MSCI 432 PROJECT PHASE 1

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1   INTRODUCTION

An existing service organization that is selected for this project will be the previous co-op firm Amazon. The work done here was for a software engineering internship in the summer of 2020 on the Amazon Freight team [1]. Amazon Freight is a shipping service across North America and Europe where a fleet of owned trailers and technology are used to ship full or less than full truckload freight across Amazon's network. More specifically, this service uses $53'$ dry haul vans and over 30,000 trailers and carrier partners to ship the loads at competitive rates and with 24/7 shipper support. The work done for the internship was the development of an invoice management system to manage and track shipper invoices across the network. For this project, the focus will be on the various operational processes that come with such a service like this, and suggestions will be made to improve upon some of these processes. This section of Amazon's business is slightly different from what it is most known for, namely that of online retailing, warehousing, and delivery, however, many of the concepts still apply in this case. More specifically, capacity planning, facility layout, quality, supply chain, and circular economy will all be addressed in this project with respect to Amazon Freight, and improvements will be suggested for many of their current processes.

2   PROBLEM STATEMENT

As this is a relatively new side of the business, namely that of freight brokerage, there are currently many limitations with this service. The biggest limitation is that it only supports full truckload, and does not support multi-stop shipments, intermodal, ocean, personal shipments, flatbed, LTL, small parcel, residential, drayage, and offer lift gates. As a result, many potential customers are immediately turned away since the service cannot support their type of shipment, hence, a loss of revenue in this case. Moreover, there are some items that cannot be accepted by this service such as hazardous materials (HAZMAT), those requiring refrigeration, and other prohibited goods. Although this is understandable, with respect to safety and the laws, however, this nonetheless is still a decline in revenue due to loss of potential customers. Lastly, the most common logistical issues with this service are the customer support, that is, assisting the shippers when problems occur. The most prominent issues are when the shipments do not arrive on time, or when they are shipped to the wrong location, as there is not much support they can provide.

3   POTENTIAL SOLUTIONS

As mentioned in the previous section, there are three main problems with this service: limitations on shipment type, limitations on allowable shipment items, and lack of quick and meaningful customer support. For each of these problems, concepts from capacity planning, facility layout, quality standards, supply chain management, and circular economy can be applied to come up with potential solutions for these problems. The mapping of problems to potential solutions are as follows:

Problem	Potential Solutions
Shipment Type Limitations	Capacity Planning, Supply Chain Management
Shipment Item Limitations	Facility Layout, Circular Economy
Lack of Effective Customer Support	Quality Standards

For shipment type limitations, concepts from capacity planning and supply chain management can be applied to solve this problem. The biggest reason Amazon Freight only supports full truckload freight is because they do not see the need and demand for the other shipment types. This is partially correct, as full truckload is the most prominent shipment type, however, this has problems when it comes to scale. As this service scales and grows over time, it is important that the company eventually adapts these other methods to be able to support more customers. As more shippers learn about this service, more potential customers will be lost due to a lack of shipment type availability. With that being said, concepts of long-term capacity and demand, effective capacity planning, and assessing capacity alternatives will be addressed. Another issue with supporting various shipment types is that the technology is just not yet there to do so, and there are not any immediate plans to provide it. This is a problem because as mentioned previously, this will lose customers over time, resulting in a loss of revenue. There are clear benefits for developing this technology, and concepts from supply chain can back this up. More specifically, the information technology used in supply chain management, the benefits of e-commerce in the transportation industry, and concepts in logistics can explain why adding support for these various shipment types will benefit the company in the long-term.

For shipment item limitations, concepts from facility layout and circular economy are applicable here. The main pain point here is that some items for shipment cannot be supported such as items that are too big, too fragile, or require a specific environment or conditions. This problem can be tackled by looking at two ideas: improvement of the delivery trucks themselves,

and improvement of the conditions of the destination. The easier solution would be to develop upgrades for the trucks to be able to support these kinds of items. Some ideas could be to add padding for items that are too fragile, install specific heating or cooling machinery for items that require it, and maybe even increase the size of the trucks to accommodate larger items. As such, assuming the truck is the facility in this case, improvements to the facility layout, having a fail-safe service process, and dealing with variable task times and bottlenecks are solutions for this problem. Moreover, the concept of circular economy applies here, a principle that aims to redefine growth, focusing on positive society-wide benefits. It is based on designing out waste and pollution, keeping products and materials in use, and regenerating natural systems [2]. This is an important concept to keep in mind when trying to widen support for additional items. Items that are too wasteful to natural resource use should be accounted for, and possibly denied if deemed to be too harmful for the environment. If transportation of these items results in more pollution than necessary, this may become a net negative should these items be considered. If there is less wasteful method of transporting these items, such as by air, then that may end up being the better option, even if it means losing out on potential revenue here.

Finally, for the lack of quick and effective customer support, concepts from quality standard apply here. The problem with customer support for this service is that it is difficult to come up with a solution that will satisfy everyone. The four parties involved here are Amazon Freight, the shipper, the source, and the destination. For example, if the destination client complains that they have not yet received the shipment, the company does not yet know right away whether it is still at the source, or on route to its destination. Similarly, issues could arise such as the shipper transporting the shipment to the wrong destination or being delayed due to traffic or an accident. Furthermore, if the shipment is intended to move through multiple locations to get to its final destination, the delays could propagate leading to massive wait times. With all these issues, the company is at a loss here, because they can only do so much as to informing them of the current status of the shipment. They do not have any control over the situation and are only forced to trust that shipments are transported on time. With that being said, improvements can be made with regards to the quality of the customer support. In particular, concepts from the Total Quality Management methodology can be applied to help solve this problem. In addition, the various ideas from problem solving, process improvement, and quality tools can be utilized to solve some of these issues with respect to customer support and management.

4 DISCUSSION

For shipment type limitations, long-term capacity and demand, effective capacity planning, and assessing capacity alternatives can help reason why supporting more shipment types is important. Long-term capacity directly impacts the ability of a company to meet future demand, and since the company plans to scale this service up, it is important to eventually provide this variability in its service. Planning for the long-term also minimizes costs and use of resources, something that is highly sought after at Amazon, as frugality is one of their leadership principles [3]. Long-term also affects competitiveness; their biggest competitor is Uber, as they also have a shipping service known as Uber Freight [4]. If Uber implements some of the shipment types that Amazon do not offer, they will directly lose customers to their biggest competitor. Effective capacity planning should be utilized to forecast the future demand of the shipment types not yet offered. They should prioritize in what order they begin to implement new shipment types, based on their projected forecasts. This will lead to maximizing the number of new customers they receive and scale faster in the future. Supporting higher shipment variability adds flexibility into the system and helps mature the product into a more robust service. By allocating some work towards this system, they further satisfy consumer demand and ultimately bring in more capital for the company. With respect to the technology behind this, there are already robust systems setup to help support this service. There is a Management Information System (MIS) to help track the shipments and invoices for each shipper, as well as Electronic Data Interchange (EDI) setup to provide near real-time updates for the status of shipments. As such, these are very useful tools that should continue to be supported and worked on. These tools improve the companies' competitiveness, quality, and overall logistics.

For shipment item limitations, improvements to the facility layout, having a fail-safe service process, and dealing with variable task times and bottlenecks can help improve their item support. As mentioned previously, there are various ways in which the delivery trucks themselves can be modified to allow for more items. Examples include developing trucks with larger storage space to transport larger items, adding padding or supports to the inside to account for fragile items, and implementing heating or cooling systems to house items that depend on specific environments. Although this seems costly at first, these changes would be able to accommodate more customers, and perhaps in the long-term, generate more revenue, and end up outweighing that initial cost of adding these new solutions in the first place. A fail-safe service

process is one that suggests that the service provider (Amazon Freight in this case) has a great incentive to ensure that the process is fail-safe, i.e., not prone to failure. When implementing these changes, it is important that these new systems are thoroughly tested to ensure they are safe. Once they are known to be safe, they become robust and reliable systems that the shippers do not have to worry about during their shipments. This promotes customer trust and keeps them happy and away from competitors. Variable task times are task times changing due to external events such as mechanical failures and delays in transport due to traffic. In the case of environment dependent items, some of these items may only be able to be in transport for a certain amount of time. As such, build in and consider this time when estimating time of arrival for the shipments. If a certain item cannot last as long as it takes to get it to its destination, then do not let the shipment happen. Although this loses out on revenue, this ensures safety of both the items as well as the shippers, which results in more gains in customer trust.

For improving customer support, the Total Quality Management (TQM) philosophy, as well as problem solving, process improvement, and quality tools from quality standards applies here, and can lead to more effective help and communication between the company and the shippers. The TQM approach involves finding out what the customer wants, designing the service that meets their wants, and keeping track of the results. In this case, customer support can be improved by simply listening to the customers and incorporating some of the feedback they give. Another leadership principle Amazon follows is customer obsession, and this is a good example of that. By obsessing over the customer (the shippers in this case), the company would tailor their development and feature work toward their customers and be able to give them exactly what they want. For example, if the customer mentions that support needs to be faster, the company can consider fixing this by streamlining aspects of the support system or by training and hiring more customer support workers. Customer feedback can be treated as data and collected to be analyzed. If trends are found in this data, then the company can prioritize in what order to improve aspects of customer support. For example, if the most prominent issue is how long it takes for support to figure out where a shipment on route currently is, then the company can consider putting more resources into improving the shipment tracking technology. More importantly, once improvements are implemented, the company should monitor their solutions. If indeed they are helping, then this proves that their solutions to the problems have worked. Lastly, the company could periodically interview their customers (shippers) for feedback.

5 CONCLUSION

In this project, a previous internship at Amazon Freight was used to critically assess and suggest improvements for its various operational processes. This part of the business provides shipment services to allow shippers to transport full truckloads of goods across North America and Europe. The concepts of capacity planning, facility layout, quality standards, supply chain management, and circular economy were used to tackle some of the issues with this service. Three main problems were identified: limitations on the type of shipment, limitations on the shipment items that are allowed, and the lack of effective customer support for the shippers. For each problem, various potential solutions were generated using the concepts mentioned previously. For shipment type limitations, capacity planning concepts like long-term capacity and demand, effective capacity planning, and assessing capacity alternatives were used. In addition, supply chain management ideas such as the information technology used in supply chain management, the benefits of e-commerce in the transportation industry, and concepts in logistics were utilized. For shipment item limitations, the problems were dealt with by considering improvements to the facility layout, having a fail-safe service process, and dealing with variable task times and bottlenecks. Moreover, ideas pertaining to maintaining a circular economy and being in line with Amazon's leadership principles help in fixing some of the itemization issues. Lastly, for increasing the effectiveness of customer support, various quality standards methodologies like the Total Quality Management (TQM) philosophy, as well as general problem solving, process improvement, and quality tools, aid in finding ways to improve upon the companies' customer support system.

6 LIMITATIONS

Limitations exist with respect to figuring out solutions for the first two problems. With shipment type, it would take a while to implement the systems to be able to support it. Development resources would have to be allocated to making it, which will take development work out of the main full truckload system. There are also problems with logistics, as the destination would have to account for more shipment types, which could cause issues. For accommodating more shipment items, this most likely requires large changes to the trucks themselves, which will be costly. A cost analysis is required here to determine whether or not it is worth it to invest in these changes, especially in the long-term.

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