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The Role of Warehouse Layout and Operations in Warehouse Efficiency: A Literature Review

Ibrahim Hassan Mohamud[1,3*], Md. Abdul Kafi[2], Syairah Aimi Shahron[2], Nizamuddin Zainuddin[2], Suria Musa[2]

[1] Faculty of Management Science, SIMAD University, Mogadishu JH09010, Somalia
[2] School of Technology Management & Logistics, College of Business, Universiti Utara Malaysia, Sintok, Kedah 06010, Malaysia
[3] Kasmo Institute for Technology, Logistics, and Economics Research (KITLER), Mogadishu JH09010, Somalia

Corresponding Author Email: gabowraage@gmail.com

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ABSTRACT

Organizations now use warehouse efficiency as a centre of expertise or a strategic weapon. A warehouse that works well can meet customer needs quickly and helps a business do better. So, the goal of this study is to look at how the attributes of a warehouse affect warehouse efficiency. This study looks at two attributes about warehouses: their layout and warehouse operations. A literature review was first conducted to find the role of warehouse attributes (layout and operation) in warehouse efficiency to draw lessons from the literature. The articles that were published between 2019 and 2022 were examined. The authors evaluated the studies' eligibility, retrieved data from the studies that were included, and assessed the study's quality and bias risk. Several studies showed that the attributes of a warehouse make a big difference in how well it works by showing the good effects on efficiency. Also, a warehouse is more efficient when it is set up in a way that makes it easy to meet customer needs quickly. Along with how the warehouse is set up, warehouse operations are a key part of making it more efficient. Layout and operations work together to make a warehouse more efficient as a whole.

1. INTRODUCTION

Today, corporations employ warehouse efficiency as a strategic weapon or a center of competency. A well-built warehouse might encounter customer requirements quickly and improve company performance. warehouse play an important role inside the logistics chain. Even though elevated work has been under heavy stress as the demand for better service grows in a strong industrial sector. The rising rate of progress and lower latency have just shown how important it is for freight forwarding to work well [1]. Enterprises have been commonly faced with the challenge of determining how to structure and design their warehouse in order to enhance efficiency while lowering operating costs. Like a direct consequence, this same goal of this study is to investigate what warehouse brand the efficiency of warehouses. We'd like to learn about warehouse site layout, warehouse operations design, optimal storage location, warehouse operation efficiency, a real-time location system to improve warehouse safety, as well as the challenges that many of these characteristics face in an influential warehouse.

The purpose of warehouse management for enterprises is to ensure the efficient and effective flow of goods and materials through the supply chain, from the point of receipt to the point of delivery. This involves managing inventory levels, tracking product movement, and optimizing warehouse layout and operation to minimize costs and improve customer satisfaction. The study [2] revealed that the purpose of warehouse management can be broken down into three main objectives which is improving operational efficiency, reducing inventory costs, and improving customer service. Warehouse layout and operation must be designed to support these objectives, while also taking into account other constraints such as budget, space availability, and regulatory requirements.

Warehouse efficiency refers to the ability of a warehouse to optimize its operations and resources in order to achieve the desired level of performance in terms of speed, accuracy, and cost-effectiveness. According to the study [3], warehouse efficiency can be measured by various factors, such as inventory accuracy, order accuracy, order cycle time, and order processing cost. The relationship between warehouse efficiency and warehouse attributes has been extensively researched in the literature. For example, a study [4] found that warehouse layout, material handling equipment, and information technology infrastructure were significant factors that affect warehouse efficiency. In addition, the study [5] highlighted the importance of warehouse location, warehouse design, and warehouse management in achieving warehouse efficiency. The authors argue that the location of a warehouse can significantly impact transportation costs and delivery times, while the design of the warehouse can impact storage capacity and material handling efficiency. Additionally, effective warehouse management can improve inventory accuracy and reduce order processing times.

The role of warehouse attributes in warehouse efficiency motivated this research because this assimilation is desperately needed. Utilization warehouses had already lately grown in popularity and sophistication, with more innovative

technology being implemented in this field. As according our knowledge and evaluate of an essay, the electronic warehouse provides an unprecedented opportunity for a real-time monitoring system (JIT) just-in-time tracking system in the warehouse, warehouse operations design, optimal storage location, warehouse operation efficiency, a real-time location system to improve warehouse safeness, as well as the obstacles that all of these characteristics encounter in an impactful warehouse [6]. Based on a variety of problems, which include underlying sound and a volume of data, it remains extremely difficult to successfully implement in a storage facility, although with the great chance. Another issue is that many businesses continue to struggle with performance. Companies worldwide expend approximately $350 billion per year on storage, per the [7]. Businesses, on either side, have been having difficulty identifying areas for improvement due to a lack of data and expertise on alternative warehouse construction and optimization. We'd all like to learn more about the characteristics of warehouse activities, which is why we're conducting this research.

Warehouse efficiency and supply chain management issues are usually ignored following globalisation. These issues continue to arise as a firm's supply chain get more complex and difficult, that was a normal practice after the 1990s. It's been particularly apparent as in distribution chain throughout the last 2 decades, where the warehouse has become a vital component of the key logistics service providers. High - performance work, according to the study [8], has now evolved into a centre of competency or a strategic weapon that many organisations use to improve their market positions. All whilst, stockroom performance is confronted with insurmountable challenges that are impeding progress toward awesomeness. Heretofore, storage was generally viewed as a consistent industry for these various other business units; however, it is currently viewed as a significant industry in its own right [9].

Different supply chain models have varying characteristics and requirements that impact the inventory needs of enterprises. These requirements in turn influence the layout and operation of warehouses. In a make-to-stock (MTS) supply chain model, enterprises typically maintain higher inventory levels to meet anticipated demand. This means that warehouse operations need to be more focused on inventory management and control, with an emphasis on accurate inventory tracking and forecasting. A study [10] found that in MTS supply chains, the layout of warehouses should be designed to minimize the risk of stockouts, optimize the utilization of available space, and reduce the costs associated with inventory carrying and handling. In addition, the requirements of specific industries and product types can also impact warehouse layout and operation. For example, perishable goods require specialized storage facilities that maintain specific temperature and humidity levels to ensure product quality and safety. Moreover, the study [11] found that in the food industry, warehouse layout and operation should be designed to facilitate the separation of different product categories, minimize product handling, and reduce the risk of product contamination. Overall, the requirements of enterprises for inventory are closely tied to the specific characteristics of the supply chain model, industry, and product type. Warehouse layout and operation must be designed to support these requirements, optimizing processes and minimizing costs while maintaining product quality and customer satisfaction.

The same astronomically high obstacles to stockroom utilisation demand far more sophisticated approaches than those lately implemented for organising and enhancing warehouse operations [12]. In a storage facility, determining the warehouse's capacity for material development, stockpiling, and data exchange would be another crucial duty [6]. Material production, stockpiling, and information transmission are essential components of warehouse performance in a distribution network.

A consistency of such variables improves warehouse efficiency [13]. Constructing a warehouse, on the other hand, is a large investment that involves capital and takes up a lot of space [14]. Another funding issue has been the time required for a payoff (ROI), which is the primary consideration of any company before implementing new technology in the warehouse and can also pose real challenges in this particular instance [15].

A cumulative availability of resources could have an influence on the adoption and application of warehouse design and technology. According to the literature, the use of blockchain in warehouse technology is currently in its initial phases in Malaysia. Furthermore, block chain technology will introduce risk but also spitefulness in and out of personal data. Another big worry seems to be the cost or value of implementing new technologies in the storage facility, including such cryptocurrency.

The significance of effective logistics operations has increased as a result of the expanding trend toward greater product diversity and shorter lead times [1]. The conundrum of how to build and design a warehouse to achieve better productivity and lower operational expenses is one that businesses face continually.

According to the study [16], warehouses should prioritize adaptability, accessibility, and efficiency while decreasing non-value-adding activities [17, 16, 1]. In every part of the warehouse, operations should be optimized, and efficiency should be attained [16]. Among the areas that should be optimized are inventory, material handling equipment, loading and unloading, personnel, and strategic storage [18].

The characteristics of the products and the warehouse design are traded off to determine the best storage location policy [19, 20]. Determining the best storage assignment strategy for a warehouse is a challenging topic to resolve, according to [19]. It is challenging since numerous warehouse activities determine the layout of the warehouse, making it heuristic to solve.

The most important thing a company has to do is figure out how much space it has in its warehouses for material development, storage, and data exchange [21]. These factors, including material development, stockpiling, and data sharing, are crucial to the effectiveness of the supply chain warehouse.

The efficiency of the warehouse is improved and enhanced by these factors being smooth [13]. Many businesses are still having trouble becoming more efficient. However, due to a lack of information and knowledge on alternative warehouse design and operations, businesses are finding it difficult to pinpoint areas that require improvement.

2. RELATED WORK

2.1 Warehouse efficiency

Warehousing is a crucial part of the supply chain process

[22, 23]. After business globalisation, problems with supply chain warehouse effectiveness and supply chain management are usually not thought about in depth [24-26]. This problem keeps getting worse as a company's logistics get more complicated, which was a common practise after the 1990s [9]. In the last 20 years, this problem has gotten worse, especially in the supply chain, where warehouses have become an important part of the main logistics service companies [27, 28].

The warehouse efficiency relationship is crucial, particularly for organisations that assemble products [29, 30]. The study [31] stated that warehouse exercises are becoming increasingly focused on the capabilities of the operations. This could provide clients with what they desire in less time while also improving accuracy and dependability. There is a vital connection between the final consumer and the warehouse-exercising manufacturer. The operation of a warehouse influences the efficiency of the supply chain.

Similarly, the study [32] said that companies should emphasis on improving the efficiency of warehousing in stock turnovers and spending orders from the time they are assembled until they are delivered. So, the most important thing a company has to do is figure out how much space it needs for material development, stockpiling, and data exchange [33]. Material development, stockpiling, and the exchange of data are all important parts of an efficient supply chain warehouse. When these things work well, the warehouse works better [13].

The study [1] used procedure mapping, data analysis, and direct time monitoring to find non-value-added time and its causes and effects. They also found that inadequate planning and sizing of the warehouse layouts were having a big effect on how efficiently the warehouse was managed. [34] indicated that supply chain warehouse attributes have a positive effect on efficiency. This showed that supply chain warehouse attributes are important for efficiency. Also, a supply chain company's warehouse is more efficient when it is set up well and can meet customer needs quickly. Along with how the warehouse is set up, warehouse operations are a key part of making it more efficient. Layout and operations work together to make a supply chain warehouse more efficient as a whole. Without a well-designed and run warehouse, it is hard to improve the warehouse's efficiency and the company's performance.

The characteristics of storage in an enterprise refer to how goods and materials are stored within the warehouse. According to the study [2], the key characteristics of storage include storage density, accessibility, selectivity, and handling requirements. The storage method used can significantly impact warehouse efficiency and properties. The study [6] found that the use of automated storage and retrieval systems (AS/RS) can improve warehouse efficiency by reducing order processing times and improving inventory accuracy. Another study [35] found that the use of high-density storage systems, such as pallet racking, can improve storage density and increase warehouse capacity. However, the storage method used must also be appropriate for the specific needs and characteristics of the enterprise. For instance, the study [36] found that the use of high-density storage systems can negatively impact warehouse selectivity, as it can be more difficult to locate and retrieve specific items. Additionally, the use of certain storage methods may require specific handling equipment, which can impact warehouse properties such as space utilization and layout.

According to the study [3], storage efficiency can be measured by various indicators, such as storage density, inventory turnover rate, and inventory accuracy. These indicators can provide insight into the efficiency of the warehouse's storage and inventory management processes. Overall, storage efficiency is an important factor in warehouse operations, as it can impact the warehouse's ability to effectively manage its inventory and meet customer demand. By monitoring and improving indicators such as storage density, inventory turnover rate, and inventory accuracy, warehouses can improve their storage efficiency and optimize their operations.

Along with the study [35], there are several factors that can impact warehousing efficiency, such as the layout and design of the warehouse, the equipment and technology used, and the warehouse management processes in place. While stock turnover may be influenced by these factors, it is not a direct measure of them. Instead, there are specific indicators that are more closely related to warehousing efficiency. As mentioned in the previous study [3], indicators such as storage density, inventory turnover rate, and inventory accuracy are often used to measure storage and warehousing efficiency. While stock turnover can be a useful measure of inventory management efficiency, it should be used in conjunction with other indicators that are more directly related to warehousing efficiency.

Companies and corporate executives presume that warehouse efficiency is one of the most important aspects of supply chain coordination. This is because it has the possibility of saving money [31]. The researchers also stated that these activities are a good way to use marketing to get ahead of the competition and make customers more loyal. As a result, having an efficient warehouse is critical for maintaining a competitive edge. According to the study [33], warehouse layout and operations make it more efficient. The researcher also stated that MIS is a big part of the relationship between warehouse features and how well they work in the supply chain.

2.2 Warehouse layout

As per the study [2], creating a storage facility is comparable to presenting a mystery, with the method involving stereotyping, optimization, rationalization, computerization, as well as automation of material handling. Some well strategic planning could indeed markedly reduction, effort, counterproductive occasions, this same lot of barriers, or even the time it takes to manage materials [37, 38, 8]. At the very slightest, the above layout did think might well increase the yield, which would be beneficial for making money. The area for compacting, the storage facility, as well as job form car parks are all part of the central point that must be considered when determining what the material management system means.

Many design elements and resources must be taken into account for warehouse operations to be effective and efficient. These include the physical layout, like where the docks are, how the aisles are set up, how deep the lanes are, and how high the stacks are [39], and the storage and handling equipment, like different kinds of racks and forklifts for putting things away and getting them out [36] and the automation solutions, like conveyors and robots [40, 41].

The study [42] recommended that the best warehouse layout is one that makes the most of the space while reducing the amount of time spent travelling and the number of points of

contact. During the design phase, all of the warehouse's working areas and the space each needs should be taken into account.

According to the study [37], selecting the best warehouse layout is difficult because there are so many factors that influence the success of warehouse activities, such as dock area, rack types, rack access, and others. The authors [43], on the other hand, say that the layout of warehouses should be standardised to get around administrative spending limits. Other related things that need to be thought about include security, labor, offices, framework, correspondence, stock, and control. There should be enough flexibility to be able to meet any requests or needs that clients or providers have for their stock. So, the layout of a warehouse is the most important factor in how well it works as a supply chain warehouse.

Moreover, the study [7] revealed that setting up the layout of a warehouse framework is difficult for a number of reasons. These include big decisions about the building's structure and a lot of problems that are hard to solve all at once. This extra factor looks at a number of operations (picking, double direction, cross docking, and value-added services) and factors (request, physical properties of things and unit loads, serving international markets, material care, and Just-in-Time (JIT), travel time, material care cost, and warehouse throughput). Such parts and processes should be shown in a clear warehouse layout so that they can adapt to any changes in operations without having to change the design. These tasks should be thought about and shown in the layout structure in a useful way [7]. So, warehouse layout design is one of the most important parts of supply chain warehousing. It is a crucial component of increasing the productivity of warehouses in supply chain companies.

2.3 Warehouse operations

A warehouse is a complex place with many different tasks and operations, such as picking, storing, scheduling, and routing. The safety and operational efficiency of such a storage facility can indeed be key aspects of its planning. Bringing items into the warehouse, putting them away, storing them, picking, sorting, packing, and shipping them out are now all common applications throughout most storage facilities. Warehouse management at various surface nodes are important components of distribution systems [44, 45].

Furthermore, operations play an important role in the efficiency of supply chain warehouses, as it is often found that good operations make a system work better [5]. The authors [2] say that companies that want to use lean operations should start with a time study and investigation of the request-fulfillment process to improve warehouse efficiency. They have to figure out how long a normal process takes, figure out which parts add value and which don't, and then figure out how much time each one takes. This is done to figure out the value-added percentage as an overall sign of the potential for improvement. Then, the work process is checked for bottlenecks, wasted motion, and equipment availability [2].

In the supply chain, warehouses are very important. In the competitive industrial market, the need for better customer service is putting more pressure on warehouse efficiency [16]. The growing trend of more products and shorter lead times has made it clearer how important it is to have good logistics operations [1]. Organizations are always trying to figure out how to set up and design their warehouses so that they are more efficient and cost less to run [46].

Warehouses should focus on being flexible, easy to get to, and efficient, while reducing activities that don't add value [16, 17, 1]. The warehouse's operations should be streamlined, and every part of it should work well [16]. Some of the things that should be optimised are inventory, material handling equipment, loading and unloading, staff, and strategic storage [17].

The way a warehouse operates and how well it operates is essential, as per the study [18]. They claim that getting, selling, caring for, storing, pressing, and speeding up logistics processes get a serious influence on the firm's general performance and achievement. Moreover, because of the need to keep improving supply chain performance grows, warehouse management is being forced to focus on coordinating their efforts [18]. As a result, warehouse operational effectiveness and supply chain warehouse efficiency are linked in a beneficial fashion.

3. METHADOLOGY

Finding current systematic reviews in information systems and social science databases, such as Science direct, ProQuest, Wiley, Sage, EBSCO, Taylor, Springer Link, Emerald, and the ACM, shows that this review is needed. When searched for "warehouse attributes in warehouse efficiency" I got a list of 686 articles. Only the ones published between 2019 and 2022, or in the last five years, were kept for further evaluation. The rest were thrown away. Figure 1 shows that there are many steps in the process of making a choice. At the end of this process, 10 empirical studies out of the 50 articles were chosen based on the following criteria: i) the studies evaluated the warehouse's efficiency in the real world; ii) the studies were clear about how they did their research; and iii) full research results were available. The authors looked at whether the studies met the criteria, took data from the ones that did, and rated the quality and risk of bias of the study. This was done so that the research would be as up-to-date and useful as possible. Also, the rest of the articles were looked at by reading their abstracts and conclusions and comparing them to the research goals and aims. Then, the purpose, method, results, and recommendations of each of the 10 articles are looked at so that more research can be done. For this, each of the final 10 articles was carefully read and reviewed, and they were put into groups based on the topic they covered, the goals of their research, and the results they found.

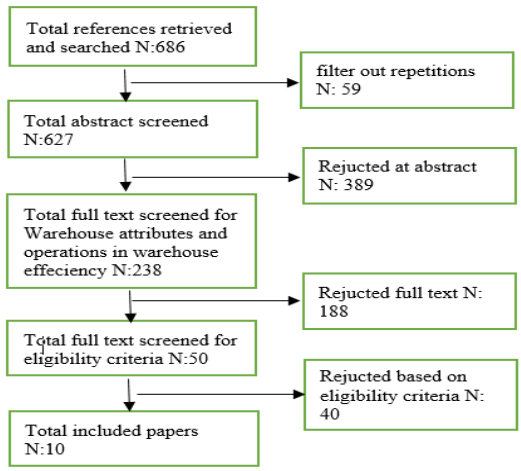


Figure 1. Study selection process overview

4. RESULTS AND DISCUSSION

The significance, hypotheses, results, conclusions, and methods used in previous study on warehouse attributes in warehouse efficiency are depicted in Table 1 below.

Warehouse management is often viewed as easier than it actually is. Some may think warehouses simply shelter goods until they are shipped abroad or distributed to retailers, but the reality is that there is much more that goes into a well-oiled warehouse system. In the process of warehousing, products and cargo are handled scientifically and made easily accessible whenever they are required for shipment. When planning a warehouse layout, there are a number of aspects that must be taken into account. Raw material transfer, cost reduction, transportation support, and warehouse efficiency improvement are all a part of an efficient warehouse operation system. Here we have mentioned the results that can help evaluate an efficiency warehouse. Due to the integration of motion control technologies and the warehouse, a new form of mobile robot known as a handling robot is being used in the field of storage operations via the installation of magnetic tracks, navigational routes, location beacons, and other indicating devices. Technologies for task management, sensor technology, and other approaches. Considering the information provided, it requires a gadget, precise positioning, and path planning. Effortless movement of mobile shelves and links exhibited between shelves and employees [6]. This significantly lowers the need for pick-up personnel, significantly lowers labor costs, and enhances working conditions and increase the warehouse efficiency [6, 21].

Table 1. Content review of the selected articles

Authors	Purpose	Methodology	Results
(Buba et al., 2019) [4]	Analyze how effective integrated inventory management affects the image of the firm.	casual and descriptive research design.	The research shows a strong correlation between warehouse operational efficiency and overall organisational performance, and that warehouse administration suffers when management lacks timely, well-prepared and accurate records.
(Jermsittiparsert et al., 2019) [34]	Look into how attributes of the warehouse affect its efficiency in the supply chain warehouse efficiency.	Survey	Warehouse attributes were found to positively affect warehouse efficiency in the supply chain. Effective warehouse design and operations help boost warehouse productivity for Indonesian supply chain businesses.
(M. Shashidharan, 2021) [6]	The effectiveness of warehouse operations as a whole is investigated.	Questionnaire	In besides generating revenue and boosting customer satisfaction, effective warehouse management also advances academic understanding of supply chain management.
(Salomonsson, 2021) [48]	Examines design, operations, and planning as means to boost efficiency in traditional warehouses.	qualitative and deductive case study approach	The warehouse of the case company suffers from widespread inefficiencies. The warehouse's lost its structure over the years, so now it's dependent on the employees' familiarity with the business and its many moving pieces in order to run well.
(Furesawa et al., 2019) [35]	Warehouse picking efficiency can be increased by using a shipping slip assignment system that minimises employees' need to walk.	shipping slip assignment method	In this investigation, it was established without a reasonable doubt that the proposed strategy is helpful for minimising walking distance in picking when applied to the simulated settings developed for their research.
(Masae et al., 2020) [12]	Different order picker routing policies can help cut down on journey time.	Literature Review	The authorss concluded that research on order picker routing in warehouses has garnered considerable attention.
(Amanda Istiqomah et al., 2020) [47]	Discussed how the use of barcodes in the warehouse management system has boosted warehouse efficiency.	qualitative method	Warehouse productivity can be improved with the help of barcodes. A warehouse that uses barcodes can complete every procedure far more quickly and precisely than one that does not.
(Halawa et al., 2020) [5]	Provide an example of how real-world application of RTLS technology can be used to improve warehouse security and operational efficiency.	Case study	Based on their findings, it appears that the suggested framework can take existing warehouse solutions to the next level, allowing for the implementation of truly smart warehouse operations.
(Martins et al., 2020) [1]	Aims to enhance management and logistics within a plant that makes cork stoppers.	Action Research	As this study demonstrated, constant development does not necessitate a large financial outlay.
(Paveenchana & Phumchusri, 2019) [21]	Improve the performance of the internal raw materials warehouse in the case study by assigning each material to its most efficient storage location.	Case Study	This means less money out of pocket for the case study company to keep finished goods in a public warehouse.

The primary attribute is Time-window-based path planning algorithm for multiple handling robots. Kim and Tanchoco came up with the time window approach, which is often used to optimise the paths of many warehouse handling robots on bidirectional graphs [21]. The carrying robot's path, distance, and time are planned using a traditional method and an upgraded algorithm, respectively additionally, it reduces the amount of running required and increases the carrying robot's effectiveness in the warehouse sector as well. As a result, by implementing the algorithm robots in the warehouse industry, they can reduce the time and increase the efficiency of internal and external factors of the warehouse.

A barcode system can be used as a second type of attribute management system. In every step of the process, barcodes are used in the warehouse management system to reduce human error and give correct data right away. Barcodes also improve the efficiency of the warehouse management system by making sure that all processes work together. The user also wanted a system that could keep track of and control every item that went into and out of the warehouse. To make recording and tracking with the system faster and easier, every item must have a label applied to it, and every document must be barcode [1].

WMS is an information technology database used to support storage operations and increase warehouse productivity by coordinating integrated storage activities and keeping accurate inventory [47]. As another characteristic, we can say that an automated warehouse management system is used to keep track of the items in the warehouse. Implementing barcodes in warehouses has many benefits, such as reducing mistakes and speeding up the process of receiving goods, automatically knowing where goods are stored, reducing mistakes in where goods are picked up by the picker, speeding up the picker's process of picking up goods, knowing if there is a shortage or surplus of goods, and knowing if the goods that will be shipped are suitable and of good quality.

The third is real-time data integration of an internet-of-things-based smart warehouse. Based on the internet of things (IoT), a warehouse the outcomes of the experiments showed that data integration is crucial for combining different types of data from different sources in the IoT-based warehouse in a real-time way. The three key components of configuration, data basing, and transmission could be used to establish real-time data integration processes in IoT-based warehousing [21]. Internet of Things (IoT) is a simple term for all the physical devices that are connected to the internet to collect and share data. Wireless networks and small computer chips have made it possible to make a huge number of products that help people stay in touch. IoT devices include robots, drones, RFID, sensors, etc., that can scan, store, share, and get data from the internet. IoT devices can sense and monitor their surroundings, report on their status, get instructions, and act on the information they get [40].

A warehouse management system that enables tracking of product information. Its rally helps to increase the warehouse productivity as well. The attributes took the huge part of the efficiency warehouse [22, 48].

Applications of IoT in Warehouse Management Inventory and Asset tracking with IoT, a warehouse can be aware of each moving part. Connected sensors track each asset across the premises. Smart shelves in warehouses can broadcast inventory information and warn warehouse managers of low stock, displaced products, unsuitable temperatures, theft, and so on. IoT helps to eliminate expensive and time-wasting mistakes by making sure inventory levels and equipment locations are known [47, 49]. Automation IoT devices such as robotic units do more than just assemble orders. These devices collect tons of data, including information on stocks and inventory, the efficiency of the warehouse, and so on, allowing employees to focus on more customer-facing tasks so by this kind of activity we can improve the warehouse efficiency to next level [22].

Aids it's another attribute in efficiency warehouse to avoiding damage and product spoilage. Keeping products safe in storage and delivery while keeping them at the proper temperature is one of a warehouse manager's toughest concerns. This task is made incredibly simple by IoT devices. In a warehouse, the gadgets can monitor and automatically alter the temperature, air pressure, and moisture. This task is made incredibly simple by IoT devices. The devices can monitor and automatically alter the temperature, atmospheric pressure, and moisture levels inside a warehouse, thereby reducing the likelihood that the goods will become spoiled or damaged [1] by this aids attribute we can avoid the damage of goods in warehouse.

5. CONCLUSIONS AND RECOMMENDATIONS

A goal of this report was to identify themes related to the shift toward the role of warehouse attributes in warehouse efficiency, as well as to draw material handling findings. Inside of a sequence of overall journal articles have been carried out in order to develop research on warehouse ideologies. In the identify, the warehouse-efficiency link is essential.

Moreover, the aim of this study was to find out how different parts of warehouses affect how well they work in the supply chain. This study shows that supply chain warehouse features have a big impact on performance, in addition to having a positive effect on reliability. A well-planned warehouse layout for a supply chain organization leads to higher productivity by meeting customer demands as shortly as possible. Aside from warehouse layout, warehouse operations play a significant role in enhancing quality.

A design and processes of the supply chain warehouse collaborate to enhance energy effectiveness. Warehouse management, as well as stockroom floor plan, seem to be critical to higher efficiency. Layout and operations work together to improve overall stockroom efficiency throughout the supply chain. Without effective warehouse layout design and operations, it is difficult to improve inventory accuracy and job satisfaction. It is hard to boost work efficiency and financial results without proper warehouse layout design and operations. Inside this scenario, we mostly know about the warehouse layout and operation. A problem also was noted in the warehouse attributes. A prospective study is necessary to introduce open innovation based on warehouse characteristics.

From this study, we strongly believe that warehouse layout can improve optimization effectiveness and allow business operations to reduce their operation time. Other than that, it also helps the organization streamline the process at every stage, from receiving inventory to dispatching the final goods. You can meet tight deadlines and manage increasing demands if you have a proper layout. Furthermore, it aids in the reduction of affiliate costs in this matter.

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