Project Report
on

GAME THEORY AND IT'S APPLICATIONS IN STRATEGIC DECISION MAKING

submitted

in partial fulfilment of the requirement for the degree of

BACHELOR OF SCIENCE
In
MATHEMATICS
By

GAYATHRI M M (AB23AMAT029)

Under the Supervision of

Smt. DONNA PINHEIRO

DEPARTMENT OF MATHEMATICS AND STATISTICS
ST.TERESA'S COLLEGE (AUTONOMOUS)
ERNAKULAM, KOCHI-682011
SEPTEMBER 2025

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CERTIFICATE

This is to certify that the dissertation entitled, **GAME THEORY AND IT'S APPLICATIONS IN STRATEGIC DECISION MAKING** is a Bonafide record of the work done by **GAYATHRI M M** under my guidance as partial fulfilment of the award of the degree of **Bachelor of science in Mathematics** at St. Teresa's College(Autonomous), Ernakulam affiliated to Mahatma Gandhi University, Kottayam. No Part of this work has been submitted for any other degree elsewhere.

Date: 30-9-2025
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DECLARATION

I hereby declare that the work presented in this project is based on the original work done by us under the guidance of Smt. Donna Pinheiro, Assistant Professor, Department of Mathematics and Statistics, St. Teresa's College (Autonomous), Ernakulam and has not been included in any other project submitted previously for the award of any degree.

Place: Ernakulam

Date: 30-9-2025

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CONTENTS

INTRODUCTION

Platform-mediated ride-hailing markets are characterised by instantaneous price adjustments, multi-homing agents and dense regulatory oversight—conditions that converge to a canonical strategic-interaction problem. Within the Indian urban-mobility ecosystem, the contest between Uber Technologies Inc. and ANI Technologies Pvt. Ltd. (Ola) has transcended promotional subsidisation to become a sustained, high-frequency pricing duel that shapes commuter welfare, driver surplus and transport-policy discourse. The city of Kochi constitutes an analytically attractive milieu for dissecting this rivalry: metropolitan trip density is sufficient to ensure continuous market clearing, institutional heterogeneity is limited by a unified transport authority, and both platforms have operated at scale for more than seven years, generating a longitudinal micro-data record.

Game-theoretic modelling offers a rigorous lens through which to interpret such interactions. The von Neumann–Morgenstern expected-utility framework, refined by Nash's equilibrium existence proof and extended to incomplete-information settings by Harsanyi, supplies a parsimonious representation of optimising behaviour when pay-offs are interdependent. Applied to ride-hailing, these constructs convert algorithmic pricing rules, driver-incentive budgets and product-line proliferation into strategy spaces whose equilibrium properties can be derived, identified and counter-factually simulated.

This dissertation exploits that correspondence to deliver an empirical game-theoretic characterisation of Uber–Ola competition in Kochi. The investigation is organised in four integrated movements.

Chapter 1 Game Theory and the Ride-Hailing Industry: An Introduction

This chapter introduces the foundational concepts of game theory and explores its relevance to the ride-hailing industry, focusing on Uber and Ola's strategic interactions in Kochi. It covers the core idea of game theory, its historical origins, and wide-ranging applications, particularly in business competition. Key theoretical tools such as the Bertrand model and Nash equilibrium are discussed to explain price competition between major ride-hailing firms. The chapter also addresses static decision-making frameworks and the types of strategies players employ, setting the stage for a comprehensive analysis of pricing dynamics in the rest of the study.

1.1 Game Theory

Game theory is a branch of mathematics that studies how individuals or groups make decisions when their choices depend on the actions of others around them. In simple terms, it helps to analyze situations where several decision-makers interact, each trying to achieve the best outcome for themselves. These situations are called “games,” but in this context, a game doesn’t mean something playful—it refers to any scenario involving strategic choices between players or organizations.

Game theory is the study of mathematical models that describe strategic interactions among rational decision-makers known as players. It provides a framework to analyze situations where the outcome for each participant depends not only on their own decisions but also on the decisions of others. Each player aims to maximize their payoff or benefit, considering the possible strategies adopted by rival players.Fundamental to game theory are three core components: players (the decision-makers), strategies (the possible actions each player can take), and payoffs (the outcomes or rewards resulting from the combination of all players’ strategies). Games can be cooperative or non-cooperative.

Every game involves rules, possible actions (or strategies), and outcomes based on the players’ mutual decisions. For instance, two ride-hailing companies like Uber and Ola compete for customers by setting prices or improving services. Their profits depend not only on their own strategies but also on the strategies adopted by their competitor.

Concepts of Game Theory

Game theory is a mathematical and theoretical framework that studies strategic interactions where multiple decision-makers, called players, make choices that affect each other's outcomes. The primary goal of game theory is to understand and predict how rational players will behave in competitive or cooperative settings to maximize their payoffs.

Key concepts include

- Players
- Strategies
- Payoff

Origin of Game Theory

Game theory originated in the early 20th century as mathematicians and economists sought formal ways to analyze strategic interactions involving multiple decision-makers. The foundational breakthrough came with the work of Hungarian-American mathematician **John von Neumann** in 1928, who published the first general mathematical formulation of game theory. He demonstrated key principles such as the minimax theorem, which pertains to two-person zero-sum games where one player's gain is exactly the other's loss.

The field was further established through a landmark collaboration between John von Neumann and economist **Oskar Morgenstern,** culminating in their 1944 book *Theory of Games and Economic Behavior*. This book laid the groundwork for game theory as an independent discipline, introducing mathematical tools to study decision-making under conflict and cooperation. It broadened the scope of game theory beyond zero-sum games to consider more complex economic behaviors.

In the 1950s, **John Nash** expanded game theory with his concept of Nash equilibrium, which allowed for the analysis of non-zero-sum games involving multiple players whose interests may both conflict and coincide. Nash's work significantly deepened the understanding of strategic decision-making and earned him the Nobel Prize in Economics in 1994.

Applications of Game Theory

Game theory is not confined to one field; rather, its tools and ideas find use in a broad spectrum of real-world situations:

Economics: Game theory revolutionized economics by explaining behaviors in imperfect competition like oligopolies, price setting, collusion, and auctions. It helps predict firm behavior in competitive markets and resource allocation.

Business Strategy: Corporations use game theory for competitive analysis, pricing strategies, market entry, advertising, product launches, and negotiating contracts. It models how companies anticipate rivals' moves to optimize outcomes.

Political Science and International Relations: Game theory models negotiations, voting behavior, coalition formation, trade agreements, and conflict resolution among nations, guiding strategic diplomacy and policy decisions.

Computer Science: Game theory supports algorithm design, network security, resource allocation, and mechanism design (e.g., auctions and matching algorithms) for efficient, strategic system performance.

Biology: It models evolutionary strategies and animal behavior in competitive and cooperative contexts, such as survival and mating strategies,how predators and prey interact or how species compete for resources, can be modeled as evolutionary games.

Technology and Networks: Whether companies share resources, adopt standards, or compete in innovation races, game theory helps map the strategic landscape in the tech sector.

Everyday Life: From pricing in ride-hailing apps like Uber and Ola through strategic competition to personal decision-making scenarios involving cooperation and conflict resolution, game theory helps understand and optimize interactions.

Number of Players

In game theory, the number of players refers to the total number of decision-makers or competitors participating in the strategic interaction. This number influences the complexity and nature of the game.

In our project, **Uber and Ola** represent the two rational players whose competitive pricing strategies are studied using game theory concepts, where each player's decisions directly affect the other's outcomes and profitability.

- ❖ Uber and Ola act as the two strategic players who decide pricing for their respective services.
- ❖ Each player (Uber and Ola) sets prices anticipating the competitor’s pricing decisions, reflecting a typical two-player oligopoly scenario modeled effectively by the Bertrand competition.

Games can be classified based on how many decision-makers participate:

Two-Player Games: These involve direct competition or cooperation between two entities, such as Uber and Ola fighting for dominance in Kochi's ride-hailing market.

Multiplayer Games: Here, more than two players are involved—think of a city where several ride-hailing services compete, or where drivers and passengers also directly influence outcomes.

Understanding the number of players shapes both the strategies available and the complexity of predicting outcome.

1.2 Game Theory in Business Competition

Game theory is a crucial tool in understanding and modeling competitive behaviors in business environments where firms decisions affect each other. It helps companies anticipate rivals strategies, optimize their own choices, and predict likely outcomes based on rational decision-making.

Bertrand Model.

The Bertrand model is one of the most widely used framework describing competition between firms that sell identical or highly substitutable products. Developed by Joseph Bertrand in the 19th century.
In this model, firms simultaneously set prices rather than quantities, and consumers buy from the firm offering the lowest price. The key outcome of the Bertrand model is that, under rational behavior, price competition drives prices down to marginal cost, leading to minimal profits. This model assumes firms have unlimited capacity, homogeneous products, and compete in a one-shot game.

In the case of Uber and Ola, if both offer rides at nearly identical quality, passengers will naturally choose the firm with the lower fare. According to the Bertrand model, this competitive pressure typically drives prices down towards the cost of operation ultimately benefiting consumers but squeezing the profits of both firms.
The Bertrand model helps explain why firms continuously adjust prices to attract customers while anticipating competitors moves.This model is powerful for explaining what happens in markets where rival companies cannot easily differentiate their products and must compete primarily on price.

Nash Equilibrium

Nash equilibrium is a key concept in game theory, named after mathematician John Nash. It representing a stable state where no player can improve their payoff by unilaterally changing their strategy, assuming others keep theirs unchanged. In the context of business competition, it indicates an optimal pricing or strategic decision point where all firms have settled, and no one benefits from deviating.
It defines a situation in a non-cooperative game where no player can gain a better outcome by unilaterally changing their strategy, assuming all other players keep their strategies unchanged. In other words, when players reach a Nash equilibrium, each player's chosen strategy is optimal given the choices of others, and no one benefits from deviating.

For ride-hailing companies, a Nash equilibrium might occur when both Uber and Ola have settled on pricing and service levels where neither can do better by adjusting their approach alone. Achieving Nash equilibrium doesn't always mean the outcome is the best for everyone involved, but it does imply a sort of strategic "truce" where moves and countermoves have balanced out.

1.3 Static Decision Making

Static decision making involves situations where all players make their choices at the same time, without knowing for sure what others will do, and decisions can't be changed afterwards. This contrasts with dynamic games, where players can observe, adjust, or act in sequence.

- ### Types of Strategies

Pure Strategy:
In a pure strategy, a player consistently chooses a specific action each time a decision arises. For example, if Ola always chooses to match Uber's lowest fare, that is a pure strategy. This approach is direct and predictable but can be exploited by clever competitors.

Mixed Strategy
In a mixed strategy, a player randomizes between different available options. Instead of always choosing one specific move, Uber, for example, might sometimes lower fares, sometimes offer special discounts, and other times keep standard pricing. By mixing things up, the company becomes less predictable, making it harder for competitors to counter their moves effectively.

Both pure and mixed strategies are vital in modeling the real-world behavior of companies facing uncertainty and rivalry, as is common in the ride-hailing sector.

Chapter 2: How Uber and Ola Compete in Kochi

Kochi, one of Kerala's fastest‑growing urban centers, has become a key battleground for ride–hailing services. Among the major players, Uber and Ola remain as dominant players. Each player is trying to balance passenger demand, driver satisfaction, and regulatory pressures. The results of this competition give daily commuting costs, service availability, and how drivers earn their livelihoods.

Both the companies aim to attract passengers by offering affordable fares, better service quality, and more ride options. This competition often takes in the form of fare discounts, promotional offers, and loyalty benefits for frequent users.

From a business perspective, Uber and Ola in Kochi are engaging in what can be explained through game theory, where each company considers the other's likely responses when making strategic decisions. The competition between Uber and Ola is not just about pricing but also about improving reliability, safety features, and overall passenger experience to achieve a long-term advantage in Kochi's transportation market.

2.1 Background of Ride Hailing in Kochi

Kochi is a fast-growing urban center in information technology, tourism, petrochemicals, and services etc. In the early years, Kochi relied mainly on traditional auto-rickshaws, private taxis, and other public transport such as buses and ferries. In those times finding a ride was difficult. It often requires waiting bargaining and dealing with uncertainty in cost and availability. With the arrival of new app-based ride systems, mobility in the city began to change. People could now book rides directly from their phones, track vehicles in real time, and make digital payments. This shift has brought more convenience, transparency, and reliability to everyday travel. Over time, ride-hailing in Kochi has also been linked with government-regulated digital platforms, ensuring that fares remain standardized and fair for both passengers and drivers. A unique feature of Kochi is its focus on the integrated mobility. Ride-hailing is not seen as separate from public transport but as a part of a wider network that connects autos, cabs, metro, buses, etc. The integration of this city reflects the vision of building a sustainable and commuter-friendly transport system. Today, ride-hailing in Kochi represents a massive move from unorganized street hailing towards a technology-driven, transparent, and inclusive mobility ecosystem that supports both urban growth and local livelihoods. Some examples of ride hailing platforms in Kochi are Uber, Ola, Yatri app, AuSa etc.

2.2 Uber and Ola, the Leading Players in Ride Hailing

Ola and Uber are the two major leading companies that transformed ride-hailing facility in India, including Kochi.

Ola is an Indian multinational company founded in the year 2010. Bhavish Aggarwal and Ankit Bhati are the founders of ola. It is India's one of the largest mobility platforms that offers various services like vehicle-for-hire, food delivery, and financial services. it quickly expanded into multiple cities, which includes Kochi. It offered different categories of cabs like mini, sedan, and budget-friendly options like making app-based taxi booking accessible to a wide section of commuters. Ola also brought autorickshaw services onto its platform, giving passengers more local travel choices.

Uber is a US-based multinational ride-hailing company founded in 2009 in San Francisco. It was launched in India in 2013. It entered Kochi as a part of its nationwide expansion. It introduced an app-based taxi booking with real-time tracking, digital payments, and shared ride options. Uber mainly focused on safety features, cashless transactions, and global service standards that appealed to urban commuters. Uber is often seen as a premium global brand in ride-hailing, known for its technology-driven approach and international experience.

Thus, Uber and Ola are considered as the leading players because of their scale, variety of services, and influence on how people in the city commute today.

2.2.1 Growth of Uber and Ola

Ola was founded in India in 2010. Ola began as a small taxi-booking service and quickly expanded across the country. Within a few years, it has entered tier-2 and tier-3 cities including Kochi, offering services ranging from budget cars to luxury cabs. Ola grew by localizing their services by adding autorickshaws, bike taxis, and rentals on its platform. It's strong local knowledge and partnerships helped it gain a large share of the Indian ride-hailing market.

Uber entered in India in 2013. It started in Bangalore and later expanded to Kochi and other major cities of India. Uber brought global expertise, advanced app technology, and safety features to India, setting a new standard in ride-hailing. Uber grew by focusing on affordable services like Uber Go and shared rides. It also integrated digital payments and cash options to suit Indian users, which helped them in rising their market.

Both the companies expanded rapidly due to the rise of smartphone usage, mobile internet, and urban transport demand. They transformed their commuting habits by making travel more convenient, transparent, and reliable compared to traditional taxis and autos. In cities like Kochi, their growth encouraged the digitalization of the local transport system and created a base for further innovations like government-backed mobility apps. Today, Ola and

Uber are considered as the leading players in India's ride-hailing sector, with millions of users and thousands of drivers connected to their platforms.

2.2.2 Overview of Uber and Ola in Kochi

Overview of Uber: After the success of app-based cab services in other major parts of India, Uber expanded its operations to Kochi and quickly became an important part of the city's transport system. Uber offers features such as real-time GPS tracking, upfront fare estimates, and cashless payment options, which made commuting more secure and transparent. It also introduced shared ride options, which helped reduce costs for passengers and contributed to lowering of traffic jams in the city. The company gained attention and popularity not only among local people but also among tourists, who found its services easy to use and reliable compared to negotiating with traditional taxis.

Overview of Ola: Ola has made its entry into Kochi around 2015 and it soon became one of the most widely used ride-hailing options in the city. It introduced the app-based cab booking at a time when most commuters still depended on buses, autorickshaws, and traditional taxis. By offering different categories of cars such as mini, sedan, auto and premium, Ola gave passengers the freedom to choose rides based on their budget and comfort level. A major step that strengthened its presence in Kochi was the inclusion of autorickshaw bookings on its platform, which attracted a large number of people who used autos for short-distance travel.

2.3 Objectives of the Study

- To examine the role of Uber and Ola as leading players in the transport system of Kochi: The study aims to explore how these two major players shaped their mobility, introduced digital solutions, and influenced passenger and driver behaviour.
- To identify the strategic choices: It shows the possible strategies such as high price and low price of each company that can adopt.
- To calculate the payoffs: It estimates the profit or market share for each of strategy combination.
- To find equilibrium: By using Nash Equilibrium we are able to see the stable outcome where neither Uber nor Ola will change their strategy alone.
- To suggest competitive strategies: It suggests how ride hailing companies can balance competition, profit and customer satisfaction.

2.4 Scope of the study

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This study focuses on the competitive strategies of Uber and Ola in Kochi, mainly through their pricing strategies.It applies game theory, particularly the payoff matrix and Nash Equilibrium, to analyse how both companies set prices and respond to each other. Data is collected from ride-hailing apps and secondary reports limited to Kochi as a case study city. The study does not cover every Indian city, other business verticals of Uber and Ola, or detailed financial accounts. The findings are expected to provide insights into competition, customer welfare, and strategic decision-making in ride-hailing markets.

Conclusion

This chapter explains how Uber and Ola have emerged as leading competitors in the ride-hailing market in Kochi by transforming the traditional travel system into a technology-driven, convenient, and affordable system. Both companies use strategic pricing, a variety of service options, and app-based features to attract customers, but their approaches differ—Uber focuses on reliability and global standards, while Ola emphasizes affordability and local adaptability. Their competition reflects a clear game-theoretic interaction, where each company's decisions depend on anticipating the other's strategy. Overall, this chapter shows that Uber and Ola significantly influencing Kochi's mobility patterns, and their competitive strategies.

Chapter 3 : Analysis of market performance and consumer trends

In this chapter, we analyze how Uber and Ola perform in the ride-hailing market in selected city. The goal is to understand how pricing strategies, consumer preferences, service offerings, and data collection work together to influence market dynamics. We will focus especially on Kochi to see real-world examples.

India's ride-hailing industry has experienced substantial growth, with cities such as Kochi seeing dramatic shifts in transportation habits due to these platforms ease of access, dynamic pricing, and versatile service portfolios. The chapter also covers the sampling methodology used for data collection, including sample routes and sample sizes from Kochi, which provide a foundation for empirical insights. By examining these components, the chapter seeks to present a comprehensive view of the market environment, opportunities, and challenges faced by service providers in this fast-evolving sector. The insights will help us apply the Bertrand model to explain their competitive behavior.

3.1 Pricing Mechanism

The pricing mechanism in ride-hailing involves dynamic pricing algorithms. The pricing mechanism in this context reflects how Uber and Ola strategically set their prices to attract riders while competing with each other.

The pricing mechanism employed by Uber and Ola in Kochi is dynamic and strategically designed to balance demand, supply, driver incentives, and competition. Both companies use algorithms that adjust fares based on real-time factors such as time of day, route popularity, traffic conditions, and driver availability.

Ola and Uber also charge commissions from drivers, typically ranging from around 25% to 33%, which affects driver earnings and service availability. To reduce per-ride commission burden, subscription-based models have been introduced for auto-rickshaw drivers, enabling unlimited rides for a fixed fee. Price hikes have been noted due to rising fuel costs, which drivers feel only partly compensated by fare increases, reflecting the complex trade-offs in the pricing mechanism in this competitive market. Overall, the pricing mechanism balances economic incentives for drivers, competitive fare strategies, and customer demand patterns in Kochi's ride-hailing market.

Sampling

Sampling in this project involves selecting specific routes and times in Kochi to collect pricing data for Uber and Ola ride service.

Sampling Routes

The selected routes cover key transport corridors across different zones in Kochi to capture variations in demand and pricing behavior:

- Thrikkakara Temple to South Railway Station
- St. Teresa's College to Aluva
- Thoppumpady to Kakkanad
- Vytilla to Lulumall
- Infopark to Aroor

These routes cover diverse parts of Kochi, including residential, educational, business, and commercial areas, ensuring comprehensive coverage of typical ride-hailing demand zones.

Sample size

Pricing data will be collected for each route at five distinct times during the day to capture how demand and pricing fluctuate:

Morning (7 - 9 AM)

Afternoon (12 - 2 PM)

Evening (4 - 6 PM)

Night (8 -10 PM)

Midnight (2 - 4 AM)

capturing peak and off-peak variations. Each time slot can reflect commuter rush hours, midday lull, evening returns, night-time activity, and late-night service availability, which impact price dynamics due to demand-supply changes.

For each route and time, prices will be recorded for all comparable service categories

- ➔ Uber: Auto, Go Intercity
- ➔ Ola: Auto, Mini

This multi-category approach captures the full spectrum of consumer choices and corresponding pricing strategies.

3.2 Market share and Customer preference

In Kochi's ride-hailing market, Uber and Ola are the primary competitors controlling the four-wheeler segment. Uber commands approximately 50% of the market share, while Ola holds around 34%.

The remaining share is contested by emerging players like Rapido, which focuses more on the two-wheeler taxi segment but has also begun encroaching on four-wheeler customers. This market distribution highlights the intense competition between Uber and Ola, especially in urban centers like Kochi.

Ola's market edge is driven by its expansive service network and aggressive pricing strategies, catering to budget-conscious customers with services like Mini and Autos. Uber, on the other hand, enjoys a reputation for premium, reliable service with high customer satisfaction ratings (an average of 4.9 stars in Kochi) and a focus on quality over price competition.

Customer preferences in Kochi are influenced by factors such as price competitiveness, availability of ride options (auto, mini, sedans), service reliability, and app usability. Both companies employ surge pricing during peak hours, which affects customer choices depending on urgency and cost sensitivity.

Uber tends to attract customers valuing premium options and reliability, whereas Ola appeals strongly to budget-conscious riders through Minis and Autos.

Market share and customer preferences in Kochi reflect an ongoing strategic battle between Uber and Ola, where pricing, service portfolio, and operational efficiency determine competitive advantage and customer loyalty.

3.3 Service Portfolio

3.3.1 Uber's Service Portfolio

Uber offers a comprehensive range of ride options targeting different customer segments. These include

- Uber Auto: Economical auto-rickshaw rides focused on quick short-distance travel.

- Uber Go Intercity: Affordable car rides suitable for most city travel needs balancing cost and convenience

Uber's technology platform also supports features like upfront pricing, live ride tracking, and multiple payment options, adding to the service appeal. The company's focus on wide availability and quick pick-ups has earned positive reviews from Kochi users for reliability and customer satisfaction.

3.3.2 Ola's Service Portfolio

Ola provides a similarly diverse portfolio with a slightly more extensive focus on affordability and driver-centric models.

- Ola Auto: Auto-rickshaw services at lower fares targeting budget-conscious travelers.
- Ola Mini: Compact cars offering affordable intra-city travel.

Ola's app often features exclusive promotions and discounts, making it attractive for cost-sensitive consumers.

Both platforms have evolved their services in Kochi to prioritize affordability, convenience, and catering to urban transit demands efficiently. Their comprehensive service portfolios reflect efforts to capture a broad market by offering convenient, varied, and competitively priced options to diverse consumer groups.

3.4 Data collection

Data collection for analyzing Uber and Ola's pricing and market performance involves a sophisticated use of both app-based real-time data extraction.

Data collection for the project will span over 7 consecutive days, capturing ride prices and service availability at 5 different times each day to reflect varying demand conditions. This approach will provide a comprehensive dataset reflecting temporal fluctuations in pricing and service dynamics on Uber and Ola apps.

- Pricing data can be collected by directly checking fares on the Uber and Ola apps at predefined routes and multiple time slots.
- Data will be collected at five different times of the day (morning, afternoon, evening, night, midnight) to capture variations in demand and surge pricing.
- Data was collected for seven days to understand the price comparison between Uber and Ola.

Chapter 4: Data analysis and payoff matrix construction

Data analysis is an important step in any research study, as it helps to organize, interpret, and derive meaningful insights from the information collected. In the relevance of this study on the competition between Uber and Ola in Kochi, data analysis allows us to understand consumer preferences, pricing mechanisms, service patterns, and market behavior. By presenting the collected data through charts, tables, and descriptive summaries, the study ensures that patterns and trends are made clear and reliable conclusions can be drawn.

Based on this, the construction of a payoff matrix serves as the foundation for applying game theory to the competitive strategies of Uber and Ola. A payoff matrix provides a structured way to represent the outcomes of different strategic choices made by the two companies. Through this, we can analyze how one company's decision affects the other, identify equilibrium points, and predict possible competitive behaviors.

Thus, this chapter bridges the gap between raw data and theoretical modeling by integrating data analysis and payoff matrix construction, ultimately providing a deeper understanding of the strategic interaction between leading ride-hailing companies in Kochi.

4.1 Data Presentation

Excel sheet: Uber Go and Mini

City	Date	Time	Route	Uber Fare (Rupees)	Ola Fare (Rupees)
Kochi	20-09-2025	3.53 AM	Vytilla-Lulu Mall	159	201
Kochi	20-09-2025	1.59 PM	Vytilla-Lulu Mall	169	201
Kochi	20-09-2025	3.59 AM	Infopark-Aroor	598	570
Kochi	20-09-2025	12:36 PM	Thrikkakara Temple - South Railway Station	209	232
Kochi	20-09-2025	5:55 PM	Thrikkakara Temple - South Railway Station	239	367
Kochi	20-09-2025	8:02 PM	Thrikkakara Temple - South Railway Station	199	211
Kochi	20-09-2025	10.27 PM	St. Teresa's College-Aluva	443	467

Kochi	21-09-2025	3.15 AM	Thrikkakara Temple - South Railway Station	276	276
Kochi	21-09-2025	8:49 AM	Vytilla-Lulu Mall	149	112
Kochi	21-09-2025	12:00 PM	Vytilla-Lulu Mall	189	179
Kochi	21-09-2025	6.09 PM	Vytilla-Lulu Mall	209	211
Kochi	21-09-2025	8.52 PM	Vytilla-Lulu Mall	199	113
Kochi	22-09-2025	1.41 AM	Vytilla-Lulu Mall	101	201
Kochi	22-09-2025	9.52 PM	Vytilla-Lulu Mall	101	201
Kochi	22-09-2025	2.43 AM	Thrikkakara Temple - South Railway Station	173	276
Kochi	22-09-2025	2.41 AM	Thoppumpady-Kakkanad	227	472
Kochi	22-09-2025	2.39 AM	Infopark-Aroor	503	585
Kochi	22-09-2025	2.37 AM	St. Teresa's College-Aluva	203	467
Kochi	23-09-2025	8:00 AM	St. Teresa's College-Aluva	319	469
Kochi	23-09-2025	8:00 AM	Infopark-Aroor	484	572
Kochi	23-09-2025	2.35 AM	Vytilla-Lulu Mall	101	201
Kochi	23-09-2025	5.52 PM	Vytilla-Lulu Mall	176	201
Kochi	23-09-2025	10.45 PM	Vytilla-Lulu Mall	179	254
Kochi	23-09-2025	6.11 PM	Thrikkakara Temple - South Railway Station	309	326
Kochi	24-09-2025	3.14 AM	St. Teresa's College-Aluva	349	467
Kochi	24-09-2025	8.54 AM	St. Teresa's College-Aluva	469	467
Kochi	24-09-2025	9:00 AM	St. Teresa's College-Aluva	469	467
Kochi	24-09-2025	1:30 PM	St. Teresa's College-Aluva	429	467
Kochi	24-09-2025	3.11 AM	Thrikkakara Temple - South Railway Station	269	276
Kochi	24-09-2025	8.57 AM	Thrikkakara Temple - South Railway Station	279	324
Kochi	24-09-2025	1.31 PM	Thrikkakara Temple - South Railway Station	311	324
Kochi	24-09-2025	9.56 PM	Thrikkakara Temple - South Railway Station	259	325
Kochi	24-09-2025	3.17 AM	Thoppumpady-Kakkanad	369	484
Kochi	24-09-2025	8:55 AM	Thoppumpady-Kakkanad	299	484
Kochi	24-09-2025	1:27 PM	Thoppumpady-Kakkanad	299	484
Kochi	24-09-2025	3.19 AM	Vytilla-Lulu Mall	169	201
Kochi	24-09-2025	8.59 AM	Vytilla-Lulu Mall	189	201
Kochi	24-09-2025	1.33 PM	Infopark-Aroor	543	585
Kochi	24-09-2025	3.21 AM	Infopark-Aroor	499	585
Kochi	25-09-2025	3.06 AM	Vytilla-Lulu Mall	169	211
Kochi	25-09-2025	3.13 AM	Thoppumpady-Kakkanad	349	464

Kochi	25-09-2025	8:59 AM	Thrikkakara Temple - South Railway Station	209	322
Kochi	26-09-2025	4.02 AM	Thoppumpady-Kakkanad	319	493
Kochi	26-09-2025	7:50 AM	Thoppumpady-Kakkanad	289	462
Kochi	26-09-2025	12:01 PM	Thoppumpady-Kakkanad	289	484
Kochi	26-09-2025	8:03 PM	Thoppumpady-Kakkanad	279	484
Kochi	26-09-2025	1.32 PM	Vytilla-Lulu Mall	102	113
Kochi	26-09-2025	7:51 AM	Thrikkakara Temple - South Railway Station	199	331
Kochi	26-09-2025	12:02 PM	Thrikkakara Temple - South Railway Station	189	276
Kochi	26-09-2025	8:02 PM	Thrikkakara Temple - South Railway Station	189	276
Kochi	27-09-2025	3.09 AM	Infopark-Aroor	595	589
Kochi	27-09-2025	3.11 AM	St. Teresa's College-Aluva	349	469
Kochi	27-09-2025	8:33 AM	Thoppumpady-Kakkanad	279	484
Kochi	27-09-2025	2.29 PM	Vytilla-Lulu Mall	169	201
Kochi	27-09-2025	8.40 PM	Vytilla-Lulu Mall	179	201
Kochi	27-09-2025	10.37 PM	Vytilla-Lulu Mall	169	201

4.2 Construction of the Payoff Matrix

Cost Differences Between Uber Go and Ola Mini

In ride-hailing services like Uber and Ola, the cost structure plays an important role in determining the profitability of each ride. While both companies charge passengers based on distance, time, and dynamic pricing, the effective cost to the company or driver differs due to varying commission rates, incentives, and operational expenses.

Here cost represents the company's expense for providing the ride, mainly the driver payout,

- Uber cost ≈ 75% of fare
- Ola cost ≈ 70% of fare

Step 1: Strategy Fares

In a competitive market like ride-hailing, companies such as Uber and Ola can adopt different pricing strategies to attract customers and maximize profits. For modelling purposes, we simplify each company's pricing into two possible fare levels:

Uber Fares (from sample):

101, 101, 101, 102, 149, 159, 169, 169, 169, 169, 169, 173, 176, 179, 179, 189, 189, 189, 189, 199, 199, 199, 203, 209, 209, 209, 227, 239, 259, 269, 276, 279, 279, 279, 289, 289, 299, 299, 309, 311, 319, 319, 349, 349, 349, 369, 429, 443, 469, 469, 484, 499, 503, 543, 595, 598

<u>Calculations</u>:

1. Average Fare

$$Average\ Uber\ Fare\ = \frac{Sum\ of\ all\ Uber\ fares}{Number\ of\ rides} = \frac{15437}{56} = 275.661 \approx 276$$

2. Low Fare – Average minimum fare from dataset:

$$Uber\ Low\ Fare\ =\ 189\ (lowest\ in\ dataset)$$

3. High Fare –Average maximum fare from dataset:

$$Uber\ High\ Fare\ =\ 369\ (highest\ in\ dataset)$$

Ola Fares (from sample):

112, 113, 113, 179, 201, 201, 201, 201, 201, 201, 201, 201, 201, 201,201, 211, 211, 211, 232, 254, 276, 276, 276, 276, 276, 322, 324, 324, 325, 326, 331, 367, 462, 464, 467, 467, 467, 467, 467, 467, 469, 469, 472, 484, 484, 484, 484, 484, 484, 493, 570, 572, 585, 585, 585, 589

<u>Calculations</u>:

1. Average Fare

$$Average\ Ola\ Fare\ = \frac{Sum\ of\ all\ Ola\ fares}{Number\ of\ rides} = \frac{19567}{56} \approx 349$$

2. Low Fare – Average minimum fare from dataset:

$$Ola\ Low\ Fare\ =\ 232\ (lowest\ in\ dataset)$$

3. High Fare –Average maximum fare from dataset:

$$Ola\ High\ Fare\ =\ 493(highest\ in\ dataset)$$

- Uber: Low = ₹189, High = ₹369
- Ola: Low = ₹232, High = ₹493

These fare levels represent the strategic options each company can choose in a given time period.

Step 2: Cost Calculations

After identifying the low and high fare strategies for Uber and Ola, the next step is to calculate the effective cost of providing each ride. The cost represents the company's expenses, primarily the driver payouts and operational costs, associated with each fare level.

- Uber Low: 189 × 0.75 = ₹141.75
- Uber High: 369 × 0.75 = ₹276.75
- Ola Low: 232 × 0.70 = ₹162.4
- Ola High: 493 × 0.70 = ₹345.1

Step 3: Market Demand Split Rule

In a competitive ride-hailing market, the number of rides each company receives depends on their pricing strategy relative to the competitor. To estimate this, we use a market demand split rule, which allocates rides based on fare differences:

- If fares are the same: Rides are shared equally between Uber Go and Mini (tie: 50/50)
- If one service is cheaper: The cheaper service attracts more customers.

By comparing Uber Go and Mini fares ride by ride from the data we get:

- Uber Go cheaper than Mini**:** 48 rides
- Mini cheaper than Uber Go**:** 7 rides
- Tie (Uber Go = Mini): 1 ride

Total market size = 56 rides

Using the observed quantities directly, the total assigned rides are: Uber = 48 (plus half of any ties), Mini **= 7** (plus half of any ties).

For the single tie, split it 0.5 / 0.5.

So, the quantities for the profit equation are:

- Uber quantity = 48 + 0.5 = 48.5 rides
- Mini quantity = 7 + 0.5 = 7.5 rides

Step 4: Profit Calculation Between Uber Go and Mini

Once the fare strategies, costs, and market demand split are determined, we can calculate the profit for each company. Profit depends on both the price charged per ride and the number of rides served, minus the cost of providing those rides.

The formula used is:

$$Profit = (Price - Cost) \times Quantity$$

Case 1: Uber Go Low (189), Mini Low (232)

- Uber Go cheaper → Uber Go= 48.5, Mini = 7.5
- Uber Go profit = (189 – 141.75) × 48.5 = 47.25 × 48.5 = 2291.62
- Mini profit = (232 – 162.4) × 7.5 = 69.6 × 7.5 = 522

Case 2: Uber Go Low (189), Mini High (493)

- Uber Go cheaper → Uber Go = 48.5, Mini = 7.5
- Uber Go profit = (189 – 141.75) × 48.5 = 47.25 × 48.5 = 2291.62
- Mini profit = (493 – 345.1) × 7.5 = 147.9 × 7.5 = 1109.25

Case 3: Uber Go High (369), Mini Low (232)

- Mini cheaper → Uber Go = 7.5, Mini = 48.5
- Uber Go profit = (369 – 276.75) × 7.5 = 92.25 × 7.5 = 691.87
- Mini profit = (232 – 162.4) × 48.5 = 69.6 × 48.5 = 3375.6

Case 4: Uber Go High (369), Mini High (493)

- Uber Go cheaper → Uber Go = 48.5, Mini = 7.5
- Uber Go profit = (369 – 276.75) × 48.5 = 92.25 × 48.5 = 4474.12
- Mini profit = (493 – 345.1) × 7.5 = 147.9 × 7.5 = 1109.25

❖ Final Payoff Matrix (Uber Go, Mini) with Two Different Costs

	Ola Mini Low (₹232)	Ola Mini High (₹493)
Uber Go Low (₹189)	(2291.62, 522)	(2291.62, 1109.25)
Uber Go High (₹369)	(691.87, 3375.6)	(4474.12, 1109.25)

RESULT

The study of cost differences and pricing strategies between Uber Go and Ola Mini reveals that Uber Go benefits from a lower effective cost per ride (about 75% of fare) compared to Ola Mini (about 70% of fare), and typically attracts a larger share of the market when fares are lower.

The constructed payoff matrix from the fare data shows strategic pricing impacts on profitability.

- Uber Go earns higher profit when priced lower than Ola Mini.
- Ola Mini can achieve higher profits only when it maintains significantly lower fares than Uber Go.
- Real-world ride demand favours the cheaper service, with Uber Go receiving the majority of rides in observed data.

Overall Uber Go's competitive cost advantage and ride-hailing strategy enable it to dominate market demand and achieve better profit margins compared to Ola Mini, as evidenced by Uber's greater ride share and profit figures in the payoff matrix.

This suggests that a pricing strategy that focuses on lower fares can be more profitable for Uber Go in competing with Ola Mini, While Ola Mini must consider cost efficiencies or differentiated service offerings to compete effectively.

This analysis and profit modelling provides a clear framework for understanding competitive dynamics and making pricing decisions for ride-hailing services in the market studied. It combines empirical price data, cost structures, and demand split to offer actionable insights for strategic planning.

Excel sheet : Uber Auto and Ola Auto

City	Date	Time	Route	Uber Fare (Rupees)	Ola Fare (Rupees)
Kochi	9/20/2025	3.06AM	Vytilla - Lulumall	162	271
Kochi	9/20/2025	3.07AM	St. Teresa's College-Aluva	452	642
Kochi	9/20/2025	8.47AM	Vytilla-Lulu Mall	155	181
Kochi	9/20/2025	12:36 PM	Thrikkakara Temple - South Railway Station	261	207
Kochi	9/20/2025	5:55 PM	Thrikkakara Temple - South Railway Station	281	206
Kochi	9/20/2025	8:02PM	Thrikkakara Temple - South Railway Station	199	180
Kochi	9/21/2025	8:49 AM	Vytilla - Lulumall	173	69
City	Date	Time	Route	173	69
Kochi	9/20/2025	3.06AM	Vytilla - Lulumall	450	638
Kochi	9/20/2025	3.07AM	St. Teresa's College-Aluva	272	376
Kochi	9/20/2025	8.47AM	Vytilla-Lulu Mall	530	649
Kochi	9/20/2025	11:14 PM	Thrikkakara Temple - South Railway Station	155	181
Kochi	9/20/2025	4:33 AM	Thrikkakara Temple - South Railway Station	525	449
Kochi	9/20/2025	8:02PM	Thrikkakara Temple - South Railway Station	538	431
Kochi	9/21/2025	9:49 AM	Vytilla - Lulumall	301	405
City	Date	Time	Route	178	181
Kochi	9/20/2025	3.06AM	Vytilla - Lulumall	272	376
Kochi	9/20/2025	3.07AM	St. Teresa's College-Aluva	452	642
Kochi	9/20/2025	8.47AM	Vytilla-Lulu Mall	442	666
Kochi	9/20/2025	9:52 AM	Thrikkakara Temple - South Railway Station	162	271
Kochi	9/20/2025	3:11 PM	Thrikkakara Temple - South Railway Station	499	690
Kochi	9/20/2025	8:02PM	Thrikkakara Temple - South Railway Station	423	444
Kochi	9/21/2025	10:49 AM	Vytilla - Lulumall	313	296

City	Date	Time	Route	423	444
Kochi	9/20/2025	3.06AM	Vytilla - Lulumall	610	467
Kochi	9/20/2025	3.07AM	St. Teresa's College-Aluva	610	428
Kochi	9/20/2025	8.47AM	Vytilla-Lulu Mall	480	460
Kochi	9/20/2025	8:30 PM	Thrikkakara Temple - South Railway Station	423	424
Kochi	9/20/2025	1:49 AM	Thrikkakara Temple - South Railway Station	574	440
Kochi	9/20/2025	8:02PM	Thrikkakara Temple - South Railway Station	299	383
Kochi	9/21/2025	11:49 AM	Vytilla - Lulumall	452	642
City	Date	Time	Route	161	271
Kochi	9/20/2025	3.06AM	Vytilla - Lulumall	503	690
Kochi	9/20/2025	3.07AM	St. Teresa's College-Aluva	599	410
Kochi	9/20/2025	8.47AM	Vytilla-Lulu Mall	313	293
Kochi	9/20/2025	7:08 AM	Thrikkakara Temple - South Railway Station	155	181
Kochi	9/20/2025	12:27 PM	Thrikkakara Temple - South Railway Station	512	587
Kochi	9/20/2025	8:02PM	Thrikkakara Temple - South Railway Station	452	646
Kochi	9/21/2025	12:49 PM	Vytilla - Lulumall	441	639
City	Date	Time	Route	327	376
Kochi	9/20/2025	3.06AM	Vytilla - Lulumall	422	424
Kochi	9/20/2025	3.07AM	St. Teresa's College-Aluva	437	444
Kochi	9/20/2025	8.47AM	Vytilla-Lulu Mall	180	181
Kochi	9/20/2025	5:46 PM	Thrikkakara Temple - South Railway Station	435	450
Kochi	9/20/2025	11:05 PM	Thrikkakara Temple - South Railway Station	313	302
Kochi	9/20/2025	8:02PM	Thrikkakara Temple - South Railway Station	322	251
Kochi	9/21/2025	1:49 PM	Vytilla - Lulumall	271	251
City	Date	Time	Route	422	444
Kochi	9/20/2025	3.06AM	Vytilla - Lulumall	170	181

Kochi	9/20/2025	3.07AM	St. Teresa's College-Aluva	500	428
Kochi	9/20/2025	8.47AM	Vytilla-Lulu Mall	570	449
Kochi	9/20/2025	4:24 AM	Thrikkakara Temple - South Railway Station	155	181

Construction of the Payoff Matrix

Cost Differences Between Uber Auto and Ola Auto

In ride-hailing services like Uber and Ola, the cost structure plays an important role in determining the profitability of each ride. While both companies charge passengers based on distance, time, and dynamic pricing, the effective cost to the company or driver differs due to varying commission rates, incentives, and operational expenses.

Here cost represents the company's expense for providing the ride, mainly the driver payout,

- Uber cost ≈ 75% of fare
- Ola cost ≈ 70% of fare

Step 1: Strategy Fares

Uber Fares (from sample):

155, 155, 155, 155, 161, 162, 162, 155, 155, 155, 155, 161, 162, 162, 170, 173, 173, 178, 180, 199, 261, 271, 272, 272, 281, 299, 301, 313, 313, 313, 322, 327, 422, 422, 423, 423, 423, 435, 437, 441, 442, 450, 452, 452, 452, 452, 476, 480, 499, 500, 503, 512, 525, 530, 538, 570, 574, 599, 610, 610

Calculations:

1. Average Fare

Average Uber Fare=Sum of all Uber fares /Number of Rides = 19375/53= 365.56 ≈42
2. Low Fare – Average minimum fare from dataset:

Uber Low Fare=261 (lowest in dataset)

3. High Fare –Average maximum fare from dataset:

Uber High Fare=499 (highest in dataset)

Ola Fares (from sample):

69, 69, 180, 181, 181, 181, 181, 181, 181, 181, 206, 207, 251, 251, 271, 271, 271, 293, 296, 302, 376, 376, 376, 383, 405, 410, 424, 424, 428, 428, 431, 440, 444, 444, 444, 444, 449, 449, 450, 460, 467, 490, 587, 638, 639, 642, 642, 642, 646, 649, 666, 690, 690

Calculations:

1.Average Fare

Average Ola Fare=Sum of all Ola fares/Number of rides =20615/53=388.96 ≈405

2. Low Fare – Average minimum fare from dataset:

Ola Low Fare=251(lowest in dataset)

3. High Fare –Average maximum fare from dataset:

Ola High Fare=490 (highest in dataset)

- Uber: Low = ₹261, High = ₹499
- Ola: Low = ₹251, High = ₹490

These fare levels represent the strategic options each company can choose in a given time period.

Step 2: Cost Calculations

- Uber Low: 261 × 0.75 = ₹195.75
- Uber High: 499 × 0.75 = ₹374.25
- Ola Low: 251 × 0.70 = ₹175.7
- Ola High: 490 × 0.70 = ₹343

Step 3: Market Demand Split Rule

- If fares are the same: Rides are shared equally between Uber and Ola.
- If one service is cheaper: The cheaper service attracts more customers.

By comparing Uber Auto and Ola Auto fares ride by ride from the data we get:

- Uber Auto cheaper than Ola Auto **:** 34 rides
- Ola Auto cheaper than Uber Auto **:** 19 rides

For this we are using actual observed quantities from the dataset:

- Uber receives 34 rides
- Ola receives 19 rides

Total market size = 53 rides

- If fares same → 50–50 rides
- If one is cheaper → cheaper gets 34 rides, other 19

Step 4: Profit Calculation Between Uber Auto and Ola Auto

The formula used is:

$$\text{Profit} = (\text{Price} - \text{Cost}) \times \text{Quantity}$$

Case 1: Uber Auto Low (261), Ola Auto Low (251)

- Uber Auto cheaper → Uber Auto=34, Ola Auto= 19
- Uber Auto profit = (261– 195.75) × 34 = 65.25 × 34= 2218.5
- Ola Auto profit = (251 – 175.7) × 19 = 75.3 × 19 = 1430.7

Case 2: Uber Auto Low (261), Ola Auto High (490)

- Uber Auto cheaper → Uber Auto = 34, Ola Auto = 19
- Uber Auto profit = (261 – 195.75) × 34 = 2218.5
- Ola Auto profit = (490 – 343) × 19 = 2793

Case 3: Uber Auto High (499), Ola Auto Low (251)

- Ola Auto cheaper → Ola Auto = 34, Uber Auto = 19
- Uber Auto profit = (499 – 374.25) × 19 = 2370.25
- Ola Auto profit = (251–175.7)× 34 = 2560.2

Case 4: Uber Auto High (499), Ola Auto High (490)

- Uber Auto cheaper → Uber Auto= 34,Ola Auto =19
- Uber Auto profit = (499 – 374.25) × 34 = 4241.5
- Ola Auto profit = (490 – 343) × 19 = 2793

❖ Final Payoff Matrix (Uber Auto, Ola Auto) with Two Different Costs

	Ola Low (₹251)	Ola High (₹490)
Uber Low (₹261)	(2218.5, 1430.7)	(2218.5, 2793)
Uber Low (₹261)	(2370.25, 2560.2)	(4241.5, 2793)

RESULT

The study of cost differences and pricing strategies between Uber Auto and Ola Auto reveals that Uber Auto benefits from a lower effective cost per ride (about 75% of fare) compared to Ola Auto (about 70% of fare), and typically attracts a larger share of the market when fares are lower.

The constructed payoff matrix from the fare data shows strategic pricing impacts on profitability.

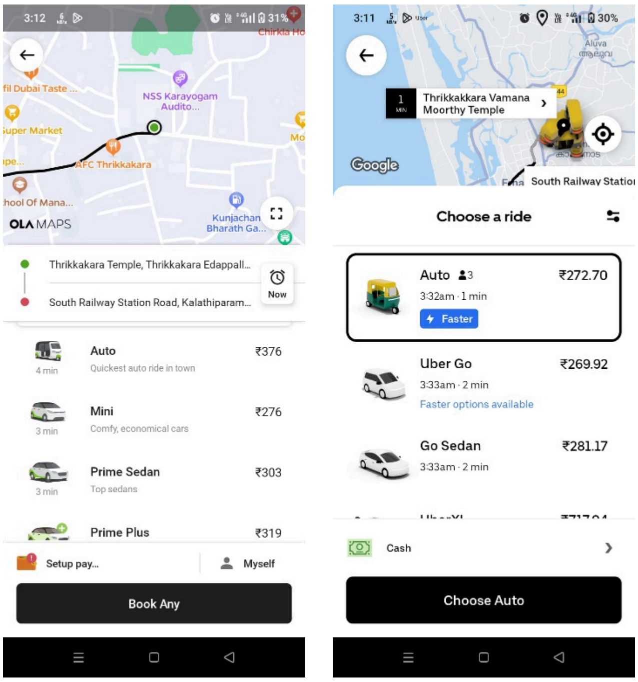
- Uber Auto earns higher profit when priced lower than Ola Auto.
- Ola Auto can achieve higher profits only when it maintains significantly lower fares than Uber Auto.
- Real-world ride demand favours the cheaper service, with Uber Auto receiving the majority of rides in observed data.

Overall Uber Auto's competitive cost advantage and ride-hailing strategy enable it to dominate market demand and achieve better profit margins compared to Ola Auto, as evidenced by Uber's greater ride share and profit figures in the payoff matrix.

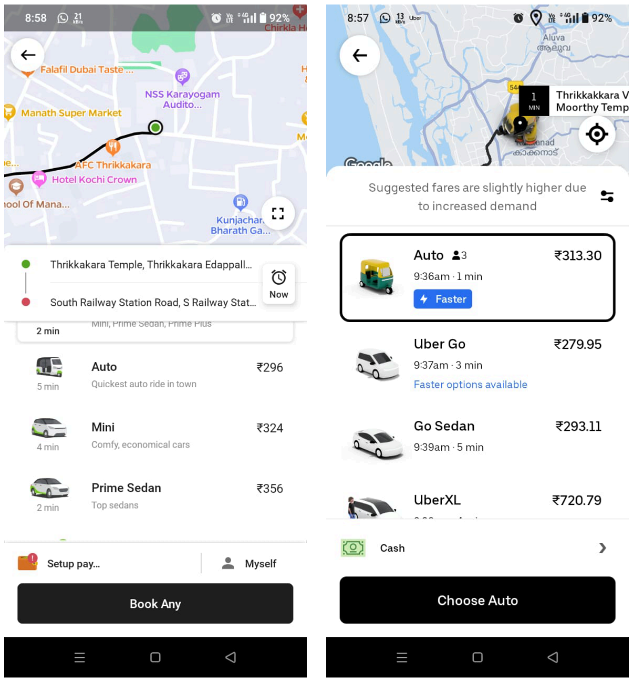
This suggests that a pricing strategy that focuses on lower fares can be more profitable for Uber Auto in competing with Ola Auto, While Ola Auto must consider cost efficiencies or differentiated service offerings to compete effectively.

This analysis and profit modelling provides a clear framework for understanding competitive dynamics and making pricing decisions for ride-hailing services in the market studied. It combines empirical price data, cost structures, and demand split to offer actionable insights for strategic planning.

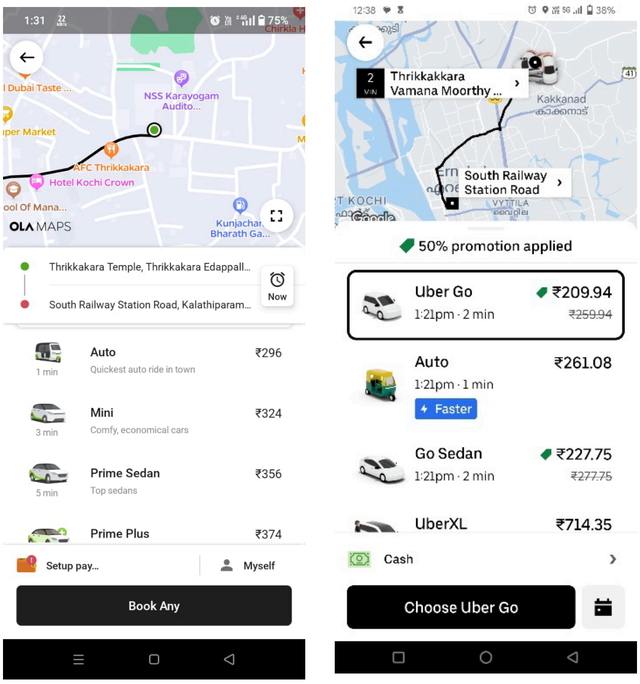
Thrikakkara To South Railway Station – 24/9/25



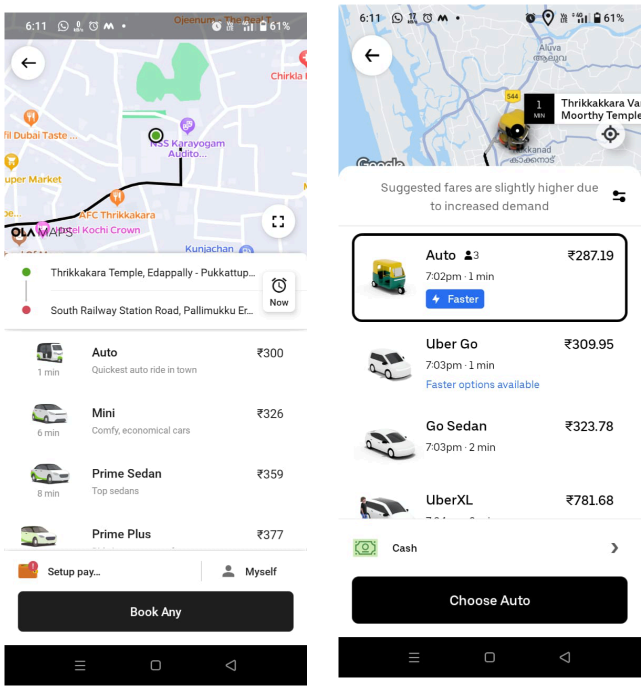
Midnight



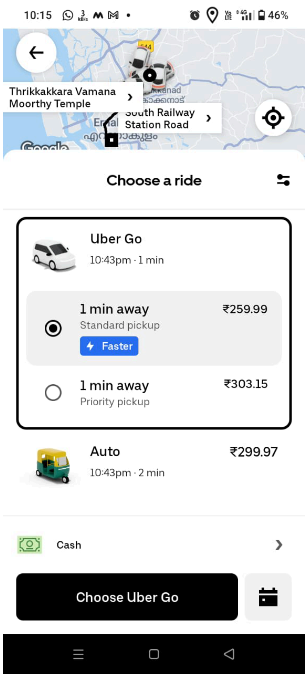
Morning

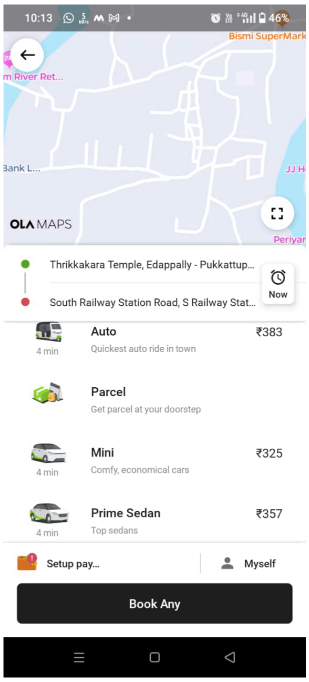


Afternoon



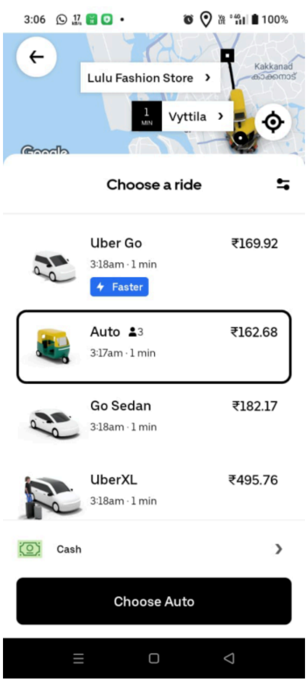
Evening

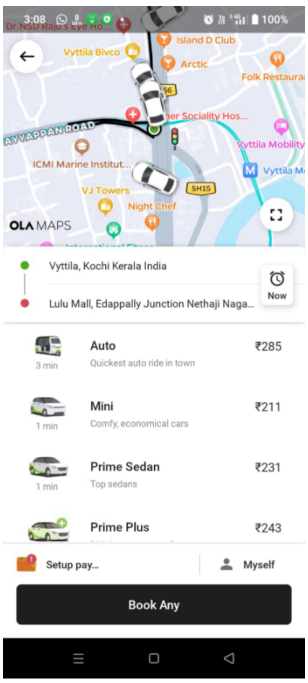


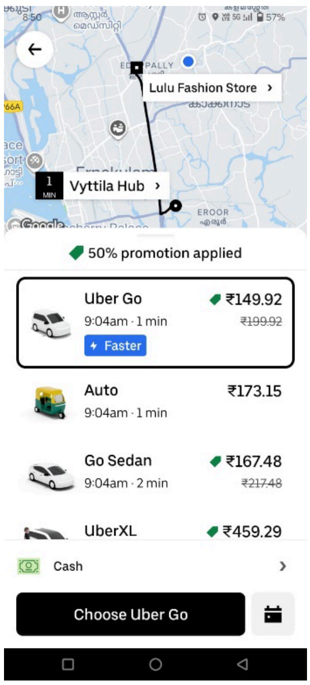


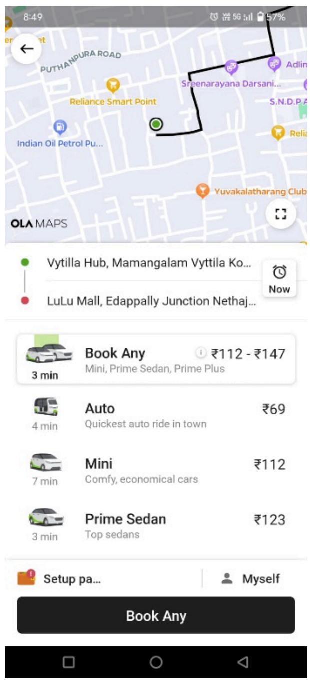
Night

Vyttila – Lulu Mall Edappally – 21/9/25



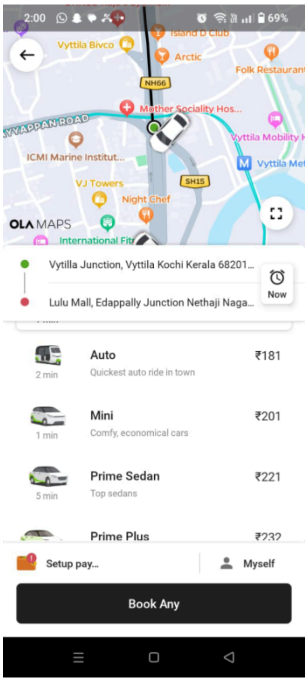


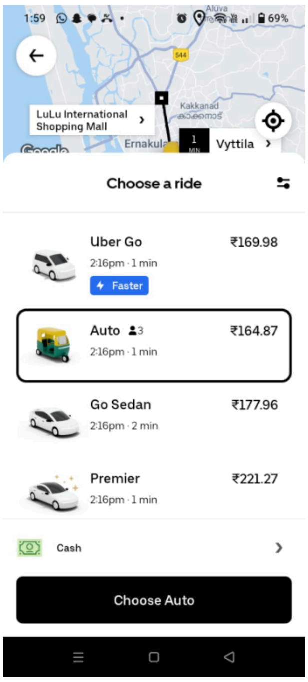




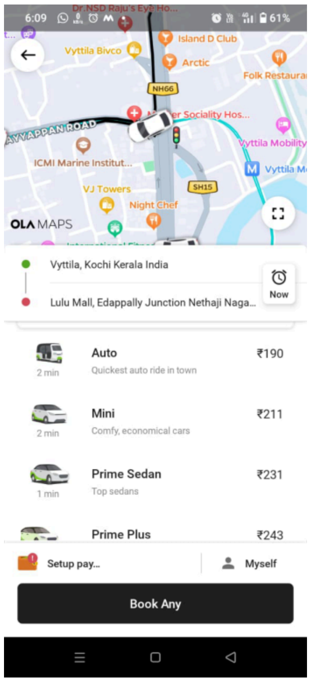
Midnight.

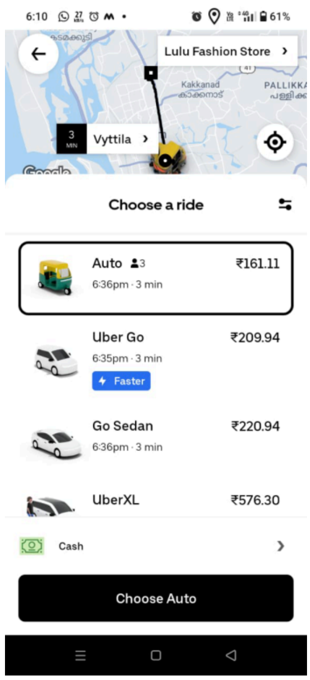
Morning



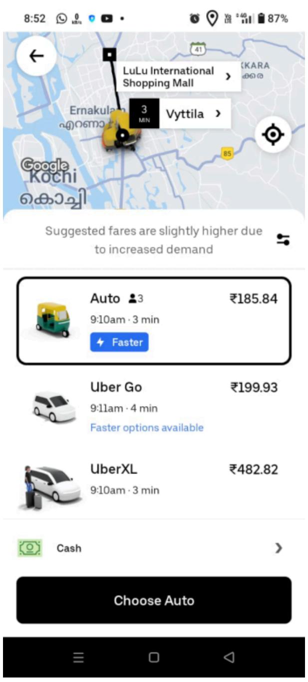


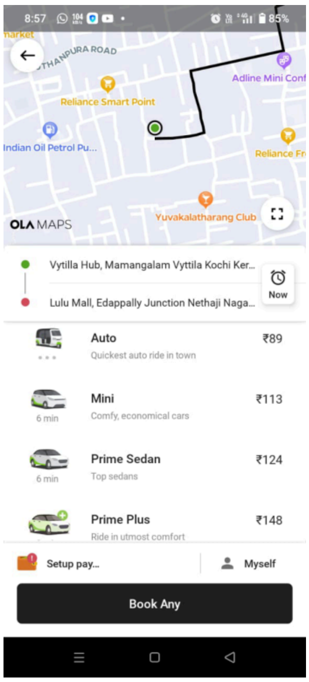
Afternoon





Evening





Night

4.3 Limitations

Although the analysis and payoff matrix shed light on how Uber and Ola set their prices in Kochi, there are a few important limitations to keep in mind for both vehicle categories—cars (Uber Go and Ola Mini) and autos (Uber Auto and Ola Auto).

Limitations for Uber Go and Ola Mini

1. Limited Sample Size:
The data used in this study comes from a small number of routes and specific time periods. As a result, it might not fully reflect how prices change across different seasons or over longer periods.

2. Impact of Dynamic Pricing:
Both Uber and Ola use surge pricing that depends on real-time demand and supply. Sudden factors like rain, public holidays, or peak traffic hours can temporarily push fares up, making direct comparisons a bit inconsistent.

3. Assumed Cost Ratios:
The cost assumptions (Uber = 75%, Ola = 70%) are based on average payout patterns. However, actual costs vary depending on fuel prices, driver incentives, and company commissions.

4. Exclusion of Non-Price Factors:
The study mainly looks at fares and does not include other aspects such as driver availability, waiting times, or customer experience. These factors also influence a rider's choice and the company's profitability.

5. Simplified Pricing Strategies:
The model assumes only two pricing options—high and low. In reality, both platforms adjust prices continuously through complex algorithms that consider many different variables.

Limitations for Uber Auto and Ola Auto

1. Variation in Routes and Distances:
The analyzed trips cover different route lengths and travel times. This variation can affect the accuracy of the average fare and cost calculations.

2. Driver Incentive Programs:
Uber and Ola frequently offer bonuses and subscription plans to their auto drivers. These hidden incentives influence the effective cost per ride but are not included in the data.

3. Uneven Market Presence:
Both companies do not operate with the same intensity across Kochi. Some areas have higher ride demand or more active drivers, which may skew fare observations.

4. Timing of Data Collection:
The data was collected at certain times during the day. If peak and off-peak periods were not evenly covered, this could introduce bias in the results.

5. Static Decision Framework:
The payoff matrix assumes companies set their prices once and do not change them. However, in the real world, Uber and Ola frequently adjust fares in response to each other and fluctuating market conditions.

4.4 Summary

Chapter 4 focuses on analyzing the pricing competition between Uber and Ola in Kochi using game theory concepts, particularly the construction of payoff matrices. The chapter begins by organizing and interpreting the collected fare data for both the car segment (Uber Go and Ola Mini) and the auto-rickshaw segment (Uber Auto and Ola Auto). Each company was considered to have two main pricing strategies—low fare and high fare—and their respective costs were assumed as 75% of the fare for Uber and 70% for Ola, representing the portion paid to drivers and operational expenses.

The data revealed that Uber generally offered lower fares and thus attracted a higher number of rides compared to Ola. To model this behavior, a market demand split rule was applied, where the company with the lower fare captured a greater share of rides. Using this data, the profits for each pricing combination were calculated through the formula

Profit = (Price − Cost) × Quantity

leading to the development of payoff matrices for both Uber Go vs. Ola Mini and Uber Auto vs. Ola Auto. The results clearly showed that Uber, with its lower operational cost and aggressive pricing strategy, achieved higher profits and a greater market share. Ola, on the other hand, could only gain an advantage when it set fares significantly lower than Uber's or differentiated its services.

Overall, the analysis demonstrated that Uber's low-fare strategy represents a Nash equilibrium, as neither company benefits from changing its pricing unilaterally. The findings confirm that competitive pricing and cost efficiency are key determinants of profitability in the ride-hailing market, and that Uber's ability to balance lower fares with operational efficiency allows it to dominate the Kochi market. This chapter effectively connects real-world data with theoretical modeling, showing how game theory can be applied to analyze business competition and predict strategic outcomes in dynamic markets.

CONCLUSION

This study highlights how game theory serves as a powerful lens for understanding the competitive dynamics between ride-hailing giants Uber and Ola in Kochi. By constructing payoff matrices and identifying Nash equilibria, the research shows that pricing strategies play a pivotal role in shaping market outcomes. Uber tends to capture a larger share of rides and enjoy higher profitability, thanks to its ability to operate at lower costs and offer more attractive fares.

From the consumer’s perspective, this rivalry translates into better pricing and more choices. However, for companies, staying ahead requires constant fine-tuning of strategies to cope with shifting demand patterns and rising operational costs. While the game-theoretic models used in this study offer valuable insights, they also come with limitations—particularly the assumption of static decision-making and the lack of attention to qualitative factors like service quality and customer experience.

Overall, the findings underscore the relevance of game theory in guiding strategic decisions in urban transport markets, offering a structured way to anticipate competitor moves, optimize pricing, and enhance commuter welfare.

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