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| Gaurish Patil |

MAN 6501 – Operations Management V1b Name:

Fall 2024

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Due date: Dec 8th, 2024 – Any extension will require an Incomplete until the case can be marked and the earned grade submitted

**Looking beyond COVID: Operations Readiness for the Next Pandemic**

Enter all of the answers to the in the form below: The boxes will expand if you need additional space.

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| Task 1 |  |  |
| Item | Item on case | Answer |
| Task 1 |  |  |
| Stations | a | 15 |
| Vehicles/hour | b | 10 |
| Total Vehicles/hour | c | 150 |
| Daily Capacity | d | 1,500 |
| Would you consider revising the service time to account for delays that may occur during the day? Yes/No and explain your reasoning. | | Yes. Adjusting the service time can account for operational inefficiencies, delays, and ensure smoother service. |
| vehicles | e | 160 |
| feet | f | 4000 |
| feet/vehicle | g | 25 |
| wait time | h | 64 minutes |
| Explain how you came up with your wait time answer | | ait time = (Queue Length / Vehicles per Hour) × 60 = (160 / 150) × 60 = 64 minutes. |
| Task 2 |  |  |
| Total Annual tests | a | **360,000** |
| Gowns | b | 9,000 |
| Gloves | c | 18,000 |
| Masks | d | 7,920 |

Task 2 Q3 Calculate the EOQ for each type of PPE. EOQ represents how many days’ worth of usage

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| **EOQ calculations Info** |  |  | Calculated  EOQ in cases | EOQ represents number of days of usage |
| **Type of PPE** |  |  |  |  |
| Gowns | Price/case of 50 | **$45.27** | **315** | **12.6 days** |
| HC | **30%** |
| RC | **$75.00** |
| Gloves | Price/case of 50 | **$29.91** | **549** | **10.98 days** |
| HC | **30%** |
| RC | **$75.00** |
| Surgical Masks | Price/case of 50 | **$79.70** | **223** | **10.13 days** |
| HC | **30%** |
| RC | **$75.00** |

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| Task 2 |  |  |
| Q4 Assume that all of the PPE items come from the same supplier. Should you use the EOQ for each item as calculated above or would you make modifications to the order process? | | While the EOQ provides an optimal order quantity for minimizing costs, modifications should be made in this context because all PPE items come from the same supplier.   * **Proposed Modifications:**   1. **Synchronize Orders:** Combine EOQ orders for all items to streamline logistics and reduce overall ordering costs.   2. **Include Safety Stock:** Account for demand variability and potential supply chain delays by maintaining a buffer inventory.   3. **Negotiate Bulk Discounts:** Larger orders for combined items may lead to cost savings from volume discounts.   4. **Adjust for Storage Constraints:** Ensure warehouse space is sufficient for bulk orders to avoid overstocking. * **Conclusion:** Modify the order process to balance cost efficiency with practical considerations such as storage capacity and demand fluctuations. |
| Q5 Is the EOQ model the appropriate one for this problem? Explain why or why not in your response. | | The EOQ model is a useful baseline for calculating order quantities, but it has limitations in this scenario:   * **Strengths of EOQ:**   1. **Cost Optimization:** Minimizes ordering and holding costs under stable conditions.   2. **Predictability:** Provides a structured framework for inventory management. * **Limitations:**   1. **Assumes Constant Demand:** PPE demand is highly variable during pandemics, making EOQ less effective.   2. **Ignores Supply Chain Disruptions:** Does not account for delays or shortages in PPE supply.   3. **No Built-in Safety Stock:** Fails to address the need for emergency reserves during crises. * **Conclusion:** The EOQ model is a good starting point but should be adapted to include:   1. Safety stock for unexpected spikes in demand.   2. Real-time monitoring of inventory to adjust orders dynamically.   3. Collaborative planning with suppliers to ensure timely replenishment during emergencies. |

Question 3

1. Business Risk Register – A minimum of 5 risks identified

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| **RISK DESCRIPTION** | **IMPACT DESCRIPTION** | **IMPACT  LEVEL** | | | **PROBABILITY LEVEL** | **PRIORITY LEVEL** | **MITIGATION NOTES** |
| Give a brief summary of the risk. | What will happen if the risk is not mitigated or eliminated? | | Rate  1 (LOW) to  5 (HIGH) | Rate  1 (LOW) to  5 (HIGH) | | (IMPACT X PROBABILITY) | What can be done to lower or eliminate the impact or probability? |
| **1. Supply Chain Disruption**  The disruption of supply chains due to factors such as transportation delays, supplier shortages, or international trade restrictions can severely impact the timely availability of PPE. This risk is exacerbated during pandemics when global demand spikes, causing bottlenecks in procurement and delivery | Delay in PPE delivery due to supplier shortages or transportation issues. | | 5 | 4 | | **20** | Build buffer stock; diversify suppliers to reduce dependency on one source |
| **2. Demand Fluctuation**  Unexpected and sudden spikes in PPE demand, particularly during pandemic waves, can lead to critical shortages. Healthcare facilities may face difficulties in maintaining adequate stock levels to meet fluctuating needs, resulting in operational delays or unsafe practices. | Sudden spikes in PPE usage due to pandemic waves, leading to shortages. | | 4 | 5 | | **20** | Use predictive analytics to forecast demand accurately and maintain buffer inventor |
| **3. Storage Constraints**  Insufficient storage space to house large quantities of PPE creates a bottleneck in inventory management. Without proper storage facilities, maintaining buffer stock or handling bulk orders becomes challenging, increasing the risk of stockouts. | Limited storage space for maintaining sufficient PPE stock. | | 3 | 4 | | **12** | Optimize storage through better inventory management and local warehousing. |
| **4. Quality Issues**  Poor-quality PPE products that fail to meet safety standards can jeopardize the safety of healthcare workers and patients. Quality issues may arise from reliance on unverified suppliers or cost-cutting measures during procurement, particularly in emergencies. | Substandard PPE failing to meet safety standards, risking patient and staff safety. | | 5 | 3 | | **15** | Perform regular quality checks and audits of suppliers to ensure quality. |
| **5. Cost Overruns**  Rising costs of PPE, driven by increased demand and dependency on limited suppliers, can strain budgets for healthcare facilities. Cost overruns can hinder the ability to procure adequate quantities of high-quality PPE, especially for smaller organizations with limited financial resources. | Rising procurement costs due to increased demand or reliance on fewer suppliers | | 4 | 4 | | **16** | Negotiate long-term contracts with fixed pricing and explore bulk purchasing discounts. |

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| Task 3 |  |  |
| Q2. In the long-term, what do you recommend as overall policy in order to reduce or avoid the kinds of PPE shortages that occurred during the different waves of the virus? In simple terms, how would you go about “securing the supply chain”? | | 1. **Supplier Diversification:**    * Reduce dependency on single suppliers by contracting multiple vendors across different geographic regions.    * Build partnerships with local manufacturers to mitigate risks of international shipping delays. 2. **Stockpiling and Buffer Inventory:**    * Establish national and local PPE stockpiles that are regularly replenished based on projected demand.    * Maintain safety stock at healthcare facilities to handle unexpected demand surges. 3. **Supply Chain Digitization:**    * Implement AI and real-time tracking systems to monitor PPE inventory and predict shortages.    * Use predictive analytics to forecast demand during health emergencies. 4. **Strategic Manufacturing Investments:**    * Incentivize domestic production of PPE through subsidies, tax benefits, and public-private partnerships.    * Develop flexible manufacturing lines that can quickly shift to produce PPE during emergencies. 5. **Policy Frameworks and Agreements:**    * Develop government-mandated guidelines for minimum PPE reserves in healthcare institutions.    * Establish emergency procurement frameworks to ensure faster response during crises. 6. **Global Collaboration:**    * Create agreements with international organizations and countries for shared PPE resources during global pandemics.    * Participate in global PPE manufacturing initiatives to ensure steady supply during emergencies.   **How Would Secure the Supply Chain?**   1. **Redundancy in Supply Chains:**    * Use multiple suppliers and regional warehouses to avoid single points of failure. 2. **Advanced Technology:**    * Leverage blockchain technology to increase transparency and traceability in the supply chain. 3. **Collaboration with Stakeholders:**    * Engage governments, healthcare providers, and manufacturers in joint planning for emergency preparedness. 4. **Regular Audits:**    * Conduct periodic audits of suppliers to ensure reliability and compliance with quality standards. |
| Provide any URL links to material used in your responses | | <https://www.who.int/europe/news/item/07-02-2021-countries-strengthen-health-supply-chains-with-support-from-unicef-and-who>  <https://www.mckinsey.com/industries/healthcare/our-insights/strengthening-health-cares-supply-chain-a-five-step-plan>  <https://gcgh.grandchallenges.org/challenge/health-systems-strengthening-ensuring-effective-health-supply-chains-round-19> |