Financial Equation Task

by

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Business Model

The business model for AI-Powered local tourism app or website. The revenue is generated by charging a commission on transactions made through the app and fee.

The AI-powered local tourism app follows a commission-based model and a small monthly subscription fee to have access to the app, earning revenue when users pre-book tickets and accommodations through the platform. It charges a commission on bookings, partners with hotels, and offers premium listings for local businesses to boost visibility.

Financial Equation:

$$R = (C * GV) + S$$

Total Revenue = (Commission Rate * Gross value) + Subscription revenue

Gross value:

$$GV = N * X$$

X = Travel ticket + accommodation + Pick up service + Local Guide

Subscription revenue:

$$S = N * Y$$

Final Revenue Equation:

$$R = (C * N * X) + N * Y$$

$$R = N[(C*X) + Y]$$

Explanation:

- **R** is the total Revenue.
- **C** is the platform's commission percentage taken from service providers.
- **GV** is the Gross Value of services used per user.
- **S** is the recurring Subscription revenue for access of the app.
- **N** represents the number of users.
- **Y** is the monthly Subscription fee.
- **X** represents the total sum of the value of services provided to a traveler.

For Example:

When a user joins the platform through the app or website, they are required to pay a subscription fee to access a curated library of local tourism spots. This library is not just a generic list—it is analyzed using advanced machine learning algorithms to provide personalized recommendations tailored to each user's travel preferences and tastes.

Hence we get a Subscription fee: Let's say fee is ₹120 a months and we have 1000 users we got a subscription revenue of

$$S = ₹120 * 1000$$

$$S = ₹1,20,000$$

When a user decides to visit a destination, they often face the hassle of arranging multiple services, finding reliable travel options, booking accommodations, and securing a local tour guide to explore the area. This process can be time-consuming and overwhelming, requiring extensive research and coordination.

For example, suppose a traveler from "*Chandmari, Guwahati, Assam"* wants to visit *"Bala Fort in Alwar, Rajasthan"*. While booking a train ticket might be relatively simple, the real challenge begins after arrival. Since Bala Fort is not as widely known as famous landmarks like *Hawa Mahal*, finding a nearby hotel, local transportation, and a trusted tour guide can be a tedious and frustrating process.

Hence we get a commission fee: Let's say from the original 1000 register user 100 decided to visit the *"Bala Fort in Alwar, Rajasthan"*

We earn by discounting the money paid to the service provider, let's say 95% and we get a 5% cut.

X = Travel ticket + accommodation + Pick up service + Local Guide

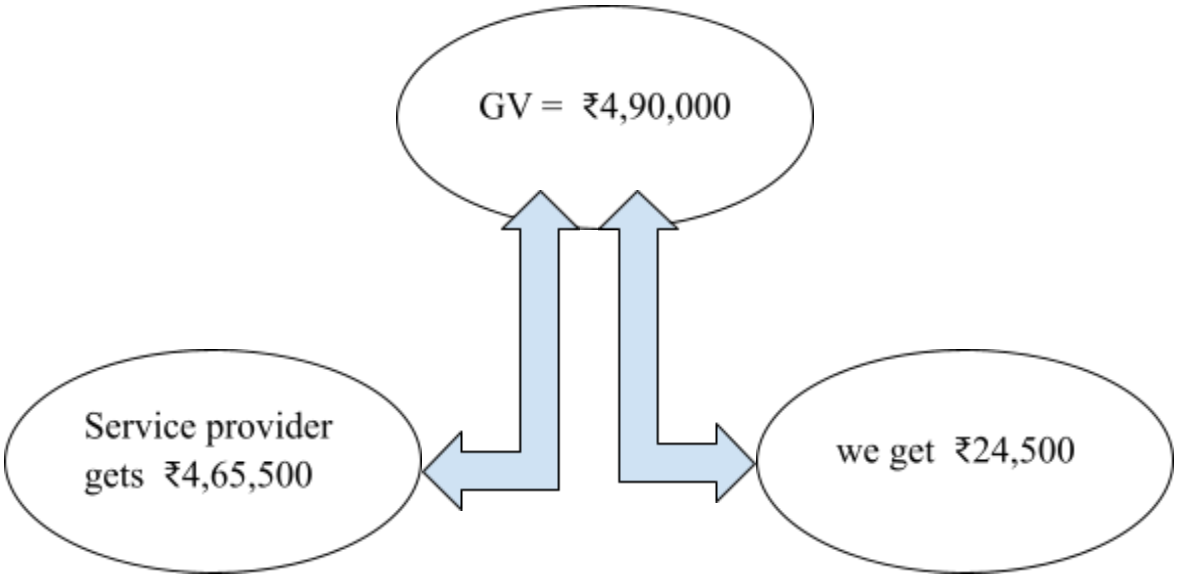
X = ₹1000 + ₹3000 + ₹600 + ₹300

X = ₹4,900

GV = X * N

GV = ₹4,900 * 100

Splitting the money where service provider get 95% and we get 5%



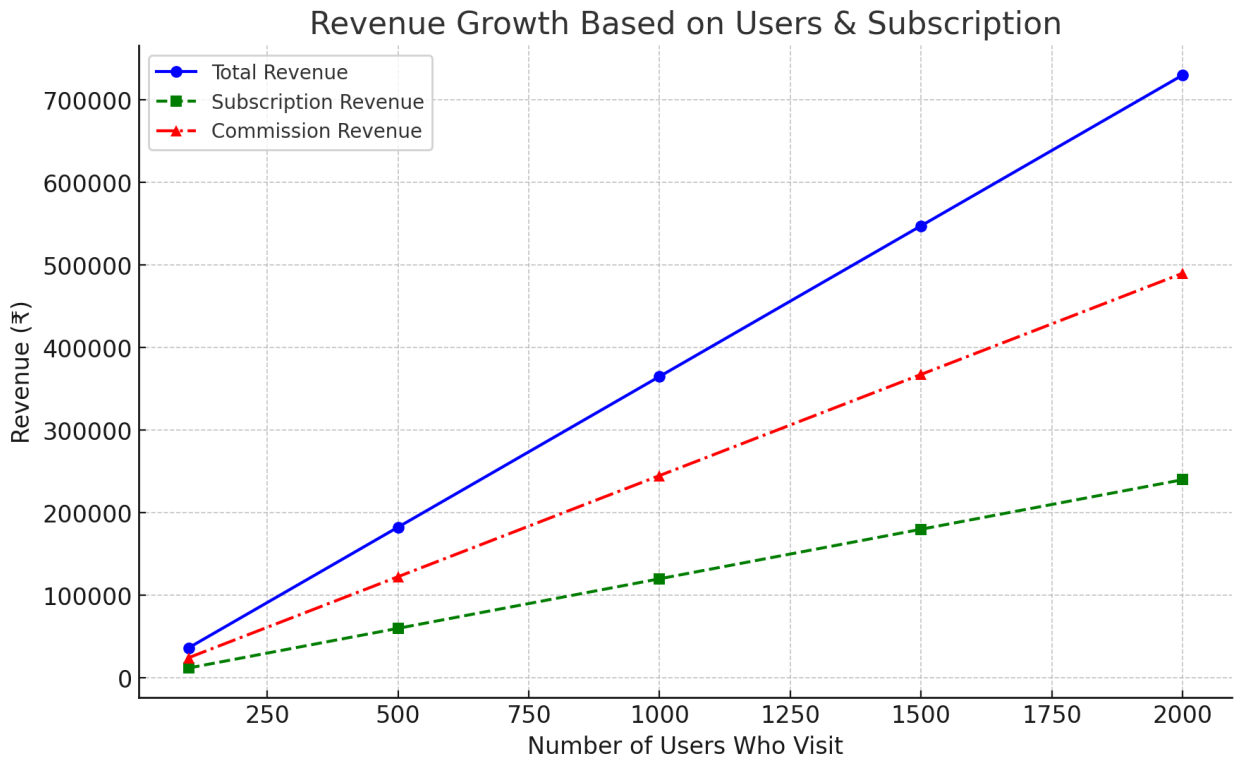
1. Total revenue:

$$R = (C * GV) + S$$

$R = (5\% * ₹4,90,000) + ₹1,20,000$

$R = ₹24,500 + ₹1,20,000$

$R = ₹1,44,000$



Here is a graph showing how total revenue, subscription revenue, and commission revenue scale with the number of users visiting a destination.

- **Blue Line** - Total revenue (combining subscription + commission)
- **Green Line** - Subscription revenue (fixed per user)
- **Red Line -** Commission revenue (5% of total service value per visitor)

We can see that subscription revenue provides a steady base income, while commission revenue increases as more users visit destinations.

2. Customer Acquisition Cost (CAC)

$$\text{CAC} = \frac{Total\ Marketing\ and\ Sales\ Cost}{Number\ of\ New\ Customers\ Acquired}$$

YouTube advertising cost ranges (on average) from $0.10-$0.30 per view or impression.

Where:

- Total marketing and sales cost includes the cost of advertisements, promotional campaigns, partnerships etc.
- Number of new customers acquired refers to the total number of customers gained during the given period.

3. Operating Cost (OC) - Represents the total expenses required to keep the platform running efficiently. It consists of several key components:

OC = Development and Maintenance Costs + Customer Support Costs + Marketing Costs + Miscellaneous Costs + Survey cost

Where:

- **Development and Maintenance Costs** - Include IT expenses for app updates, bug fixes, and server infrastructure.
- **Customer Support Costs** - Cover the costs of running customer service operations.
- **Marketing Costs –** Investments in advertising, promotions, influencer collaborations, and digital marketing to attract new users and retain existing ones.
- **Survey Costs –** Expenses involved in researching and identifying emerging local tourism spots to expand the platform's curated library and provide fresh travel recommendations.
- **Miscellaneous Costs –** Any other operational expenses, such as legal fees, office costs, third-party services, or unexpected expenditures.

4. Net Profit (NP):

$$NP=R_{total} - OC - (\text{Number of New Customers Acquired} * CAC)$$

5. Revenue per Usage (RPU):

$$RPU = \frac{R(total)}{Total\ Number\ of\ Users}$$

Where:

- R_{total} is the total revenue generated in a specific period.
- Total Number of Users refers to the number of active users using the app in that same period.

6. Lifetime Value of a Customer (LTV):

$$LTV = \frac{Average\ Revenue\ per\ User\ (RPU)*Average\ User\ Lifetime}{1-Churn\ Rate}$$

Where:

- **Average Revenue per User (RPU)** is the revenue generated by each user over a given period.
- **Average User Lifetime** refers to the average duration that a user remains active on the platform.
- **Churn Rate** is the percentage of users who stop using the app in a given period.

Note: With government initiatives like the @2047 vision targeting 100 million inbound tourists by 2047, WTTC projects the sector's GDP contribution to hit INR 21.15TN in 2024 and potentially INR 43.25TN by 2034, supporting nearly 63 million jobs.

7. Break-even Analysis:

$$\text{Break-even Point} = \frac{Fixed\ Costs}{Revenue\ per\ Unit - Variable\ Costs\ per\ Unit}$$

Where:

- **Fixed Costs** are costs that do not change with the volume of users, such as server costs and development costs.
- **Revenue per Unit** refers to the average amount of revenue generated per user or transaction.
- **Variable Costs per Unit** refers to the cost of each user or transaction (such as commission fees or transaction processing costs).

8. Profit Margin:

$$PM = \frac{NP}{R} * 100$$

Where:

- **NP** is the net profit.
- **Rtotal** is the total revenue.

10. Conversion Rate (CR):

$$CR = \frac{Number\ of\ Users\ Who\ Make\ a\ Booking}{Total\ Number\ of\ Users} * 100$$

11. Gross Revenue:

$$\text{Gross Revenue} = \sum(\text{Total Transaction Value for Each User})$$

Product Development Cost Estimation

1. Research & Planning *(₹800 per 10 user survey)*

Market research identifies traveler preferences, and a feasibility study ensures AI-driven recommendations are practical. Product requirements define necessary data sources and machine learning models. Costs cover data collection, expert consultations, and travel behavior analysis, ensuring an effective segmentation strategy for personalized recommendations.

2. Design & ML Prototyping *($3.67 per hour)*

ML models segment users based on age, budget, interests, and accommodation preferences. Prototyping involves training AI models using cloud GPUs. Cost of renting a cloud gpu on Google Cloud.

Name	GPUs	VRAM	VCPUs	RAM	Price/h
a2-high gpu-1g	1x A100	40GB	12	85GB	$3.67

3. Manufacturing Setup

The setup involves cloud infrastructure for storing travel data, API development for AI-driven recommendations, and software maintenance. Costs include server hosting, which ranges from ₹89/month to ₹1200/month.

4. Marketing & Launch

- Marketing focuses on branding, digital advertising, influencer partnerships, and app store optimization to drive user adoption.
- **YouTube Ads:** Targeted campaigns using skippable in-stream ads and bumper ads, starting with a daily budget of ₹1,000–₹5,000. Estimated cost per 100,000 views is ₹8,30,000 – ₹25,00,000, so budget optimization is key.

- **Influencer & Affiliate Marketing:** Travel influencers and bloggers create authentic content, with a budget of ₹50,000 – ₹1,50,000 for partnerships and affiliate programs.
- **Google & Social Media Ads:** Pay-Per-Click (PPC) campaigns on Google Search, sponsored social media posts, and travel-themed reels to reach targeted travelers.
- **App Store Optimization (ASO):** Focuses on keyword optimization, engaging descriptions, and user-driven growth strategies to improve app visibility and downloads.