

World Class Logistics Operations: The Case of Bombay Dabbawallahs

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Abstract

The Bombay Dabbawallahs operation is widely recognized as an outstanding example of excellence in Logistics. It is often quoted as a standard example of six sigma implementation in the Indian context. Because of its popularity Prince Charles of the United Kingdom paid a visit to the operations site during his official visit to India in 2003. In this article we study in detail the nature and content of this system, critically examine its salient features and analyze the possibility of extending the system to similar or related domains.

Introduction

The central theme of this work is to present a detailed analysis of Bombay Dabbawallah's Operations (BDO) from a management perspective. BDO is a home grown model, conceived, developed and perfected by a group of individuals who have very little or no formal education in the area of Logistics. BDO is operated by a group of 5000 individuals organized in the form of a cooperative, delivering everyday 150,000 lunch boxes from home to customer locations in Bombay with negligible error rate. BDO is recognized as an outstanding example of excellence in service delivery. BDO is the most talked about Indian example of excellence in logistics operations.

Several academic institutions routinely invite the Bombay Dabbawallah representatives to make formal presentations in their campus to complement and enhance their academic content of their respective programmes. Often, senior management meetings find it useful to have a presentation on BDO to illustrate the applicability of six sigma in Indian context and inspire managers to adopt and practice world class systems. The popular business press has been publishing material on BDO from time to time. The Forbes journal had an article on BDO. Recently the Alliance Air Official Inflight Magazine had an article on BDO. Top ranking management schools have documented BDO as case material for teaching purposes. Prince Charles of United Kingdom, as a mark of appreciation visited the Bombay Dabbawallahs' work location during his visit to Bombay in 2003.

The purpose of this article is to present the details of BDO and explore the distinguishing features of it from other world class systems. The secondary purpose is to conceptualize the broad management principles (in BDO) which may have universal application.

In this article, we provide a detailed analysis of the content, context, and decisions made by Bombay Dabbawallahs' in managing BDO effectively. We try to provide a balanced perspective on BDO features. As a consequence of this discussion, we hope academicians and managers would not only develop a perspective on BDO, but also see the essentials of the system and its inherent potential and limitations in its replication to other contexts.

The presentation is organized in three sections. In the first section, the standard operating procedures, basic statistics and information on BDO is presented. The second section details the logic, the distinguishing features of BDO and its growth options. The final section summarizes some of the best management practices in BDO and draws some meaningful insights in managing such a large service model.

BDO a Profile

BDO operations is confined to Bombay, the commercial capital of India. BDO services include collection, transportation and delivery of lunch boxes from home to office location in the morning. In the evening the (empty) lunch boxes are moved in the reverse direction. This service is aimed at the middle income group families, small traders and owner managers. BDO operates 25 days a month, with a one week pre announced holiday in a year.

The need for BDO service is driven by clear preference to home food by its customers. Many target customers find food available in their work area as not suitable for their life style. Often, they find it expensive too. In addition, a typical BDO customer commutes about 100 kms a day between his home and work place. They usually leave their home early morning to work. At such a time, lunch may not be ready.

The BDO service is priced at Rs. 250 per lunch box per month. Depending on specific customer requirements customized offering (large lunch box, special diet requirements etc. are charged differently.

Most commercial establishments are situated in North Bombay. The middle income residential areas are in South Bombay. Accordingly the lunch box traffic movement is predominantly uni-directional (South to North in the morning and vice versa in the evening).

BDO started its operation with a modest beginning in 1890 by a group of people (same ethnic background) from Pune to support their livelihood in Bombay. The system has been operational for (about) 120 years without any interruption. As of 2005, BDO handled 300,000 transactions a day (150,000 boxes), employed 5000 people and earned Rs. 360 million every year.

BDO reported less than six errors in 13 million transactions. They work for six days a week. There is no disruption to work (as long as the Bombay Sub-urban rail network is functional). BDO not only provides clean home food but it also delivers it safe against theft and pilferage.

BDO is organized as a co-operative movement. The basic entity is a Dabbawallah. A set of Dabbawallah's would form a team. Several teams would form a group. Several groups (120) constitute the entire organization.

Standard Operating Procedures

The BDO is designed to collect, transport and distribute lunch boxes to its customer routinely (every day) for 25 (working) days in a month. The specific details are described below.

The fundamental unit of organization is a Dabbawallah. There are 5000 of them in the system. Each Dabbawallah is assigned (a set of) upto 30 customers in a specific geographical area. Each Dabbawallah visits a pre-assigned and fixed route and carries the lunch boxes and brings it on his head to the nearest railway station.

Their primary job is to visit the pre-assigned set of household under their area of operation. Usually this visit is made between 8.30 and 9.00 a.m. in the morning. Each Dabbawallah is in-charge of about 30 lunch boxes. They either walk or travel on bicycle to collect the lunch boxes. The household is expected to keep the lunch box ready when the Dabbawallah reports for collection. For some reason, if the lunch box is not ready, the Dabbawallah would leave for the next destination. After collecting approximately 30 such lunch boxes, the lunch boxes are brought to the nearest sub-urban railway station for sorting and onward transportation.

Upto 8 Dabbawallahs are organized as a team. Usually, more than one team operates out of a collection railway station. Upto 8 teams form a group. There are 120 groups in the system. The groups are responsible for entire operations (customer care, quality, complaint management, manpower recruitment, compensation, discipline, scheduling of work, collection, accounts receivables and revenue management). The teams are responsible for operational execution.

At the originating railway station a team of designated Dabbawallahs would sort the lunch boxes according to their destination. The sorting process is facilitated by a detailed and elaborate codification system. (The details of the codification would be described later). The essence of the codification system is it clearly identifies the origin of the lunch box, the associated collection team member, the destination, the corresponding delivery team member, at the delivery location, destination, location building identification and floor number.

Based on codes assigned to individual boxes, they are sorted for a origin to hub transfer by using the Bombay metropolitan rail network. At the destination a group of members would receive the Lunch box, resort the lunch boxes based on destination (building, floor and location). Subsequently, the assigned members would move the lunch boxes to the respective location physically and leave the lunch boxes at the appropriate consumer location or floor. The lunch boxes are accompanied by team members from collection location to final destination. As the train moves towards central Bombay more and more lunch boxes and team members join the journey.

The origin-hub transfer is facilitated by greater frequency of sub-urban trains (one in a minute). The lunch boxes arrive at destination railway stations by 11.30 a.m. The subsequent delivery is completed before 1.00 p.m. After the delivery the members hang around (gossip, play card, rest, eat their own lunch) in public parks in central Bombay near the destination areas. By 3.30 p.m. they return to the offices and buildings where they left the boxes and collect the empty boxes for their return journey.

Between 12.30 p.m. and 3.30 p.m, the customers reach their lunch boxes left in their respective floor, eat their lunch and return the empty box to the location from where it was collected by them.

All the empty lunch boxes are assembled at the destination railway location, resorted to the respective origin location, placed on standard carts and transferred to the respective hub or individual stations by the designated members.

The carts are unloaded at the appropriate (Bombay) sub-urban train station and taken to the individual households by the same member who collected them in the morning. After this transaction, the member's responsibility is over and he retires for the day.

The members of BDO should be capable for carrying a load of 100 kgs. manually on their head and walk 2.5 kms. effortlessly. The work hours are between 8.30 a.m. to 5.00 p.m. with an appropriate rest period of 2½ hours. They travel in the train along with lunch boxes every day. Each member would have a railway pass which allows him to make unlimited number of trips on designated routes.

The sorting and loading operations need care and they are time bound. They are carried out in areas which are public places. These locations are usually congested. The origin-hub transfer normally happens in designated carts. These carts are loaded in pre-determined compartments in the beginning or at the end of the train.

Critical Success Factors

The BDO is known and recognized for its negligible number of transactional errors. We now discuss in detail what is behind such an outstanding performance.

Flexible Infrastructure: The back bone of BDO is the higher frequency of sub-urban train services. There is a train service virtually every minute. The entire operational area of BDO is serviced by the well developed railway infrastructure. Further, the train services are inexpensively priced.

Customer Co-operation: The members of the co-operative do not wait for lunch boxes, if they are not ready when they arrive for collection at residences. The household understands the need to be punctual to support the functioning of BDO and extend appropriate co-operation.

Appropriate Network Structure: The logistics network of BDO is a combination of milkman route, hub-hub transfer, and hub and spoke distribution. There is perfect symmetry in the reverse logistics operation.

Codification system: The codification system is the core to material flow and its tracking in the system. It is home grown, ad hoc but serves adequately the purpose for which it is designed. It is a combination of alphabets, symbols and colour. It is unique to BDO. The codification is a combination of systems approach and personalized information available to members. It is specific to the extent required.

Topography: The BDO has evolved in the context of Bombay city. The operational area topography is linear. At the origination it is dispersed over a large area. At the destination it is concentrated on a smaller geographical area. The traffic pattern is characterized by low volume spread over larger area to high volume spread over small area.

Process Capability: The total time required from collection to delivery is about 3 hours. End to end (conservative) travel time - 1.30 hrs. Travel time to the nearest railway station at the origin 30 mts. sorting and material handling etc. - 30 mts. and final dispatch - 30 mts. All this adds up to 3 hours. However, the time available for end-end delivery is at least 4 hours. Thus the BDO process is inherently capable of meeting customer expectations and specifications. Further, the delivery of the lunch boxes is consolidated at the floor level at the consumer location. In a place like Bombay, this saves significant time, energy and possible complications. The customers also participate in the last step of the (lunch box) delivery process. Further, it makes no difference to the customer (on time dimension) as long as the delivery is made before 1300 hrs.

Transport economics: The public infrastructure (sub-urban rail network) is used to deliver lunch boxes. This keeps the cost low, and hence affordable price to consumers. Lower price induces volume and scale economics. Depending on the need (at the origin and destination locations) the allocation of manpower is dynamic and flexible. There are more members to handle large volume at destination. At collection centers it is more of spread and appropriate volume and member ownership. Every customer location is identified with a team member. It is his (members) responsibility to collect lunch boxes and return empty boxes back home. The codification system incorporates this specific need. Actually the BDO assigns specific collection routes to individual members.

Redundancy: Each route (collection) is assigned to an individual member. Often, this information on collection route is known to every other member in the team. Should there be a need to substitute a member on collection route it can be done effortlessly, without affecting the collection process and its accuracy.

Coordination: The responsibility to collect, transport and deliver lunch boxes is at the individual member level. There are no managers or supervisors in the system. Every member is motivated, trained, disciplined and empowered to do his job to the best of his ability.

Structure: The structure is decentralized. The model is scalable (on volume). It is a three tier structure, co-operative organization. The basic units are individuals, teams and groups. There are in all 120 business units.

Compensation: Compensation in a group is same to every member irrespective of work load and responsibility.

Management Practices

The BDO provides illustration of several well known world class business practices. It has all the salient features of a brilliant business strategy. We first discuss briefly the elegant management practices and then outline the business strategy.

Structure and Organization: The BDO is organized as a co-operative structure to symbolize equality and fairness. The three tier structure is readily scalable based on business opportunity and volume. It eminently suits the attention needed at specific territories (group level). It ensures attention to detail and decentralization (at optimal resource deployment) at the team level. The team is nothing but a confederation of members. Each member is associated with a route. In this sense, the revenue opportunity is well integrated with the organization structure. The scale and scope economics are managed respectively by the teams and groups. The present structure is an optimal way of delivering centralized planning and decentralized execution of business services.

Codification System: This pragmatic codification system ensures complete traceability of lunch boxes in the system. It enables material flow and tracking of individual boxes by detailed information. It is inexpensive, less elegant, yet detailed enough to support operations. It integrates the knowledge and information of individual members on route, origin, handling agent, destination address etc. In a sense it is a variation of an online transaction processing system to identify and track material in (such) a large system.

HR Practices: The BDO is built on (members') pride in work. The members do not consider themselves as logistics (operation) providers. They consider their job is to provide food to their customers. This is source of pride for them. It is a great motivator to improve and sustain their performance. The members belong to a homogeneous (ethnic) group. There is a well developed apprenticeship program.

Compensation: The compensation is same at the group level. Equal work equal pay. There is no subsidy since group is a homogeneous and logically a differentiating entity.

Redundancy: The team members have slack capacity. Substitutability among members in a team is easy. Flexible manpower deployment at the destination ensures operational accuracy. More than one team operating in an originating train station ensures internal competition and operational efficiency.

Fun and Work Mix: After delivery of lunch boxes, the members break away from work to enjoy their leisure time. There is a one week forced holiday every year to visit their (member) villages. Mutual respect for individuals and empowerment are reinforcing features. Members are expected to conduct themselves to earn respect from public. They were uniform while at work.

Transportation Economics: BDO is an example of a judicious mix of transportation economics. At the collection point it is a milk man route structure. This is supported by a hub-hub transfer to

handle large volume at reduced operational cost. At the destination, it is hub to spoke to ensure response time and handle volume flexibility. The rail infrastructure ensures flexibility and lower cost of operation. Flexible manpower deployment and codification system guarantee appropriate response time, smooth flow of information and material tracking in the system.

Element of Strategy, Sustainability and Growth Options

In this section, a conceptual understanding of competitive strategy of BDO and its elements is attempted. Based on these observations, the long term sustainability of BDO is explored. We conclude this section with possible growth options to BDO and its inherent limitations.

The BDO competitive strategy elements include identification of a long lasting customer segment or need, effective use of public infrastructure, standardized operating procedures, partnership with customer, motivated and empowered employees and an appropriate material flow tracking system. A brief detail of these elements follow.

Perpetual Need: BDO caters to the basic yet perpetual demand of (serving) delivering home prepared (ethnic) food to Indian middle income executives working in Bombay. The need is more acute because of long commuting time, congested traffic conditions and long travel distances. This market segment would exist for long time to come. The only erosion to this market size or need is from changing food habits of Indian middle income group executives. While this is a reality, the change is surely expected to be slow. Therefore, in the immediate future, BDO is assured of its business so long as it can meet customer expectations on delivery and price (service charges).

Value Pricing: The core to BDO's operational efficiency is the well managed Bombay metro rail network. On any scale of comparison, for its wider reach and frequency of operations, the members of BDO use the rail network for a nominal price. The 5000 members are paid a reasonable compensation. The entire set of operations (BDO) are manual. All these contribute to lower operational cost and hence a reasonable price (or value pricing) to the consumers. Complemented by a large customer base, satisfied customers and an ever increasing working class population at Bombay, this business model is a passport to perpetual growth.

Standard Operating Procedures: BDO over a period of time has evolved as an outstanding example of standard operating procedure. There is no uncertainty in the delivery model at any stage. The individual member's role is clearly articulated. The information flow to track material (codification system) is perfect. Members are empowered in task execution. There is an element of internal competition: multiple teams in the same geographical location are operational to generate additional business volume. Fair business practices (equal compensation) and joy of work, pride in activity, fun mixed with work break the monotonicity in the standard operating procedure in BDO.

Partnership with stakeholders: There are three important stakeholders groups with whom BDO enjoys an excellent relationship. The first set is its primary customers. They support BDO in meeting no delay in delivering lunch boxes and accepting delivery at the floor level in the destination locations. The members are delighted to work for BDO (supported by empowerment, compensation and an economic activity for livelihood). The commuting public at large is tolerant to the inconveniences caused to them by BDO in the already over crowded, over stretched urban transport system. Over a period of time, BDO has become an essential element of modern Bombay.

Operational excellence: BDO has a remarkable and enviable quality record. This is a combination of flexible infrastructure, adequate buffer in material handling, reasonable and achievable service level specifications, elaborate and efficient codification system, self motivated

and empowered employees, dynamic and flexible deployment of members to execute a given task, adopting a variety and mix of transportation models, and commitment to work ethics.

Structure: BDO operating structure is elegant, appropriate and enhances its operational excellence based business model. As discussed earlier the 3 tier structure ensures operational details are delegated to the most appropriate level. The structure provides for redundancy in team members and hence volume flexibility on lunch boxes handled by the system. The business integration happens at the group level. Broadly each group is self sufficient and has to manage its own operational income, volume and hence profitability. Any other centralized structure to supervise operations would have made the process inherently ineffective (expensive) and less responsive to customer needs.

Performance measures: BDO performance measures are real time transactions based. As a matter of fact every transaction is monitored in terms of its collection, transportation, and delivery. Revenue collection is periodic and systematic. Employee (member) productivity is volume based. Compensation is equal, group based and is a function of revenue generated. Given internal competition at the group level this model is self corrective. Broadly there are no fixed assets. Therefore assets productivity is irrelevant in BDO. The performance of BDO is closely linked to the near automation (standardization) of the process. There are inherent buffers to manage and accommodate unanticipated risks in the system.

Customer focus: BDO is a service organization focused on customer expectation management. The service is priced low to attract and retain relevant customer segment and base. The process is capable enough in the context of assurances made to customers. The BDO has elevated the purpose of their business to an opportunity to provide food (higher order objective than transport logistics support to deliver lunch boxes). The discipline, empowerment, commitment to work of members are all consequences of this higher order objective in meeting customer expectations.

What is unique about BDO?

There are several complimentary aspects of BDO which render it as unique and hence protects it from competition. The first and most critical is a business proposition based on inexpensive and reliable public infrastructure. This coupled with a formidable volume (of business) BDO has built up over a period of time, provides an unparalleled advantage to BDO. The topography of Bombay (and client locations) and need for home based food (preference) are important contextual uniqueness.

The BDO model is scalable. The logistics activities are member driven. The day to day operations are managed at the member level which provides harmony, synergy and symphony. The tracking mechanism is an innovative (and inexpensive) variation of online tracking system. Because of its innovation the tracking cost is negligible. The BDO annual revenue is Rs. 360 million. The size, scalable nature of operations, modular structure, customer service and negligible errors have kept competition away from this attractive business proposition.

BDO is essentially a homogeneous product flow system in a linear topography. The present model may not be effective if any of the above conditions are not valid. There is a tolerance and sympathy shown by (Bombay rail) commuting public to BDO which may not be feasible in another context. The simple codification system which tracks the lunch boxes would be a serious constraint to handle multiple products in more than one direction.

There is an attempt to use the BDO infrastructure to do market research etc. This is at best a temptation. BDO caters to a specific market and customer segment. Therefore any market research activity based on this would inherently have less universal applicability. Also, for the members of BDO (because of their limited educational background) such activities may be a stretch. Therefore in our view, the growth for BDO would be volume based and is constrained to

either Bombay alone or cities which are very similar to Bombay, in terms of infrastructure and traffic pattern.

Conclusion

We have described in detail the BDO. We review the business model, factors behind such an outstanding practices, elements of the business strategy, opportunities and limitations for its growth.

- BDO creates a sense of pride and a source of inspiration to managers and academicians (world class)
- BDO has perfected its systems and procedures to handle large volume of operations with negligible errors (six sigma)
- BDO operations are modular, they are scalable and flexible enough to handle volume (Flexible business strategy)
- BDO operations are customer centric, employee driven, and value based
- BDO is an example where flexibility in operational procedure takes precedence over precision (Prioritized objectives)
- The output accuracy (the number of transactions delivered on time) is supported by flexible infrastructure and time buffers in the delivery system (Strategy enablers)
- The management practices at BDO are intuition based (codification system, homogeneous employee background, innovative Human Resource practices etc.)
- Several contextual factors are combined to develop an excellent business model (inexpensive manpower availability, need for home food, urban transport infrastructure, unique traffic flow pattern etc.)
- BDO has no unique scientific and or technological breakthroughs or competences. It is an excellent business model based on an innovative approach to satisfy a real (and unique) customer need (Innovation based strategy).

Acknowledgement

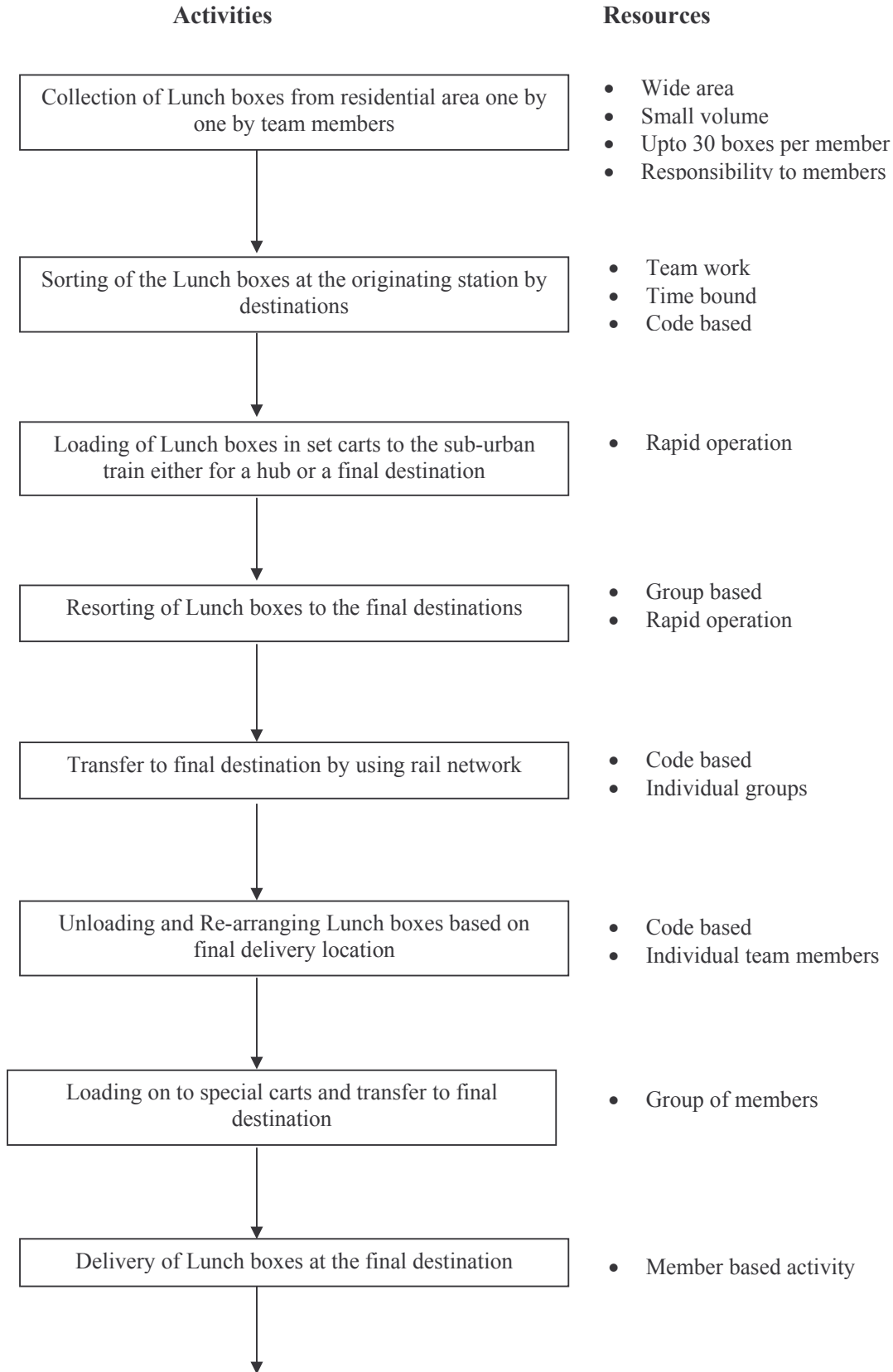
Gangaram Talekar and Raghunath Medge enabled the author to understand BOD operations. This article would not have been possible but for the support and co-operation extended by them. This is gratefully acknowledged.

Exhibit 1: BDO Profile

Location	Bombay, Maharashtra State, India
Product / Service	Collection, transportation and delivery of lunch boxes (daily) from home to office location and bringing back the (lunch) boxes in the evening.
Need	Preference to home food by Indian Executives, Managers and Traders
Target segment	Middle income group, owner managers and Small Traders
Environment	Long commuting distances (upto 50 miles), congested route (rail, road), over stretched and slow public transport system
Topography	Linear spread (North to South of Bombay)
Price	Rs. 250/- per month per Lunch box
Legacy	100+ years old
Actors	A group of people from Pune of same ethnic background
Organization	Co-operative
Size	5000 employees
Volume	300,000 Transactions a day
Structure	Team (5 – 8 individual) Group (5 – 8 team) 120 groups
Performance	Less than six errors in two months of operations
Operations	6 days a week No discontinuity in service delivery One week pre announced holiday

Exhibit 2: Standard Operating Procedure (SOP)

Standard Operating Procedure (SOP)	Resources Used
Collection of Lunch boxes from residences	Member, Milkman route
Received and sorted at the railway station	Manual, rapid process, team
Loading for hub-hub transfer	By sub-urban trains in dedicated compartments
Re-sorting for hub-spoke transfer	Manual, rapid process
Unloading at destination stations	Manual
Sorting destination wise & Loading in special carts	Manual
Delivery to specified locations	Group of employees (Milkman)
Collection of boxes from office locations	Manual
Reverse logistics (Empty Lunch boxes from Office to Home)	Need based and situation specific



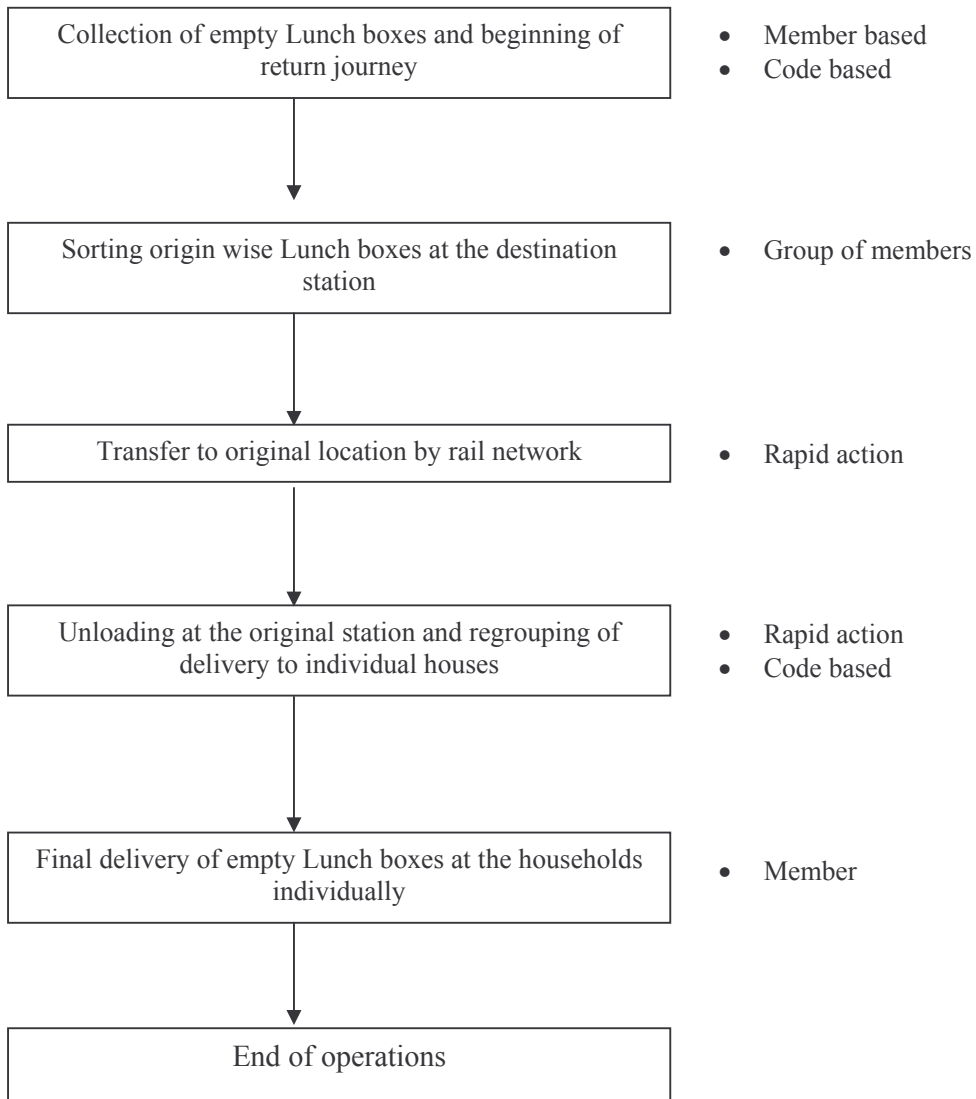
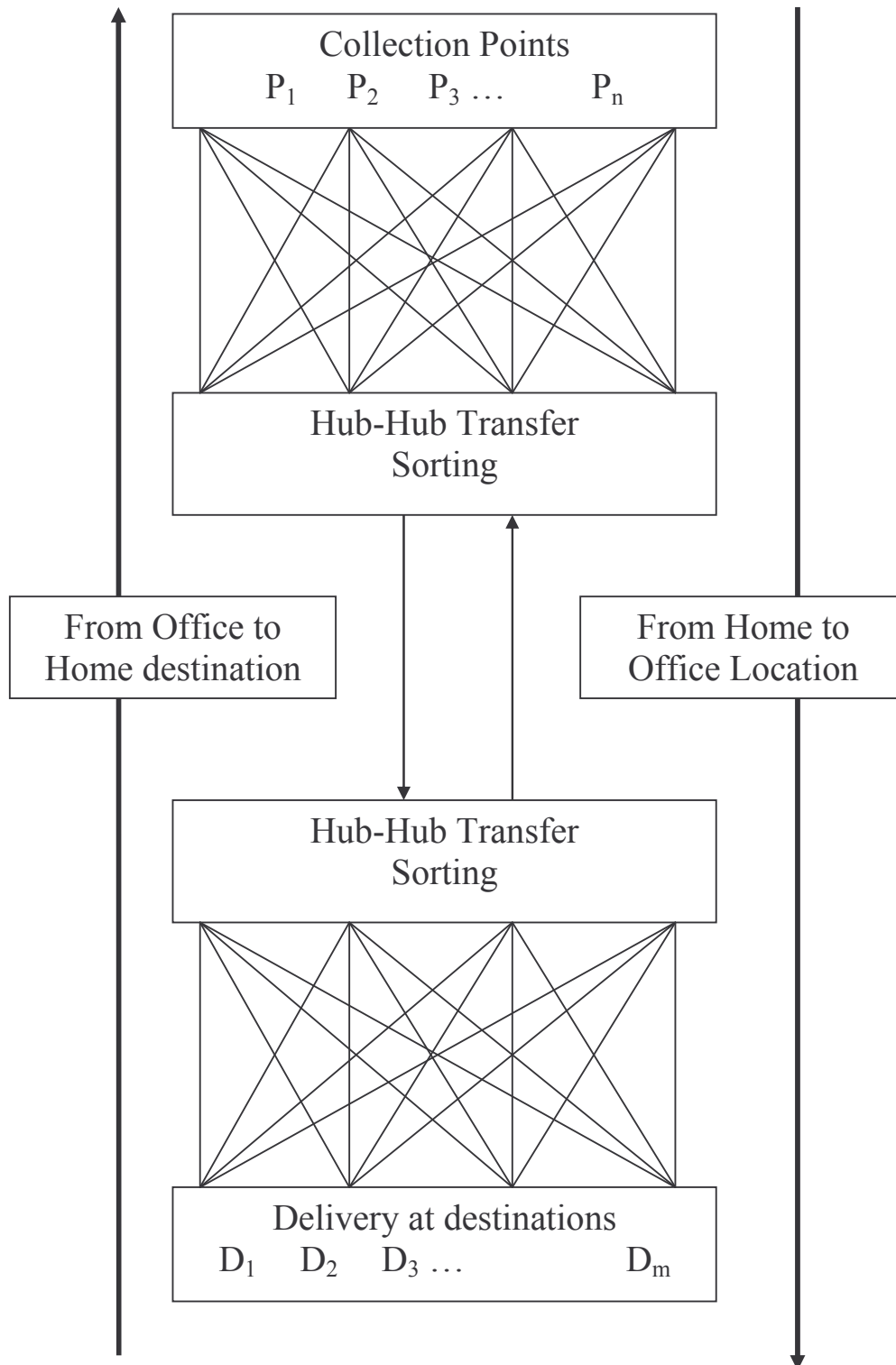


Figure 1: Flow Chart of Dabbawallahs Operations

**Fig. 2: BDO Network Diagram**

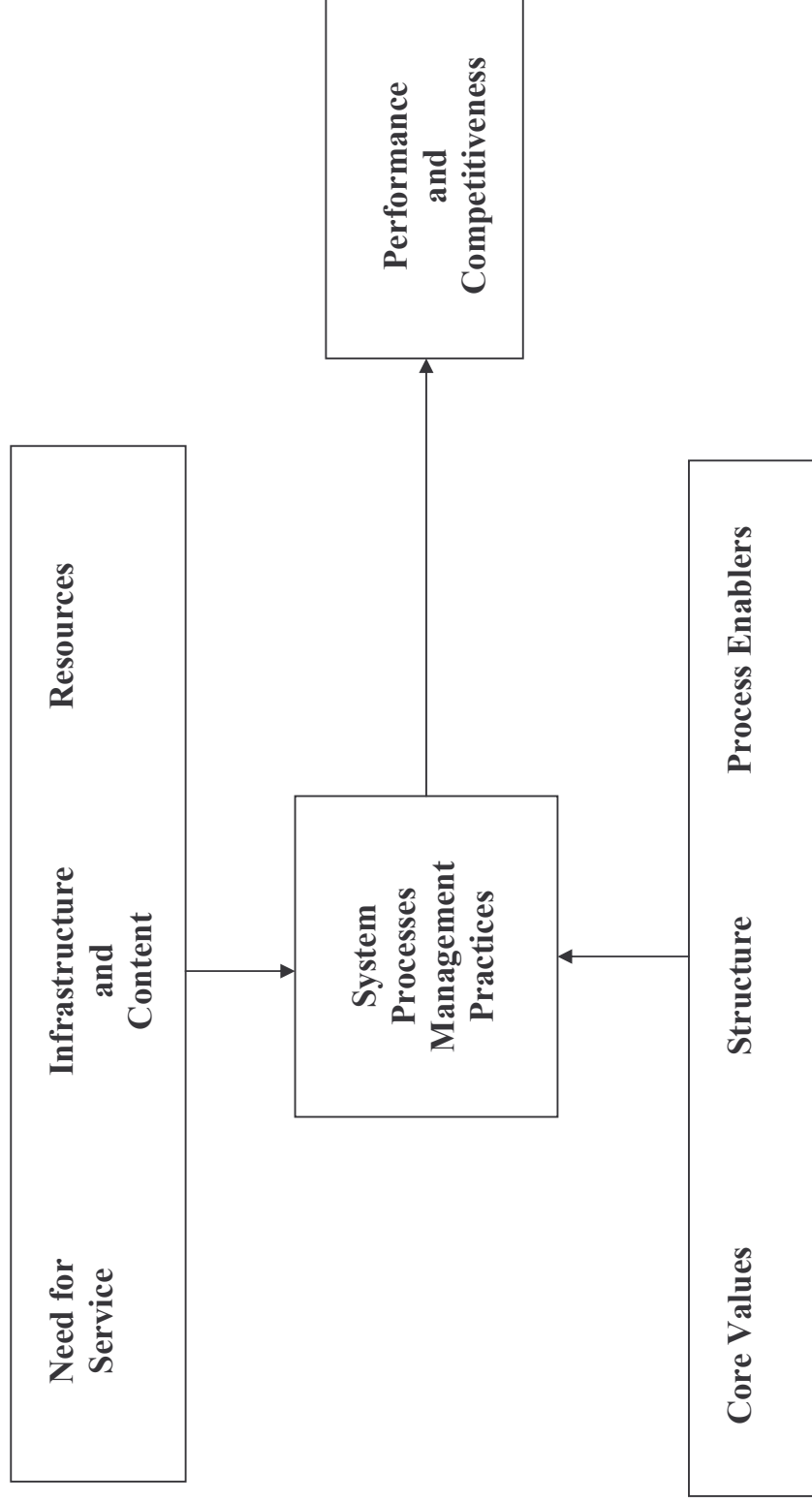


Fig. 3: Logic of BDO

Fig 3: Logic of BDO (Contd.)**Competitiveness**

- Large scale operation
- Formidable entry barrier
- Powerful Brand
- Uninterrupted Legacy

Core values

- Discipline
- Providing food (higher order objective)
- Dignity of Labour
- Fixed one week holiday in a year

Infrastructure

- Linear topography
- Sub-urban rail network
- Subsidized Transportation
- Wide reach and coverage

Management Practices

- More than one group in a location (Internal Competition)
- Derisking
- Redundancy on route assignment

Need for service

- Preference to home food
- Long commuting distances
- Overstretched public transport system
- Early departure from home

Performance

- Negligible error (six sigma)
- Inexpensive pricing
- Reasonable compensation to members

Process Enablers

- Co-operative customer
- Flexible train schedule
- Supportive public
- Delivery at floor level (destination)
- Liberal delivery time specifications

Resources

- Members
- Same ethnic group
- Apprenticeship

Structure

- Member, team and group
- Modular and scalable structure
- Co-operative organization

System

- Codification (origin, destination)
- Mix of work and leisure
- Equal compensation
- Optimal Mix of transportation economics
- Centralized planning
- Decentralized execution
- Localized monitoring
- Dynamic manpower allocation

Annexure 1 Mumbai (Suburban) Railway Network



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