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Addressing the backlog in the General Warehouse Pickups area using Quantitative survey approach: a study on Gulf nails manufacturing LLC

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Abstract

Sultanate of Oman is one of the 6th gulf countries with the leading oil export countries throughout the globe. Due to the growing demand for oil export and others manufacture, logistics came to the hand as a vital role within the country's economic growth. The overall concern with several logistics organizations and others firms around the Sultanate of Oman, owning the logistics warehouse inventory systems allow firms to manage easier in terms of inbound and outbound procedures. The countries have an enormous sound of logistics sectors across the country. However, its challenges and importance within the logistics are unclear. Due to the rising technology within logistics sectors, warehouses are facing an immense challenge through organizations across the Sultanate of Oman. It is necessary to take initial steps to solve certain warehouse challenges that the organizations are facing (Roth, Klarmann, and Franczyk 2013). The warehouse challenges in the present time within the warehouse are the backlogs within the warehouse pickup procedure. On the statement to Burinskiene (2010), analysis of customer orders, order picking entails retrieving items through the designated central warehouse. From the general perspective within warehouses, order picking is perhaps the most time-consuming operation. Order picking costs can account for up to 55% of the firms' warehouse overall operating costs. This research paper aims to address the creation of warehouse backlog within the pickups procedure. Moreover, the research goals are also to help to reduce the backlogs by addressing the distance traveled towards the order employer's shelf region within the warehouse. Numerous specific considerations are taken into account herein to meet the goals of this research paper: Stockroom scale, warehouse space/storage, architecture, and routes. The importance of this research is to understand the depth effect of warehouse backlogs effect within pickup operation and its overall effect on the organization's success. This paper also proposes several innovative approaches towards reducing the backlog effect upon its order picking operation. Such as a density technology upgrade, warehouse device upgrade through its use of connection among order picking productivity and inventory precision. The research presented at this time identifies variations with its appropriate independent implementation approaches to minimize backlog effects.

INTRODUCTIONS

Warehousing in the supply chain is an integral part of a firm's operation. The latest analysis within logistics cost control/cost reduction was rate as the top concern by as many as 71% of those who responded (Jermsittiparsert, Sutduean, and Sriyakul 2019). Since warehouse space has a monthly cost, the space management part, storage, has a monthly cost. The labor involved in managing materials as they travel in and out of the warehouse is included in the time management component. Both warehouse-based businesses bear certain costs, but yet different calculations are done mannerly (Speh 2009).

Author Kasimov (2016), the term "Bullwhip effect" is one of the most common warehouse management issues that occur within the majority of the firms. It considers as one of the precise mutual occurrences and the integral consequence via the inventory/order-to-delivery

phase. Once it occurs, it can face undesirable consequences for organizational success towards supply chain management. Such a phenomenon arises due to the supply chain propagation through request demand irregularities arises.

According to Wallace (2000), some of the bottlenecks are understaffed or poorly trained personnel, excessive separation among staff duties, obsolete equipment/technologies and facilities. In addition, ineffective communications exist as some of the factors that lead to warehousing bottlenecks. For the firm's warehouse capacity to remain effective and efficient, the organization needs to address the specific right strategies to address the issues of warehouses. Moreover, the most frequent challenges of the warehouse operations are effect due to arise in the bottleneck, overstocking also with dysfunction within warehouse management, motivation of workers plummets, lack of work alternative possibilities (Mizgier, Jüttner, and Wagner 2013). Also by author Kokemuller (n.d.), the majority of the bottleneck occurred mainly within warehouses of the manufacturing firms. Equipment usage and job processes are the most common manufacturing bottlenecks. Identifying or eliminating every cause of the appearance bottleneck will boosts efficiency that eliminates wasted labor & utility expenditure.

Literature Review:

The term warehousing in the supply chain is considered an essential component for supply chain management in addition to logistics systems. For the most part, maximum folks assume warehouse operations as simply loading items that are not accurate. Its warehousing functions also include incoming core strategies and outgoing packaging and distribution functions (Westford University College 2016). Among storage, processing, between transportation and customers, there should always be warehouse service amenities, built to balance irregular phases with manufacturing, consumption, and service with different modes for transportation (Kabus 2016).

Importance of warehousing in supply chain and logistics forum

According to Santos international (2015), warehousing provides firms products with state control: Receiving, storing, including distributing items appears simpler when all products are being executed in one place. As a result, firms operating/transportation expenses can reduce with the help of the warehouse. Authors A, N. Subramanya, and M. Rangaswamy (2012) states the management, planning, and coordination of warehouse operations is known as warehouse logistics. It involves room management, delivery preparation, including info for

the organization to ensure that the warehouse runs smoothly. Such sections are essential for the firms to have the right towards improved storeroom/warehouse through logistics to provide consumers with faster order fulfillment and reduce expenses. According to author Arora (2020), warehousing is considered as one factors important component of SC (supply chain). Yet such function might not operate face-to-face towards a consumer and the customers under no circumstances be aware of every purchase behavior would be hampered without it.

Warehouse pickup area process and its issues

According to Burinskiene (2010), order processing seems to be the process of retrieving items through designated collection points based on consumer demands. In particular, order processing is by far the most time-consuming task in a warehouse. Order picking costs can account for up to fifty-five percent of a warehouse's total operating cost. . In addition by the author Sinisalo (2016), identifies that whenever an object isn't somewhere that necessarily available within specific warehouses, every handler/picker will spend too numerous amount of actions/time looking for the product. The causes request fulfillment to be delayed, resulting in disgruntled consumers and challenging attention. In addition, it is a rather wasteful warehouse activity. Furthermore, according to NewcastleSystems (2016), a bottleneck might create because of inefficient processes, slowing everything down. The accuracy with which warehouse workers could perform requests nor coordinate inventory can be measure, and regular inventory management procedures, become fraught with problems.

Challenges of bottleneck within warehouse pickup area towards supply chain management

Some researchers like Sakthivel and Muralidharan (2019), founded within the present fast-changing entrepreneurial climate necessitates. Firms must collaborate and place much greater emphasis upon beneficial impacts through teamwork rather than working with individual goals. Supply chain management partakes becoming essential standard business practice, which is critical with every business performance & customer retention nowadays more than ever before. SCM (Supply chain management) abstains ability, which increases customer support, lowers operational budgets, even enhances a company's financial status (Kleab 2017). In risky situations, the integration of supply, output, and distribution in manufacturing processes is critical. A procedure of supply chain throughput is determined by the effect of the bottlenecks. Addressing and improving on this fact would maximize working capital (Sardar and Hae Lee 2015). In a supply chain, a bottleneck (or constraint) refers to the

commodity that takes the most duration to operate for a specific request. Typically, phenomena including a rise in inventory before a bottleneck and a shortage of parts following such congestion appear common (Hajmirfattahtabrizi and Song 2019). According to Mizgier, Jüttner, and Wagner (2013), statements argue that it just requires a single blunder throughout the distribution chain that can create a barrier that slows down the units that come before it. Items that are hailed or need to be complete will easily overflow storage rooms, forcing workers to wait until continuing the operations work. Such shortfalls become especially harmful towards businesses that produce agricultural or farm commodities having limited useful cycles.

Addressing the benefits of having effective supply chain management to minimize occurrence of bottleneck

Supply chain management aims to include to achieve a competitive advantage by conducting certain operations. Such operation can be accomplished through smaller worth/price or by defining innovative products of consumers' demand with higher cost (Wahyuni 2010). Cooperation within the business not only targets to help companies towards cost-saving. It also enables merchandise can reach consumers more quickly. It also will increase sales and lowering costs throughout the chain as a function of the two-chain result. Reduced order processing periods, and increased product availability, are two other main advantages (Fawcett, Magnan, and McCarter 2008).

Gaps for growing firms manufacturing warehouse production

As the warehouse covers the supply chain operations with 55%, it is crucial to understand the gaps or cause of backlog within warehouse management. Some frequent influence causes of the warehouse are the formation of bottlenecks within the warehouse pickup operation. Due to the bottleneck formation within the warehouse operation, firms must grow with smooth business overall operations (Hajmirfattahtabrizi and Song 2019).

Development of warehouse bottleneck within pickup network

Order pickup classification and identification of warehouse pickup area bottleneck

Order picking, since currently stated, consider as the method for selecting items through various warehouses towards fulfilling the consumer demands. Such a task entails the preparation & delivery of consumer requirements and their retrieval with goods. In addition, the following operations are achieved through the warehouse and accomplish the task for recycling of those commodities (Yu 2008). Furthermore, author Bowles (2020) states that

warehouse order picking accounts for equivalent towards 55 percentage area for the warehouse's operating expenses. As a result, by selecting the fittest order picking approach to consider one way via mega liabilities saving from the financial plan.

Numerous researcher has defined the importance and impact of the warehouse within the supply chain networks. Moreover, it also clarifies in-depth reasons for many firms' leads to unsuccessful within warehouse operations. Such reasons are due to the area of bottleneck within warehouse pickup line (W. Moran 2017). Authors like Ericson (2017), argue within their thesis paper a device might be a bottleneck for a variety of purposes. Classifying equipment with availability bottlenecks indicates perhaps bottleneck trigger exist either the system running too slowly via manufacturing or the machine not being vacant within the specific area of manufacture for long sufficient due to disruptions. Also, numerous researchers like Velumani and Tang (2017) dictates the terms bottleneck as any point in the manufacturing process. In addition, several amounts for errands that are performing represent the maximum workflow concept in terms of a bottleneck. A simple illustration of bottleneck occurrence is displaying as the image below: -

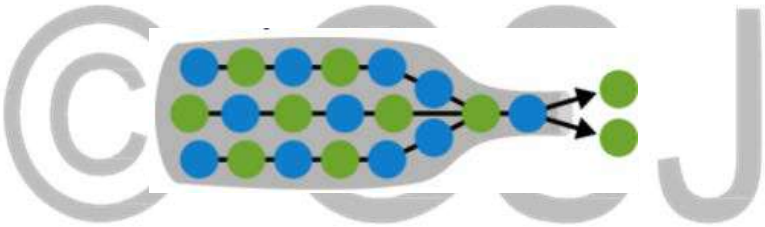


Fig 2.1 (Velumani and Tang 2017)

Intention for bottleneck creation

The blog report by Gravity Flow (2017), has been arguably stating that backlogs may occur for numerous circumstances, including outdated technology, insufficient workers, and limited resources. Also by the author Kikolski (2016), to ensure high utilization of a workstation processing capability poses several significant challenges towards efficiency with manufacturing procedures. Since a firm's terminal produces a certain logjam. The production line has the greatest standard to remain manipulated that implies the highest probability for a firm's production crashing. According to Hajmirfattahtabrizi and Song (2019), congestion within the supply chain/series appears similar towards components within the machine. Such a scene happens whenever its previous phase completes the task sooner nor quicker than the time. The next step and the procedure partake in achieving the firm’s goals due to low efficiency through inefficient labor or machines. The supply chain management systems were established as the bottleneck chain because the process took longer than usual.

According to journals article report by Gravity Flow (2017), identifies the two types of backlogs within warehouses management procedure: -

Bottlenecks in the short term – Such backlogs cause the result in momentary/temporary issues. When key personnel become sick or go on holiday, this is a good example. Nobody stands capable of taking tasks for such ventures, resulting in a job backlog before the personnel's arrival.

Bottlenecks that last a long time – such scenes occur additional common. For instance, suppose the corporation's end-of-the-month control framework becomes disrupted each period since a single individual must perform several sequences with laborious/time-consumption activities.

An author like Jacobs (2020) states before it hits the consumers almost 40% of industrial production is lost. Manufacturing bottlenecks source about a $12 trillion downturn throughout the production capacity markets. Such results in a significant portion deficit on firms' performance evaluations. Moreover, the diversion will deter businesses from meeting their organizational goals also have a significant effect on their procurement and SCM (supply chain management) approaches.

According to Pegels and Watrous (2005), the chief roots for causes of backlogs within warehouse manufacturing firms are as the following: -

- The root cause is often machinery capability as well as efficiency rather than workforce resources.
- Factors include out-of-date infrastructure, unplanned downtime, and unreliable supply chain forecasting.
- Yield losses, reliability issues, and intrinsic capability are all root causes.
- Because of variations in OEE (Overall Equipment Effectiveness) variables, non-bottlenecks may often become bottlenecks.
- The product mix can affect bottlenecks.
- The occurrences of the bottleneck are often challenging to spot since the subsequent production and damage have often been obscured.

Identifying procedure for backlogs within warehouse pickups operation

According to Reinboth (2014), ways of calculating backlogs are with few steps such as: -

Phase 1: Calculate its efficiency within each processing resource (m/activity period or measurements each/per hour).

Phase 2: Using multiple flow modules, calculate the service demand for each of these resources.

Phase 3: Can measure total demand for a resource, add multiple unit requests with each commodity.

Phase 4: To measure the implied utilization, divide the total demand by the resource's capacity.

In area to identify bottleneck simple methods of calculation can be performed such as: -

Bottleneck analysis

- The manufacturing production produce, operations at the level of 100% period/time, can produce a rate of: 20 merchandises/1 min= 20 merchandises per minute.
- Workers within the firms operate, 100% period/time, which can produce: 10 merchandises/27 min=22.2 merchandises per minutes.
- The manufacturing production is the bottleneck resource; resulting in producing at the least quantity of goods throughout the shortest period of time.

Impact of warehouse bottleneck towards another department within Firms

Subsequently, the manufacturing process phase takes longer and less versatile than production due to inefficient system reworking and considerably lengthy/high capacity of manufacture consignments, backlog formation occurs (Feldt, Kontny, and Wagenitz 2019). The bottleneck within the manufacturing warehouse impacts numerous planning divisions such as production planning, assembly planning, and human resource planning (Higgins n.d.). There is a lot of waiting time due to the sequence of events in the receiving procedure and the operational responsibility of the two departments. The processing period is a non-value-adding operation that can be classified as waste in a procedure (Hanus 2015). Its primary issue remains whether the position code remains written within the stickers at the end throughout the operation. Such circumstances slow down the firm's entire procedure because the operation package could only be processed throughout its designated positions till the label is applied (Stouwdam 2010).

Technologies to solve warehouse bottleneck target

The potential innovative tools entail the growth for the framework that aims in the direction of helping warehouses and distribution centers support man-to-goods order picking. This imminent with merge Interactive Digital functionality with blended learning and its finishing

result. Furthermore, such can be completely incorporated into every current WMS (Warehouse Management System) (Plakas et al. 2020). The authors Custodio and Luiz Machado (2020) argue that among them is the efficacy of stock management, methods of selecting or modifying products according to request, and the impact of automated systems. Authors Nilsson and Merkle (2018) states the demand in place towards supply chain monitoring grows further and more. The fast-paced environment over the last decade has necessitated greater awareness through accountability for companies. Visibility, traceability, and related details can be provided by monitoring systems at different phases towards supply chain and logistics, allowing for a comparative edge. Authors Janse van Rensburg (2019) suggests that tools technology like an enterprise that could aid the warehouse bottleneck is the ERP (Enterprise Resource Planning) solutions. The Enterprise resource planning, inventory management, and job scheduling software services are provided by WMS companies to warehouse operators. These further incorporate automated systems storing, automatically picked, including hydraulic ram equipment into the control system and provide interfaces for warehouse staff.

Addressing the bottleneck

For example, firms might discover a further, probably lesser, constraint just at starting procedure, as well as removing this would impact several mass manufacture/production downturns. Adding more power, changing its stream, removing wasted measures, increasing workers, and even reducing output are some of the solutions to bottlenecks (Lizarralde Aiastui, Apaolaza Perez de Eulate, and Mediavilla Guisasola 2020). The manufacturing process can be simplified and run much more smoothly once a bottleneck is established, discussed, and resolved. Employees within the firms should be trained in identifying small constraints/bottlenecks as a preventative measure. Moreover, the employees should be addressing issues before they become too severe (LeanProductions 2011). Department managers will typically advise forefront workers about how to recognize the symptoms of a bottleneck. Departments or equipment that are experiencing trouble coping, workers being shifting around to suit procedures. Furthermore, including finding unique regions that are affected by perpetually understaffed are examples of these (Wolniak, Skotnicka-Zasadzień, and Gębalska-Kwiecień 2018).

Research Methodology:

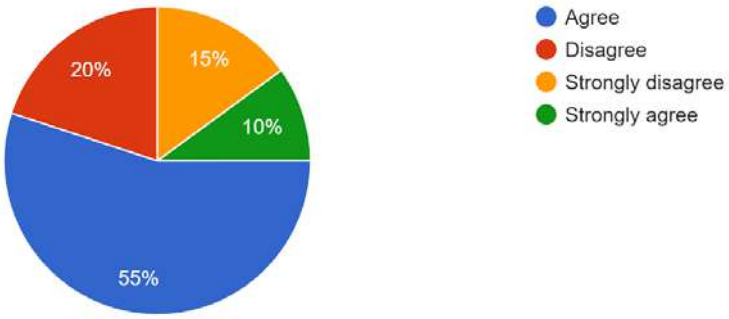
In this research quantitative survey questionnaire research methods were used to collect data from primary resource data collections. Quantitative research is one of the most commonly implemented uses of any degree of research. These are the reason why through this research quantitative data collection will be used. Moreover, it is one of the tools for research-based with the simplest to do so and analyze (Canals 2017). The style of this study proposal narrates as they are, with an emphasis on consequences, beliefs, principles, or features. This research goal was to resolve its territory's multiple bottlenecks, which is why a quantitative research method was chosen as per best option. Staffers of the Gulf Nails Enterprise were taken into account on survey's population of the study. The “Gulf nails” corporation remains among the Sultanate of Oman's newest building materials manufacturers, with a well-developed warehousing business.

The company's warehousing personnel provided the sampling frame list. Senior, middle, and procurement department staff members were polled for this study. Respondents in the first two categories, senior and medium level, were chosen using selective representative sample in the study. Such methodology ensured that all possible responders in these 2 categories had an equivalent yet impartial opportunity at participating in the research. Because warehouse is the host department of the warehouse function, all warehouse and operations staff members were included in the sample. Warehouse staff consider assessed in providing research furthermost relevant data towards the subject of the research. According to GN gulf nails (2019) recent update report from the gulf nails firm, its company has employees over 50 person’s employment. The researcher aims to focus on within the gulf Nails organization warehouse related only to the research topic. Those parts were selected for this research as they will assist in obtaining research insights that the researcher seeks and also helping to strengthen the research

All primary and secondary data were used in this investigation. Raw information was obtained via workers using questionnaires distributed as part of the primary data collection. These surveys were distributed to the participants by the investigators themselves. For the secondary data collection, we used empirical and theoretical literature from books, journals, and the internet. Every information gathered from research surveys subsequently reviewed but also categorized before being analyzed. This was qualitatively also quantitatively assessed. Basic qualitative analysis were used to summarize all statistical results.

1) The bottleneck are one of the frequent terms used within the organization's warehouse platform.

20 responses

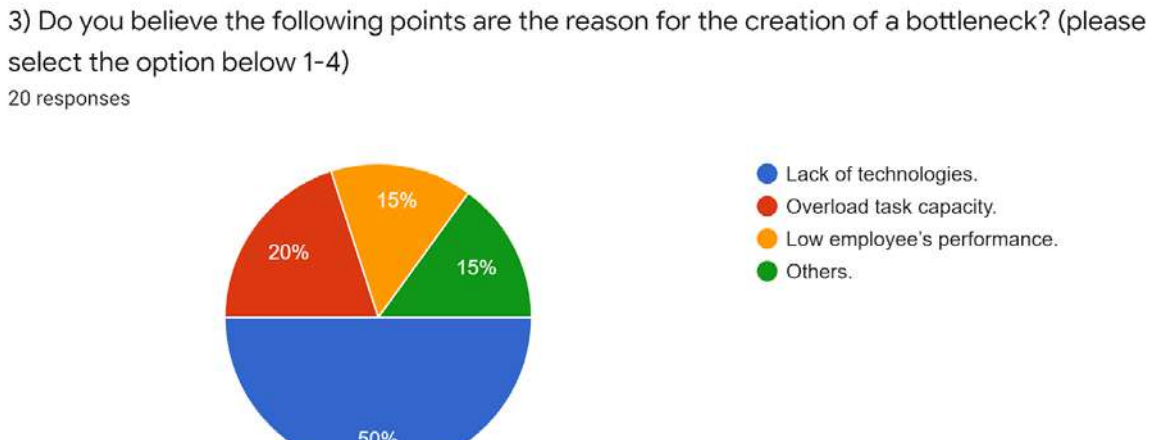


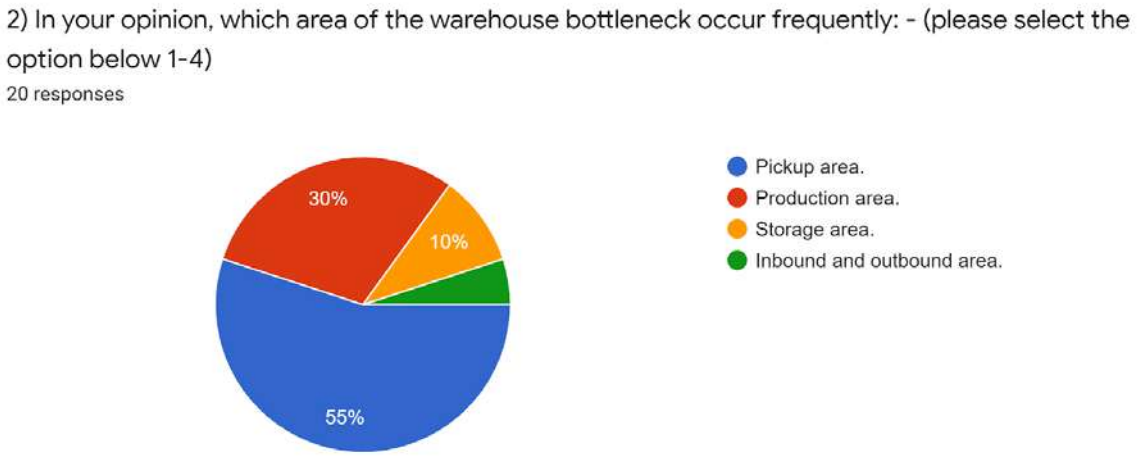
Result of the Study:

Survey result discussion: -

outbound area warehouse operation. According to Hajmirfattahtabrizi and Song (2019), many researchers also agreed that the occurrence of the bottleneck within the warehouse operation appears towards the pickup area, where numerous operation slows down From an analysis of the pie chart, it concludes that 55% percent of survey responder agree. Respondent working within the manufacturing firm and managing the warehouse has heard frequent “bottleneck” terms describing within the organization. On the other hand, the least 20% percentage of the responder disagrees with the statement. There is no doubt that the term “bottleneck” within the gulf nails warehouse appears or is heard occasionally once in a while.

55% of the survey responder agreed on the pickup area of the warehouse operation occurs the

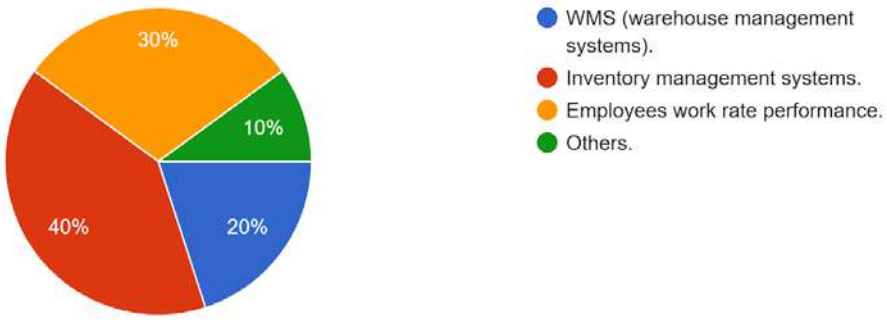




majority of the bottleneck challenges. The other 10% vote for the bottleneck occurrence on the storage area. On an average of 30% survey are voted for the production area of the warehouse operations. No votes count seen towards bottleneck effect on inbound and

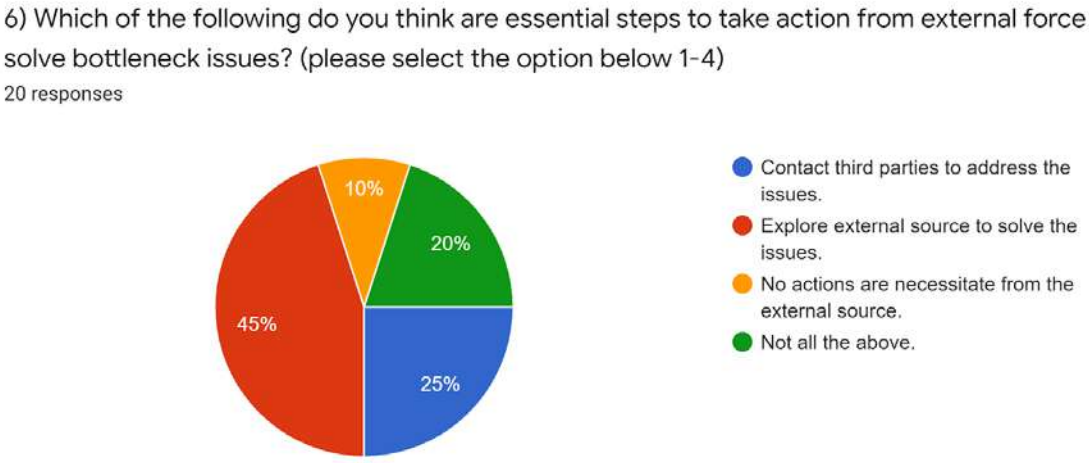
4) Which of the following technologies tools do you think will determine bottlenecks amongst the warehouse? (please select the option below 1-4)

20 responses



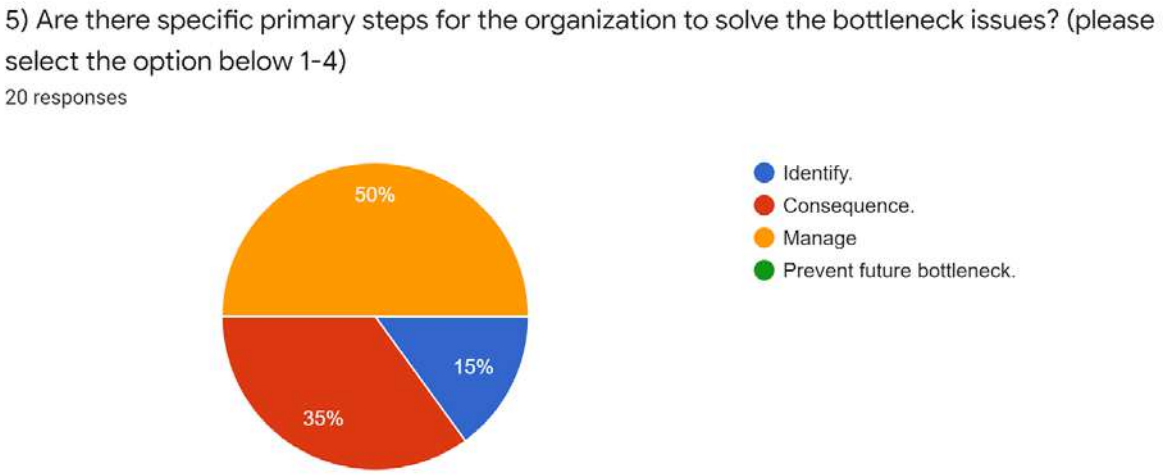
50% percent of the survey responder believes that it due to the lack of warehouse technologies that cause the creations of the warehouse bottleneck. Second highest 20% percentage responses that due to overload of the work task capacity is the reason that is leading bottleneck creations. Moreover, equally 15% percent vote for both low employee's performance and others reason for the creations of the bottleneck. In conclusion, according to Hajmirfattahtabrizi and Song (2019), research also quotes that technologies play a vital role in bottleneck creations through our modern technology advancement times. Lack of technologies within any organization will not lead to bottleneck challenges but also many others disadvantages for the organizations.

For the above pie chart survey, 40% percent of the responses agreed on the inventory management systems tools for the firm to detect the bottleneck within warehouse operations. Another, 30% percent of the survey response to the employee's work-rate performance to identify the bottleneck. The tools such as warehouse management systems to identify bottlenecks within the warehouse are only accepted 20% percent by the survey responder. 10 % percentage conclude using others tools that are t available at the survey tools



identifications.

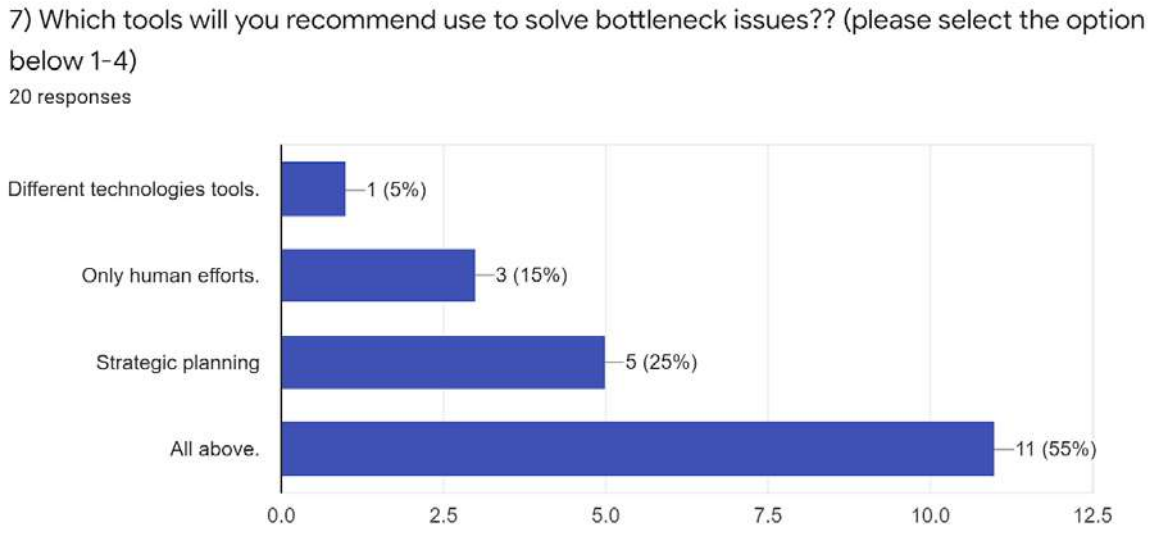
The survey response towards the primary steps that the organization vote for the first 50% percent can take management as the primary steps. 35% percent of the responder agreed to identify the “consequence” as a primary step to solve bottleneck issues. Lowest, 15% percent of the survey responder agreed the primary steps for the firms is to identify the bottleneck.



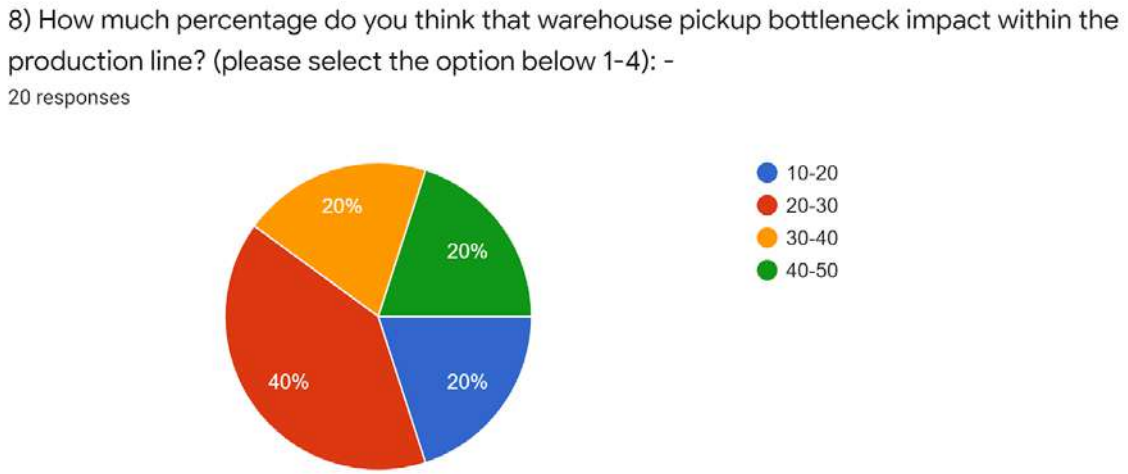
No responses are recorded towards it’s prevent a future from occurring bottleneck

In the response survey question 6, 45% percent agreed to explore the solution from an external source to solve the bottleneck issues (to research solution by investigating similar bottleneck issues from other firms). Lowest, 10% percent vote for no external force interference needed for the bottleneck solution. 25% percent of the survey responder agreed to contact third parties to address and solve the warehouse bottleneck issues.

In the survey response, half of the 55% percent agreed to use all the tools recommended on the survey to solve warehouse bottleneck issues. 25% agreed to use strategic planning to solve the warehouse bottleneck issues. Survey vote only 15 % percent to use only human effort to solve the warehouse bottleneck issues. The lowest 5% percent agreed to rely on the technology used to solve the warehouse bottleneck issues.

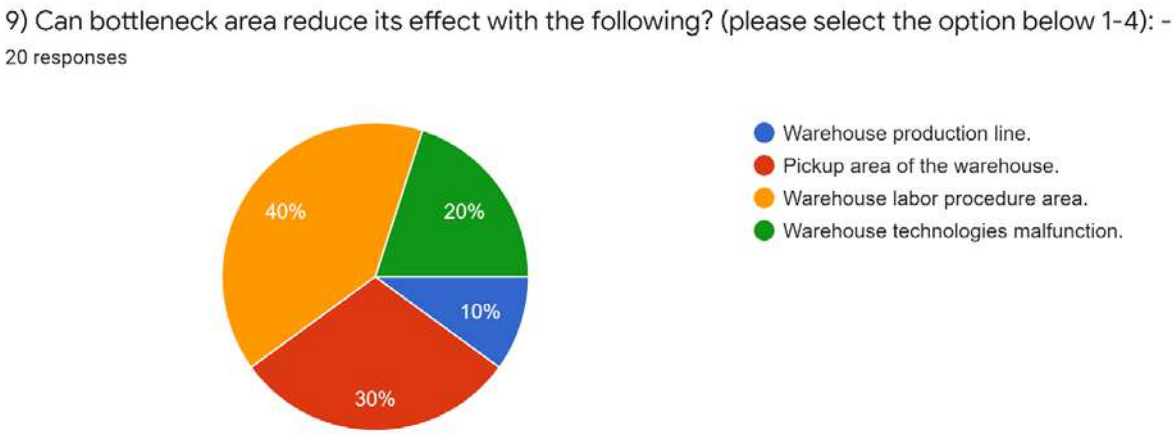


The survey awareness about percentages impact of the production line through warehouse bottleneck within pickup area result states, 40% percentage of the responder agreed that warehouse bottleneck affect covers around 20-30 percent of the production line. With few responders agree that 20% equal to all the percentages of the survey. The highest agreement

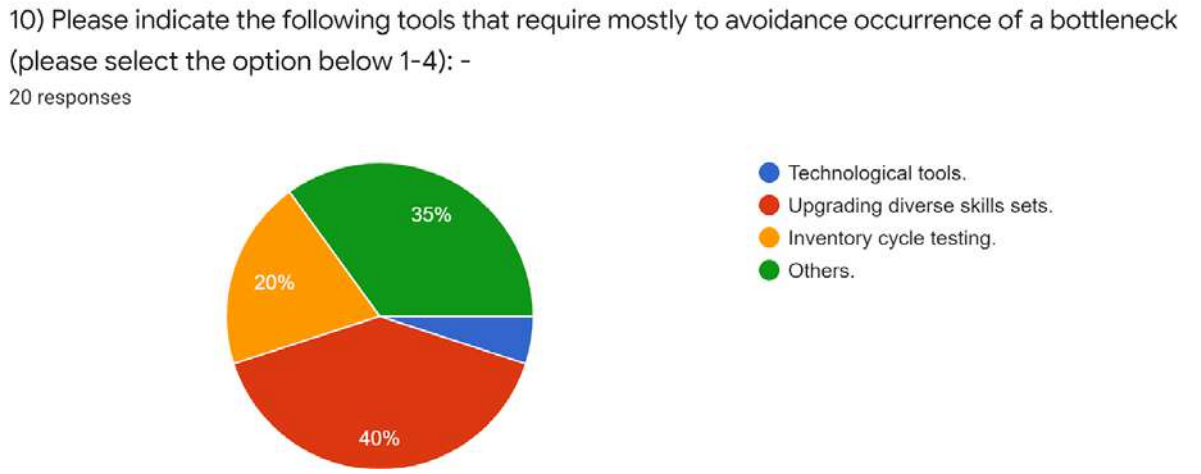


concludes with 20-30 percent of the warehouse production.

Survey question 9, responder agreed 40% percentage of bottleneck area can be reduced towards the warehouse labor procedure area. The lowest 10% percentage of the responder agrees that the warehouse production line can reduce the bottleneck effect.

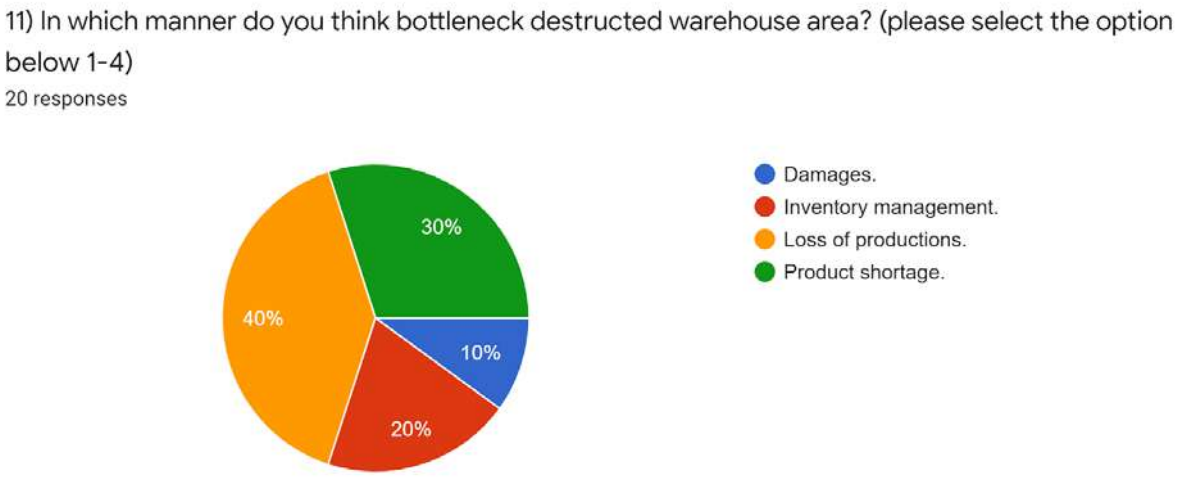


40% percentage of the survey responder agreed on upgrading diverse skills sets as part of the tools to avoid the occurrence of the Bottleneck. Only a 5% percent of the responder agrees to rely only on technological tools to sidestep bottleneck occurrence within the warehouse



pickup area.

Survey questions 11, 40% percent of the responder agreed the destruction of bottleneck leads to the loss of productions within warehouse operations. Lowest, 10% percent of the responder



agrees on the overall damages of the warehouse operation due to bottleneck occurrence.

Discussion:

It concludes that the overall result of the research survey found that the occurrence of warehouse bottleneck is not a new issue for the Gulf Nails firm. They are well aware of the challenges that bought by the challenges bottleneck within the warehouse pickup operations and the solutions to handle such challenges. The research survey also found that challenges of human task operations and technologies issues within the organization. Through concern to the modern technology advancement, it is clear that different types of technology involvement need to solve the bottleneck issues and human labor efforts. Moreover, the research survey result identified that the firm should not rely 100 on the technologies solution as it also includes one of the causes of the bottleneck creations. Balancing amongst human and technologies are the highest bottleneck solution to handle the issues of the firm warehouse pickup operations.

Conclusion:

According to Anderson et al. (2021), some solutions to dissolve bottleneck issues within the warehouse management operations can be work by increasing the number of personnel mainly towards operation within bottleneck. Authors Ba-Awain and Daud (2018), states if its companies may delegate some employee from another operation to help execute the bottleneck operation during an unutilized period, the company can increase the number of resources running the operation without adding headcount. Abdul Latif Jameel Company (2017), stands with the solution that states, enhancing its information exchange within warehouses, track - and - trace, including service rates with the remainder via supply chain's cogs. According to ALKhatib (2009), the bottleneck around the warehouse pickup area considers being problematic towards warehouse operation management. Since there isn't a widely accepted term, there isn't a globally understood logjam/bottleneck attentive solution.

On concern to the main objectives of this research in identifying the bottleneck and recommending best solution for the Gulf Nails firm, it is clear that bottleneck issues can be capture with cooperate through frim management team.

Certain suggestion are made towards businesses considering the essential that the firm warehouse being appropriately computerized via technology solutions which know how to enhance bottleneck storeroom operations. Employees should also receive increasingly advanced training within information technology.

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