chain Management Cycle
Source: blog.procurify.com

II. LITERATURE REVIEW:

Shamas Pervaiz, 2020,[1] says Organizations like Siemens and Amazon are as of now utilizing AI in their flexibly chain frameworks through savvy automatons and AI mechanical autonomy. A high number of AI is fundamentally mechanical autonomy, and programming dealing with the start to finish procedure of gracefully chains is being created. Despite the fact that the possibilities with AI are regularly talked about, there is little direction on commonsense parts of applying AI.

Rupa Dash, Mark McMurtrey, 2019,[3] says the technological advancement in mobile computing, artificial neural networks, robotics, and storage of huge data on the internet, cloud-based machine learning, and information processing algorithms, etc. has propelled the use of AI in various business sectors. Many businesses are using AI in major parts of their value chain as AI delivers significant competitive advantages. Most importantly, AI technologies have helped them eliminating many levels of manual activities including promotions, assortments, and supply chain. The e-commerce business using AI to predict the trends, optimize warehousing and logistics set prices, and personalize promotions etc. Some even go one step ahead like anticipating orders and shipping goods without even waiting for purchase confirmation.

KUNNATHUR Mohamad Usama, 2020,[2] presents five Artificial Intelligence (AI) methods to predict the final duration of a project. A methodology that involves Monte Carlo simulation, Principal Component Analysis and cross-validation is proposed and can be applied by academics and practitioners. The performance of the AI methods is assessed by means of a large and topologically diverse dataset and is benchmarked against the best performing Earned Value Management/Earned Schedule (EVM/ES) methods. The results show that the AI methods outperform the EVM/ES methods if the training and test sets are at least similar to one another.

Nguyễn Thành Long, 2018,[5] says that by AI, the logistics networks will shift to a proactive and predictive paradigm. Computer vision and language-focused AI will help logistics operators see, understand, and interact with the world in novel, more efficient ways than before.

Taylor & Francis, 2015,[12] find Construction Supply Chain Management (CSCM) is emerging as a rapidly growing discipline. CSCs are becoming more complex, they are subject to constant change, and the industry environment is highly competitive and cost critical. The challenge becomes greater where joint ventures, partnerships and sub- contracting agreements are involved. The business as usual approaches to construction management often fail to perform in these situations, and managers need to consider adopting innovative approaches to solve these complex problems.

Davide Aloini, 2012, **[18]** identified a lack of construction supply chain risk management (CSCRM) literature which is mainly conceptual and descriptive and focused especially on the risk assessment phase. A total of 13 common risk factors are identified in literature and critically analyzed considering eight key perspectives. These stress the attention on the project planning phase and confirm the main contractor as the main promoter for the SCM practice.

Ruben Vrijhoef, 2000,[23] contains three contributions to knowledge. Firstly, various existing initiatives towards construction supply chain development are explicitly related to a generic SCM methodology. Secondly, the present status of construction is empirically assessed from a supply chain viewpoint. The result of this investigation is revealed to be compatible both with previous observations in construction and in make-to order supply chains.
Sanaz Soleimani, 2018

III. FINDINGS:

- In Supply chain management (SCM) there are some major factors which affect the process like: Long variable lead time, not proper resource management, Poor financial stability, Inaccurate demand forecasting, Lack of contractor experience. These factors can be removing or minimize their affects by the Artificial intelligence.
- AI has different tools like: Machine learning, neural network, expert system, agent based system; genetic algorithm etc. can be helpful in this process which needs to apply in this process.
- These AI tools can optimize the SCM process and many problems occurs in it. And AI technologies have helped them eliminating many levels of manual activities.
- AI has been put forward as a useful decision-aid tool that helps the firm connect its customers, suppliers, and SC partners by facilitating information exchange among various business entities.
- These AI tools can optimize the SCM process and many problems occurs in it. And AI technologies have helped them eliminating many levels of manual activities.

IV. CONCLUSION:

In Supply chain management (SCM) there are some major factors which affect the process like: Long variable lead time, not proper resource management, Poor financial stability, Inaccurate demand forecasting, Lack of contractor experience. AI has different tools like: Machine learning, neural network, expert system, agent based system, genetic algorithm etc. These AI tools can optimize the SCM process and many problems occur in it. And AI technologies have helped them eliminating many levels of manual activities.

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