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The Impact of Covid-19 on the Dabbawala Supply Chain: Lessons Learned from Mumbai's Resilient Lunchbox Delivery System

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ABSTRACT

Dabbawallas of Mumbai is a food delivery organization which is very famous for their supply chain process, with its level of operational excellence and delivery accuracy. It is still competing with popular food delivery services in Mumbai. In this paper, the organizational structure, logistics, and history of dabbawallas are examined, with a focus on their dedication to cultural values, collaboration, and customer service. Their battle during the lockdown is the main focus in this research. The article continues by describing how the dabbawallas opted to use their core capabilities after the lockout to revisit their well-known business strategy. To provide varied delivery services, the dabbawallas formed relationships with a number of restaurants. Moreover, they intended to streamline their delivery services in the future by using a mobile application.

Keywords: Dabbawallas, Covid, Disruption, Supply chain, Lunchbox delivery, Risk

INTRODUCTION

The Mumbai Dabbawallas is an organization, which offers the convenience of picking up and delivering home-cooked meals to employees offices prior to lunch. With a population of more than 15 million, Mumbai is one of the most populous cities in the world, it is nearly impossible for people traveling in the over-crowded local trains to carry their tiffin boxes, and office workers don't regularly eat out. By offering this service, Dabbawallas makes the job of the staff easier. (Balan Sundarakani, 2018) Mahadeo Bhavaji Bachche founded the first Dabbawalla in 1890 by offering a British man a delivery service on demand, then gradually increased this service. This concept evolved 125 years ago was when the first time a coding system was designed to match the deliveries to the final destination. An estimated 85% of Mumbai Dabbawallas workforce is illiterate, and their age spans from 18 to 65 (Punam, 2022)

The Dabbawalla transacts 200,000 customers on any average day for 6 days a week, 51 weeks which is 400,000 tiffin's a day. Dabbawalla has over 5000 employees who are not actually employees but their business partners. They charge a price of 400-500 rupees a month to transport more than 130,000 lunchboxes throughout Mumbai, where each employee travels a distance of 60-70 km each day by bicycle, handcart, and local train (Ravichandran , 2005) They even teamed up with KFC to announce the launch of KFC's 5-in-one meal box and had surprised their customers with these complimentary meal boxes, along with their ordinary meal. (The Operations Club of IMI, New Delhi, 2017) Most importantly, they were able to have a great corporate success without making any investments in technology. (Thomke, 2012) The Dabbawalla have their recognition all around the world and even they had Prince Charles as their guest visit their premises.

But after the covid-19 Dabbawallas entire business structure got changed, because people started doing work from home jobs so Dabbawallas business was dull and many employees eventually quit. But after a great struggle they were able to mark their name again in the Mumbai city. Dabbawalla, as this paper would show has one of the most efficient supply chains in the world with no investment in technology but later according to the business needs they did make investments in technologies. (IMI Operations club)

Now this Dabbawalla system can't be followed in other cities because of their infrastructure and transportation. Dabbawallas hugely rely on Mumbai's local train and we can't find such system in Chennai or Bangalore, Mumbai's crowd is huge so it's difficult for them to carry their own boxes, Moreover Mumbai is vast city so the demand there is high.

OBJECTIVE

The Mumbai Dabbawallas is world famous for its Six Sigma and they do their service with great efficiency and accuracy, with only one error per 16 million deliveries. These Dabbawallas are also known for their time management, teamwork and without any technology they build a huge team who serves their customers without any delay. However, this paper will discuss about the success of Dabbawallas and further elaborate;

- Business model of Dabbawallas

- Impact of Covid-19 on Dabbawallas Business Model
- Risks associated with Dabbawalla Business

REVIEW OF LITERATURE

1. ORGANIZATIONAL STRUCTURE

The structure, management, procedure, and culture of the dabbawallas are its fundamental pillars, all of which are perfectly matched and mutually supportive.

- **Management**

Dabbawallas follow a three-layer organizational structure; the President, the Supervisor and the Members. Every group has a supervisor, who oversees the coding, sorting, loading, and unloading. Supervisors are employees with more than 10 years of experience (Punam, 2022) Dabbawallas are in charge of managing the supply chain, logistics, customer satisfaction, employing personnel, and resolving disputes. The customer's fee is collected directly by the dabbawallas, who also talk over problems. They also interact with their customer during the free time and ask suggestions from them to further improvise their business (Prajul Bagri, 2020)

- **Process**

The Dabbas is uniformly placed into crates of a common size so that they may be loaded onto trains quickly. Unusual dabbas that hinder the distribution process are avoided. The dabbawallas strictly observe certain rules, workers are fined or fired for repeated mistakes, customers who repeatedly delay giving their dabbas are dropped. (Thomke, 2012) Dabbawallas were responsible for negotiating prices with their customer according to the distance between home to station and from station to office.

- **Culture**

The employees don't eat until all of their deliveries have been made. The dabbawallas are easily recognized since they carry their identity cards and wear white caps while working. Their mission is to deliver food on time and prioritize customer satisfaction (Thomke, 2012) The idea of consistency is crucial to the organization's continued existence. They keep an eye on both employee and customer behaviour. Planning and focusing have been brought about by discipline, and focus leads to concentration, which increases production. (Punam, 2022)

2. CODING METHOD

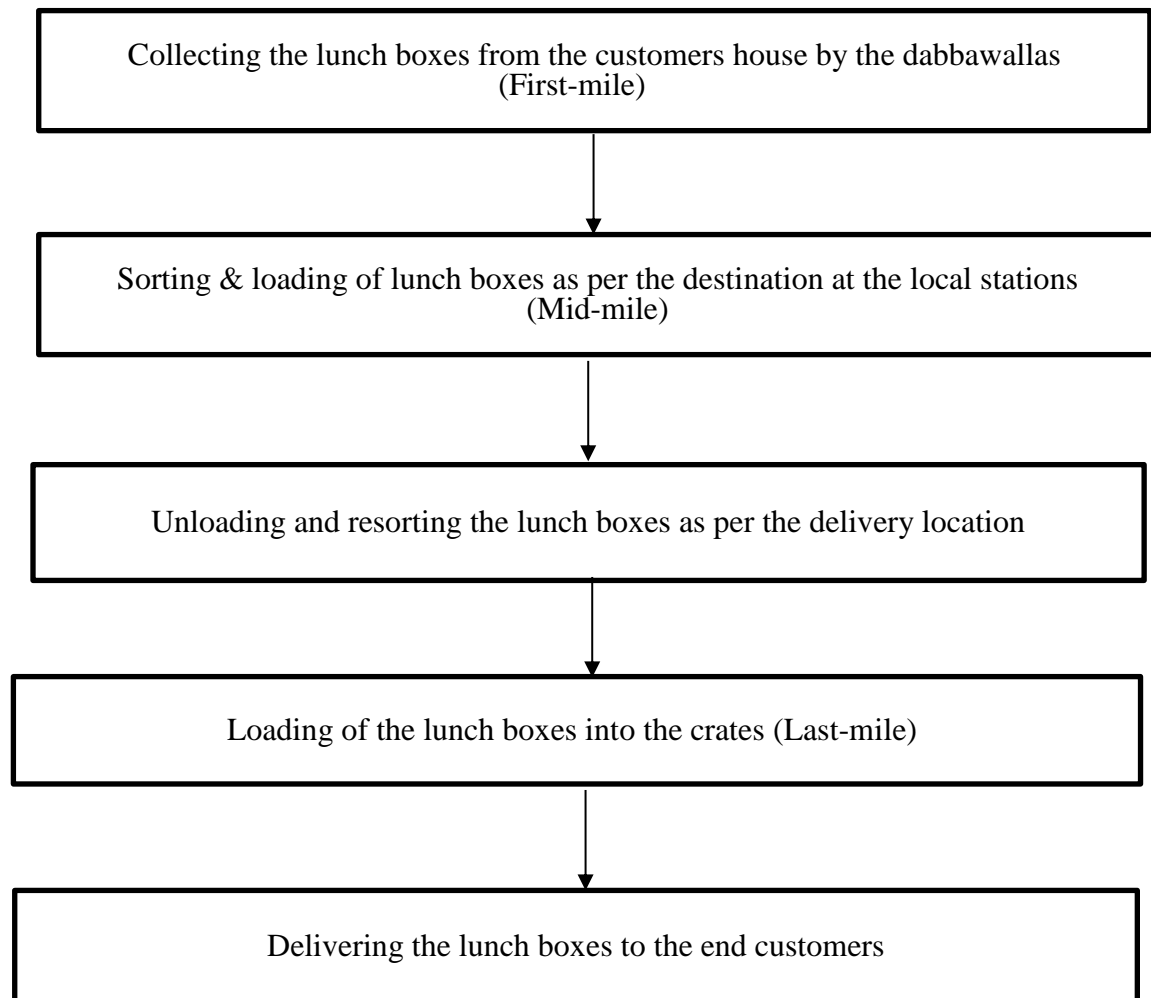
The coding system is one of the most innovative ways to identify. The Mumbai Dabbawalla don't need any investment in technology, they don't need SAP or Oracle to align their supply chain and share information. All they need is a few coloured markers or chalks to share all the information that can make the supply chain a success. (Balan Sundarakani, 2018) Dabbawallas apply a coding system that involves writing alpha-numeric codes and utilizing colour combinations to assist them organise the boxes in the stations. When the number of clients expanded, it became more challenging to recall every business and home location, so they thought of using a colour coding scheme (IndeBo India, 2017) Each employee received explanations of each of these coding schemes as part of their training. The main meanings of a code-word included in the coding system are as follows:

- The first specifies the addresses at which the dabba is to be delivered.
- The second shows a series of characters around the edge of the lid: a number for the delivery personnel, or dabbawallas.
- The third displays a spectrum of colours that designates the station of origin. (Thomke, 2012)

3. SUPPLY CHAIN DESIGN

The delivery of the tiffin boxes requires a total of 6 hours: 3 hours to go from home to office and 3 hours to go from office to home. The pickup point for the first mile, referred to as the milkman route, begins at 9am, when the dabbas are taken from the house. The second phase begins between 11am and 11:30am, when they transport the boxes to the closest gathering place, where they are divided into groups according to route and destination station (Balan Sundarakani, 2018). Workers have 40 seconds to load the dabba crates onto a train and only 20 seconds at interim stops (Thomke, 2012). Hub-to-hub transfer or hub to final destination occurs during the mid-mile process with the help of wooden crates. (Prajul Bagri, 2020) The segregated boxes are loaded in the goods compartment of the local train, preferably the last compartment to avoid chaotic situations. The final mile procedure involves unloading at the destination station, sorting the tiffin boxes according to the delivery location, and delivering them between 12pm and 12:30pm. After the delivery, the dabbawallas rest and eat lunch, and at 1:30pm. the dabba collecting process starts. (Balan Sundarakani, 2018)

Now the entire procedure is repeated backward, they pick up the tiffin boxes from the workplaces where they had delivered. Before returning to the original house, each dabba follows the same route. Around 4 pm, everyone gathers once more at the original station, where the last round of sorting and dispatching takes place. (Thomke, 2012) Empty boxes are gathered and then sent home. Before it reaches the consumer, a single dabba passes through six dabbawallas. (Resham Sengar, 2018) In order to complete their work as quickly as possible, the dabbawallas have divided into 200 units, each with about 25 people. They stop servicing a customer if they manage to not give the dabba more than three times. Bad clients are dropped by them. (IndeBo India, 2017)



4. BUFFER CAPACITY

The allotted time for picking up a dabba at a house might be only 30 to 60 seconds, thus even a minor delay may quickly influence thousands of deliveries. Each group includes two extra workers who step in wherever needed to keep things on schedule, and everyone is cross-trained in various tasks including collecting, sorting, transportation, finances, and customer service. In order to deal with issues and crises, they make sure they have additional capacity. (Thomke, 2012)

FLEXIBLE INFRASTRUCTURE	<ul style="list-style-type: none"> The availability of local train service is the backbone of their entire operation
CUSTOMER CO-OPERATION	<ul style="list-style-type: none"> The customers punctually delivery the lunch boxes and supports the operation process
CODIFICATION SYSTEM	<ul style="list-style-type: none"> The coding system helps in material flow, easy identification and delivery system
EMPLOYEE COORDINATION	<ul style="list-style-type: none"> The employees are responsible to collect, sort, transport and delivery the lunch boxes. They stay focused and do their best
SUPPLY CHAIN NETWORK DESIGN	<ul style="list-style-type: none"> The network is a combination of milkman route, hub-hub transfer and last-mile delivery process.
BUFFER CAPACITY	<ul style="list-style-type: none"> Each Dabawallas team has extra manpower to handle ectra capacitites and emergencies.
PROCESS CAPABILITY	<ul style="list-style-type: none"> The Dabbawallas are able to retain their service quality by handling the boxes with speed and delivering to the correct customer at the right time.

Figure2: SUCCESS OF DABBAWALLAS (Ravichandran , 2005)

SIX-SIGMA PERFORMANCE

Six Sigma is a set of techniques and tools used to improve the process. It aims to increase the process' quality by detecting and eliminating the roots of errors. Six Sigma has six concepts, they are; DPMO-Defects per million opportunities, Critical to quality, Defect, Process capability, variations, and stable operations. (SIX SIGMA: A CASESTUDY ON MUMBAI'S DABAWALA, 2022)

Dabbawallas received Six Sigma certification in 1998. Forbes Global magazine carried out a quality assurance analysis on the operation of dabbawallas and gave a six-sigma efficiency grade of 99.999999, meaning the Dabbawallas committed one mistake out of six million transactions. Dabbawallas' supply chain network, effective time management techniques, and coding system enable them to achieve a 99.99% work efficiency rate and 100% customer satisfaction. This indicates that their work has a margin of error of less than 0.1%. (Nitesh Purohit)

BLUE OCEAN STRATEGY

"Blue ocean is an entrepreneurship industry term, describes a new market with little competition or barriers standing in the way of innovators" (Renee Mauborgne, 2005)

The "Blue Ocean" approach was used by the Bombay Dabbawallas. Although courier services are considered rivals, dabbawallas have set themselves apart from them with their own services. While courier firms offer a variety of services, Dabbawallas only deliver lunches boxes and with such a differentiated business model they can be called a "Blue Ocean" (Balan Sundarakani, 2018)

COVID-19 IMPACT ON DABBAWALLA BUSINESS

- Business Model of Dabbawallas Pre-Covid**

During this period, the Dabbawala business model operated smoothly and efficiently. Dabbawallas bring home-cooked lunches to Mumbai residents working in businesses, industries, and government buildings. Every morning, a dabbawala travels on bicycle to the closest train station after collecting a

number of dabbas from households around the city. The dabbas frequently change hands on any given day, thus it is doubtful that the dabbawala who originally picks up the lunch would bring it to its intended location. The meals are divided into several groups, placed on a train, and transported across Mumbai. Just before noon, the Dabbawalas make sure that each dabba is swiftly delivered on a hand cart to the customers office. The collection and delivery locations, as well as the name of the Dabbawala, are indicated by codes, numbers, and letters painted in a variety of colours on the dabbas. The coding system was entirely numerical and highly efficient, enabling the Dabbawalas to sort and manage thousands of lunch boxes each day. The last-mile delivery was often completed on foot or using bicycles, ensuring the timely and accurate delivery of each lunch box to the intended customer. With zero technology usage, the Dabbawallas highly dependable, low-cost system runs on the principles of efficiency, coordination, availability, and timeliness. The Dabbawallas prided themselves on their punctuality, reliability, and low error rate, which contributed to their reputation as one of the most efficient delivery systems in the world. Dabbawallas would engage with customers through word-of-mouth referrals and personal connections. Typically, a customer would contact a dabbawala directly to enroll in their service, specifying their lunch preferences, delivery address, and desired timing. With a strong relationship and established trust, they delivered consistently and accurately.

S.NO	Management Concept	Beginning of COVID	During COVID	Post COVID
1	Service Suspension	Dabbawalas unable to operate and deliver	Suspension of dabbawala services due to stringent lockdown measures	Resumption of dabbawala services with restrictions being eased out
2	Financial Struggles	Steady income from consistent lunchbox deliveries	Loss of revenue due to no work	Measured recovery with resumption of services
3	Decline in Customer Base	Steady customer base	Decrease in customer base due to remote work	Efforts to regain customer base as reduced work from home
4	Supply Chain Disruption	Smooth and efficient procurement and delivery processes	Disruption in procuring food items and supply chain process	Adaptation to new normal of redefined procurement methods and supply chain
5	Health Concerns and Safety Measures	Safety measures followed	Increased health risks concern	Health concern still a concern
6	Change in Work Dynamics	Office deliveries	Work from home - Impact	Partial work from home options
8	Slow Recovery and Uncertain Future	Initial uncertainties about the future	Uncertain future prospects	Gradual recovery and working towards the new normal

Table1: The impact of Covid 19 on Dabbawallas

- **Business Model of Dabbawallas during Covid**

The COVID-19 pandemic had a significant impact on the Dabbawalla business model. When lockdown was declared in India in late March, the Dabbawalla group suffered a great loss of income since individuals were forced to work from home and were unable to travel. As a result, there was a significant decline in the demand for dabbawallas. Also, the government placed limits on rail travel, which was the backbone to the dabbawalla industry. Each employee delivered 30 orders each day prior to the pandemic, but they only delivered less than 10 orders per day at that time. It became exceedingly tough for the workers without any financial assistance from the government, and the workforce was down to 10% of what it had been. During the COVID period, the Dabbawallas adapted to the situation by exploring alternative business opportunities. Some Dabbawallas started delivering groceries and essential items to households instead of lunch boxes. They leveraged their existing delivery network and coding system to provide services that were in high demand during the lockdown. However, these diversification efforts were not as widespread as their traditional lunch delivery service. Around 1,500 of the thousands of dabbawallas who had left their hometown had returned. They mostly overcome all odd situations pre covid but never saw a crisis like covid. This led to a significant decline in the number of lunch deliveries required. As a result, the Dabbawallas faced a severe drop in their customer base and revenues.

Later in the covid period, they came up with a creative idea and decided to collaborate with a few restaurants in Mumbai to deliver food to customers. The restaurants educated the dabbawallas to use the technologically advanced platform to get notifications about orders and delivery locations as they began operating as delivery partners. Dabbawallas were utilised by Impresario Group to supply meals; they made between 600 and 1,000 deliveries per day for the restaurant. For meal delivery, they collaborated with small startups as well. Additionally, they discovered new customer base in the form of isolation center, hospitals, home quarantine. (Rathina Sankari, 2021)

- **Business Model of Dabbawallas post-covid**

As the situation improved and offices gradually reopened, the Dabbawallas began to regain some of their pre-COVID business. However, the dynamics of the workplace had changed, with many companies continuing to adopt work-from-home policies or hybrid models. This meant that the demand for lunch deliveries might not have fully recovered to pre-COVID levels. To adapt to the changing landscape, the Dabbawallas have explored options like partnering with online food delivery platforms or offering customized meal plans for individuals working from home. They have also focused on expanding their services beyond office deliveries, targeting events, parties, and social gatherings where home-cooked meals are in demand.

Post Covid, after working for several restaurants, dabbawallas decided to launch their official website digitaldabbawala.com, in October 2020, representing all delivery organizations. They also decided to expand their services beyond lunchbox deliveries to include last-mile delivery of digital services like document delivery and laundry delivery. (IMI Operations club)

Consumers may now order lunch through their website and choose between a monthly or yearly membership that is paid for online. Although other food delivery services charge up to 50% fees on each order, Dabbawallas charges its restaurant partners a 15% commission each order. Due to the lower commission, customers can order the same food for less money from the same restaurant. When the customer picks up their order, Dabbawalla pays their restaurant partner. Some meal delivery services, however, pay the restaurant vendor after 7 to 10 days of order pick. This payment module has made them secure their market share, and immediate payment gives them more liquidity and long-term growth. (Neeta Lal, 2021)

The dabbawallas introduced Central Kitchen in August 2021, will let consumers make orders and see where their food is being produced and served. As they began to prepare a greater variety of foods, they began including the ladies in their family in the company. In their cloud kitchen, the dabbawallas prepare a seven-day rotating menu of homestyle lunches. (Neeta Lal, 2021) This has helped them create jobs, restore stability and pride to the country's oldest fast food chain, adapt to new trends and technologies, and make significant progress in their English-language acquisition. (Apart From Delivering Lunches, Mumbai's Dabbawallas Will Soon Cook The Meals Too, 2021)

RISKS ASSOCIATED WITH DABBAWALLAS

Technology Risks

Dabbawallas rely on technology to deliver food so possibilities of cyber-attacks are there such as hacking, phishing, and data breaches, which can compromise sensitive information, including personal and financial data can get leaked. Any disruption or failure in the technology infrastructure, such as server crashes, connectivity issues, or software glitches, can cause delays or even complete shutdown of the system, leading to lost orders and dissatisfied customers. They need to invest in upgrading their software, hardware, and other technological infrastructure as their operations depends on it. This can be a significant expense, especially for smaller businesses.

Customer Behaviour

Currently dabbawallas, rely on impersonal technology to manage orders and deliveries, which may lead to a loss of the personal touch and customer satisfaction. Customer behaviours can change quickly, and their preferences for food, delivery options, and payment methods can change at any time. These changes can affect forecasting accuracy and make it difficult to plan for future operations. Also, there is limited customization in their central kitchen, this results in limited choices for customers, demand for food items from the central kitchen can vary according to the seasonal variations, special events, and holidays.

Increase In Competitors

Dabbawallas face increased competition from other online food delivery services, such as Swiggy and Zomato, which offer a wider range of food options and faster delivery times and launch of new cloud kitchen business in the market can also be a threat to their business. This can lead to a loss of market share and reduced profitability.

Supply Chain Risks

As Dabbawallas expand their services to new areas, the cost of delivery and transportation can increase. This can be due to higher fuel costs, maintenance costs, or other factors related to logistics. Supply chain disruptions, such as delivery delays, shortage of raw materials can impact the ability to fulfill orders. Any delays in transportation can lead to the food getting stale or spoiled, which can result in customer dissatisfaction. This can lead to revenue losses.

Operational Risks

In the centralized kitchen, it can be difficult to maintain consistent quality across the meals, dealing perishable items such as food to manage the inventory. Quality control issues may arise due to differences in cooking techniques, ingredients, and even hygiene practices. Health and safety risks can be high, especially if they are not maintained properly. There is a risk of contamination, foodborne illnesses, and other health hazards if proper hygiene and safety practices are not followed.

Inaccurate data: Forecasting depends on clear information, such as past sales figures, customers feedback, and market trends. Inaccurate data can lead to inaccurate forecasts and poor inventory management such as over-ordering or under-ordering.

Raw material costs: Central kitchens rely on raw materials to produce food items. Price fluctuations for raw materials may affect production costs and lower profitability.

Equipment maintenance costs: Central kitchen equipment requires maintenance, repairs, and replacement. The total cost of manufacturing may be impacted by these expenses.

SWOT ANALYSIS OF DABBAWALLAS

<p>Strengths</p> <ul style="list-style-type: none"> ✓ Reliable and efficient delivery network ✓ Low-cost delivery system ✓ Sustainable operations ✓ Customer-focused service 	<p>Weakness</p> <ul style="list-style-type: none"> ✓ Takes time to adopt the trends & technologies ✓ Limited geographical coverage ✓ Mostly illiterate employee
<p>Opportunities</p> <ul style="list-style-type: none"> ✓ Diversification of services ✓ Geographical adaption ✓ Adapting to the trends & technologies ✓ Employing more educated people 	<p>Threats</p> <ul style="list-style-type: none"> ✓ Competitors in the market ✓ Economic fluctuation ✓ Changes in customer preference

Table: 2: SWOT ANALYSIS OF DABBAWALLAS

Lessons Learned by Mumbai Dabbawalas from COVID-19

The pandemic of COVID-19 has had a significant impact on numerous industries and businesses around the globe, including the renowned Dabbawala community in Mumbai. During the pandemic, these devoted lunchbox delivery personnel, renowned for their impeccable efficiency and precision, encountered unprecedented obstacles. However, adversity taught the Dabbawalas vital lessons that have reshaped their business strategy. This article examines the most important lessons learned by Mumbai Dabbawalas as a result of COVID-19's impact on their business.

- **Adaptability:** The importance of adaptability and flexibility was one of the most important lessons the Dabbawalas learnt from the pandemic. As office spaces remained closed and work patterns shifted, Dabbawalas quickly modified their delivery routes to service residential areas. They adopted contactless delivery methods to ensure their consumers' and their own safety. This lesson emphasises the significance of being adaptable and adapting one's strategies to changing customer requirements and market dynamics.
- **Strong community support:** The Dabbawalas, renowned for their strong communal ties, understood the importance of collective support during difficult times. As their income decreased, the community banded together to provide financial support for one another, ensuring that no one was left behind. This experience reinforced the importance of unity, cooperation, and mutual assistance. The Dabbawalas learned that unity and collaboration within their community are necessary for surviving crises and fostering resilience.
- **Incorporating Technology:** The pandemic accelerated the Dabbawalas incorporation of technology, which had previously played a lesser role in their operations. They understood the importance of utilising digital tools for efficient coordination and communication. Technology played an essential role in streamlining their operations, from digital route mapping to the use of smartphone applications for order management. This lesson emphasised the significance of embracing technology to enhance efficiency, reduce costs, and maintain competitiveness in a business environment that is swiftly evolving.
- **Diversification of Services:** The Dabbawalas also understood the significance of diversifying their services in order to mitigate risks and adapt to shifting customer demands. As the demand for lunchboxes decreased during the pandemic, they investigated alternative markets, such as the delivery of groceries and essentials. This diversification allowed them to maintain a consistent income and grow their customer base. Diversifying services can increase a company's resilience and create new opportunities even during difficult times, as this example demonstrates.
- **Precautions for Health and Safety:** The pandemic emphasised the importance of health and safety measures for Dabbawalas and their clients. They swiftly instituted stringent protocols, including wearing masks, sanitising lunchboxes, and practising social distancing. This emphasis on health and safety not only ensured the well-being of their employees, but also gave their clients peace of mind. Even beyond the pandemic, the Dabbawalas recognised that prioritising health measures builds client trust and strengthens relationships.
- **Financial Preparation and Contingency Planning** The financial difficulties encountered during the pandemic served as a wake-up call for the Dabbawalas to improve their financial planning and implement contingency measures. They understood the necessity of accumulating emergency funds and investigating insurance options to safeguard themselves and their families during times of crisis. This lecture highlighted the importance of proactive financial management, which ensures stability and resilience in the face of unforeseeable events.

The COVID-19 pandemic presented the Dabbawalas of Mumbai with unprecedented challenges. However, it also provided teachings that have altered their business strategy. From adaptability and flexibility to embracing technology and diversifying services, the Dabbawalas discovered how to navigate uncertainty and develop resilience. They accepted authority.

CONCLUSION

Several large corporations have learned from the Mumbai Dabbawallas that organizations don't require remarkable personnel to attain extraordinary performance; instead, they only need to strengthen the proper system. The surge of online food delivery apps has proven to be stiff competition to the dabbawallas. Nonetheless, the need for low-cost home-cooked meals has made sure they are still important in modern society. These new efforts aim to break the pattern by broadening the dabbawallas offering beyond tiffin boxes to a wider variety of services that will assist to save their livelihoods once the outbreak is gone. Yet lunch will still be delivered by the men in white, ensuring the survival of one of the most venerable and enduring food delivery systems in history. It is obvious that change is necessary right now if the dabbawallas are to remain relevant. But, in order to prevent their heritage from being lost, they must work to maintain their identity and the distinctive delivery method that made them famous.

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