The EDA done by me gives an insight to the actual problems and difficulties people face while using Delhi Metro. Also, I have sorted out the top 20 metro stations which need the operational changes which at-most priority to have maximum change in user experience in limited budget.

Below are a few points of difficulties or changes suggested in Delhi Metro, alongwith a global example of course of action to deal with similar problem :-

**1. Dynamic Dwell Time Adjustment Using AI Models (The amount of time Metro would stop on a station to let the passenger’s board)**

***Concept:***

Machine learning models can be used to predict passenger boarding patterns to dynamically adjust station dwell times, focusing on peak-hour and high-crowd stations (as identified in EDA, e.g., Kashmiri Gate, Rajiv Chowk, etc.).

***Global Example:***

London and Tokyo metros use real-time passenger data to vary dwell times and improve punctuality.

Dynamic adjustment smoothens service, reduces delays, and prevents overload at key stations.

***Delhi Metro Benefit:***

Adapting dwell times to crowd levels would optimise both train frequency and platform safety, directly reducing congestion and improving on-time performance.

**2. Train Frequency Optimisation with Demand Prediction**

***Concept:***

Again, ML models could be leveraged to match train frequency with varied demand fluctuations along each line.

***Global Example:***

Singapore’s MRT (Metro Rail Transit) employs predictive analytics to shift number of metro running on each line and adjust intervals in real time.

***Delhi Metro Benefit:***

Matching train intervals to real passenger load would boost comfort and reduce wait times, especially during unpredictable rushes and events.

**3. Real-Time Information to passenger and Crowd Management**

***Concept:***

Mobile apps and Screens on platforms can be used to show live crowding or delays and suggest accordingly use of alternate routes.

***Global Example:***

Tokyo Metro and Hong Kong Metro offer mobile crowding indicators and real-time alternate routing.

***Delhi Metro Benefit:***

It would Ease-out platform pressure, allow passenger self-optimization, and balance train car occupancy, especially at interchange hubs.

**4. Platform and Interchange Re-Engineering**

***Concept:***

Station layouts can be reconsidered, especially at high-traffic interchanges, to create wider platforms, one-way flows, and direct interchange corridors.

***Global Example:***

London’s Victoria Line and Shanghai Metro underwent station expansions and introduced barrier-free one-way transfer corridors, greatly reducing bottlenecks during morning peaks.

***Delhi Metro Benefit:***

Physical redesign at key choke points could prevent critical overcrowding and improve the issue of congestion.

**5. Last-Mile Connectivity & Station Area Redesign**

***Concept:***

Metro access should be enhanced by integrating seamless last-mile solutions—e.g., e-bike/scooter share, bus synchronisation, reserved pedestrian zones for easy station entry/exit.

***Global Example:***

Paris Metro’s "metro-bus-velo" program significantly increased commuter satisfaction and decreased car traffic near stations.

***Delhi Metro Benefit:***

It will directly address one of the most persistent pain points: getting to and from the station quickly and safely.

**6. Big Data-Driven Service Customisation (A new vertical of job openings to provide better real time data)**

***Concept:***

There should be separate teams working to aggregate and analyse multi-source data (ticketing, mobile, WiFi) for real-time insights into travel patterns, station bottlenecks, and unserved flows.

***Global Example:***

New York and London metros extract actionable patterns from Oyster/MetroCard data, leading to precise service modifications.

***Delhi Metro Benefit:***

It will help to detect hidden trends: e.g., unpredicted night rushes, evolving event-based surges, or chronic bottlenecks—in order to rapidly adapt service, metro card users’ behavioural patterns on service usage etc.

**7. Proactive Communication and Social Incentives**

***Concept:***

Providing regular, transparent updates about delays, alternative routes, or off-peak travel incentives via mobile, social, and station displays, should be focused upon to normalize the usage of services, and to deal with situations heavy load above the bar or low load going below the bar.

***Global Example:***

Seoul Metro and Hong Kong MTR issue real-time travel advisories and reward passengers for off-peak travel.

***Delhi Metro Benefit:***

It will reduce frustration during disruptions, encourage balanced use of the network, and improve public trust and perception.

**CONCLUSION :-**

Taking learnings from world-wide operational problems and their implemented solutions, would really help our India’s most busy as well as vast metro network to provide much better and smooth experience to its passengers. Also, following its blueprint would also help in a successful establishment of Metro networks in other areas of the country.