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Impact of Green Practices on Operations Strategies in Business

Dr. Sandeep Mathur [1*], D.M.R. Dissanayake [2], Dr. Nitendra Kumar [3], C. Jayasinghe [4]

[1] *Vice President, IKIO Lighting Solutions Ltd, Noida, India. Email: sandeepmathur2018@gmail.com*

[2] *Director (Staff Development Centre), University of Kelaniya, Sri Lanka*

[3] *Assistant Professor, Department of Decision Sciences, Amity Business School, Amity University, Noida, India*

[4] *Senior Lecturer, Human Resource Management, University of Kelaniya, Sri Lanka*

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ABSTRACT

Sustainability has emerged as the key focus for manufacturing industry, driven through increasing consumer demand, environmental concerns and regulatory requirements for practices related to eco-friendliness. Green practices like eco-design, waste reduction, energy efficiency and sustainable sourcing are transforming how manufacturers operate. These practices are enable the business to get align with the goals of global sustainability while simultaneously reducing costs and improving operational efficiency. This paper examines the influences of green practices on strategies of operations in manufacturing industry through analysing its long-term benefits and challenges implications. Through integrating sustainability in the operation of business it achieves cost cost-saving dynamic, enhancing the reputation of the brand and compliance with regulations. The aim of this study is to investigate how green practices affect business operations strategies and how they support sustainability and competitive advantage.

Green operations practices contain many useful practices that are responsible for enhancing the operations environmental performance of the organization. The study has mentioned the importance of green practice and the ways that can assist the firm in enhancing operations strategies at the firm. Both implementation as well as operation of a green environment assist in business expenditure and are also helpful in accurately fostering the new market possibilities for the companies. Additionally, the study has also mentioned the importance of employee training that can help to enhance awareness among the employees and the firm can get better outcomes in the business.

For support this, a secondary qualitative data collection method is used to gather information about how green practices affect business operations strategies. However challenges like technological barriers, resistance and high initial investments to change pose obstacles. The study shed light on how the adaptation of green practices are influences the key aspects of manufacturing strategies like product lifecycle management, supply chains and production processes. It further also discusses how sustainability drives competitive and innovation advantage in business. The finding of the study also emphasised the need for businesses to hold sustainable strategies to meet the expectations of stakeholders, contribute towards a greener future and remain in competition. Sustainability innovations offer brands a chance to stand out in crowded marketplaces. By addressing environmental issues and demonstrating their commitment to sustainable practices, businesses can attract clients who value eco-friendly products and services.

Keywords: Green practices, operational strategies, sustainability, eco-friendly, sustainable.

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INTRODUCTION

Implementation of green practices in the business positively influences the environment and business bottom line. Businesses cannot overlook the economic advantages of going green, which include increased productivity, profitability, and reputation. Through encouraging cost savings by decreasing waste and energy consumption, improving brand reputation by exhibiting environmental responsibility, drawing in eco-aware customers, and possibly creating new market opportunities through sustainable product development, green practices have a big impact on business operations strategies. In the whole dynamic of a business, the manufacturing industry is the largest contributor to environmental degradation, accounting for some significant greenhouse gas emissions, waste generation and resource depletion. With these rising concerns about environmental degradation and climate change, the global focus on sustainability has intensified. Businesses, consumers and governments are also increasingly advocating for more sustainable and greener operations, pushing different businesses to adopt green practices. This paper focuses on analysing the operational changes prompted through green practices, their influences on the process of strategic decision-making, and how businesses can overcome different associated challenges.

Green practices are strategies which are designed to reduce environmental impact while maintaining operational profitability and efficiency. These days, environmental goals are a top priority for policymakers and top managers (Aftab *et al.* 2023). Their key examples are the utilisation of renewable energy sources such as wind or solar and the adaptation of different energy-saving technologies. Implementation of lean manufacturing (LM) principles and recycling program are help in minimising waste and procuring material from environmentally and ethically friendly suppliers. It also includes eco-product design with recyclability and minimal environmental influences. However, as of today dynamic integration of sustainability into a business has now become a necessity rather than a choice.

Through exploring global trends, the study also focuses on providing insights to the critical role of sustainability in shaping the future of green supply chain management. GSCM is a method that controls the movement of materials through various phases of the value chain, including procurement, manufacturing, and distribution, in order to preserve natural resources and lower carbon emissions and global warming (Sahoo and Vijayvargy, 2021). “The supply chain management (GSCM)” concept help in covers every phase of product's life cycle, from the raw material extraction to production, distribution and design to final consumer disposal and use. Adopting GSCM practices necessitates collaboration between various stakeholders both internally and externally. For example, the manufacturing sector, collaboration between the different functional departments of the suppliers, customers and organisation is necessary to develop an environmentally friendly product that meets customer requirements.

1.1 Purpose of the Study

This research aims to review and discuss the green practices applied for operations strategies resulting competitive advantage and sustainability. Accordingly, the main research tools used was literature review and empirical discussions based on the relevant publications. Authors mainly addressed to the application of green practises with reference to the manufacturing sector depending on the significance of the sector and challenges encountered compared to other sectors.

LITERATURE REVIEW

2.1 The Contribution of Green Operations Practices to Environmental Sustainability

Green operations practices have numerous effective practices that are ultimately contributing to improving the firm’s operations environmental performance. The function of operations mainly encompasses numerous required activities. These activities are mainly including production planning, product as well as process development. In addition to that the other essential activities are manufacturing, after-sales operations and also supply chain management (AL SEEDI and

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ALSHAHEEN, 2023). The author has also mentioned in the study that both implementation and operation of a green environment is not only a business expenditure but is also referred to as an incentive that is ultimately fostering the new market possibilities. Additionally, it is also facilitating the sustainable growth achievement in organizations.

Another study has explored that the green manufacturing has almost a positively influences on both economic and environmental performance. While the major factors that have influenced economic performance of the firm are firm reputation as well as operational competitiveness. Another thing that has been found within the study is that there are several aspects that are firm reputation, operational competitiveness as well as environmental performance that play almost no mediation role that is between economic performance and green manufacturing (Afum *et al.* 2020). While it has also been identified that social performance is the key aspect that has been mediate relationship that exist between economic performance and green manufacturing.

In one another study, it has been identified that there are many green operations that are almost sustainable within its practices that are mainly as compared to the other traditional competitors. At the same time, the literature also suggests that textile industry is facing numerous problems related to the environment within several developing countries. Because of this reason it is very essential for the organizations to accurately assess, monitor, and also improve numerous activities that are related with management (Amjad *et al.* 2021). Accurately shielding environment from pollution through implementing various practices related to green supply chain is another advantage that can be successfully attained. Adopting numerous green practices within the operations of business will benefit society as a whole and will be important for a healthier lifestyle. The promotion along with the use of many green management practices within industry is necessary.

The results have revealed that there are few areas that need to be prioritized by the organizations. One thing is that training is best “green human resource management practice” in accurately predicting performance of environment of an individual. Another that also needs to prioritize is perceived organizational support that is essential for environment and also increases overall influences of environmental performance during when the workers are satisfied with effective environmental engagement of organisation (Paillé *et al.* 2020). The findings of the mentioned study are significant and can further contribute to the several emerging literatures that is associated with green human resource management.

2.2 Impact of Green Practices on Operations Strategies in Business and Industry

The study has identified that there are few major green practices that are energy efficiency, sustainable supply chain and waste reduction that are ultimately highlighting the major key potential to decrease environmental footprints. This is also enhancing the competitiveness as well as operational efficiency at workplaces. The significant obstacles are resource constraints and the other major problem was sustainable technologies (Omowole *et al.* 2024). It has been seen within the study that numerous green business practices have been increasingly identified as required for SMEs and aiming to effectively align with several sustainable development goals. Through adopting these practices, most of the SMEs are contributing to environmental protection. Apart from that it also promotes societal well-being and in this way they are positioning themselves in many eco-conscious markets.

The study mentions that the environmental concerns which have been raised by the scientific community causes huge pressures on firms to identify the significance of sustainability. Due to this pressure, most of the companies have increased both efforts along with investments that are toward practices associated with saving energy, the renewable energy use, waste reduction, and recycling as well. However, the study has also analysed the significance of strategic options for the firm that allow them to get advantage in business practices. There are multiple strategic options that may the firms have but the recent study has evaluated the possible benefits that are mainly offered by agility (Salandri *et al.* 2022). Agility has also been defined in this study as the unique ability to react precisely and

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capitalize on numerous rapid changes. It also encompasses the capacity to sense, perceive, and predict a wide range of ecosystemic changes.

The study has examined the importance of green practices for the business and also mentioned that all Businesses need to adopt numerous green practices that are linked to the different “green orientation goals”. The competitive advantage of the company effectively reflects its green training, supply chain and also reflects innovation enhancements. It has also identified within the study that a company that is with substantial competitive edge effectively differentiate itself in market. They can also operate at fewer costs, as well as generate almost higher revenues than its most of the rivals (Barakat *et al.* 2023). The study has also suggested that the organizations that are investing for training their workers on green practices and the dynamic related to the environmental sustainability are getting more benefits. These companies are also more likely to adopt as well as effectively integrate numerous practices that are environmentally friendly even throughout their operations of supply.

According to the study, the operational performance of the company is nearly positively impacted by the adoption of GSCM, which is primarily between suppliers and customers. This suggests that businesses can benefit from a green supply chain by precisely collaborating with numerous upstream suppliers. The suppliers are those who are almost environmentally responsible with production technology (Santos *et al.* 2019). They can also benefit from informing them about environmental issues and considering the views of their clients and eco-friendly consumers when making decisions. This study is significant as it is providing empirical support for the firm's managers. It allows them to promote many environmental practices and all these areas may directly lead to both operational performance as well as sustainable growth.

2.3 Significance of Green Practice Implementation in Supply Chain Management

Ensuring dynamic related to sustainability through GSCM practices has almost become very challenging for the businesses. The study has mentioned that it has become very essential for the Organizations to systematically examine the different factors. The factors are associated with the sustainability performance of the firm. The firms need to examine how to accurately manage several factors strategically (Habib *et al.* 2021). Along with these areas, the study has mentioned that the effective and also even the best approach for using and implementing GSCM will be strategic organizational orientation. It will be very significant and further help to improve sustainability performance of the firm.

GSCMPS which mainly involves introduction of different environmental practices that are into many activities of supply chain. The aim is to ensure an effective a more sustainable supplychain constantly has both confusing and inconsistent impact on the performance of the firm within different industries, many countries and also within numerous continents. Along with these areas, the study has also mentioned that GSCMPs are defined as the significant subsystems that are associated with the sustainable supply chain which are mainly involving numerous aspects. These aspects are green purchasing, hence green cooperation with many customers and it is also including effective cross-functional cooperation that is for required environmental improvements. (Acquah *et al.* 2021). The study has also mentioned other aspects that are included in the paradigm of cross functional cooperation. These are quality environmental management, systems related to environmental management, auditing programs and it also includes many green supply chain information systems.

Supply chain processes as well as other activities are also playing an effective role in many firms that help in decreasing the overall adverse effect of the activities on both society and also on the environment. At the same time, the study has also identified that most of the firms are systematically integrating a number of effective ecological initiatives that are into supply chain processes and also in numerous activities. The aim is to curb the firm’s negative environmental and also social impacts that are within the face of getting economic advantages (Acquah *et al.* 2021). However, it is also true that green supply chain management has effectively emerged as a specific way to systematically combine

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numerous elements associated with environmental management and also related to supply chain management.

Another study has also mentioned the advantage of green manufacturing that is also significant in providing numerous opportunities to the organizations. The study has mentioned Green manufacturing and also discusses that it is accurately presenting a number of effective opportunities for any organization and also to its environment. Along with these opportunities it has been seen within the study that it is effectively serving as a specific benchmark for most of the firms who are striving to get a balance between economic performances, their environmental as well as social performances (Afum *et al.* 2020). The study has also mentioned the importance of GMPs as it allows most of the firms to get organisational efficiency at the workplace. At the same time, in turn systematically influence many financial gains, accurately protect the environment and along with that also improve performance associated with the environment.

DISCUSSION AND IMPLICATIONS

Green practices help to improve the efficiency of operations by reducing the consumption of resources, waste and energy use. For example, Toyota used the high productivity of the "Toyota Production System" to become competitive and prosperous after realising that waste had to be eliminated during the operating process in order to prevent resource scarcity. Toyota produced automobiles with fewer defects, human labour, inventory, and expenses as a result (Naeemah and Wong, 2022). Eight types of waste, including waiting, underutilised talent, overproduction, unnecessary inventory, needless motion, improper processing, flaws, and transportation, can be decreased or eliminated by lean manufacturing tools. As ecological and social awareness in manufacturing has grown, the definition of LM has been broadened to incorporate ideas of sustainability, wherein LM's objectives are extended to encompass upholding the environmental and social facets of sustainability. For improve intra- and inter-organisational sustainable performance effectiveness and create sustainability metrics to achieve competitive features in manufacturing performance, numerous LM tools have also been used.

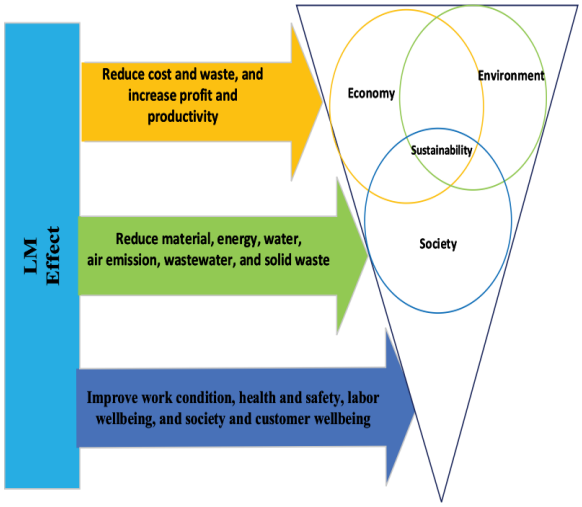

Figure 1: Contributions of lean manufacturing toward sustainability

(Source: Naeemah and Wong, 2022)

Adaptation of renewable energy, like using solar panels in factories, has helped manufacturers significantly and also helped reduce the expenses of energy. Additionally, smart and automated manufacturing technologies also contribute to optimising the use of resources and waste reduction. Adaptation of green practices includes different high-potential investments like upgrading equipment for energy efficiency or installing renewable energy systems. However, these types of costs are offset through long-term savings. For instance, as per Nenkov (2024), IKEA invested to the energy-efficient

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LED lighting, sustainable building designs and solar panels for their distribution centers and stores. Amazon has made significant investments in its fleet of electric delivery vehicles and committed to meeting the Paris Agreement's goals ten years early, including reach to the net-zero carbon emissions by the year of 2040 and switching towards 100% of renewable energy by the year of 2025. Unilever also foster investments in the energy-efficient manufacturing, packaging, and distribution practices. Google made a significant investment in the data centers which is energy-efficient, sustainable building designs, ad renewable energy procurement. Microsoft has also focused to set a target by 2030 of being carbon negative.

Green supply chain management is a crucial aspect of sustainable manufacturing. It includes sourcing materials ethically, using eco-friendly packing and reducing emission at the time of transportation. Companies such as IKEA have also revamped their dynamic of supply chains towards sustainability, through using local suppliers and renewable materials to minimise the impact on the environment. Furthermore, it has rated as the second most sustainable Swedish brand by the Sustainable Brand Index (Lee *et al.* 2021). Through emphasising use of natural renewable resources, IKEA is the leader in the dynamic of resolving the issues related to despite its overtly aggressive cost-cutting strategy. Consequently, its activities are directly related to society and the environment. IKEA acknowledge that it needs to communicate with their suppliers about its environmental and social conditions for prevent harming its brand. The company has consistently worked to become a climate-positive business by 2030 (Nenkov, 2024). Implementation of dynamic of code of conduct and developing plans which improve supplier relationships while effectively utilising renewable energy, recycled materials, and other initiatives are ways to become more sustainable.

Modern supply chains are changing dramatically as a result of the introduction of Industry 4.0 enabling technologies. Supply chains are becoming more complex systems that are geographically distributed, manage both new and existing partners, and are only concerned with satisfying the demands of increasingly discerning customers. Simultaneously, traceability and transparency have become crucial components of a global supply chain. In addition to helping to establish supply chains with robust traceability and transparency features (for instance, by utilizing state-of-the-art RFID and GPS technologies), blockchain technology can assist in addressing environmental, financial, and social sustainability issues (Centobelli *et al.* 2022). The supply chain may be impacted by blockchain, especially if it replaces electronic data interchange (EDI), which enables efficient and rapid information sharing between parties. Blockchain adoption has the potential to revolutionise the supply chain through eliminating the shortcomings and inefficiencies of the current system. When EDI is typically used in supply chain management, different systems are in charge of data processing and exchange.

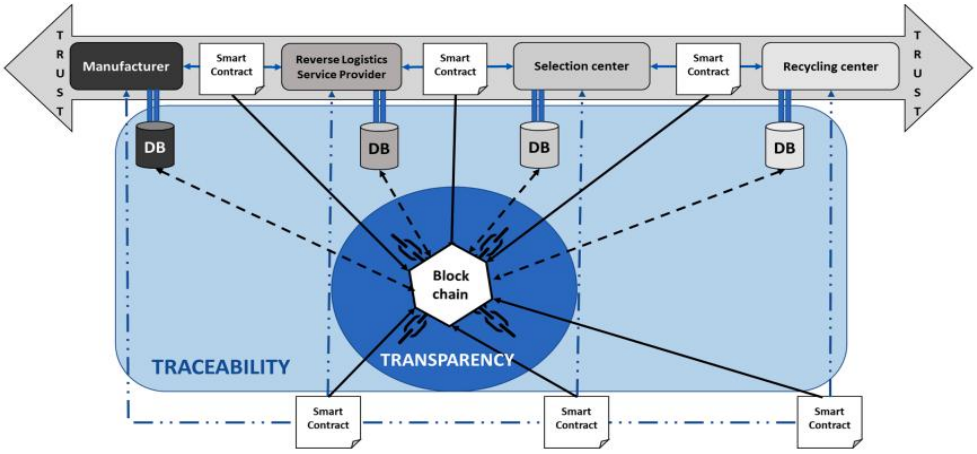

Figure 2: Blockchain as operational strategies

(Source: Khanfar *et al.* 2021)

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However, by using technology of blockchain, the information, knowledge flows and data of supply network can be retrieved from integrated system. By eliminating middlemen from a network and facilitating direct connections between parties, blockchain has the potential to reduce transaction costs and human error. However, for business operations strategies, EDI and blockchain might complement each other more effectively than they would if they were used separately. By 2025, it is anticipated that investment in blockchain solutions will have grown to USD 176 billion (Khanfar *et al.* 2021). Blockchain has the ability to store information in its ledgers, exchange and share data through its consensual mechanism, and process data using smart contracts. Blockchain technology on the networks of EDI is expected to be used by global supply chain platforms to enhance supply chain performance and make it easier for companies to share information (Centobelli *et al.* 2022). Every event is confirmed and recorded in order to produce transparent and an unalterable book of records. Therefore, the problems that are so prevalent in traditional management systems may be lessened by incorporating blockchain technology into supply chain networks.

Awareness of consumers towards sustainability has also led towards increased demand for eco-friendly products. Brands which adaptation of green practices for gain a competitive edge through appealing environmentally aware customers. Businesses like Interface, Tesla, and Patagonia show how incorporating sustainability into operations can have a significant positive influence and promote long-term success (Ghajiga and Warlimont, 2024). This shift can enhance the reputation of the brand and also drive innovation in product manufacturing processes and its design. For instance, rise of electric vehicles revolutionised automotive industry and also pushed traditional manufacturers to invest in green technologies. In a time of growing environmental degradation and social injustice, the need for creative and sustainable solutions has become critical. An innovation in sustainability gives brands an opportunity to differentiate themselves in crowded markets. Businesses can draw in customers who value eco-friendly goods and services by addressing environmental issues and showcasing their dedication to sustainable practices.

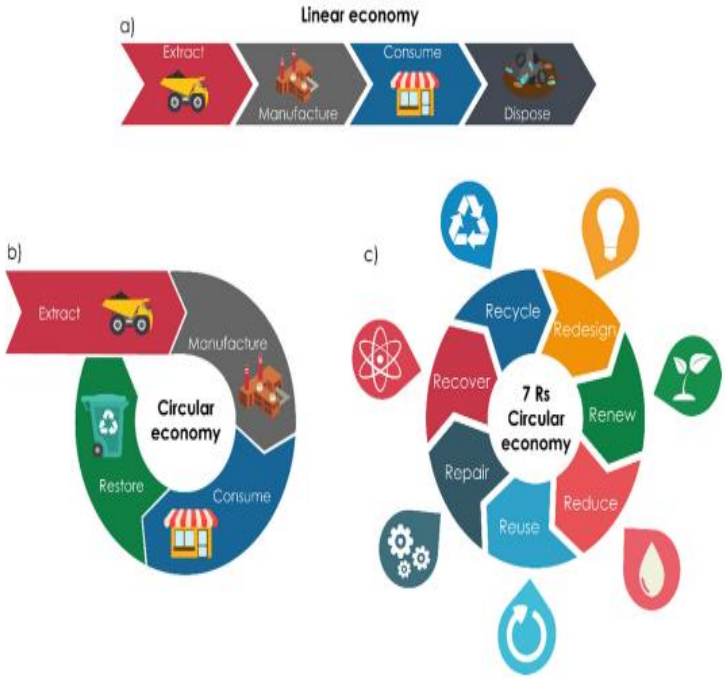

Figure 3: a) Linear economy models, b) circular economy models and c) 7Rs of the circular economy model

(Source: Araujo-Morera *et al.* 2021)

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The futures of business are mainly lies in integrating an advanced technology with green practices. Industry 4.0 technologies, like robotics, IoT and AI are enabling more efficient and smarter processes of production. There are different circular models, and each of them is engaged to extend the lifecycles of business. The circular economy model is focused on recycling and reusing resources and it also gaining traction, with the companies for redesigning their products for extends their lifecycle. Different international agreements and government policies will also further help in accelerating adoption of the sustainable practices. While "Michelin is investing in advanced technology recycling to ensure that tyres are 100% recycled by 2048", "the Bridgestone Group has set a goal to use only sustainable materials in its products by 2050 and beyond" (Araujo-Morera *et al.* 2021). However, making sure that any procedure that meets its technical goals is also financially feasible and, thus, has strong commercial potential is the difficult part.

CONCLUSION

The adoption of green practices transformed the manufacturing industry through making sustainability a core aspect of different operation strategies. This paper explores the benefits of green practices like improved efficiency, compliance with environmental regulations and cost savings. Through integrating eco-design, energy efficiency, sustainable sourcing and waste reduction in their operations, businesses can gain a competitive advantage and also reduce their environmental footprint. Sustainability programs of business can also help in reducing operational costs through improving energy efficiency and cutting down waste, which further leads towards significant savings over time. Blockchain technology is being used to ensure traceability and transparency in sustainable sourcing. The dynamic of LM has expanded to include concepts of sustainability as ecological and social consciousness in manufacturing has increased. As a result, LM's goals have been expanded to include preserving the environmental and social aspects of sustainability. An essential component of sustainable manufacturing is green supply chain management. It entails using environmentally friendly packaging, sourcing materials ethically, and lowering emissions during transit.

A transition towards sustainable business practices does not remain without any challenges, technological barriers, resistance to change and high initial investments remain as some of the significant obstacles. Overcoming these barriers needs collaboration among businesses, technology providers and governments as well. Policymakers are provided financial incentives, while the companies have to invest in innovation and also employee training, as it helps them to facilitate the adoption of green practices. Moreover, subsidies and tax incentives for adopting green technologies are further help in mitigating financial burdens. The future of business is shaped by the circular economy models and advanced technologies. The manufacturers are also have to embrace sustainability as their strategic priority to meet the expectations of eco-conscious consumers and address challenges related to global environmental. Ultimately integration of green practices is vital and also critical for the success of a long-term business.

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