



EVALUATION OF PUBLIC TRANSPORT INTEGRATION IN INDIAN CITIES

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CoE-UT CENTER
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URBAN TRANSPORT

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STRUCTURE

CONTEXT OF INDIAN
CITIES

EVALUATION TOOL
FOR INTEGRATED
TRANSPORT

PT INTEGRATION EFFORTS IN INDIAN CITIES

- National Urban Transport Policy 2006 emphasizes on implementing integrated multi-modal system in cities
- Indian cities are adopting various multimodal strategies realizing its relevance
 - Feeder bus services & e-autos, introduction of smart cards, multi-modal hubs, travel apps
 - Even after planning and implementing mass rapid transit systems, different modes operate independently
 - Commuters are faced with onerous transfers, increased wait times and higher travel costs - makes public transport unattractive and adversely affecting transit patronage.
- Need to adopt a comprehensive approach towards integration rather than adopting standalone measures

It is only with a clear vision, strategic effort and a high level of cooperation amongst transport agencies and operators that these systems and services can be integrated (Luk & Olszewski, 2003).

MULTI-MODAL INTEGRATION

- Combines public transport with other modes – NMT, IPT, private vehicles, other PT modes to provide seamless and door-to-door travel alternatives for commuters



Improve delivery of PT services



Improve passenger comfort and convenience



Improve access to major facilities and activity centers

- Often used interchangeably with 'integrated public transport' or 'integrated transport' (Janic & Reggiani, 2001)

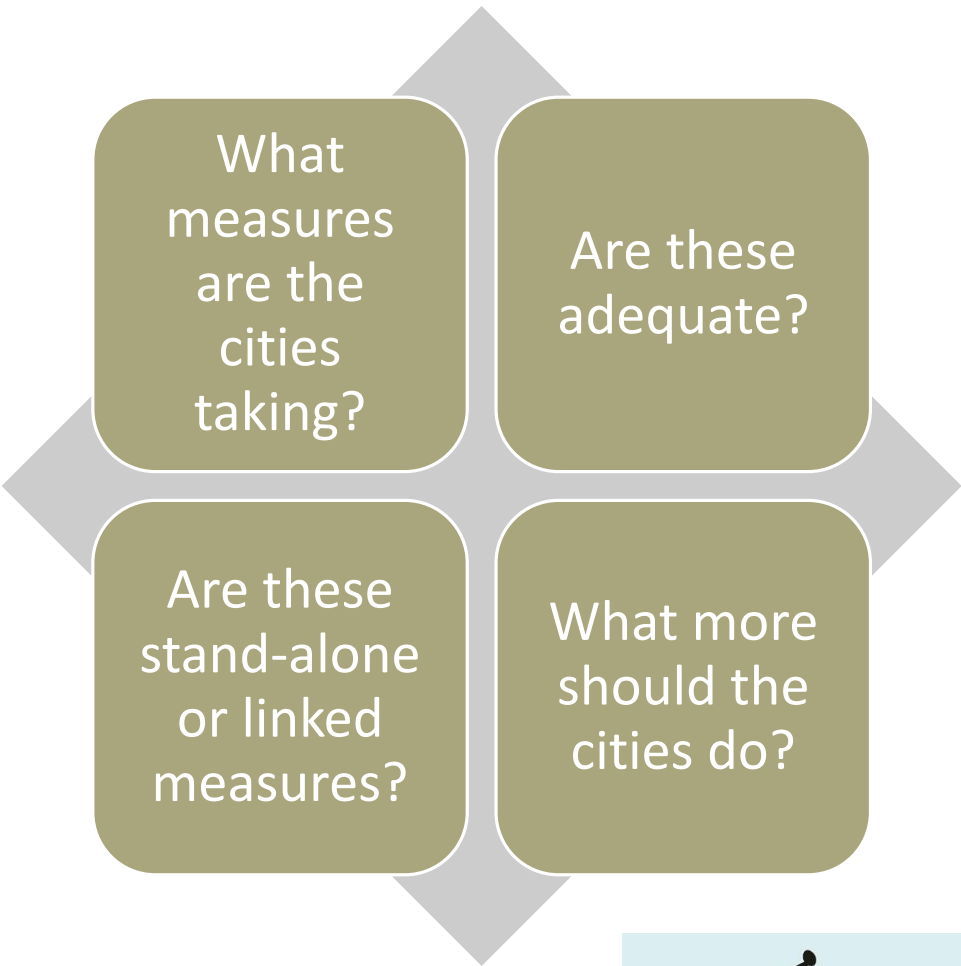


Bring efficiency & increased revenue for PT operators



Facilitate shift to sustainable modes

- Means to reduce private car use and facilitate shift to sustainable modes of travel



What
measures
are the
cities
taking?

Are these
adequate?

Are these
stand-alone
or linked
measures?

What more
should the
cities do?

ARE OUR CITIES WORKING TOWARDS AN INTEGRATED TRANSPORT SYSTEM?

WHERE ARE WE IN TERMS OF MULTI-MODAL INTEGRATION?

INPUT INDICATORS TO
ASSESS MEASURES ADOPTED
AND THEIR
COMPREHENSIVENESS

OUTCOME INDICATORS TO
ASSESS EFFICACY LEVELS

KEY COMPONENTS OF MMI AND THEIR ELEMENTS

Network & Service Integration

- Route structure
- Service headways
- Coverage
- Demand vs supply patterns
- Service Coordination

Physical Integration

- Proximity of stops
- Accessibility within the interchange zone, access to the interchange zone
- Universal accessibility

Fare Integration

- Fare policy/ structure
- Fare technology and interoperable cards
- Ticketing

Information Integration

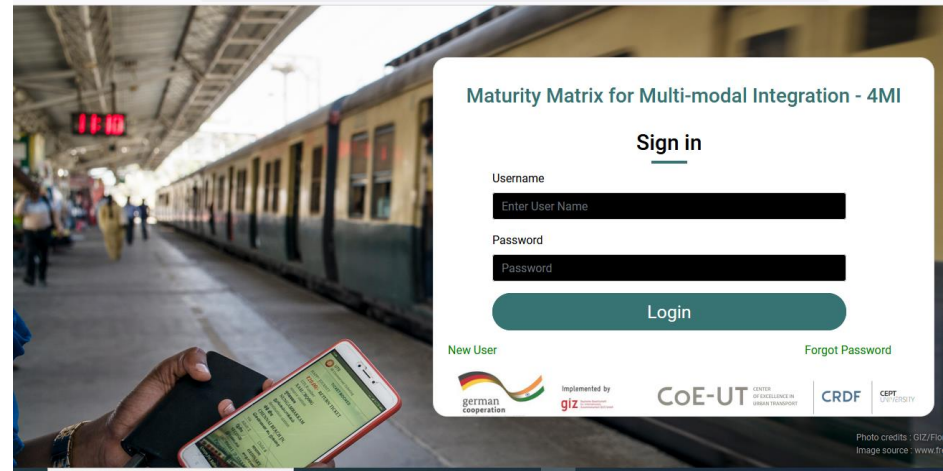
- Information availability
- Customer care
- Data for operational facilitation

Institutional Integration

- Responsible agency for MMI
- Decision making processes
- Leadership, strategy and organisational capacities
- Financing/ funding for MMI

MATURITY MATRIX FOR MULTI-MODAL INTEGRATION (4MI) TOOL

- Developed by COE-UT, CRDF CEPT University as part of SMART-SUT project jointly implemented by MoHUA and GIZ under the Indo-German Green Urban Mobility Partnership
- Web-based tool, available at <https://4mitool.crdf.org.in/>



MATURITY MATRIX FOR MULTI-MODAL INTEGRATION (4MI) TOOL

- Assessment tool for Indian cities to assess maturity levels of integrated transport systems;
- Objective is to evaluate progress towards MMI and identify barriers/action areas
- Determine the extent of integration achieved across the five core areas of MMI and its sub-categories
- Can be used by the city authorities – to align with city objectives & enable realistic targets.

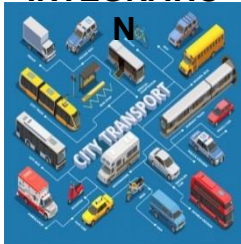
**5 CORE MMI
AREAS**

**13 MMI
ELEMENTS**

**5 LEVELS OF
INTEGRATION**

**13 X 5 MATURITY
MATRIX**

**NETWORK &
SERVICE
INTEGRATION**



**PHYSICAL
INTEGRATION**



**FARE
INTEGRATION**



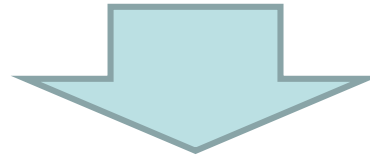
**INFORMATION
INTEGRATION**



**INSTITUTIONAL
INTEGRATION**



LEVELS OF MATURITY



Independent
Systems

Integrated
Systems

LEVEL 1

Nothing, marginalized
or ad-hoc efforts/
planning

LEVEL 2

Baseline, informal
efforts, not
mainstreamed

LEVEL 3

Getting started, basic
applications and
processes being
adopted

LEVEL 4

Improving, partially
integrated,
standardized and
managed applications

LEVEL 5

Advanced, integrated,
continuous
improvement

ELEMENTS CONSIDERED IN 4MI TOOL

NETWORK & SERVICE INTEGRATION



- E1. Planning of routes and services
- E2. Service headways and schedule coordination
- E3. Accessibility

PHYSICAL INTEGRATION



- E4. Proximity of transit stops
- E5. Accessibility within the interchange zone
- E6. Last mile connectivity to the interchange zone

FARE INTEGRATION



- E7. Fare policy/ structure
- E8. Fare technology

INFORMATION INTEGRATION



- E9. Information availability for commuters
- E10. Wayfinding
- E11. Customer care

INSTITUTIONAL INTEGRATION



- E12. Decision making processes
- E13. Data sharing and integration

14th

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Core Areas of Multimodal Integration	Elements	Levels of integration				
		Independent systems				Integrated systems
		Level 1	Level 2	Level 3	Level 4	Level 5
Network & Service integration	E1. Planning of routes and services					
	E2. Service headways and schedule coordination					
	E3. Accessibility					
Physical integration	E4. Proximity of transit stops					
	E5. Accessibility within the interchange zone					
	E6. Accessibility within the interchange zone					
Fare integration	E7. Fare policy/ structure					
	E8. Fare technology					
Information Integration	E9. Information availability for commuters					
	E10. Wayfinding					
	E11. Customer care					
Institutional integration	E12. Decision making processes					
	E13. Data Sharing and Integration					

Detailed descriptions of each maturity level for the 13 elements are specified based on which users can choose the level of maturity

Source: 4MI Tool developed by CoE-UT, CRDF as a part of SMART-SUT project jointly implemented by MoHUA and GIZ under the Indo-German Green Urban Mobility Partnership

SELECTION OF LEVELS FOR DIFFERENT MMI ELEMENTS

4mitool.crdi.org.in/MaturityMatrix/MaturityMatrix

Multimodal PT System – Maturity Matrix

Select City

New Scenario

Save

City MMI Score : 0

Admin

Elements	Level 1	Level 2	Level 3	Level 4	Level 5	Select Level
8. Fare technology	<ul style="list-style-type: none"> No use of technology Manual ticketing – paper tickets issued 	<ul style="list-style-type: none"> Use of Electronic Ticketing Machines (ETM) for issuing tickets QR code tickets enabled for some of the modes 	<ul style="list-style-type: none"> Use of ETM for issuing tickets with QR codes on buses Automatic fare collection systems (AFCS) enabled with smart cards in case of rapid transit modes 	<ul style="list-style-type: none"> Interoperable smart cards across all transit modes – a single card can be used to pay fares for rapid transit modes Use of ETM for issuing tickets with QR codes on buses may continue 	<ul style="list-style-type: none"> Interoperable smart cards across all PT modes – a single card can be used to pay fares for all the modes including last mile modes - auto rickshaws, taxis, PBS, etc Mobile ticketing option also enabled 	Select Level

Information Integration

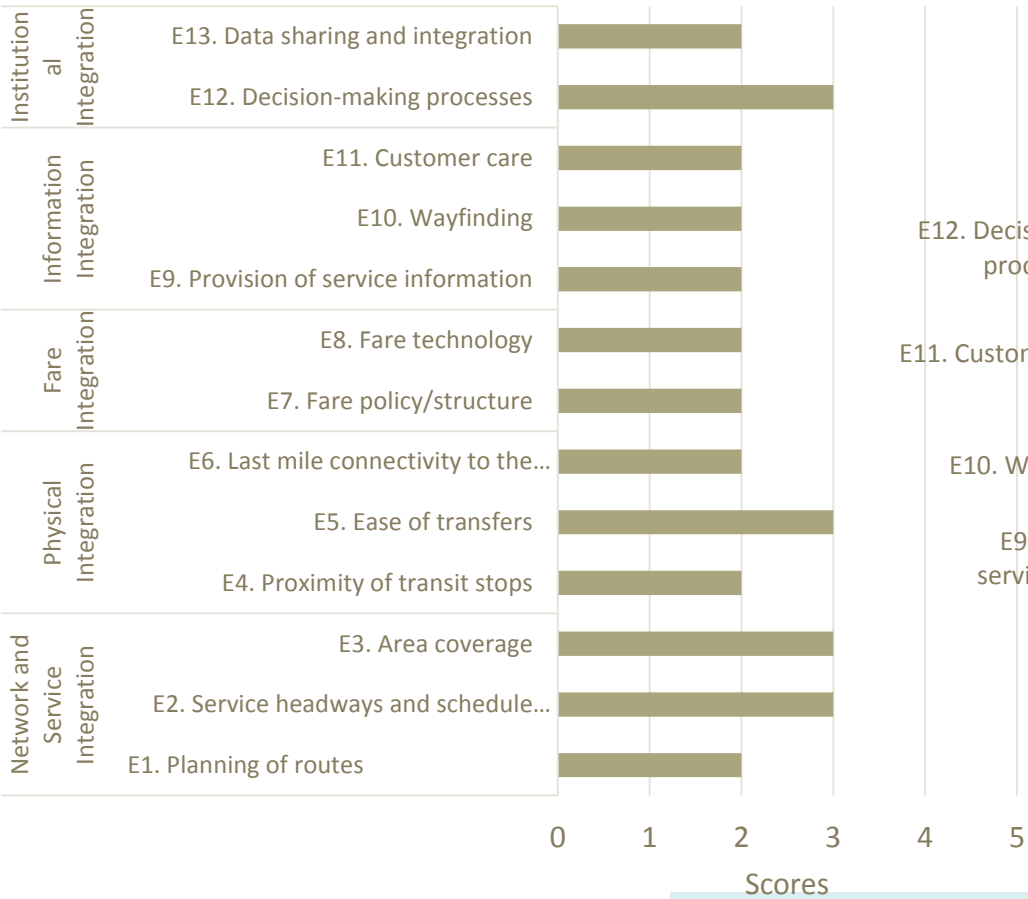
9. Provision of service information	<ul style="list-style-type: none"> No pre-trip information available online Information available at bus stops/ rapid transit 	<ul style="list-style-type: none"> Pre-trip information available on rapid transit mode agency's website Information available at bus 	<ul style="list-style-type: none"> Pre-trip information available on respective PT agency's website; in some cases, static information available on Google 	<ul style="list-style-type: none"> Pre-trip data available independently for each mode through respective websites or Google Maps 	<ul style="list-style-type: none"> Integrated trip planners available for all modes to help plan journeys Maps, service details and real-time 	Select Level
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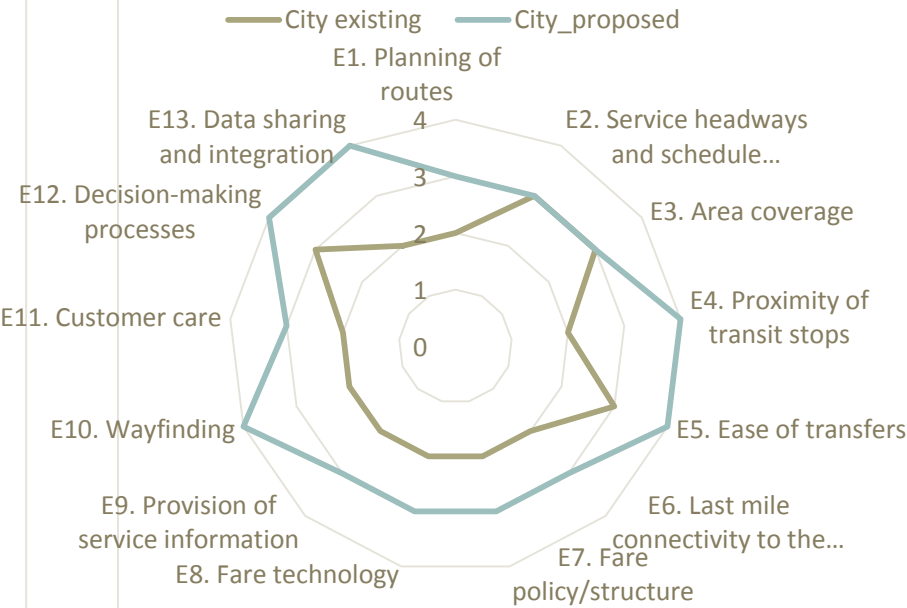
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4MI TOOL OUTPUTS

City existing



MMI Scores comparison

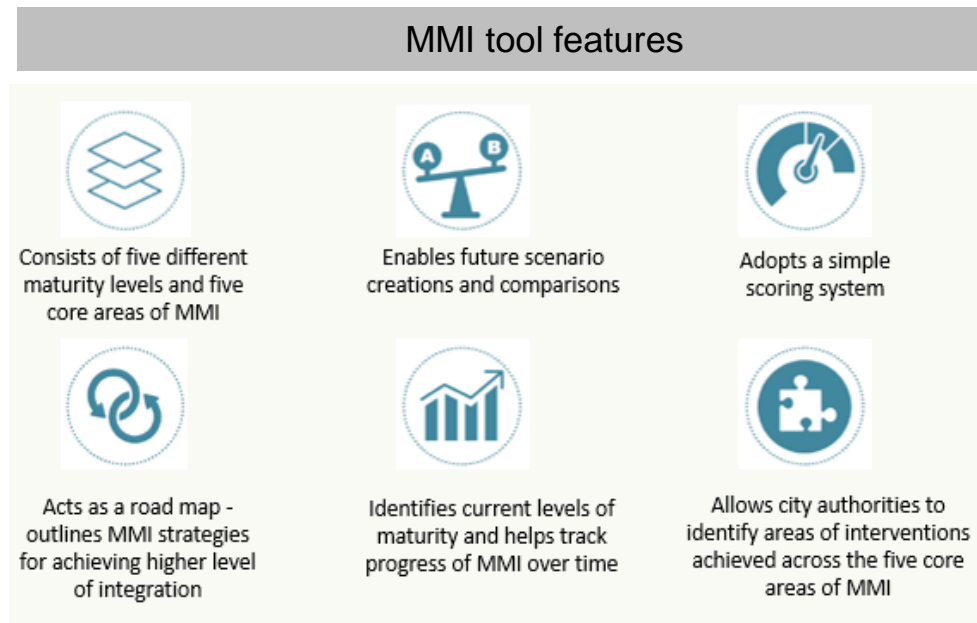


OUTCOME INDICATORS FOR MMI

Multi-modal outcome indicators		Unit of measurement
1.	Mode share of PT and NMT	Percentage
2.	PT patronage	Percentage increase in ridership
3.	Multi-modal integrated PT journeys (with transfers)* <small>*Data regarding multi-modal integrated PT journeys will be available once integrated smart card ticketing is implemented across all PT modes</small>	Proportion of total trips
4.	Average PT journey time reductions (Transfer time & Waiting times separately)	Minutes
5.	Smart card usage	Proportion of total trips
6.	Customer satisfaction level	Percentage of PT commuters satisfied with the service levels of PT system

SUMMARY

- Integrated transportation system key for seamless passenger journeys and facilitating mode shift
- Cities undertaking several initiatives towards integration
- Need for a self-assessment framework for analysing their initiatives towards MMI and identifying future action areas



Thank you

Tool link: <https://4mitool.crdf.org.in/>

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