

Measuring the Performance of Taxi Aggregator Service Supply Chain

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Abstract

The taxi aggregator services (also called as ride sourcing services) have become popular in the last few years in India. The companies managing these services call themselves as technology companies. This excludes them from the purview of transport regulations that a typical transport operator has to adhere to. One of the major reasons for the success of Ola and Uber, the two ride sourcing services in India, is their ability to digitally match supply and demand by successful deployment of technology. Technology has enabled the right information to be available to the right persons at the right time. The business model of taxi aggregators has intelligently woven solutions to address the gaps in the present call taxi system – namely driver behavior, lack of focus on performance, uncertainty of demand, difficulty in matching capacity with demand, increase in prices etc. With technology comprising of software algorithms enabling accurate matching of demand and supply, the wait time is reduced for the customer and for the drivers, the idle time is reduced. The other benefit for the consumer is that travel using ride sourcing services is at an affordable cost due to the volume of the operations. This has created a win-win-win situation for all – the taxi aggregator gets his commission, the driver gets assurance of demand and the consumer has to wait less and pay reasonable charges for availing the taxi services. The pricing structure is also very dynamic. This paper attempts to study the technique by which performance of these aggregator services can be measured. The paper has identified the criteria and measures of performance that can help taxi aggregator services to improve customer satisfaction and quality of service. The paper has also suggested possible ways in which these services can use an innovation strategy to drive the business agenda.

Keywords: Innovation, Technology, Ola, Ride Sourcing, Services, Service Supply Chain, Spokes Model, Taxi Aggregator, Transportation Network Companies, Uber

1. Service Supply Chains: An Introduction

Services have become a major driving force across different economies in the globe. India is no exception. Service businesses can benefit from best practices in manufacturing sector – however the differences between services and manufacturing present a complex picture. This has led many researchers to develop framework that can be specifically applied to the services sector³,¹¹. Diversity of the services sector makes it difficult to develop a unifying services framework. Service supply chain management is the management of information, processes, capacity, service performance and funds from the earliest supplier to the ultimate customer¹¹.

Service supply chains are characterized by theoretical processes like – Information flow, Capacity and skills management, Demand management, Customer relationship management, supplier relationship management, service delivery management and cash flow.

Service supply chain management is the management of information, processes, resources and service performances from the earliest supplier to the ultimate customer. In these definitions, it should be noted that the ultimate product delivered to the customer is the 'core service' that provides benefit to the customer. In other words, opening an investment account in a bank, treatment of an illness in a hospital, or having an enjoyable vacation in a hotel constitute the core benefits that the customer seeks and therefore are referred to as the core services.

When delivering a core service, a number of supporting services may be required, such as doctor's examination, laboratory tests or realisation of a surgical operation when a health care business is considered. The supporting services may be produced by suppliers as well as the service provider itself.

In the service supply chain context, the core service and supporting services in combination is the focal subject of transaction. The customer perceives all services s/he receives as one and as aiming to provide her/him the ultimate benefit³. If we consider the taxi aggregator / ride sourcing services, then the ride becomes the core service while "app" becomes one of the supporting services through which the customer and the driver are connected.

In service supply chains, suppliers contribute to production of services and in some cases are in direct contact with customers. The suppliers play an important role in customer's perception of service. Proper selection of suppliers is a must. For the taxi aggregator service supply chain, the drivers can be "technically" considered the suppliers. The driver plays a crucial role in the last mile delivery of service.

Demand management, capacity and resource management, customer relationship management, supplier relationship management, order process management, service performance management, information and technology – these are the main focal areas in service supply chain management and the ride sourcing services is no exception. The adoption of technologies to support and collaborate within supply chain to improve service supply chain operations is vital for achieving competitive advantage in their business Baltacioglu³. This is what the taxi aggregators have done by means of deploying technology to digitally connect the customers and drivers – in other words, technology enables digital matching of supply and demand – which is an enormous challenge in traditional businesses.

2. Call Taxi System in India

One needs to understand the reason for the development of call taxi system in India – the growth of middle class, rise in disposable incomes and focus of the government on infrastructure development that has been identified as a key factor in boosting GDP growth. The rise of the BPO industry in India has also contributed to the growth in demand of taxi services due to their non-conventional working hours (night shifts etc). Till 2003, the call taxi

sector in India was unorganized. There were either private operators or state government controlled pre-paid taxis offering a standardized, costly but low quality service.

Radio cabs business emerged in India with Mega taxi launching their service in 2003. But the fact is that the organized taxi sector in India still accounts for 15% of the total market. This presents tremendous opportunities for growth²⁴.

New models have emerged with focus on affordable travel and use of technology for matching supply and demand. The main challenge has been to ensure easy accessibility of taxi services. Taxi aggregators are able to provide affordable travel because they do not incur any capex costs. The only cost that they incur is on investment in providing the technology infrastructure²⁴.

Radio taxis capitalize on their comfort quotient and availability quotient to attract people even though fares are comparatively higher than normal taxis. Use of Global Positioning System (GPS) and GPRS (General Packet Radio Service based technology) can help operators monitor the cabs on real time basis, making efficient use of cabs in terms of a high utilization ratio. This results in a good financial performance.

The deep penetration of mobile internet helps customers to book cabs online and monitor costs on real time. Whats App is an efficient tool for booking cabs, tracing cabs and leads to reduced waiting time. Interestingly, the success of the model is attributable to a host of factors - low entry barriers, growth in disposable income of population, over reliance on road transportation in many metros and lack of a well developed railway network for public consumption.

3. Ridesourcing

Research scholars have termed the on-demand ride services as ridesourcing. Ridesourcing is the result of customer's unmet demand for convenient, point to point urban travel. User experiences are different in ridesourcing²³. Comparison of ridesourcing with traditional taxi services in terms of types of customers, locations serviced and the trip types were researched. The key research question was whether ridesourcing complemented public transport or did it pose a competition?

The unique aspect of ridesourcing is its ability to ensure shorter wait times and more consistency in service quality as compared to taxi services. This consistency is a result of technology – the algorithms that help in the

digital matching of supply and demand. The consistency is also a result of the increased stress on performance of the driver – both in terms of driving and non-driving behavior. The research study revealed that ridesourcing complemented public transport but also proved to be a competition for public transport. These ridesourcing services (also called as taxi aggregator services) have challenged existing regulations and practices²³.

The Uber ridesourcing service has attracted drivers-partners from a wider range of backgrounds. People have left full time careers to join Uber. They have presumably been driven by their entrepreneurial spirit. Drivers reported that flexibility in working hours coupled with rise in incomes is what has motivated them. Uber also provides opportunity for drivers to work on a part-time basis. From the social angle, the ridesourcing service has attracted people who have not had a formal education but who aspire to work hard and earn well⁵.

4. Theoretical Framework

The taxi aggregators will do well to take inspiration from the service profit chain model¹⁶. Motivating the drivers who are the frontline employees and are directly interacting with customers is crucial. Drivers who are satisfied are more productive and will deliver a better customer service than those who are not suitably motivated. Drivers will thus play a crucial role in last mile delivery. Technology is the primary reason for the success of the taxi aggregator service supply chain model – however drivers as human capital play a vital role in successful delivery of service.

Some of the other theories that are relevant for the taxi aggregator services supply chain are:

4.1 Economies of Scale¹⁸

Digital matching of supply and demand helps in increased capacity utilization of the taxi cab. This results in less idle time for the driver. Revenue from the operations increases due to increase in the number of rides. This leads to increase in revenue due to greater spread of the fixed costs.

4.2 Economies of Scope²¹

There are economies of scope where it is less costly to combine two or more product lines in one firm than to produce them separately. It characterizes the conditions which lead to the formation of multi product firms in

perfectly competitive markets. In case of taxi aggregator services, there is scope for better deployment of the cab services during non-peak hours or off season (example – during public holidays). As it has been found in the West, the cab services can be used for home delivery of goods.

4.3 Information Asymmetry²

In any contract, the complications arise from the fact that both the parties to the transaction have information that is only privy to themselves and not known to the other party. This often creates problems during the execution. Drawing a parallel to the ride sourcing services, technology has been able to address this gap. Customer gets a clear idea about the arrival time of the cab and the driver too knows the relevant information pertaining to the customer.

4.4 Market for Lemons Framework¹

There is incentive for sellers to market poor quality merchandise since the returns for good quality accrue mainly to the entire group whose statistic is affected rather than the individual seller. Quality goods are not traded even in the presence of a demand for it as consumers fear to buy low quality goods. This framework clearly explains the reason why the earlier call taxi system caused greater discomfort to the passengers. Some of the call taxi services were good while some of them were egregious. Drivers would demand unreasonable incentives from the passengers, manipulate the taxi meter and would get away as there was no effective performance feedback system. The entry of the taxi aggregator has introduced credibility even as all these gaps have been addressed.

4.5 One Theory that has been Proposed for the Hotel Aggregators is the Spokes Model²²

This theory attempts to understand the impact of the review aggregators on pricing, consumer behavior and welfare.

Horizontally differentiated goods differ in variety but not in quality. Vertically differentiated goods differ in quality. As per the spokes model of horizontal differentiation, in the presence of aggregator, a same firm is likely to face a different set of competitors – online and offline. Entry of the aggregator may have an expansion effect.

If the aggregator earmarks certain areas depending on specific customer requirements, then switching is possible from one spoke to another spoke if transportation cost is low and there is a marginal change in prices. This pertains to the hotel aggregator services. Aggregator solves the information problem but it strengthens competition.

Aggregator enters the market. In the short run, some firms react by entering the online market. In the medium run, the market adjusts to the entry of the aggregator so that profits online and offline are equal. In the long run, the total number of competing firms adjust to restore the zero profit condition. In the long run, the poorly ranked firms either disappear or converge to the competitor's quality.

Aggregator reduces the inefficiencies due to information asymmetry between customer and hotel, it expands the market that is covered and increases the competition among firms. Profits increase in the short run – a larger share of the market is served (offline to online firms). Entry of more online firms pushes online and offline medium run profits down to a level that is lower than the one previous the aggregator's entry. Firms face a prisoner's dilemma. It would be desirable for firms to resort to the aggregator as a deviation from the previous equilibrium, but they would be better off if they did not.

In the long run, the zero profit condition induces a reduction of active number of firms on the market. Therefore variety reduces. Consumer's surplus is affected if they have a strong taste for variety. But any such decrease in welfare is compensated by the previously mentioned dynamics. The total welfare effect is always positive.

The spokes model can be applied to the taxi aggregator service supply chain as well. The taxi aggregator services have resulted in the expansion of market – considering that many of the customers who have their own vehicles prefer to choose Ola or Uber to avoid parking woes and enjoy a comfortable ride. As is mentioned elsewhere in the paper, in US, drunken driving incidents have whittled down as people have the option to source a Uber ride after a party. Entry of technology companies like Ola and Uber have intensified the competition in the market place and in many cases they have made traditional services more redundant. The service has proved to be a major differentiator. This has become possible due to technology adoption.

5. Literature Review: Taxi Aggregator Service Supply Chains

Over the past 30 years, economic restructuring and technological advancements have led to new business models resulting from disruptive innovation. Technology companies and start-ups have developed a better cost model by utilizing smart phone enabled apps to offer simpler and less expensive products and services. Uber services has demonstrated that its innovative model can disrupt the market¹⁷.

Uber, an on-demand ride sourcing service that connects passengers to local drivers in real time using smart phone technology has been successful due to its low fixed cost model. Ride seekers have a more reliable and faster alternative. Drivers get higher hourly earnings through the avoidance of costly regulations. This has severely disrupted the taxi service industry. Companies like Uber, Lyft, Sidecar and Hailo are called "Transportation Network Companies".

Use of smart-phones to avail of taxi services has now become very popular across the globe^{15, 19, 20, 25, 27}. In 2014 there was a battle between two Chinese taxi aggregators – Didi and Kuaidadi. These two apps were backed by Internet giants Tencent and Alipay. Drivers were given promotional fees and customers who used the app and paid the fare through mobile phones were incentivized. This competition changed performance parameters (service indices) like travelling distances and idle time lengths. Big data can be used to analyze the performance²⁰.

A spatial equilibrium model to balance the supply and demand of taxi services has been proposed¹⁵ in e-hailing taxi applications through smart phones. In a study on smart phone based services in Taiwan (Lee & Cheng, 2008), field experiments were able to provide empirical evidence that efficiency of drivers using a portable navigation system was better than those relying on paper maps in unfamiliar urban areas. Such a system was also able to improve the performance in terms of safety. Smart-phone based technology can promote a taxi aggregator's competitiveness and a driver's performance and safety and offer environmental benefits as less time will be spent on searching locations.

Taxi aggregator services have been confined to urban areas. But rural transport infrastructure is not only weak in terms of accessibility and connectivity but technological infrastructure is also tenuous. Technology solutions in rural transportation can help overcome barriers and provide opportunities for growth (Velaga et al, 2012). Current taxi services suffer from problems of unreasonable taxi distribution, high load rate and low dispatching efficiency. Smart phones help in taxi driver-passenger bidirectional search system including map matching, hotspot analysis and taxi route planning. Thus smart phones enable achievement of efficiency of urban taxi service²⁵.

Uber is classified as a technology company instead of a transportation company to avoid expensive taxi laws and regulations. Drivers are considered as independent contractors instead of employees. From the Uber app on their smart phones, passengers request a ride from a private passenger car driven by a non-commercial licensed driver. Mobile app communicates the passenger's location to drivers using GPS technology, during which time the customer can see where the driver is in real time in relation to pick up location. The customer is also sent a picture of the driver and the driver's car making it easy for the passenger to safely identify the vehicle upon its arrival. The passenger is charged a distance variable fare which is automatically charged to the passenger's credit card¹⁷.

Uber has leveraged on technology to deliver service innovations. It leverages detailed information on demand patterns and can respond to customer needs with increased expediency. Emergence of distributed labor technologies that enable new forms of contract labour reduce risk for companies and increase their control & flexibility over nearly all aspects of business operations.

Uber uses a dynamic pricing model that employs surge pricing during high demand times such as on weekends, holidays and late at night. Company analyzes block by block demand so it can dispatch an appropriate number of cars. Uber uses technology to gauge high demand times and areas and adjusts the fares accordingly.

Uber uses a bi-directional rating system to regulate the market and flush out bad drivers. After a trip is completed, the passenger and the driver rate each other out of 5 stars. Drivers who average a rating below 4.7 stars are automatically deactivated and banned from driving for Uber. This system increases transparency and accountability, incentivizing both drivers and customers

to act appropriately or risk being shut out of the app which in turn makes the market efficient and reliable¹⁷.

Besides technology, the other three factors that have contributed to Uber's success are:

- Uber is free from regulatory hassles unlike traditional taxi operators
- Drivers are classified as independent contractors and Uber is free from paying statutory liabilities for drivers
- A depressed labor market in which workers are willing to assume large amounts of risks and cost burdens

Uber plays the role of the digital matchmaker by providing a free market platform for drivers and rideseeking customers to connect with each other and in the process Uber earns a commission of 20-27%.

Uber's model has been termed as 'evasive entrepreneurship'¹². Evasive entrepreneurship is an important source of innovation in the economy. Institutions may create barriers for exploiting business opportunities and this can influence entrepreneurs to circumvent rules to exploit new opportunities. Thus during times of change, evasive entrepreneurship can lead to better economic development. This can prompt institutions and law makers to change the rules for betterment of society.

In tough economic times, people are desperate and willing to take on jobs that they would not have considered otherwise. Limited research has shown that use of Uber services has reduced the number of road accidents in US resulting from driving under the influence of alcohol.

Digital technology has made self-employment a more attractive option. Entrepreneurial opportunities get a fillip due to low start-up and marketing costs and free access to information, customers and easy access to capital. Technology has always changed the nature of work, but demand for workers has continued to increase. Technology is often disruptive but in the long run generally beneficial. However, for people and technology to be compatible, we need an education and training system that provides people with strong core skills and opportunities to acquire a varied skill-set with relative ease. Creating such a system remains a work in progress¹⁰.

6. Taxi Market in India

As per a report in the financial express, Uber and Ola taxi hailing services have not only disrupted the Indian market but have also brought about a social revolution

in terms of making the cab drivers work hard and earn more. This socio-economic transformation has become possible because of technology even as it is fuelling an entrepreneurship wave. It also presents a grim side in terms of poor work-life balance for the drivers. Ola is valued at \$ 2.5 billion and operates in several cities in India.

Uber's value is above \$ 50 billion and it started its Indian operations in August 2013 and is present in 11 cities. Uber has also adopted a polycentric approach in terms of accepting cash payments in India.

The taxi market in India is estimated to be around Rs 11,000 crore, and growing in double digits. The business model has become so attractive that even educated people are opting to become drivers.

Ola cabs runs on a pay for performance model. Flexibility in payment options and wider choice of categories and booking modes is one of their advantages. They attempt to give a standardized experience which is very difficult in services. As part of perform or perish concept, Ola cancels the incentive to a driver if he refuses to ply a passenger and Ola cabs receives a complaint. If the driver is caught riding the vehicle without the Ola sticker, he doesn't receive incentives for a week. There is freedom for the driver to login and logout at his own convenience. The phone given to the driver is such that driver cannot make personal calls from it.

Ola is keener on grabbing the market through predatory pricing. The benefits of E-commerce are many customer satisfaction, efficiency, cost effectiveness, flexibility to customers. Taxi aggregators like Ola have built their business model considering the gaps in the present taxi transportation services.

7. The Business Model of Ola

Ola cabs acts as a facilitator in providing cab-booking services to customers through multiple channels. Earlier, customers were able to book their cabs through the website, call centre or the app. However, later on Ola revised their strategy and made bookings possible only through the app.

The drivers have a flexibility to decide their own time to login to OLA Application and accept requests for rides from customers. They may choose to remain logged out of the system as per their convenience.

The source of revenue for OLA is the commission for each drive and the costs they incur are also quite low as they majorly have to invest only on the technology.

Ola has proved to be a great technology platform for transportation and offers easy options of booking a cab through an app and gives flexibility to the driver in terms of willingness to work. Those who work more get incentives.

8. Criticism against Taxi Aggregator Services

Despite all the hype about Uber's taxi services, the truth is that disruptive technology platforms are only as good as the human resources that they leverage. Where physical delivery of people or products is needed a committed workforce is a must.

Uber will fire a driver if his or her performance rating (an aggregate of the ratings provided by customers of that driver) falls below a certain level. This puts immense pressure on the driver. If there is a malicious intent on part of the customer to give an adverse rating then this could hamper the performance rating of the driver and put him at a disadvantage. In US, for instance, the driver is enticed by Uber to buy a vehicle on bank credit. One of the criticisms against Uber is that it treats people as replaceable parts¹⁷.

The last mile delivery is the critical stage in the supply chain and it is not only costly but also proves to be much less efficient as compared to the entire supply chain process. Taxi aggregator services which are asset-light delivery enterprises have still not understood that the driver is an integral part of last mile delivery process. It is worth looking at James Heskett's service profit chain model which says that happy employees are more productive and deliver greater customer satisfaction breeding customer loyalty which in turn spurs growth. Taxi aggregators need to pay attention to this.

9. Performance of Service Supply Chains

Research on the performance measurement of service supply chains is still evolving. An efficient and effective service supply chain needs assessment of performance. Demand management, customer relationship management, supplier relationship management, capacity and resource management, information and technology management, cost efficiency are all metrics that can be used to assess performance. Integration and coordination

among service supply chain members is important. A performance measurement system should enable informed decisions to be made and actions to be taken because it quantifies the efficiency and effectiveness of past actions⁷.

Some of the performance attributes and the corresponding metrics are delineated as below. Reliability can be measured by a. the number of bookings cancelled b. time for booking the service c. wait time. Responsiveness can be measured by a. ability to provide services for unscheduled requests, availability of capacity and lead time confirmation (how soon you can book the cab and how soon will the cab arrive at your doorstep?). Flexibility is measured in terms of the ability to entertain non-routine requests. Cost measurement is based on idle time or overtime wages (in case of aggregator services, overtime wages would be replaced by the incentives that the taxi aggregator has to pay to the driver)⁴.

Performance measures should deal with suppliers, delivery performance, customer-service and Inventory and logistics cost in a supply chain. Performance has to be measured at the tactical, strategic and operational level^{13,14}.

Let us look at the important parameters for measuring performance in a service supply chain⁷

Customer query time – the time it takes for a firm to respond to a customer inquiry with the required information¹³. Providing online information is an important element of customer service.

- Post process services – this involves valuable feedback for improvement in the supply chain. Some services also have a service level agreement.
- Matching demand and capacity efficiently. Capacity management is the dedicated act to balance demand from customers and the capability of the service delivery system. Service businesses continuously face the problem of matching their capacity and demand.
- Capacity management tries to achieve a balance between too much and too little resource utilization, within the constraints of the networks and facilities of the operation.
- Capacity utilization is also an important performance metric.

There are three types of strategy in services:

- Chase strategy – Matching capacity to demand
- Level strategy – Maintaining capacity that serves the maximum demand
- Demand management – Influencing the demand profile to smooth the load on the resources

A successful capacity and resources management requires that all these resources are organized effectively and efficiently to operate at optimum capacity that meets the fluctuations of demand. Therefore, suitable metrics must be established for this.

10. Effectiveness of Scheduling Techniques

Scheduling is allocation of resources to tasks over time to perform a collection of activities. In a fiercely competitive environment, effective scheduling has become important for survival in the market place. Scheduling should lead to use of resources in an efficient manner.

Productivity of human resources is another performance metric. Comparison of actual versus planned time to determine the service production efficiency, capacity levels and service delivery cost. Demand management is a preliminary function of service supply chain management that focuses on forecasting and managing customer requirements with the objective of facilitating this information to shape service supply chain operating decisions⁸.

Information is critical to the performance of a supply chain because it provides the basis on which supply chain managers make decisions. Product availability, delivery accuracy, responsiveness and flexibility, improvement through feedback, increase in sales revenue and improvement in the efficiency of operations.

The new model for performance management in service supply chains considers performance management at all levels of a business, not just at the Strategic Business Unit (SBU) level, and makes propositions relevant to PM system design including Information Technology (IT) aspects⁶.

The way orders are generated and scheduled determines the performance of downstream activities and service capacity levels. Order processing has a great impact on customer's perception of service and customer satisfaction. Improvement in order processing has a tremendous impact on sales. (Fitzgerald, 1991)

Service order lead time refers to the time that elapses between the receipt of a customer's order and the delivery of a service to the customer. The reduction in service order lead time leads to reduction in service supply chain response time and is a source of competitive advantage⁹.

Table 1. Metrics for service supply chain performance evaluation²⁶

Criteria	Performance Metrics
Responsiveness	Service delivery customer query time
Flexibility	Volume, delivery speed, specification, quality of service, employee loyalty, supplier risk sharing initiatives
Reliability	Buyer-supplier partnership level, service order entry method, accuracy of forecasting techniques, supporting service delivery lead time and service order lead time
Tangibles	Range of services, service capacity
Profitability	Average customer spend per visit per store
Cost	Total service delivery cost
Resource utilization	Capacity utilization, total cycle time, productivity, effectiveness of scheduling techniques, operating ratio of actual to planned working hours

11. Results and Recommendations

Service economy has been the driving force of economic growth of every developed nation. Transformation of industrialized economies from a manufacturing base to a service orientation is a continuing phenomenon. Emphasis in SCM is still skewed towards the manufacturing sector. Effective supply chain management can lead to a lowering of total amount of resources required to provide the necessary level of customer service to a specific segment and improving customer service through increased product availability and reduced order cycle time while reducing costs.

Services have certain inherent problems like difficulty in achieving standardization and designing service and delivery processes. Service is a process. A process cannot be managed if its performance cannot be measured. Any performance measure has to maximize effectiveness and efficiency.

The top 5 innovations that Ola can consider implementing are:

- Focus on performance based incentives to drivers that will motivate them
- Provide for advance reservation of cab services
- Hire part-time drivers for managing capacity backlogs
- Transportation facilities for educational institutions

- Annual contracts with business houses for employee transportation

India is a market that is largely unpenetrated when we consider the rural areas. This presents immense scope for businesses like Ola and Uber. The mobile phone technology has successfully managed to penetrate the Indian market – including rural areas. This can be leveraged by taxi cab companies like Uber and Ola. These companies can develop the wherewithal for running their own bus fleets in rural areas if the situation demands for it.

The important performance measures for the taxi aggregator service supply chains can be delineated as below:

- Service delivery customer query time – how soon can a ride be booked using the app.
- Measurement of wait time for customers – The services can arrive at a benchmark based on experiential data. This parameter can also be labelled as ‘Service Order Lead Time.’
- Measurement of idle time for drivers – This is a direct indication of capacity utilization which plays a crucial role in profitability of the ride sourcing services.
- Number of kilometers covered per driver per day – each ride can be different as destinations and sources of pick up are different. Rather than look at the number of rides per driver, computing the number of kilometers covered is a better performance metric.
- Customer Lifetime value - To begin with, the metric could be – what is the revenue per year from a single customer – this can help in measuring customer loyalty for the services.
- Calculate the service times excepting the travel duration which is not under the control of the organisation. Example – right from the time a ride is booked on the app till the time the bill is generated and feedback is obtained, compute average times that can be used as a benchmark. In short, the cycle time per ride excluding the travel time.
- Forecasting adjustments when there is a cancellation of the booking – how soon can a cancelled booking be converted into another demand. This can be a measure of the responsiveness and flexibility of the service.

Computation of total service delivery cost can be a complex affair because the taxi aggregator does not bear the expenses for the cab, maintenance, fuel etc. The costs are disproportionately shared between the drivers and the aggregator. For the aggregator, the main investment is in technology.

The taxi aggregator service supply chain is a classic example of how technology can be deployed for

improving the effectiveness and efficiency of the supply chain. In services, matching of demand and supply has been a challenge due to unpredictability of demand. However, taxi aggregators have managed to overcome this challenge by digital matching of supply and demand. This enables the customers to avail of a ride that is affordable. The drivers enjoy a steady stream of revenue due to greater capacity utilization. Increased volumes enable the aggregator to enjoy revenue growth due to increase in the commissions earned. The focus on service quality enables the aggregators to achieve a competitive advantage over traditional taxi services. This ends up in a win-win-win situation for the customer, the driver and the aggregator. The taxi aggregators have also managed to expand the market and this has resulted in their tremendous growth in the short run.

12. Suggested Innovations in Taxi Aggregator Services with Specific Reference to Ola Cabs

As per news reports, Ola has recently introduced a mini-bus service. This is a welcome step. Other innovations that can be considered by the taxi aggregator are:

- Hiring on call drivers who can drive the vehicles of customers. Booking of these services is done through App. Clarify the process.
- Maintain a list of trained and competent drivers – vehicle wise data.
- Provision for advance reservation (at least two weeks in advance); discounts for the same.
- Hiring of part-time drivers to manage capacity backlogs
- Provision of Ola bike ride (similar to bike-hiring facility prevalent in Goa)
- Based on past trends, look at the possibility of leveling the capacity
- Introduce non-peak hour pricing
- Tie-up with driving schools for driving training
- Pick up and drop facilities for school and college students at concessional rates; provision for hiring separate maxi cabs for the purpose
- Annual contracts with corporate houses as part of business diversification
- Arranging for heritage tours on Ola on Sundays and public holidays during a lean phase
- Tie up with educational institutions for organizing picnics/ educational tours

- To improve the customer experience, give the option – if customer is not clear about the destination location, use GPS ; if customer is well-versed with the destination location, rely on customer's inputs.
- Frequent traveler discounts/ Loyalty cards for passengers who avail the cab services regularly
- Share information on fare revisions along with the rationale for the same
- Personal accident insurance cover: Tie up with insurance companies
- Look at the option of non-app based service for senior citizens or those who are unable to order a cab using an app
- Continuous monitoring and review of idle time and capacity using technology
- Explore introduction of inter-city travel
- Special discounts for senior citizens, senior citizens going for health check-ups and pregnant women.
- Introducing special midnight to early morning ride-sourcing service
- Travel time depends on the destination and road traffic.
- After the ride is over, customer has to press a switch in the vehicle or on his mobile handset indicating a “Yes” or “No” response regarding feedback about service quality. Bill will be dispatched by Email only after customer exercises this option.
- Rather than number of trips made in a day, calculate number of trips and total distance covered in a day (maximum of the two). Arrive at a benchmark on these values.
- Increase in incentives beyond a certain threshold of trips/ distance covered (Ola can reduce its commission).
- Same day cash deposits in the bank accounts of drivers (net transfer). Have a dedicated shared services team that works only in the evening shifts to make this happen.
- Ola can tie up with mobile companies so that when a person buys a new mobile, the Ola app comes along with it without the need to download the app later.

13. Limitations of this Research

This is a conceptual research paper that is not supported by empirical evidence. Future research can involve conducting empirical studies to understand the drivers of customer satisfaction in taxi aggregator services and evolution of a conceptual model for measuring the performance of these service supply chains that is amenable for empirical testing.

14. Conclusion

The success of the taxi aggregator business model is ample proof of the ever growing influence of technology in the success of a business. Technology has played a greater role in effective alignment of demand and supply in taxi aggregator services. This paper highlighted the innovative manner in which the aggregators like Ola and Uber have penetrated the Indian market using smart phone technology. They have identified the problems in urban transportation in Indian metros and then converted them into business opportunities. What is more, they have achieved success in their efforts too.

Research on service supply chains is still evolving. The peculiar nature of services adds to the complexity in service delivery. However technology can be a great enabler in service quality. Having achieved success, the taxi aggregators need to focus on performance measures to ensure the sustainability of the business model. With increase in the levels of the service quality, the expectations of customers are bound to grow in the future. Performance metrics enable benchmarking of the services and direct the focus on continuous improvement in service quality. Taxi aggregators should also focus on innovations to grow the business.

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