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<div align="center">The Dabbawallas of Mumbai</div>

Waking up at 8 am in India, I can smell the fresh dew and feel the sun beating on my face. From my house tucked in a neighborhood, I can hear the hustle and bustle of people leaving for work. There are men on bikes delivering milk and auto rikshaws driving. The yelling of advertising and bargaining for mangoes can be heard. The streets are filled with slow-moving traffic consisting of cows, auto rickshaws, motorcycles, and cars- none of which follow the traffic rules. Mostly filling the streets around this time are men, dressed in white, carrying a tray above their heads loaded with tiffins filled with food. They speed through the streets of Mumbai, picking up lunches from houses in the morning.

THE DABBAWALLAS

The Dabbawallas of Mumbai are a group of people that take part in a lunch box delivery system throughout the city. A 'dabba' is a lunch container and a 'wala' is a mobile street vendor. These dabbawallas have been coordinating the delivery of homecooked meals to thousands of Indians for hundreds of years. They carry tiffins of food from the home to the office of the worker and then the empty tiffins from the office back to the home in an organized fashion. Each dabbawalla carries approximately 40 dabbas, weighing about 60-75 kg. Mostly from the village around Pune, they are identified by their white kurta and Gandhi topi ("Mumbai…").

This system was created by a man named Mahadeo Havaji Baacche after he hired someone to bring his lunch to his office every day from home. After realizing he was not alone in this demand, he created a system of about 100 dabbawallas. This system quickly grew to what is now known today. Due to long commutes, workers often leave for work before the rest of the family is awake to pack their lunch. People with office-jobs in Mumbai also find it difficult to carry both their office work and their lunchboxes through the intricate and over-crowded train system, but they still desire a healthy, home-cooked meal at low-cost. This network satisfies this overlooked niche by providing two major benefits to customers in the market. First, it allows the customers to get the home-cooked meals while managing their budget, charging 200 -500 rupees or $3-$7 per month; and second, it leverages time constraints (Rathore).

There are two types of organizational structures within this system. First, there is organization of the workforce; and second, the journey of the dabbawallas themselves as they get to the destination on time and error free. The Dabbawallas of Mumbai have harnessed the power of code in a non-traditional format that has brought great successes for hundreds of years due to the information infrastructure's simplicity and control.

ORGANIZATION OF THE WORKFORCE

The dabbawallas have a system with basic pillars consisting of organization, management, process, and culture (Thomke). These pillars contribute to their interest of getting the lunch from home to destination to home on time with no errors. They do this by optimizing and standardizing the principles of operation through a human-centric organizational system with a flat structure (Rathore). In their organizational structure, there is an executive committee with

13 directors at the highest level of the Nutan Mumbai Tiffin Box Suppliers Charity Trust (NMTBSCT), a cooperative registered in 1984. These 13 directors include the president, vice president, general secretary, treasurer, and nine directors as shown in Figure 1. This executive committee, re-elected every five years, meets once a month to fine-tune the line of operations and address any problems related to dabbawalla service. The second tier in the organizational structure consists of 800 mukadams who each lead a team of 5-10 dabbawallas. 'Mukadam' is an Arabic title meaning 'assistant' or 'facilitator'. The third tier consists of the remaining 5,000 dabbawallas. Each dabbawalla is not an employee, but an equal shareholder in the dabbawalla trust. All people who hold power in the organization continue to operate as dabbawallas, and their salary is still consistent with the standard dabbawalla salary based on the dabba delivery line- not the ranking ("Nutan…"). Every dabbawalla receives the same income regardless of their age, experience, strength, or number of customers served. There are only about 20 women who work as a dabbawalla due to the strength necessary to lift the dabbas. However, there is no retirement age. So once a worker becomes a dabbawalla, they can continue this position for life, even once they are no longer able to carry such heavy weight.
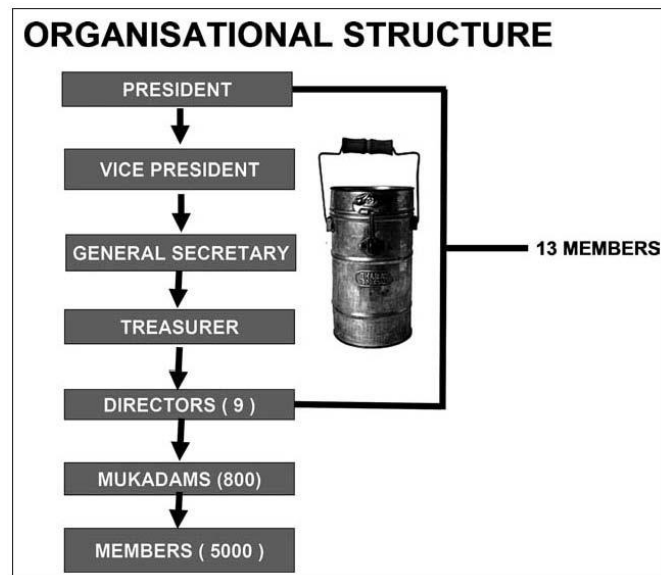
Figure 1: Dabbawalla Organizational Structure

SOCIAL CONTROL

Though there is a hierarchy, the dabbawallas operate with a flat structure. No one person holds authority over another, and no wala needs to report to anybody. Yet, there is a form of social control that exists, allowing workers to use only their own motivation to guide them. It is this form of social control that makes the organizational infrastructure like no other. In "Social Control After Foucault", Michalis Lianos discusses how control is part of infrastructure for coexistence and order. Oftentimes, there is a negative connotation to control as it is often mixed up with 'domination'. In this case, the dabbawallas exemplify Lianos's social control in a positive light. They show that social control is integral to their act and even liberating. The social control manifests in two ways: rules and community.

SOCIAL CONTROL: RULES

There are strict rules that the dabbawallas must follow. They must always carry an ID, they must wear the Gandhi topi, and there is no undercutting allowed. Other standards are set to ensure adherence to the processes. These rules include that the walas don't eat until they have completed all their deliveries, and workers are fired for repeated mistakes. This system "empowers frontline workers to take action" according to Stefan Thomke. He compares this to the car manufacturing company Toyota, as any worker who takes issue to work, even outside their realm, can halt the production line. Thomke attributes this empowerment to part of the success of the organizational system (Thomke).

ORGANIZATION OF THE WORKFORCE: COMMUNITY

Most dabbawallas come from a specific Hindu sect called Varkari, meaning they also worship the same deities together. The shared cultural background gives a sense of community ("Nutan…"). Along with the rules provided by the dabbawalla's work, they maintain cultural and religious rules that everyone follows including not drinking alcohol or eating meat. They live by the philosophy 'anna daan is maha daan' which translates to "donating food is the best charity" (Henderson). Though not everyone fits into the same caste or religion, the dabbawallas share the same values and work ethic. Many of them, from the region of Pune, have similar ancestry tracing back to the warriors of the 17th century who fought for Chatrapati Shivaji, the leader of the Maratha empire (Thomke). The dabbawallas tend to remain in the same groups from the time they begin working to the time they retire. New workers are usually relatives or close friends of current dabbawallas. Scholars such as Amy Edmondson and Richard Hackman from Harvard find that "familiarity, bonds, and psychological safety lead to lower error rates

(Edmonson). With this context, the homogeneity plays a role in the social control to reduce errors and accomplish tasks to extraordinary depths.

The organization of the workforce is a self-reinforcing system. This provides a new connotation to social control as Lianos has pointed out. It enforces the idea that social control is not about domination but unification. It does not need to involve constant surveillance, but a form of control that can motivate others. However, to truly understand the distinctiveness of the dabbawalla information infrastructure, it is also important to analyze not just the organization of the workforce, but the journeys that the dabbawallas need to make and the nontraditional code that plays a significant role.

THE JOURNEY: INFRASTRUCTURE

The 5,000 dabbawallas cover roughly 60 square km with over 200,000 deliveries and 400,000 transactions per day. For the workers to coordinate this journey, a protocol is necessary. In "Protocol: How Control Exists After Centralization", Alexander Galloway explores the infrastructure of the Internet through TCP/IP networks and states that the foundation of the internet is control and modulation through protocols. He defines 'protocol' as a form of power that is decentralized and distributed. The structure of the dabbawallas can be compared to a TCP/IP network. The TCP/IP network is used as a transmitter of information between two mediums. It does this by compiling packets of information and sending them to the right location via the quickest route. Similarly, dabbawallas act as a transmitter of food between two locations by compiling tiffins and sending them on the quickest route possible to their destination. A single lunchbox could change deliverers three to four times before it gets to the destination. By using

bikes and the railway system the dabbawallas can navigate the streets to the destination. Studying the dabbawallas can give a tangible visual on how TCP/IP networks work as well as different mediums through which information travels.

Their day starts around 9 am where all the walas pick up the dabba from the worker's home and bring it to the Andheri Train Station. The tiffins are all standardized in size with tiers. The bottom tier is the largest filled with rice, and the upper tiers are filled with curry, vegetables, daal, and naan. These meals are usually made by the wives of the workers or service-workers in the household. Next, the dabba makes its journey through the train. Around 11 am the dabbas are unloaded and sorted at the destination station. From there, a new wala picks it up and the dabba makes its way to the office of the customer. Around noon, the process of recollection starts where the empty dabbas are recollected, sorted, and sent back to on the train to the home of the customer. A break-down of this can be seen in Figure 2. This may seem like a simple process, but when dealing with hundreds of thousands of lunches that go great distances, infrastructure is important.
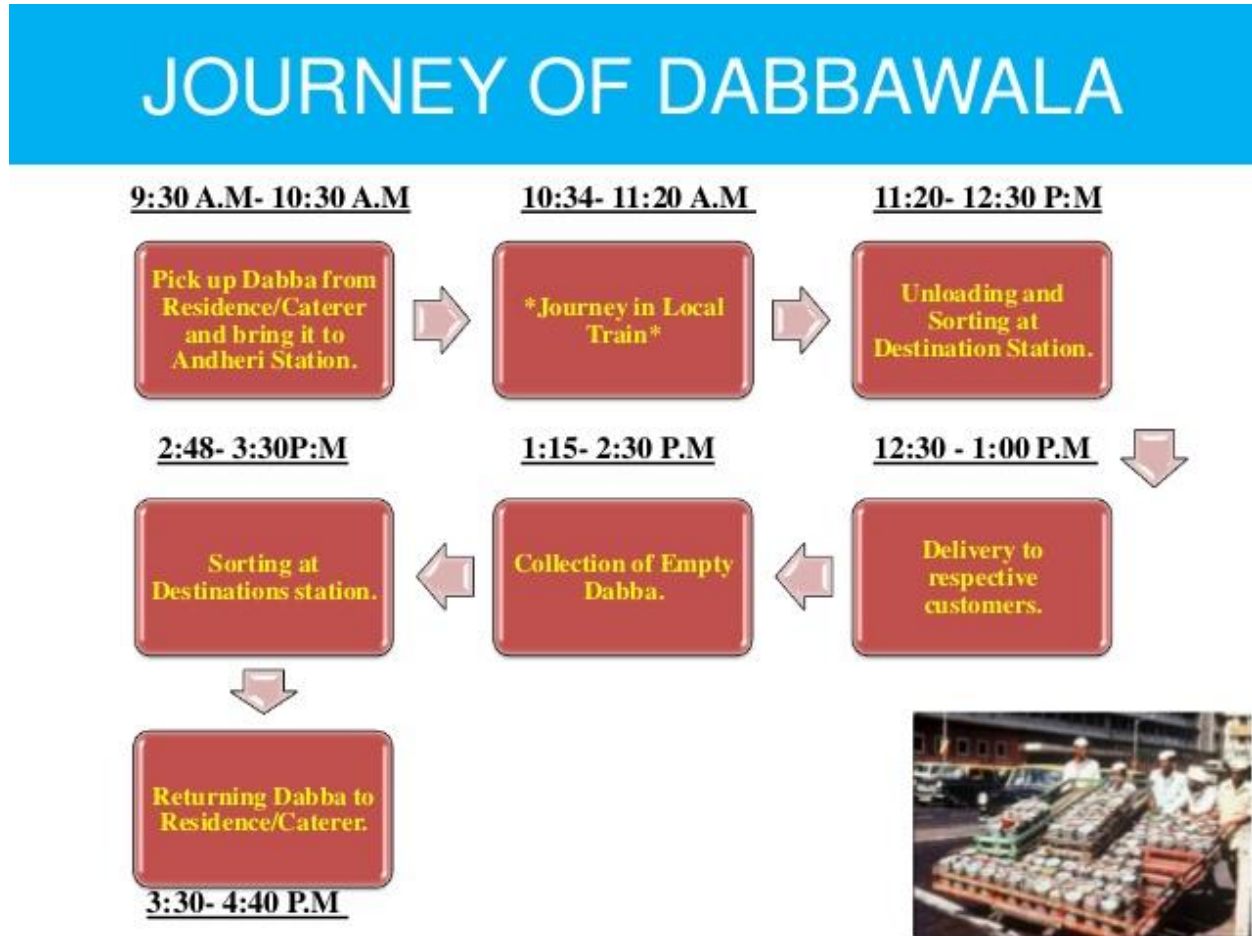
JOURNEY OF DABBAWALA

9:30 A.M- 10:30 A.M
Pick up Dabba from Residence/Caterer and bring it to Andheri Station.

10:34- 11:20 A.M
Journey in Local Train

11:20- 12:30 P:M
Unloading and Sorting at Destination Station.

2:48- 3:30P:M
Sorting at Destinations station.

1:15- 2:30 P.M
Collection of Empty Dabba.

12:30 - 1:00 P.M
Delivery to respective customers.

Returning Dabba to Residence/Caterer.

3:30- 4:40 P.M

Figure 2: Dabbawalla Journey

THE JOURNEY: CODE

Most dabbawallas are illiterate and uneducated. Furthermore, though there is a community within different teams, many of them do not all speak the same language but need to communicate together to figure out how to get the lunchboxes to the correct destination. Thus, they use the power of code in a non-technical format. As shown in Figure 3, there are markings on the lid of every dabba. First, there is a letter representing the home where the dabba needs to

be picked up in the morning and brought back in the evening on the left side. Next is the station code for the wala to take the dabba on the train in the center. Occasionally, there are multiple station codes if the wala needs to take connecting trains. On the right is the code for which dabbawalla will pick up the dabba from the train station and the destination address with specificity. Finally, there is the residents station code for the dabba to get back to the home. The dabbawallas follow these codes in somewhat of a clockwise pattern. Through letters, numbers, symbols, and color-coding, each marking gives all the information necessary for the process to occur without cluttering the lid with irrelevant information (Thomke). This standard and self-descriptive code eliminates ambiguity and only requires that the generally illiterate dabbawallas understand the standards.
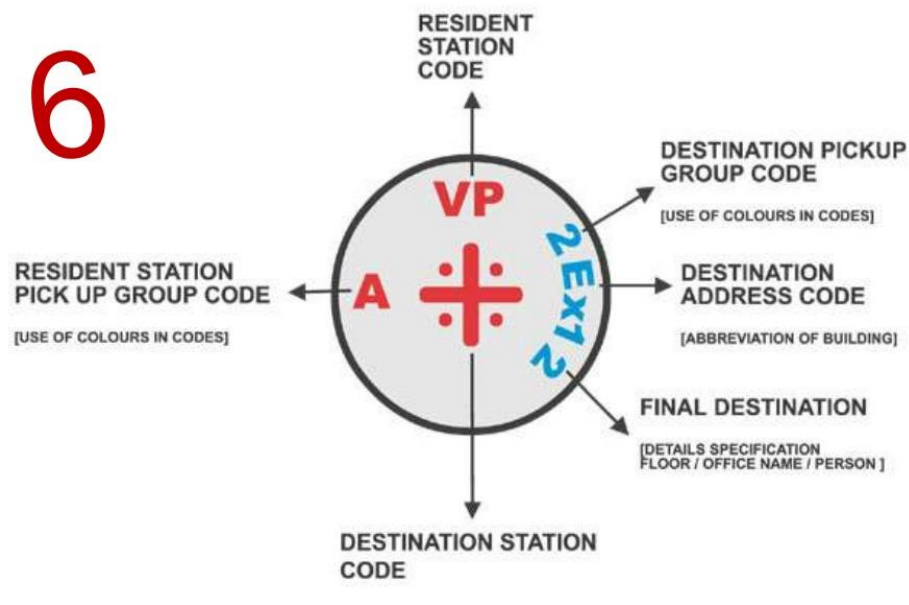

Figure 3: Dabbawalla Lid Code

This system follows what Lawrence Lessig's four mechanisms for regulation in his piece "Code is Law": norms, market, laws, and architecture. He defines norms as societal regulations;

markets as incentives for desired behavior; architecture as the limits set by the code; and laws as the guidelines people follow from the set architecture. In the dabbawalla case, the norms are that people want their food delivered on time; the market is the dabbawalla's salary and internal rewards for this job; architecture is the code created to guide the dabbawallas to the correct location as well as the train system and streets through which they travel; the laws are the rules set in place for the walas as discussed in previous sections.

Even with this simple yet efficient coding system, the workers need to keep a tiny margin of error for tasks involving interactions with others outside of the dabbawallas. The time allotted for picking up the lunch from the house is only between 30-60 seconds. Any small delay can have a cascading effect that would affect thousands of deliveries. Therefore, there are always two to three workers who act as the buffer capacity to fill in when needed. All the walas are cross-trained in different areas including collecting, sorting, transporting, finance, and customer relations. They usually have no specialties and tend to rotate positions (Thomke).

In Tara McPherson's argument comparing UNIX operating systems to racism and segregation in "Race After the Internet", she discusses the notion of good code being simple and modulated. Though the paper's central idea revolves around race, her argument is developed with the notion of 'dividing and conquering'. This concept is common in code, and she discusses how it is a common strategy used throughout life, whether that be in civil wars, code, or tackling bigger tasks. The idea of breaking things down makes it easier and simpler to conquer. Though she attributes good code to one that is broken down simply, she brings this together by highlighting UNIX philosophy's rules of good code. The list includes modularity, clarity, composition, separation, simplicity, parsimony, transparency, robustness, and representation.

The Dabbawallas of Mumbai's code acts much like an operating system and, in fact, follows all these rules. Though this is a nontraditional form of code, one can draw parallels. The code is modulated so that each dabbawalla can read what they must do to complete the big picture. The code is broken down into simple pieces and is very clear. Nobody can misinterpret a code because they are all standardized. The design is composed so that all the code is on one tin, but there are separate spaces with the information necessary for each walla to follow. The wallas do not need to read other information but can in case of error. It is parsimonious and transparent in its lack of ambiguity and simplicity. There is nothing hidden about the code, and the workers know exactly everything and nothing more than what they need. The dabbawalla code works due to its good, clean, and simple code.

THE IDEAL INTERNET

By using this system, the average customer saves on average 450 rupees a month. The dabbawalla makes about 8,000 rupees a month. This system is known for its reliability after still functioning after famines, wars, terrorist attacks, etc. It has attracted so much attention that it has brought royal visits from Prince Charles, Richard Branson, and many companies who are trying to understand its secret (Thomke). Despite lack of computers or cellular infrastructure, there are rarely any errors due to the repeatable, predictable, systematic, and iterative nature which allows easy tracking and monitoring (Rathore). In 1998, Forbes Global magazine gave the Mumbai dabbawallas' operations a Six Sigma efficiency rating of 99.99999% accuracy (Pandita). It is so efficient that the President of the Mumbai Tiffinmen's Association estimates that the dabbawallas only make a mistake once in every sixteen million deliveries (Talekar). The dabbawallas of Mumbai make less errors than the TCP/IP network!

The Dabbawallas of Mumbai are a tangible form of information infrastructure that highlights the different mediums through which information can travel. However, what is intriguing, specifically about this case, is the uniform network despite its nonlinearity. In "Network Culture" by Tiziana Terranova, she discusses the implications of mediums through which information can travel. Her thesis involves three points: information is defined in contrast to noise; information is limited by channels, noise, the sender, and the receiver; and information "implies representation". In her paper, she takes a stance that there is a political dimension of network culture and that nonlinear network dynamics can provide conditions for politics to emerge. In the dabbawallas case, there are no politics involved through information travel. Perhaps it is due to the simplicity of the information being sent (the food), or maybe it is due to the simplicity of the infrastructure, but this organization seems to take the internet or other such information mediums into a utopian light. The food will only get to the destination if it goes against traffic; food is constrained to what can fit into the tin and is in the jurisdiction of the dabbawalla territory; and the food is a representation of a home-cooked meal. Therefore, this follows the thesis of Terranova without bringing politics to the table. The dabbawalla case brings the human into network cultures that are often fetishized as digital and inhumane. Introducing the human into these "perfect" systems can reorient the approach to code and different mediums of travel in a more empirically accurate way.

Without the use of any technology or digital resources, this organization system has been functioning practically error-free. Throughout the years, the dabbawalla system has received many recommendations to increase revenues or optimize operations from top US companies and businesses who study them. Companies such as Microsoft and HUL have attempted to help by

creating flyers and advertising materials. These suggestions are usually rejected (Thomke). The dabbawalla system is completely optimized. There is no way to alter it to make it cheaper or better. Even extra time required to fix flyers and ad materials from Microsoft created disruptions to their tight model, and they were able to work less efficiently (Pandita). Introducing new technology would increase cost; there are less errors than TCP/IP networks, and the process is already simple. Creating new solutions would further complicate the process. Although Mumbai is evolving and becoming the hub of India with its tech start-ups and Western-style fast food chains, the dabbawalla practice remains steady and continues to increase between 5-10% per year (Henderson). This is not to say that they oppose change. They have begun to collaborate with small companies and canteens but remain undistracted from the core mission: delivering the dabbas on time with no errors.

The dabbawallas have become a benchmark of efficient logistical service while its workers are illiterate, uneducated, and work with no digital technology. Yet, this organization system is one to learn from. Through analysis of both the organizational structure of the workforce by evaluating social control in the form of rules and community, and the organization structure of the journey through simple code, the Dabbawallas of Mumbai exemplify the phenomena of a successful lunch delivery network. Innovation does not necessarily mean creating new mediums, but sometimes evaluating the infrastructure of pre-existing mediums. The dabbawallas show that with the right system, organization does not need extraordinary talent or complex patterns. With simple code and social control, extraordinary results can be achieved. This old system is a strong one, and it's here to stay.

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