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CENTRAL PARKING SERVICES PRIVATE LIMITED

> Howards End mall is an important site for us and we need to predict traffic trends of vehicles to the mall accurately so that we can plan our pricing and resources accordingly. Otherwise, we will never be able to have an effectively managed work force and the pricing resulting in customer dissatisfaction.
>
> - Poornima, Director for New Initiatives, Central Parking Services

Although these thoughts were reverberating in her mind for quite some time, it was during the board meeting in March 2013 that Poornima decided to voice her thoughts. Central Parking Services (CPS) with headquarters located in Bangalore, India provided parking solutions at various malls, office buildings, airports, residential apartments, hospitals and so on throughout India. The discussion was about frequent operational problems such as demand supply gaps for parking bays, longer waiting times at the entry and exits they faced. The recent series of such events at one of their biggest sites ''Howards End'' mall was an example; where owing to sudden incoming traffic of cars, there were frequent alarms, resulting in many complaints from unsatisfied customers. Howards End[1] was a mall situated in one of the most posh areas in the heart of Mumbai, the financial capital of India. It harbored all the top retail brands available in India and was laced with other essentials such as a 400-seater food court and a 500-seater cinema hall. This site witnessed a huge spike in traffic especially during weekends where the workforce faced several challenges in managing the parking space.

Most of the work force at Howards End comprised permanently hired staff and was managed on a shift system. One of the solutions, which were proposed, was keeping extra staff during weekends. However, the incoming traffic was unpredictable and employing an optimal manpower still remained a challenge. According to Poornima:

> We deploy more staff at this mall during weekends, to maintain smooth flow of vehicles in and out of the parking lot. The operational cost increases during weekends, so we need to use dynamic pricing considering the demand and supply of parking lot as well as increase in the staff.

CPS invested approximately INR 12,00,000 (1$ = INR 62, in November 2013) per parking bay in any retail mall to make it functional. So, it was extremely important that its manpower requirement was met and the parking fee pricing was right. CPS followed a thumb rule for planning manpower which was also influenced by factors such as type of technology used and design of the building. If the parking lot had facilities such as an automated ticketing facility, then the manpower needed was lesser. The number of employees assigned to a parking lot also depended upon estimates of seasonality of demand. CPS deployed more manpower during weekdays, national holidays, and other religious festivals. The strategy also changed based on the region that CPS operated in. For example, in Kolkata, the festival of Dusserra generally celebrated in October attracted large crowds; whereas in cities down south such as Chennai, the festival of Pongal celebrated in January was considered more important. CPS also looked at the structure of the parking lot in order to plan manpower.

[1] Name of the mall changed for confidentiality purpose

Tanmay Gupta, Abhishek Srivastav and U Dinesh Kumar, Professor of Quantitative Methods and Information Systems prepared this case for class discussion. This case is not intended to serve as an endorsement, source of primary data, or to show effective or inefficient handling of decision or business processes.

CENTRAL PARKING SERVICES – THE ORIGINS

The origins of CPS can be traced to Building Control Solutions started in 1996 as a building management system company. Sathya and Poornima started Building Control Solutions with personal capital. Sathya was the chief executive officer (CEO), Amit was the Chief Operating Officer (COO) and Venkatesan was the Chief Finance Officer (CFO). Poornima served as the director for new innovations in the company. The vision with which the company started was to spread its presence across the country since the company was the first mover in the business of building management system in India. During 1996–2001, it was doing projects for building management systems along with home automation. During the initial days, the company was into installing and maintaining temperature and humidity control systems. After about 5 years, the company decided to diversify into providing parking solutions. Its clients wanted CPS to work with the architects to design the parking lot, be involved with equipment planning as well as manage staff requirements of the parking lot. While the company was started in Bangalore, it secured projects across the country. First, the projects were only limited to metropolitan cities, but increasingly the company also secured more and more projects in tier 2 and tier 3 cities. CPS also expanded its presence to shopping malls, hospitals, airports, metros, etc. Besides expanding geographically, the company has been completely focused on its value proposition of being a technological leader in this industry. Since the technology in this industry is constantly changing CPS has also forged technological partnerships with companies from Germany, Japan and China.

STRATEGY FOR SUCCESS IN THE ORGANIZED PARKING INDUSTRY

Expansion had occurred quickly for CPS. The auto industry in India was booming and so was the retail industry. From this stemmed a demand for organized parking spaces across the ever-expanding urban landscape of the country owing to increase in the number of new malls and apartments. There were a few cities in India such as Bangalore, Chennai, Delhi and Mumbai where the surge in demand was immense. This was fuelled by growth in various manufacturing and service companies operating within these cities. It is in these cities where CPS started its operations, and with the meteoric rise of these cities, the company's scale of business also grew. CPS was present at the right place at the right time.

It had taken full benefit of the first mover advantage and was at a strong position in the market; however, the fast growth also created a few problems. Although, the standards of technology that the company maintained were equivalent, the service practices as well as operational practices differed from time to time. While Poornima headed new initiatives, she was also very closely involved in customer relationship management as well as the operations. Therefore, these discrepancies in operations were not hidden from her.

Poornima said:

> The market for automated parking is estimated at INR 150 crore (1 crore = 10 million) in 2013 and this market is projected to grow at 50–60% in the next 5 years. The market is likely to reach INR 500 crore in the next 3–4 years.

The famous Forum mall situated at Koramangala, Bangalore was the first project that CPS completed successfully. It was also a pioneering project since it was the first in India to install an automated parking. Before the company's entry into the parking industry, the parking industry in India was mostly a cornucopia of unorganized players, which had not changed much even in 2013. After successful implementation of parking solution at various malls in Bangalore, CPS expanded their operation to other cities such as New Delhi and Pune. CPS was the first mover in a largely untapped industry but exponentially growing industry. However, many companies entered the market of organized parking solutions generating competition in the market.

Another very typical feature about the industry is that since the technology needed for the industry was fairly new, the entry barrier for new players was also very high. When asked, Poornima proudly stated:

> Not only are we pioneers in this industry within India, what sets us apart is also our expertise in managing the whole end-to-end life cycle of the parking lot. We offer our customers a fully customized solution which includes not only the equipment but also a professional management staff and services to support on that.

As a strategy, CPS entered into tie-ups with various international players to suit local demands. In this way, it was able to offer customized state-of-the-art products and services to their customers. In order to stay ahead of the competition, it always believed in planning a sustainable strategy. In 2013, CPS controlled about 65% of the overall organized parking lot industry, and managed 65,000 parking bays across 32 cities.

THE NEW DIRECTION

In 2007–2008, Poornima's initiative led to data centralization resulting in all locations being connected to a single data center in one location instead of various data centers spread across different locations. This way, the management had access to live data across all the centers. However, this was where the buck stopped since all this data was being captured but was not fully utilized to reach business decisions. Poornima said:

> We are now growing very fast but if we have to grow faster, then we have to stop taking our decisions just by gut feeling and adopt a more analytical approach.

This thought found agreement with all members of the company's management. The company administration increasingly believed that with time, the need to understand the business increased. The company had to not only understand its immediate customers' requirements but also understand and predict the end customers' needs and behavior. CPS divided its business into three main verticals namely airports, hospitals, and retail outlets. For each vertical, the critical factor which governed customer behavior was different. CPS wanted to understand these factors in order to make better decisions such as reaching an appropriate pricing strategy for each vertical, or optimizing the work force management.

Current Pricing Structure

Although CPS already had a pricing model (shown in **Exhibit 2**), this model mainly copied the pricing structure of other malls in similar regions. This pricing structure was only applicable to vehicles on regular tariff. The other pricing structure was meant for vehicles possessing pass cards. These pass cards were given to a few customers who were allotted dedicated parking spots. They could be shopkeepers, office staff, or a few privileged customers. These pass keepers did not necessarily make substantial contribution to the overall revenue of the company. These were more of additional or courtesy privileges that the company offered as mostly goodwill gestures and only a small percentage of parking slots were dedicated to pass holders.

PROBLEM AT HAND

The company was struggling with operational issues not only at Howards End, but across many sites in the metropolitan cities where such problems such as demand supply gap and waiting time at the entry and exits were becoming a daily occurrence. CPS management agreed that predicting the demand for number of bays on any given day and the length of stay was important for effective management of the parking lots. If the company could predict the spike in traffic, it would have two options: hire more manpower for those days or increase the work force during specific intervals of time. But trained workforce was not only difficult to procure but also expensive. Even if it hired more people and trained them, the cost of both options was high and could bring its margins down.

According to the company management, if it had to hire more people, then would it have to increase the charges for those time periods? There was of course another reason for the company's management to think about modifying the pricing. A parking lot has a fixed capacity, and if the incoming traffic is more than the capacity of the parking lot, then once the parking lot is full, the shift manager would have no option but to ask incoming vehicles to return which would mean revenue leakage for the parking lot. This was also owing to the fact that while the capacity of the parking lot remained constant, the rate of incoming traffic was not always equal to the rate of outgoing traffic. Similar to the rate of incoming traffic, the ''Length of Stay'' of an incoming vehicle could also vary depending upon the time of the day.

Therefore, a vehicle occupying the parking lot during those peak hours had to pay the opportunity cost of availing the services when the demand was very high. The administration knew that since Howards End was located in one of the most posh areas of Mumbai, price sensitivity of customers was relatively lower than other areas. The above

reasons forced the company to re-think its pricing policy. This way, the company could manage peak demand with both manpower as well as pricing management; thereby, keeping its customer satisfaction high while also improving its overall operating profit.

Poornima knew that with the availability of transactional data solution to operational problems was more accessible at present than it would have been in the past. Owing to the improvement in technology, much transactional data was available. Although possessing the data was a crucial requirement, the next step was to use it to first perform the right kind of analysis and then draw conclusions and eventually take decisions to counter such operational issues. In the instance of Howards End, the company had managed to capture 3 years' transactional data. The data was provided in a very simple format. It contained nine fields as shown in **Table 1**. Sample data is shown in **Exhibit 3**.

Table 1 Data Description

Data Code	Description
Vehicle	Type of vehicle (2W for 2-wheeler and 4W for 4-wheeler)
Date In	Date of entry of the vehicle
Time In	Time of entry of the vehicle
Date Out	Date of exit of the vehicle
Time Out	Time of exit of the vehicle
Amount	Parking fee paid
Length of Stay	Length of stay in the parking lot
Mode	Category of pay (ticket for regular user and pass for pass holders)
Weekday	Day of the week (Sunday, Monday, …, Saturday)

In order to investigate the data, analysts collected a sample of 5,000 data points for weekdays and 4995 data points for weekends, randomly selected from the population of the data available[2]. Based on this sample data, the average length of stay of the vehicles was determined. What came across as the first observation was that the length of stay of vehicles varied greatly. The graph shown in **Exhibit 4** plots the number of vehicles represented by individual entries against time spent by each vehicle in the parking lot.

As shown in **Exhibit 2**, the tariff during a weekday was INR 30/- for the first 3 hours and then INR 10/- for every incremental hour. During a weekend, the tariff was INR 50/- for the first 3 hours and then INR 20/- for every incremental hour. Poornima wanted the analysts to statistically determine if 3 hours was the correct time interval after which they could introduce an incremental tariff. Also, Poornima was interested in knowing whether they should use differential pricing across different time periods such as morning, afternoon, and evening. Poornima also questioned whether the average length of stay of vehicles really differed for cars coming in the morning, afternoon, and evening?

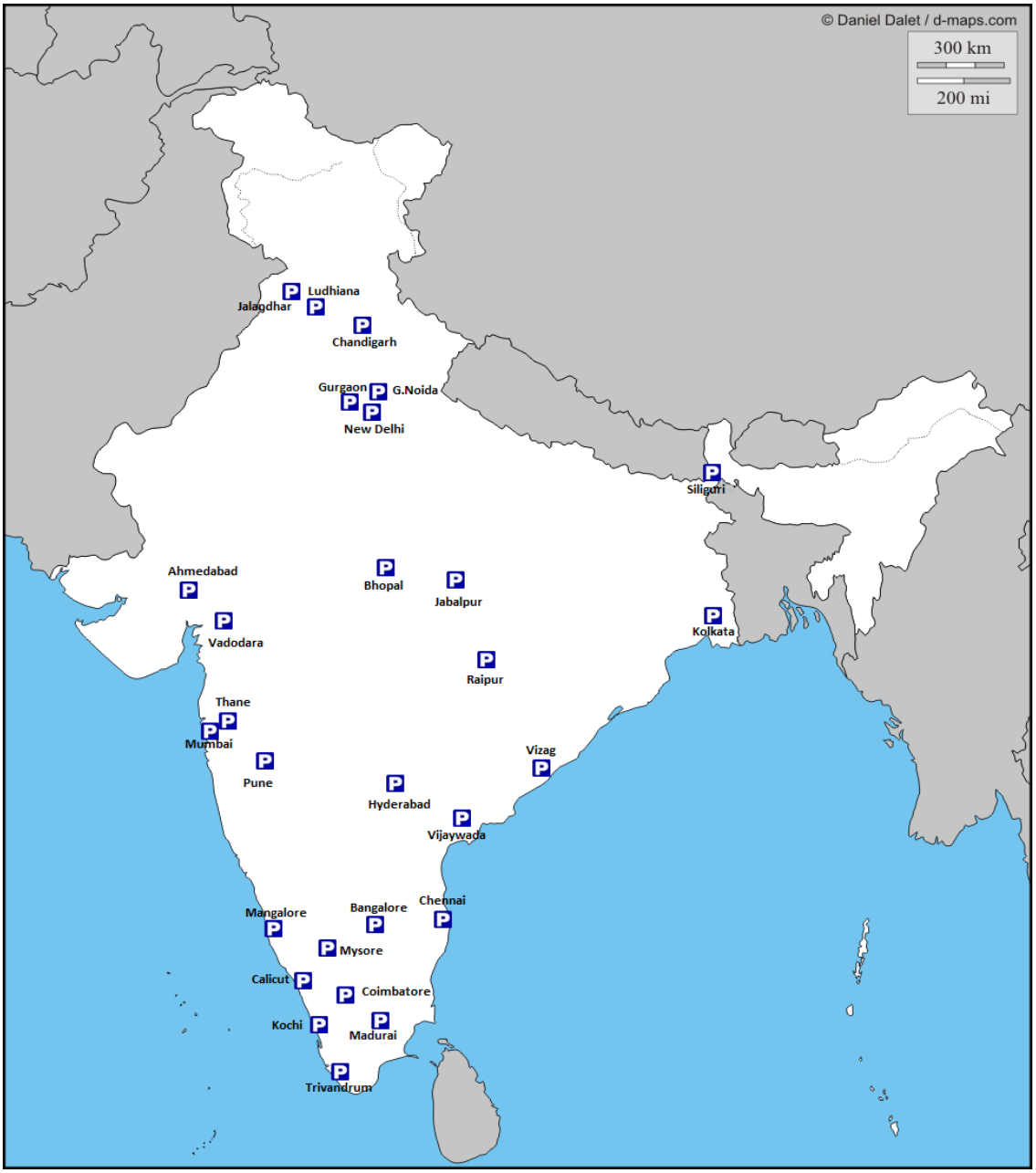
Also, according to **Exhibit 2**, the difference in the parking charges for the first 3 hours during a weekday versus a weekend was INR 20/- and the difference between the add-on charges or every additional hour after the initial 3 hours was INR 10/-. What the company needed to decipher was whether this differentiated pricing policy for weekdays and a weekends a suitable strategy or would it make no difference to the revenue earned if it kept a uniform tariff for all days of the week.

CPS also noticed that during the weekend, the arrival rate was significantly high during the matinee time (2pm to 6pm) and was sometimes nearly twice that of arrival rate at other times of the day. This observation also makes one to think whether it will be more advisable to deploy more manpower to manage the incoming traffic more efficiently and effectively during those hours. If CPS could determine the probability of the incoming traffic being significantly high, then it would be easier to plan manpower deployment; so that it could provide appropriate and desired service to customers during those hours; thereby, keeping customer satisfaction high.

[2] Dataset is provided in the spreadsheet supplement IMB453CPS.xls

Exhibit 1

CPS operating sites in India



Source: d-maps.com

Exhibit 2

Pricing Chart

Sl. No.	Description	Day of the Week	Parking duration	Charges (in INR)
1	4-wheeler	Monday to Friday	0 to 3 hours	30/-
			Every Additional Hour	10/-
	4-wheeler	Saturday, Sunday, Holidays	0 to 3 hours	50/-
			Every Additional Hour	20/-
2	Valet Parking	Monday to Friday	0 to 3 hours	100/-
			Every Additional Hour	10/-
		Saturday, Sunday, Holidays	0 to 3 hours	100/-
			Every Additional Hour	20/-
3	Loss of Ticket			300/-
4	Government Vehicles			No Charge

Source: Central Parking Services

Exhibit 3

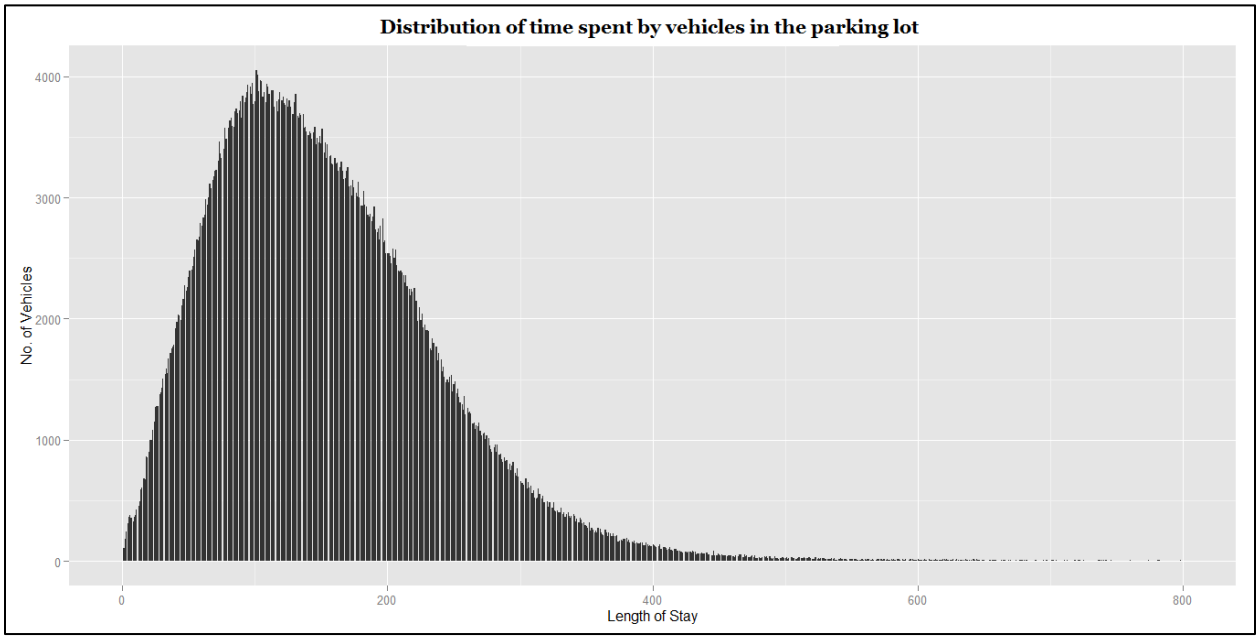
Sample Transaction Data

Vehicle	Date In	Time In	Date Out	Time Out	Amount	Length of Stay (in minutes)	Mode	Weekday
4W	17-Sep-11	17:30:00	17-Sep-11	18:07:00	50	37	Ticket	Saturday
4W	12-Dec-10	19:42:00	12-Dec-10	21:31:00	50	109	Ticket	Sunday
4W	8-Nov-09	15:13:00	8-Nov-09	19:29:00	90	256	Ticket	Sunday
4W	16-Jan-11	15:11:00	16-Jan-11	16:09:00	50	58	Ticket	Sunday
4W	28-Nov-10	20:02:00	28-Nov-10	21:41:00	50	99	Ticket	Sunday
4W	16-Jul-11	14:53:00	16-Jul-11	16:34:00	10	101	Ticket	Saturday
4W	17-Jul-11	13:00:00	17-Jul-11	20:21:00	15	441	Ticket	Sunday
4W	20-Feb-11	11:56:00	20-Feb-11	12:28:00	50	32	Ticket	Sunday
4W	14-Feb-10	9:54:00	14-Feb-10	10:18:00	50	24	Ticket	Sunday
4W	28-Jan-12	15:04:00	28-Jan-12	19:57:00	90	293	Ticket	Saturday
4W	12-Jul-09	14:05:00	12-Jul-09	14:40:00	50	35	Ticket	Sunday
4W	30-May-10	18:52:00	30-May-10	20:27:00	50	95	Ticket	Sunday

Source: Central Parking Services

Exhibit 4

Distribution of time spent by vehicles in parking lot on a certain weekend



Source: Central Parking Services