Abstract Title: Differentiated Design Logic and Mutual Learning Insights Between Airport APM and Traditional Subway

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Background / Context
Airport APM and traditional subway are homologous rail transit modes with distinct scenarios: APM serves high-efficiency airport hub transfer (precise, volatile passenger flow), while traditional subways cater to urban-wide commuting (popularized, multi-destination). Traditional subways face rigid technical routes and redundancy; APM, less constrained by traditional standards, has developed targeted designs. Exploring their mutual learning potential is key to optimizing rail transit efficiency.

Objectives
1. Clarify core differences between APM and traditional subways.
2. Analyze APM's targeted design logic across key dimensions.
3. Extract actionable mutual learning insights for traditional subways.
4. Guide rail transit towards demand-oriented, efficient development.

Methods / Approach
1. Comparative analysis of scenario and positioning differences.
2. Dimension-by-dimension deconstruction of APM's design (service, flow management, operation, integration).
3. Case verification (Beijing Capital Airport APM, Shanghai Metro Line 6, etc.).
4. Insight extraction linking APM's practices to traditional subway pain points.

Results / Findings

1. Root cause of differences: Scenario-driven positioning (APM: flight-matched transfer; traditional subway: urban accessibility).
2. APM's core design outcomes: ≤90s headway, ≤10s arrival error, vibration/noise reduction, flexible marshalling, 24/7 multi-mode operation, and simplified wayside equipment.
3. Mutual learning points: User-centric customization, intensive design (cost-efficiency), and precise operational regulation.

Conclusions

APM and traditional subways, scenario-differentiated but homologous, have significant mutual learning value. APM's targeted solutions provide actionable references for traditional subways to address rigidity and redundancy, promoting rail transit's efficient, flexible, and humanized development.