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UNDERSTANDING THE LOGISTICS SERVICES OF MUMBAI DABBAWALLAHS AND DISCUSSING THE FACTORS BEHIND ITS SUCCESS

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Abstract

Mumbai dabbawallah's presents an excellent example of world class logistics services with six sigma certification, and these all even without using advanced technologies, like navigation services, GPS, mobile application, tracking services, and even without motorised vehicles. So, by having a look in case of Mumbai dabbawallah's, it is extremely important to know that how they are managing to do this, even when they are giving very less salary to their workers. This paper provides details of logistics services of Mumbai dabbawallahs and the most critical factors that are responsible for their success without the intervention of advanced technology in their system.

Keywords: Mumbai dabbawallah's, Supply chain management, logistics service, food delivery, success, sustainability, dabbawallah, Mumbai, India, case study

INTRODUCTION

The Mumbai dabbawallahs constitute a lunchbox delivery and return system that delivers warm (if not hot) lunches from homes to people at work in Mumbai. The First thing that should be clear is that Mumbai dabbawallahs main business model is not to provide catering services, but only to provide logistics services, to deliver the lunch boxes (called dabba in Mumbai) from the home of service person to his office and then returning back to his home. Lunch boxes are picked up in the late morning, and delivered by using bicycles, local trains and even by walking. And in afternoon, after lunch, their responsibility is also to return the lunchboxes to homes from offices of subscribed persons. In the late 1800, there was supply of labours from small villages, who had to travel to the cities due to agriculture activities not being able to support them. The idea of delivering home-made food was born for their, as, in that time period, there was no culture to eat food outside. Currently, Mumbai dabbawallahs are a distributed, flat, self-governed, network organizational structure, with around 5000 members/employees. In the three-layered structure, all employees are paid equally. The organizational culture is characterized by discipleship and not followership. This culture is known to nurture individualized customer care, collaborative planning, and implementation. They take pride in strong teamwork and strict time-management (North & Kumta, 2014). These specific economic circumstances predetermine also the importance of the impact of new logistic technologies on inventory investments (Kisperska -Moroń, D., 1992).

UNDERSTANDING LOGISTICS SERVICES OF MUMBAI DABBAWALLAH'S

Dabbawallahs, each dabbawallah (delivery person) serves around 30 customers per day, works under the leadership of a 'mukadam' (supervisor). They have time-tested and perfected their hub-n-spoke concept. Each spoke is managed autonomously by a team of 20-25. Over the time, this 'hospitality network' evolved into a flawless system with six sigma performance rating (Isher, & Bhal, 2005; Karthi et al., 2015). Dabbas (lunch boxes) are collected from homes by dabbawallahs. After collecting all the lunch boxes, they all go to a sorting place, where the lunch boxes are sorted into groups based on the destination or area in which they are going to be delivered. And this sorting place can be a footpath, depend on the place selected by group members of a group. The grouped boxes are then carried to the coaches of trains. At Destination station dabbawallahs will found some dabbawallahs to pick these groups and deliver them. This same happens at almost each major station. Later in the day, the empty lunchboxes are carried back to their places of origin by the same process but reversed. A combination of colors and symbols help dabbawallahs to identify pertinent delivery instructions. The lunch boxes have the following identifiers on them: Dabba origination point; abbreviated location name; name of the railway station nearest to the origination point, color-coded; name of the railway station nearest to the destination point, color-coded; and, identifiers for destination building and floor, for the benefit of the destination dabbawallah handling the lunchbox (Ghodake, 2016). Their system creates the unique situation of circular distribution with supplier and the supplied often indistinguishable: something like a zero-order closed loop supply chain. All dabbawallahs uses a train pass which is not very costly, by which they can travel, as many they need to do, in order to deliver dabbas. There is no division of labour and every dabbawallah is an undivided part of the whole (Pathak, 2010). The entire process of sorting and delivery happens at a pace unimaginable for most of us without using advanced

automation techniques. It is estimated that there is no more than one mistake in every millionth transaction carried out by them. The dabbawallahs do not use GPS routing, barcodes, or RFIDs. The dabbawallahs may not speak English or may not have attended schools; but, they are not illiterate about their labour (Chopra & Sharma, 2012). Their nonmainstream literacy is part of their inimitable success and competitive advantage, notes Krishnan (2014).

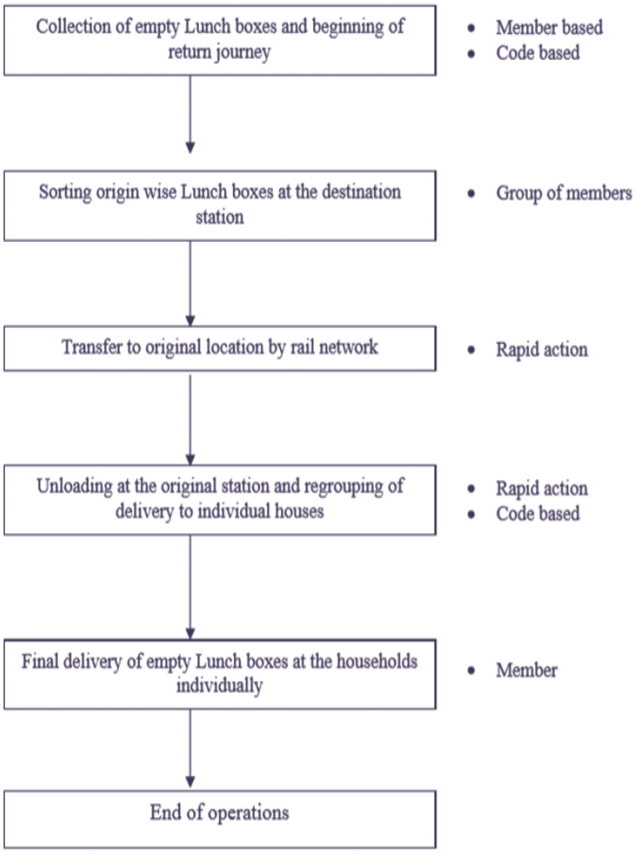


Figure 1: Flow Chart of Dabbawallahs Operations

LITERATURE REVIEW

Before understanding the critical reasons of success of Mumbai dabbawallah's, firstly we have to understand the history of Mumbai, its population density, land distribution, sub-urban rail system and Urban freight transport in Mumbai. The operations commenced in 1890 by a group of people from the same ethnic background in Pune. The operations are characterized by cohesive community bonds and can be compared to a modern guild where work and social identity, devotion and economic gain and mutual aid and shared goals are indistinguishable from one another19. Havji Bacche, a young man from Pune entered Mumbai in the late 1880s. A Parsi banker employed Bacche to go to his home in Grant Road, Mumbai, collect his tiffin and deliver it to his office in Ballard Pier. It was 1890 when the system started when the British were colonizing India. Parsee women began cooking food as a business like a canteen. Unskilled workers could be found at any cross roads, sitting there with their top is or hats on. One day a woman asked one of them to deliver food and he willingly agreed. He started taking 20-25 tiffins from Girgaon to VT station19. Bacche decided to recruit his fellow villagers for the delivery service in pursuit of creating an organized working group. Since then the system and the business model both have endured.(Prof. Venkatesh Ganapathy , Dr. Padma Mahadevan and Prof J. V. Ravikeerthi 2016)

1. History of Mumbai, Population density and Land distribution in Mumbai

Mumbai or formerly Bombay is the capital of the Indian state of Maharashtra. The metropolis lies on the west coast of India and has a deep natural harbour. According to the 2001 Census, Greater Mumbai had a population of 11.91 million. The city's population is expected to be 14.8 million by 2011 assuming the growth rate of 2.2% per annum with an average population density roughly estimated to be 22,000 people per km^2. As, the latest population survey was done in 2011, so based on that fact, it is the latest data. Mumbai is considered the financial capital of the country as it generates 6% of the total GDP of the nation.[1] In 2009, Mumbai's GDP per capita income was Rs. 128,000 (USD 2730) which is almost 3 times the national average (FT 2008). Until the 1970s Mumbai's economy flourished on textile mills and sea trade. Port and shipping industry is an established sector in Mumbai with Mumbai port being one of the oldest and significant ports in India. In the past 3 decades, the economy has diversified into other sectors such as engineering, diamond polishing, healthcare, information technology, media and entertainment. For decades since India's independence in 1947, Mumbai's spatial development followed a mono-centric, linear pattern of growth wherein, office and commercial activity concentrated at the southern end of the city, the industrial and residential development spread northwards along the suburban rail corridors.

De-centralization of commercial areas has been visible in Mumbai but took some years for businesses and population to relocate. Office relocations in Mumbai have shown some typical trends. Large manufacturing business establishments that require large tracts of land appear to have adopted decentralized locations. While small businesses that depend on inter-linkages with other businesses have agglomerated in areas with relatively lesser real estate market prices. In Andheri, (near Saki Naka and SEEPZ4) a lot of new offices related to electronics are coming up mainly through land use conversions from residential to industrial zones. New growth centres and new transport linkages are likely to give rise to a new spatial structure and pattern. Presently, South Mumbai continues to remain the most dominant business center in the Mumbai Metropolitan Region. Bandra Kurla Complex has developed as Mumbai's new International Finance and Business Center. Vashi has acquired a key position in Navi Mumbai's development as the center for wholesale trade. Similarly, Central Business

District of Navi Mumbai, and the area around Jawaharlal Nehru Port have developed for port-related activities and have attracted office establishments, export processing activities etc. (MCGM, 2005)

Figure 2: Mumbai population by year

Source: https://worldpopulationreview.com/world-cities/mumbai-population/

2. Urban freight transport in Mumbai

Transport of millions of Mumbai citizens and goods is done by train, road and water transport modes. Over 88% of the Mumbai commuters and a small part of goods are transported by public transport (suburban trains or buses) because it is the most convenient, efficient and cheap transport to a population that cannot afford a car or use a private goods vehicle (Sriraman, Venkatesh, & Karne, 2006). Mumbai has the most extensive road and rail networks among India's major cities. Road users are diverse and employ slow, medium and fast motorized and non-motorized vehicle types (mixed traffic) on the same road infrastructure. For example, vehicles include cyclists, pedestrians, hand carts, bullock carts, auto rickshaws, and cars/ taxis, commercial vehicles which include trucks, vans, trailers, tankers & tempo. Traffic management on Mumbai roads is handled by the Mumbai Traffic Police Department. Updated traffic bulletins are posted on the Mumbai Traffic Police website[2] and announced in the local media (FM radio and local TV channels).

Urban freight transport demand has increased as a consequence of increasing urban population, consumption patterns mainly as a consequence of increased economic activity and the mushrooming of malls for shopping. Due to the availability of a large diversity of consumer products and shopping malls all across the city, Mumbai experiences a massive increase in urban freight transport movements generally similar to cities in developing economies. From 1991 to 2005, the total number of motorized vehicles (goods and passenger) more than doubled from 0.6 to 1.3 million (MCGM, 2005). While the vehicles multiplied 37 times over the last 50 years, Mumbai's road network only doubled. The number of registered vehicles (goods and passenger together) is growing at 4e5% per annum. Trailers have also registered 9% CAGR reflecting the increase in containerized goods movement through Mumbai's ports (MCGM, 2005).

Goods transport in Mumbai is important as two major ports of the country are located in Mumbai region and the region is well connected by rail and road with the rest of the country. Intercity flow of goods is characterized by bulk shipment whereas intra city movements are characterized by smaller shipments. The increase in the urban population, urban sprawl on the one hand and the relocation of wholesale markets and warehouses has triggered growth in urban freight transport volume and intensity. The annual urban freight transport growth rate in Mumbai Metropolitan Region (MMR) is estimated to be 5.7% which means an inflow of goods tonnage to MMR is expected to increase from 100,000 tonnes in 2005 to 440,000 tonnes by 2031 (Sriraman et al., 2006). MMR produces 110,000 tonne of freight traffic daily, and attracts another 104,000 tonne on Thane regions are also important freight traffic attraction centres. About 16% of the total freight movement constitutes through traffic, not stopping in MMR. According to (Lea, 2007), truck terminal area requirement will need to be increased from 350 Ha in 2005 to 1450 Ha by 2031.

Mumbai's urban population is projected to double in the next 32 years making the problem even more worrying. In fact, travel demand is often linked to economic growth more than population growth. The forecasted private vehicle growth in MMR is expected to grow by 9 million by 2031, an estimated increase of approximately 4.5 times from 2005. High vehicular growth is expected in

Thane, Kalyan and Pen-Raigad areas compared to Greater Mumbai.

A comparison of planning and organization of goods transport and city logistics is extremely difficult in the present circumstances because of two critical factors e goods transport data in India is non-existent and because of the lack of systematic and non-existent standard data collection methodologies and institutions (Sriraman et al., 2006). There exists scarce urban freight transport data for the city of Mumbai. Given that the freight transport industry has never been in the public domain and fully deregulated, collection of freight transport data has always been a problem. A number of Working Committees set up by the Indian Government emphasized the need to develop systematic database. Very often, Working Committees appointed from time to time have commissioned studies for the purpose of their work and each Committee looks at specific issues which required specific data to be generated (Sriraman et al., 2006). As a result, no systematic time series data is available even now. According to the Planning Commission Committee Report for XI 5 year plan, there is not yet an institutionalized collection of freight transport data in any of the urban or inter-urban transport flows. In the given circumstances, the main sources for data collection in India for urban freight movements are Permit System, Vehicle Registrations and Octroi charges (Sriraman et al., 2006). However, the database relating to these permits is not updated on a systematic basis, as a result of which one is unable to know the exact number of permits issued.

3. Mumbai's sub-urban rail system

Mumbai's suburban rail services are not only used for

passenger movements but also freight movements. The main skeleton of the rail network in Mumbai was laid down in 1925 with 1500 volt DC (Direct Current) traction system, initially to link Mumbai and adjacent townships. This network grew rapidly to become the Mumbai termini of two great trunk railways interlacing the Indian sub-continent. Today Mumbai is served by two zonal railways Western and Central (See Fig. 1). The Western Railway line runs northward from Church gate terminus station in Mumbai CBD extending 60 km northward up to Virar. The Central Railway runs from Mumbai Chatrapati Shivaji Terminus (CST) situated on the eastern side of the Island extending north eastwards (120 km) linking Kasara and 100 km south eastwards linking Karjat. The Central Railway is also responsible for services on the "Harbor Line" which runs from Mumbai CST along the east side of Mumbai Island to Rawli Junction where the line splits. One branch goes to north west to join the western railway main line at Bandra, with other line continuing northward to Kurla, before turning eastwards to serve Chembur and Mankhurd and cross the new Thane Creek bridge to access the developing city of new Mumbai. The whole system consists of about 319 km of suburban rail with 95 stations, moving 6.6 million people every day using 2435 train services and constitutes more than half of the total daily passenger capacity of Indian railways itself (Sehgal & Surayya, 2011). Each suburban train in Mumbai is formed of electric multiple units (EMU's) predominantly formed as 9 or 12 car rakes or coaches. Broadly each train. roads.Of this, Greater Mumbai generates about 43% and attracts 37% (Lea, 2007). Navi Mumbai, Bhiwandi and contains special compartments or coaches (General and First Class compartments, Ladies General and First Class Compartments, Handicap and Cancer patients' compartments, Senior Citizens compartment and Goods and Heavy luggage compartments) to cater to different needs of the travelers. Typically a dedicated the goods and heavy luggage compartment is located in the front, middle and rear sections of each suburban train. These compartments have wide doors on either side of the rake and have open space for stowage of cargo inside each goods compartment. Small vendors, traders and street hawkers are primary users of the goods compartments. Occasionally, inter-city passengers with heavy luggage use the goods compartment on the local trains to travel from home to the outstation railway stations or vice versa. Due to its extensive reach across the Mumbai Metropolitan Region, efficiency of suburban rail and nominal fares, the suburban rail system is the preferred mode of transport suffers from severe overcrowding unknown to any other rail system of similar dimension. Over 5000 passengers are packed in a 9 car rake during peak hours as against a capacity of 1800. Goods transport too, by small vendors and traders has grown over the years to cater to the rising demands of the city's population. The dedicated goods compartments are inadequate during peak hour traffic. Due to inadequate enforcement, many rail passengers use dedicated Goods compartments for commuting during peak hours regularly. This further reduces available capacity and increases inconvenience to carriers of goods during train journey. Although a number of measures to improve the suburban railways system have been planned under the Mumbai Urban Transport Project MUTP I, II and III) sanctioned under the Railways Ministry the primary focus has been on increasing the existing Mumbai suburban rail network, improving passenger comfort and provisioning for additional passenger capacity. There has been no mention of supplementing goods compartment capacity in any of the MUTP project phases. It remains to be seen whether special goods compartments on each train will continue in the medium and long term given that the pressure for carrying passengers is top priority for the decision makers and politicians.

FACTORS BEHIND MUMBAI DABBAWALAS SUCCESS

The Mumbai dabbawalas also known as for its negligible number of transactional errors. We are now going to discuss in detail, "what is behind such an outstanding performance".

1. Solution of gigantic social problem or need of customers

There are three main problems/reasons:

1. Crowd in Public Transportation: You cannot carry your own tiffin in trains, because the crowd in Mumbai local trains is so huge. On other side, it is itself so difficult to travel in Mumbai locals.
2. In Indian Culture, wife makes lunch-boxes for their husband, and most of the population in mumbai also do the same, So, In Mumbai, say if you want to reach office at 9am , then you have to go out your home at 6am, and if you don't want your mother or wife to make food, by waking up at 5 am.
3. Less shelf life of food or if anyone wants to eat warm but homemade food in lunch (if not hot).
4. Culture: Mumbai is a very cosmopolitan city where people with diverse cultures, backgrounds and food habits migrated. The diversity of food habits makes it impossible for local restaurants, canteens or fast food centres to fulfil specific tastes and needs of each employee in a same place.
5. And also Majority of Indian people's believes that "Homemade food is most hygienic food".
6. Free services: Some Value added services are free by dabbawallah, like customers lost their spectacles in home, then their family member will put it in tiffin and it will reach to the designated person in his office.
7. Sixteen dabbawallahs went to Delhi to collect the Six Sigma certification. People work so hard for Three and Four Sigma but dabbawallahs got Six Sigma because they didn't care about the certification and cared only about customer satisfaction. It is a big achievement especially without the use of technology. Even if the dabbawallahs use technology in the form of mobile phones, they can't because both their hands are used in delivering tiffins. Technology is useless for them for delivery. And after all this, they charge only 400 rupees per month for delivery. So, I asked one dabbawallah why they charge so less. He said his customers are poor. I asked him how much he earns; he said Rs 6000-7000 or Rs 8000-9000 a month. If they want more income, they work

extra. Dabbawallah then gave me an example of a teacher, who earns only Rs 5000 per month as a government rule. He said, "Despite the teacher's double graduation, I earn more than him, so I'm happy." When students and parents come to our institute, the first question they ask is about placements. And everyone, including me, lie when they say 100% placements. Their second question is about the package. I say 20 lakhs. That's it. They would have decided based solely on the package. There was a student I met once, who had a package of 11 lakhs, but he didn't take it up because he was looking for 12 lakhs. I was shocked. I always advise students, when you get a job, commit yourself completely to that organization, that company, and they'll pay you what you want. Industry people taught me two words: attrition and retention. Dabbawallahs have a 0% attrition rate and a 100% retention rate, because they believe that work is worship.

2. Infrastructure

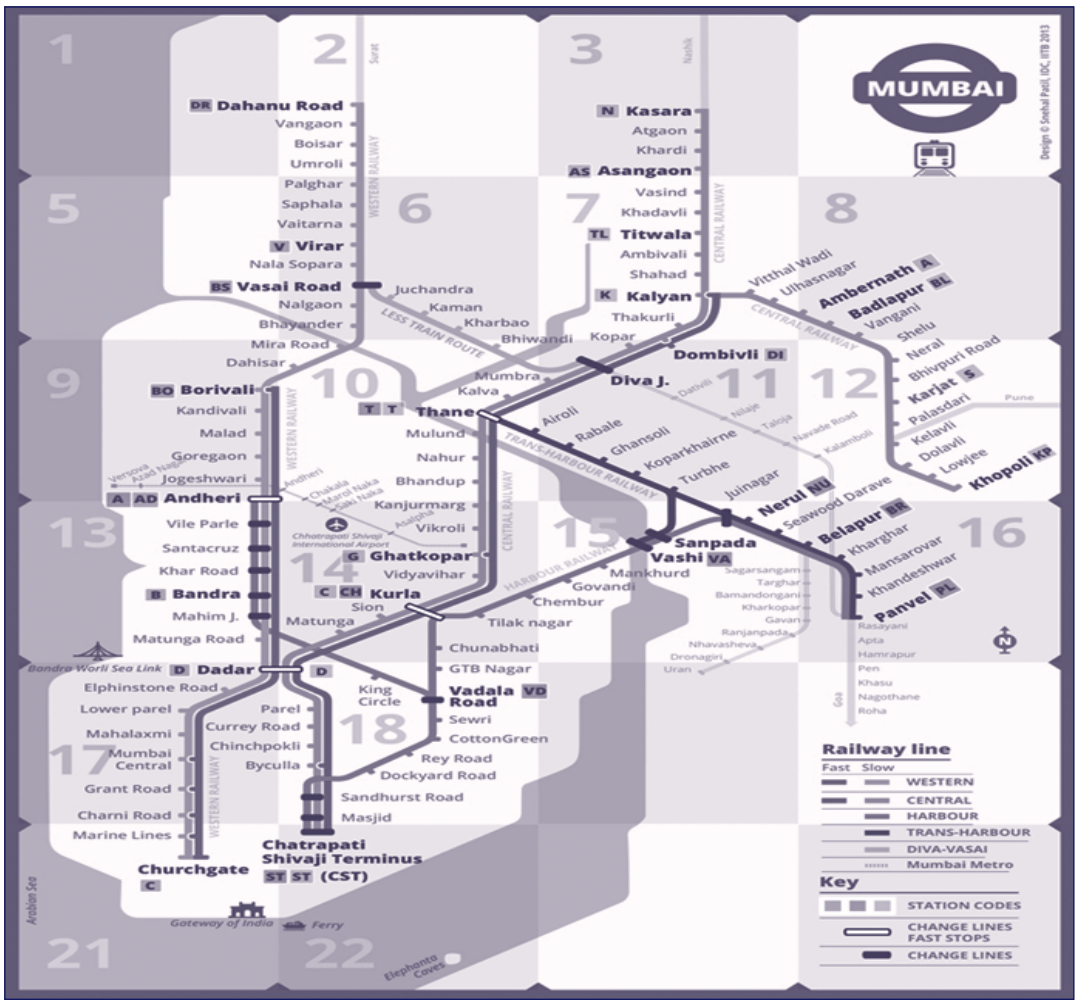
Local trains : The black bone of Mumbai dabbawallahs is the higher frequency of sub urban train services in Mumbai. There is a train service virtually every two minutes. The entire operational area of Mumbai dabbawallahs is serviced by the well-developed railway infrastructure. Further, the train services are inexpensively priced. And covers almost each important places in Mumbai with its gigantic rail network. The dabbawallahs uses a monthly train pass, by which they can able to use train services, as many times as they need.

Transport Economics: The dabbawallahs uses bicycles, hand carts and public transport network only, to deliver lunch boxes. This keeps the cost low and affordable to consumers/customers. Lower prices results in more volume of customers and hence results in economics of scale. And this economics of transports results in low cost supply chain logistics, which makes it more affordable to customers.

Topography of Mumbai: (The arrangement of the natural and artificial physical features of an area)

The dabbawallah service has evolved in the context of Mumbai city whose topography is almost linear. The linear geographic dimensions such as seen in Mumbai city is an important factor for its success. At the origin it is dispersed over a large area. At the destination it is concentrated on a small geographical area. The traffic pattern is characterized by low volume spread over a large area to high volume spread over a small area.

Figure3: Mumbai sub-urban railway network map



Source:https://www.localsofmumbai.com/making-of-mumbai-rail-map/

3. Customer support

The members of the dabbawallahs, do not wait for lunch boxes at pickup level, if lunch boxes are not ready, when they arrived for collection at residence. And the customer's also understands, that if they will wait, then they will no more able to give best service possible. So they supports dabbawallahs and make the lunch boxes ready, before they arrives at their place.

4. Working structure of Mumbai dabbawallah

Flexibility: Each route is assigned to an individual member. But the information of this route is known to every other person of the team. If there is any need to change the member on any route, then this can be done effortlessly. **Salary distribution**: Salary distribution in a group is same to every member irrespective of work load and responsibility. **Independent teams and team leaders**: In a group there are 10,20 or some time 30 dabbawallahs, based on the strength of customers of that region. The most aged person in that group is mukadams (group leader). He control all the activities of the group and the members, and not getting extra money, but then also he controls all activities, why? Because he gets the opportunity to become group leader. And due to the fact that he is the most aged person, so based on Indian culture, the team members respects them.

5. Physiological factors

- **Less literacy rate of dabbawallahs**: Among 5000 dabbawallahs, 80% of them are illiterate and for rest, the average literacy rate is 8th grade schooling. So, physiological their thinking is like that "if I will not do this job properly, then i will not able to get job at anywhere else ". And also "THEY ONLY KNOW I HAVE A BOX AND I HAVE TO DELIVER IT".

- **Some slogans or quotes that all dabbawallahs follows, and these slogans are taught during their training**

1. "We don't have any error, because error is horror, don't look into the mirror, it is danger, So Don't do error ".
2. "Customer is god. We don't want to remain them without food".
3. If someone, not give bonus, then what if I will discontinue service, "I will lost my 12 month salary. So i have to choose, 1 month bonus or 12 month salary".
4. "Work is worship".
5. "I am delivering love, packaged in food"
6. See the whole through the part • "If I fail, all other dabbawallahs will fail"
7. "I will pass only if all other dabbawallahs pass the test every day"
8. Trust broken once is broken forever"
9. "Simplicity is not the best solution, but it always works"

- **Stake-holder system :** Dabbawallahs are the stakeholders of their company, so it is clear to them, that their income will grow, if the company or business will grow,and also they get their salary always on time if they will work perfecty. So, this is the reason of no strike rate in the history.

6. Total trust: Due to the highly discipline of workers, in history, there is no case like "dabbawallah had eaten my food". So, this rock hard trust is very beneficial for dabbawallahs.

7. Disciplines :

1. No Alcohol Drinking/ Smoking during business hours.
2. Wearing white cap during business hours.
3. Carry identity card
4. No leave without prior notice.

If any dabbawallah will do any mistake, then first time it will be forgive, second mistake will have huge fine, and if the dabbawallah is going to do his 3rd mistake, then he will have to resign from the job.

8. Standards and quality practices that dabbawallahs follows

- **Six sigma** : By opting the six sigma methodologies, like – (Quality is everyone's responsibility)

If the coding gets rough, then dabbawallah will write it by finger and paint, he cannot say, it is not my work, because in our organisation, everybody is responsible.

- **Quality training**: For every dabbawallah, it is compulsory to take 1 month training before joining. In this training, they also taught even the simplest thinks like how to ride cycle in traffic jam.

- **Highly responsive teams**: Example, which can clear this point very well. So, Prime Minister Narendra Modi was giving his first speech about Swatch Bharat Abhiyan , the speech is not finished but the dabbawallahs start cleaning the roads.

And if they are late, then some time, sorting can be done, even in running train itself, to make the whole process on time.

- **Codification system**

The codification system is the core part of working of dabbawallahs for its tracking in the system. It is home grown but serves adequately, the purpose for which it is designed. It is a combination of alphabets, symbols and colours. The code can tells us the home address, office address and even gives the hint of name of person, whom the lunchbox (dabba) is this related to.

DISCUSSION

Mumbai Dabbawallah plays key role in delivering lunch boxes at cheap prices, and here are some of the points which makes it different.

1. Only Logistics service network in the world, with accuracy far ahead than six sigma, even without intervention of latest technology.
2. This study proves that the Technological advancement is not only the critical factor for any business to succeed, but simplicity, discipline, determination and even low wages of workers can make the system robust.
3. Mumbai dabbawallah has no unique scientific and or technological breakthroughs or competences. It is an

excellent business model based on innovative approach to satisfy a real customer need.

4. This paper has attempted to examine the case study of dabbawallahs within the context of their logistics operations and the factors responsible for their success.

CONCLUSION

Here, in this paper, we have described in details the factors responsible for the success of supply chain network or logistics services of Mumbai dabbawallahs. We have also seen the population density, land distribution, urban freight transport in Mumbai, Mumbai sub urban rail system and operations at Mumbai dabbawallah. Mumbai dabbawallahs logistics system is currently handling more than 4 lakhs daily transactions, with accuracy far ahead than six sigma. This study proves that Technological advancement is not only the critical factor for any business to succeed, but simplicity, discipline, determination and even low wages of workers can make the system robust. This study shows that the informal sector is capable of managing a complex urban logistics system as efficiently and effectively as any other big player in Logistics Company is doing in the organized manner. The paper highlighted a numerous number of success factors that are unique and even cultural related itself. And this is when the logistics services of dabbawallahs are totally eco-friendly, because technically they are not doing anything that are causing pollution. Even the lunchboxes are also reusable. And all this, is at lowest cost possible. If any other giant will try to get in this business, then at least it needs, dozens of warehouses and hundreds of small truck. And by this also, they will not able to deliver the lunchboxes at time, due to traffic problems in Mumbai. And after all, their price will also going to be high. So, after this whole study, we can say that the dabbawallahs give a very unique twist to logistics services. This paper has attempted to examine the case study of dabbawallahs within the context of factor responsible for their success even without intervention of latest technology. Mumbai dabbawallah has no unique scientific and or technological breakthroughs or competences. It is an excellent business model based on innovative approach to satisfy a real customer need.

REFERENCES

1. *Pathak, G. (2010). Delivering the nation: the dabbawallas of Mumbai. South Asia: Journal of South Asian Studies, 33(2), 235e257.*
2. *MCGM. (2005). Greater Mumbai city development plan (2005e2025). Available at: http://www.mcgm.gov.in/irj/portal/anonymous?NavigationTarget¼navurl://095e1c7b9486b1423b881dce8b106978 Retrieved on 18 March 2011.*
3. *Pathak, G. (2010). Delivering the nation: the dabbawalas of Mumbai. South Asia: Journal of South Asian Studies, 33(2), 235e257.*
4. *Behrens, A., Singh, P., & Bhandarker, A. (2016). View from Practice: Managing Effectively in Collectivist Societies: Lessons from Samba Schools and Dabbawalas. Thunderbird International Business Review, vol. 57, no. 1, pp. 37-51.*
5. *North, K., & Kumta, G. (2014). On the Way to a Knowledge Society. In Knowledge Management (pp. 1-29). Springer, Cham.*
6. *Sriraman, S., Venkatesh, A., & Karne, M. (September 2006). Competition issues in the road goods transport industry in India with special reference to the Mumbai metropolitan region. Transport Economics148*
7. *https://www.localsofmumbai.com/making-of-mumbai-rail-map/*
8. *Chopra, R., & Sharma, H. (2012). Corporate to Cooperative Entrepreneurial Leadership in Emerging Economy-Lessons from Indian Enterprises. Journal of Organisation and Human Behaviour, 1(4), 12-28.*
9. *Ghodake, S. T. (2016). Transcending Life through Romance: Mumbai Tiffinwalas and the Lunch Box. Advances in Social Sciences Research Journal, vol. 3, no. 12, pp. 8-15.*
10. *Mumbai lunch box delivery system: A transferable benchmark in urban logistics?*
    a. Deepak Baindur[a,], Rosário M. Macário [b,1]*
11. *Isher, A. S., & Bhal, H. (2005). Factor Study of Human Reliability and Industrial Productivity: Comparison of Food Delivery System. In ASQ World Conference on Quality and Improvement Proceedings (Vol. 59, p. 495). American Society for Quality.*
12. *Lea. (2007). "Comprehensive transportation study of Mumbai" executive summary. Genesis1e63, Available at: http://www.mmrdamumbai.org/docs/escts.pdf Retrieved on 18 March 2011.*
13. *Sehgal, P., & Surayya, T. (JaneMar 2011). Innovative strategic management: the case of Mumbai suburban railway system. Vikalpa: The Journal for Decisionmakers, 36(1), Available at: http://www.vikalpa.com/pdf/articles/2011/Vik361-05Note_ Comments.pdf Retrieved on 22 November 2011.*
14. *Kisperska-Moroń, D. (1992). Relativity of the "new logistic technologies" and of their inventory aspects. International Journal of Production Economics, 26(1-3), 181–186. doi:10.1016/0925-5273(92)90061-b*
15. *Prof. Venkatesh Ganapathy, Dr. Padma Mahadevan and Prof J. V. Ravikeerthi. An Empirical Study of the Feasibility of Introducing the Mumbai Dabbawala Food Delivery System in Bangalore 2016*

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