

# TRANSIT ORIENTED DEVELOPMENT (TOD) AND ROAD SAFETY

WORKSHOP SERIES

SESSION # 1

1 October 2020



*Supported by:*



*Conducted by:*



- Introduction
- TOD process mapping & need for Road Safety
- Safe System in TOD
- ‘Safe Access to Mass-transit’ virtual interactive activity
- Q/A



# Workshop on Transit Oriented Development and Road Safety: Session 1

Gerald Ollivier

TOD CoP



**WORLD BANK GROUP**



**WRI INDIA**

# Program



## **Session 1. TOD and Road Safety**

October 1, 2020  
4.30 pm (IST time)



## **Session 2. Assessing and Enabling Road Safety within a TOD project cycle**

October 8, 2020  
6.30 pm (IST time)



## **Session 3. Planning and Designing Road Safety measures in TOD**

October 15, 2020  
6.30 pm (IST time)



## **Session 4. Financing and Implementing Road Safety measures in TOD**

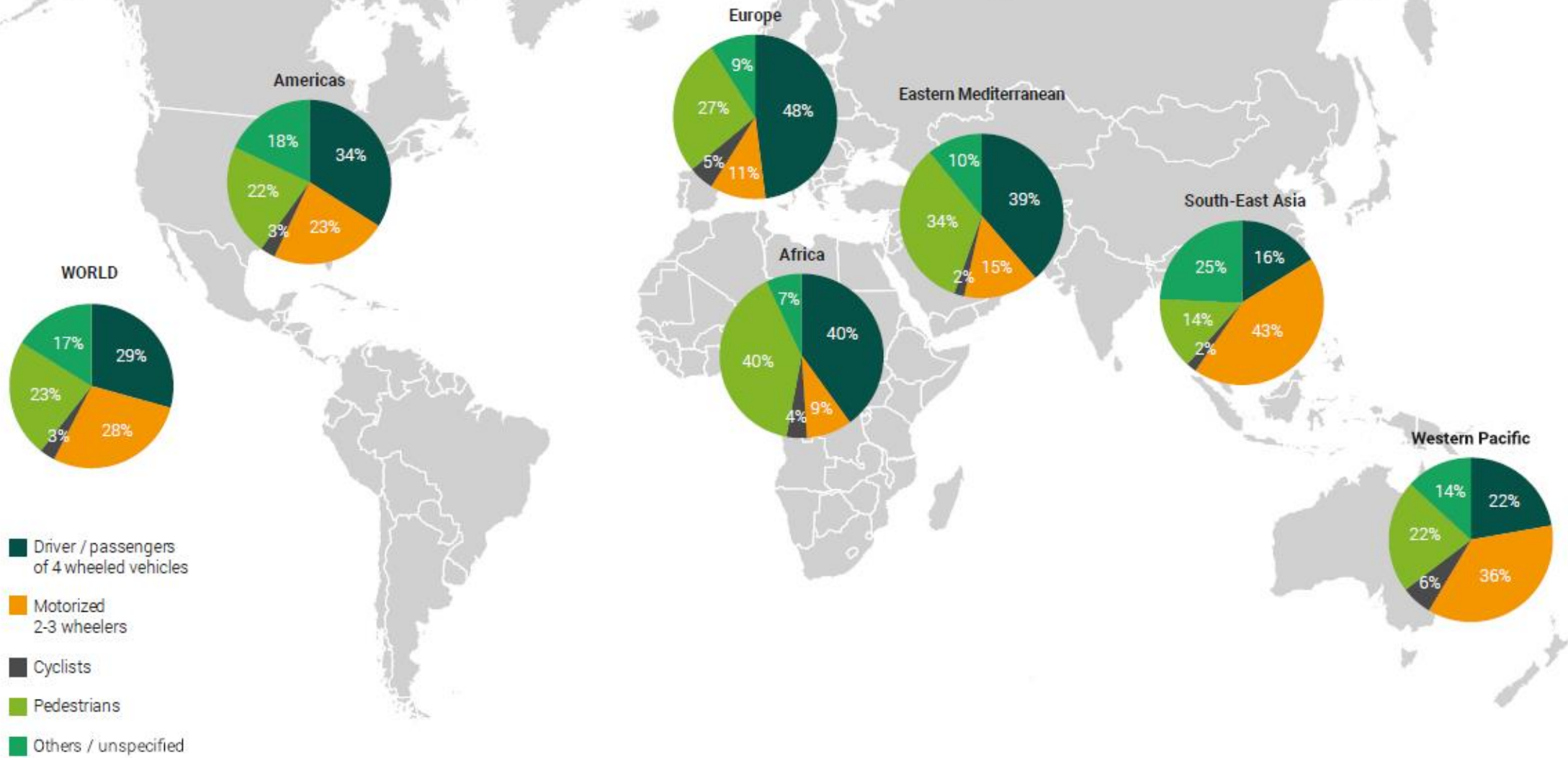
October 22, 2020  
5.00 pm (IST time)

90 Minute sessions



# TOD & ROAD SAFETY

# ROAD SAFETY: A world- wide problem



Road traffic deaths by type of road user



Dhaka (Bangladesh). Source: Blanca Domine

## Why safe TOD?

Strong interrelationship  
between TOD and road safety



自由が丘駅  
JIYUGAOKA STA.

At the **CITYWIDE LEVEL**, TOD influences urban form and mode-choice; two very critical factors for road safety.

- Mixed-use land use developments
- Safe walking and cycling distances around transit stations
- Use of transit combined with non-motorized commute over use of cars

Decreases number of cars on the street thereby reducing the chances of conflicts





At the NEIGHBORHOOD LEVEL

TOD promotes more pedestrian-friendly streets with lower traffic speeds, which significantly improves the safety of the most vulnerable road-user group.



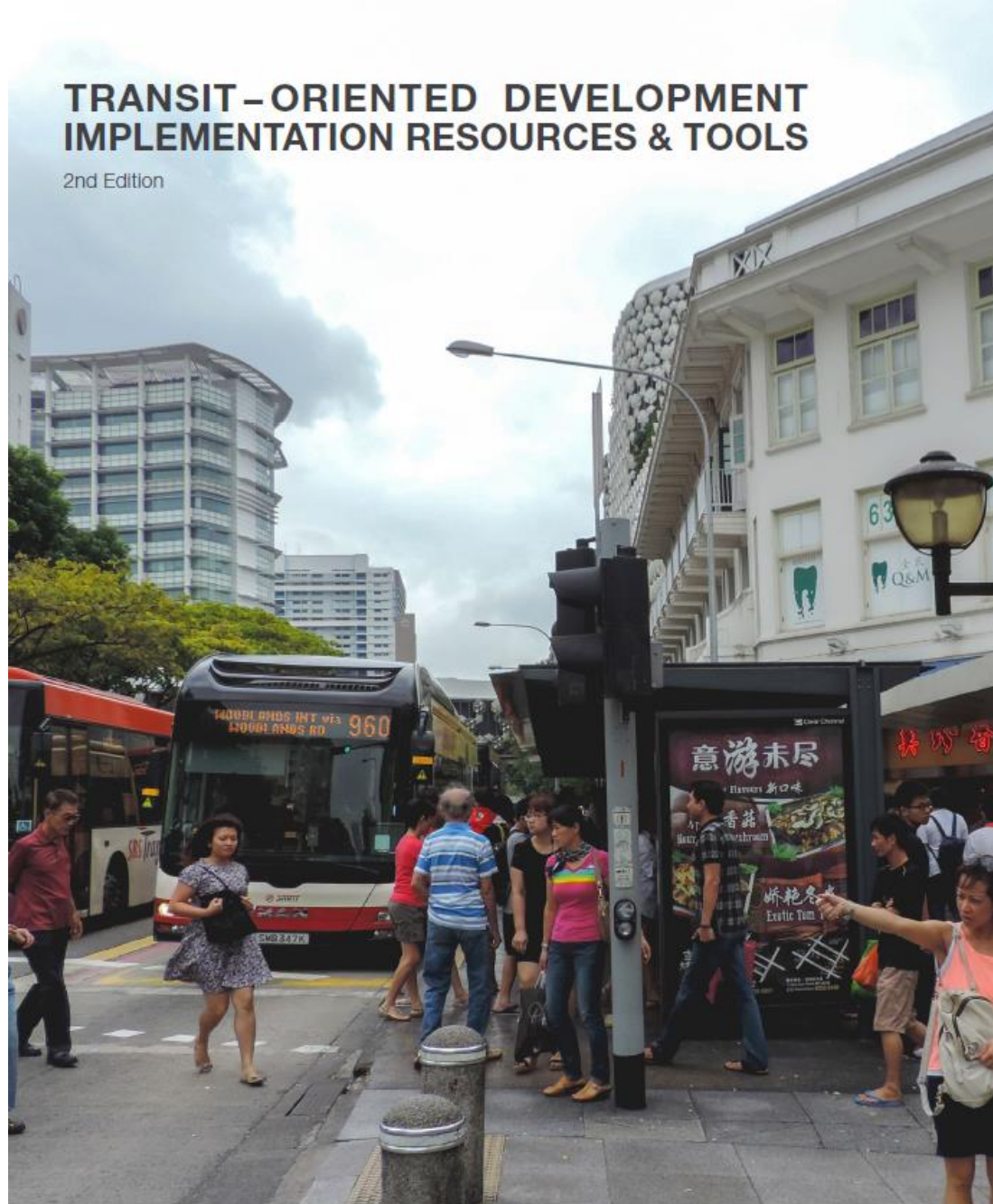
Valencia (Spain). Source: Blanca Domine



# Overview

## TRANSIT-ORIENTED DEVELOPMENT IMPLEMENTATION RESOURCES & TOOLS

2nd Edition



- **Streamline the process** of TOD in low and middle income countries
- **Avoid duplication** of effort by individual governments/ municipalities
- Sensitive to **contextual variations** and on-ground realities
- Applicability at **various scales**
- Cater to **diverse user groups**
- Flexible standards for development of **Greenfield areas & redevelopment of infill areas**



A. Communicate



B. Guide Creation of Successful TODs



C. One-stop TOD Resource



D. Capacity Building

# TOD Implementation Resources & Tools

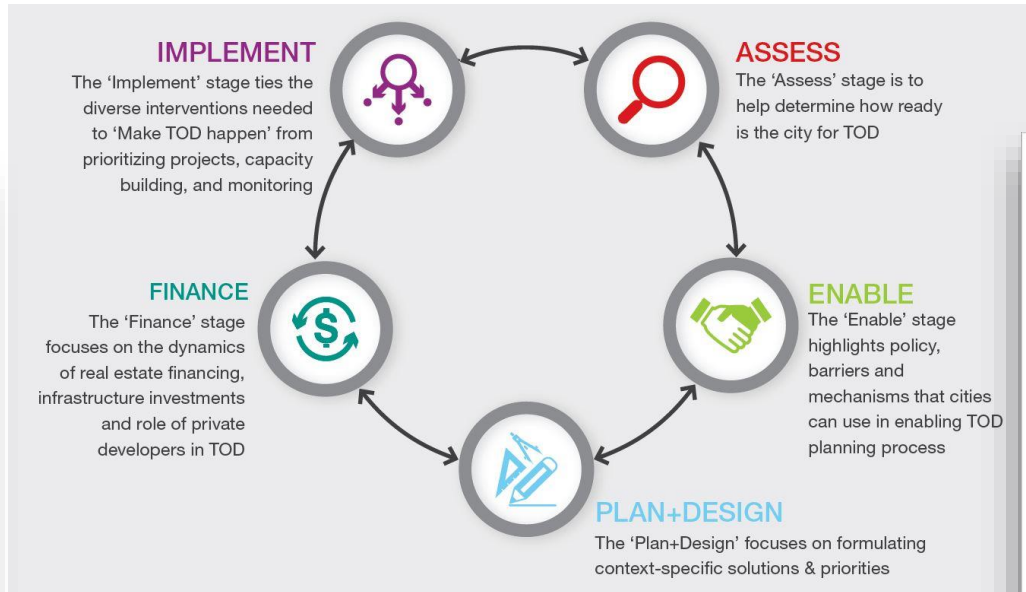
[www.thegpsc.org/tod](http://www.thegpsc.org/tod)

## TOD Fundamentals: Key concepts to start project conversations

**TOD K P**

**SCALES OF TOD**

	BOUNDARY/ZONE	KEY OUTCOMES	FOCUS
<b>CITY REGION</b>	Administrative Boundaries/ Transit Systems.  TOD Implementation Program, Addis Ababa, Ethiopia	Involves integration of land uses with transit system planning to support analysis and decision making related to citywide growth management. Provides a point of intervention for TOD as a policy in statutory documents (Master Plan/ Development Plan).	<ul style="list-style-type: none"> <li>TOD Policies</li> <li>Generic DCR Modifications</li> <li>Institutional Framework for Implementation</li> <li>Metropolitan/City TOD Plan</li> <li>Accessibility Guidelines</li> </ul>
<b>CORRIDOR</b>	10-minute (800m-2km) walking/cycling distance on both sides of existing/ planned transit corridor.  BRTS Urban Design Strategy, Hubli- Dharwad, India	Ensures that development at one station complements development at other stations, resulting in a network of transit-oriented places. Specific transit ridership goals can be evaluated at this scale against development potential around transit stations.	<ul style="list-style-type: none"> <li>TOD Policies</li> <li>Generic DCR Modifications</li> <li>Real Estate/Land Value Capture Potential</li> <li>Institutional Framework for Implementation</li> </ul>
<b>STATION AREA</b>	5-10 minute (400m-1km) walking distance from station facilities.  TRX financial district, Kuala Lumpur	Focuses on areas surrounding transit stations within a 5-10 minute walking distance focusing on land use, transit station accessibility, multimodal integration and connectivity.	<ul style="list-style-type: none"> <li>Detailed Station Area Plan</li> <li>Urban Design Guidelines (Built Form)</li> <li>Accessibility/ Streetscape Proposals</li> <li>Real Estate/Land Value Capture Potential</li> <li>Investment Strategy</li> <li>Implementation Plan</li> </ul>
<b>SITE LEVEL</b>	Individual parcel within 5-10 minute (800m-1km) walking distance from the station facility.  Metro Mansion Station, Nanchang, China	Focuses on individual developments within a station area. Includes targets for net intensity and density for development, internal circulation, building design, and parking.	<ul style="list-style-type: none"> <li>Site Plan</li> <li>Detailed Development Program</li> <li>Urban Design Plan</li> <li>Accessibility/ Streetscape Design</li> <li>Financial Strategy</li> <li>Implementation Plan</li> </ul>

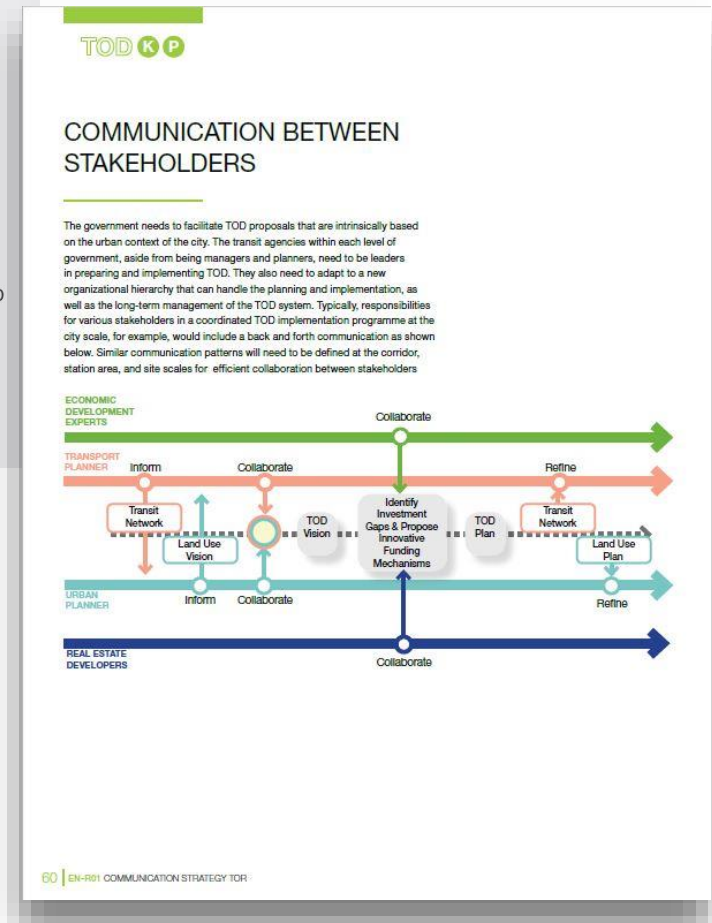


## 5-Step TOD Framework

Focuses on providing stakeholders with a step-by-step approach to make informed decisions.

[www.thegpsc.org/tod](http://www.thegpsc.org/tod)

## Enable: Policies and mechanisms to enable the TOD planning process



## ANALYTICAL



The Products under this category build on the available facts or information to make critical evaluations

→ SPREADSHEETS | REFERENCE DOCUMENT | CHECKLIST

## COMMUNICATION



This category of Products impart or exchange information with the purpose of conveying a message or expecting better results

→ INTERACTIVE GAMES | REFERENCE DOCUMENT

## 'HOW-TO' GUIDES



Products created as a step-by-step approach for evaluating the multitude of information to reach a conclusion

→ STEP-BY-STEP GUIDE

## RESOURCES



Products include details of external sources that can be referred for informed assessment

→ CHEAT-SHEETS | SPREADSHEETS | WEBLIOGRAPHY | GLOSSARY OF TERMS

## PROCUREMENT



The Products help in acquiring services/works from an external source to accomplish a task/attain the objectives

→ REFERENCE DOCUMENT | TOR TEMPLATE

# Toolkit Types

# TOD Knowledge by type

## ANALYTICAL -A-



- AS-A01 - TOD Readiness Assessment
- AS-A02 - TOD Scale & Context Assessment
- AS-A03 - Thresholds for TOD Real Estate Demand
- AS-A04 - Threshold for Rapid Transit Mode
- FI -A01 - Real Estate Development Pro-Forma
- FI -A02 - Infrastructure Capital & Operating Cost Estimates/Ranges
- IM-A01 - Monitoring and Evaluation
- IM-A02 - Key Performance Indicators for TOD

## COMMUNICATION -C-



- EN-C01 - Making a Case for TOD to the Public-Communication Strategy-
- EN-C02 - TOD Role Out - Stakeholder Engagement Games
- IM-C01 - Applying Safe Access in TOD Areas

## RESOURCES -R-



- AS-R01 - Real Estate Analysis Best Practices
- EN-R01 - Roles & Responsibilities of Stakeholders
- PD-R01 - TOD Zoning Code Template
- PD-R02 - TOD Planning Principles & Design Guidelines
- PD-R03 - Land Use And Transportation Integration Best Practices
- PD-R04 - Pedestrian Friendly Design Best Practices
- FI- R01 - Development Incentives
- FI- R02 - Land Value Capture Mechanisms Best Practices
- FI- R03 - Municipal Finance Tools

## 'HOW-TO' GUIDES -H-



- AS-H01 - How to Undertake Real Estate Market Analysis
- AS-H02 - How to Undertake Rapid Transit Alternatives Assessment
- AS-H03 - Infrastructure Carrying Capacity Assessment
- AS-H04 - How to Undertake Road Safety Assessment for TOD Areas
- EN-H01 - How to Build Institutions and Enable Intergovernmental Coordination
- PD-H01 - How To Prepare A City-Wide TOD Plan
- PD-H02 - How To Prepare A Corridor TOD Plan
- PD-H03 - How To Prepare A Station Area Plan
- PD-H04 - How To Prepare A Site Level TOD Plan
- PD-H05 - How To Develop TOD Supportive Zoning Framework
- PD-H06 - Land Amalgamation Framework
- PD-H07 - How To Plan Safe Access for TOD
- FI -H01 - Land Value Capture Framework
- FI -H02 - Private Sector Participation Framework
- IM-H01 - How To Undertake Capacity Building
- IM-H02 - How To Develop A TOD Phasing Strategy

## PROCUREMENT -P-



- AS-P01 - Real Estate Analysis Terms of Reference
- AS-P02 - Transit Alternatives Analysis Terms of Reference
- AS-P03 - Infrastructure Analysis Terms of Reference
- EN-P01 - Communications Strategy Terms Of Reference
- PD-P01 - TOD Plans Terms of Reference
- IM -P01 - Capacity Development Strategy Terms of Reference

Inclusion of Road  
Safety in the TOD  
Toolkit

# Outputs



## ASSESS AS

The 'Assess' stage is used to help assess the city's readiness in terms of technical capacities, real estate conditions, and transit service quality, as well as the appropriate scale and context for TOD in the city.

### ANALYTICAL - A -

#### AS-A 01 - TOD Readiness Assessment - Also Refer to AS-H04 / IM-H01

A checklist and spreadsheet aimed to help **city leaders and policymakers** define the city's readiness across various aspects. Applicable at all scales and contexts.

#### AS-A 02 - TOD Scale & Context Assessment - Also Refer to PD-H01/02/03/04/05

A checklist aimed to help **urban planners** define the scale of TOD interventions and context-specific typologies. Applicable at all scales and contexts.

#### AS-A 03 - Thresholds for TOD Real Estate Demand - Also Refer to AS-H01

A spreadsheet aimed to help **urban planners** identify real estate demand. Applicable at corridor and station area scales in urban and suburban context.

#### AS-A 04 - Threshold for Rapid Transit Mode - Also Refer to AS-H02

A spreadsheet aimed to help **transport planners** identify appropriate mode for transit-oriented densities. Applicable at city and corridor scales in urban and suburban context.

### 'HOW-TO' GUIDE - H -

#### AS-H 01 - How to Undertake Real Estate Market Analysis - Also Refer to AS-H03/04 / AS-R01 / AS-P01 / FI-A02

A step-by-step guide process to help **economists** to determine the full development potential of the TOD corridors and sites, as well as the financial viability of such projects. Applicable at the corridor, station and site scales and all contexts.

#### AS-H 02 - How to Undertake Rapid Transit Alternatives Assessment - Also Refer to AS-H04 / AS-P02 / FI-A01

A step-by-step guide to help **transport planners** evaluate the mode, cost-effectiveness and alignment alternatives for rapid transit. Applicable at the city and corridor scales.

#### AS-H 03 - Infrastructure Carrying Capacity Assessment - Also Refer to AS-P03 / FI-A01

A step-by-step guide to help **urban and transport planners** evaluate the infrastructure needs of the city and the

#### AS-H 04 - How to Undertake Road Safety Assessment for TOD Areas - Also Refer to AS-A01 / IM-H01 / IM-P01

A step-by-step guide to help **urban and transport planners** assess road safety and crash data within the TOD station area. Applicable at all scales and contexts.

## ASSESS AS

### RESOURCE - R -

#### AS-R 01 - Real Estate Analysis Best Practices - Also Refer to AS-H01

Case study examples of real estate analysis for **economists** undertaking TOD projects in low and middle-income countries. Applicable at all scales and contexts.

### PROCUREMENT - P -

#### AS-P 01 - Real Estate Analysis Terms of Reference- Also Refer to AS-H01

Template terms of reference for **city leaders** to hire a real estate consultant to perform targeted demand analyses along a TOD corridor. Applicable at the corridor, station and site scales and all contexts.

#### AS-P 02 - Transit Alternatives Analysis Terms of Reference- Also Refer to AS-H02

Template for **city leaders** to hire a transport planning consultant to perform a transit alternatives study. Applicable at all scales and contexts.

#### AS-P 03 - Infrastructure Analysis Terms of Reference - Also Refer to AS-H03

Template terms of reference for **city leaders** to hire a consultant to conduct an infrastructure analysis for a TOD project. Applicable at all scales and contexts.



# ENABLE EN

The 'Enable' stage highlights policy barriers, communication mechanisms and governance suggestions that cities can use in enabling the TOD planning process.

## COMMUNICATION - C -

**EN-C 01** - Making a Case for TOD to the Public-Communication Strategy- Also Refer to **EN-C02**

*A creative guide to help **urban planners** disseminate information to public and regional bodies and express the importance and benefits of TOD. Applicable at all scales and contexts.*

**EN-C 02** - TOD Role Out - Stakeholder Engagement Games- Also Refer to **EN-C01 / EN-P01 / IM-C01**

*An interactive game, format and templates for cross-agency coordination and visioning with all stakeholders, including **city leaders, urban and transport planners, policymakers, economists and community members**. Applicable at all scales and contexts.*

## 'HOW-TO' GUIDE - H -

**EN-H 01** - How to Build Institutions and Enable Intergovernmental Coordination- Also Refer to **IM-H01 / IM-P01**

*A step-by-step guide for **city leaders and policymakers** to define an institutional structure and coordination framework that can make TOD happen within the existing planning and development framework. Applicable at all scales and contexts.*

## RESOURCE - R -

**EN-R 01** - Roles & Responsibilities of Stakeholders- Also Refer to **EN-C01 / EN-P01**

*A resource to help TOD **urban and transport planners** identify the stakeholders to be involved in planning and implementing TOD and the roles and responsibilities of each stakeholder. Applicable at all scales and contexts.*

## PROCUREMENT - P -

**EN-P 01** - Communications Strategy Terms Of Reference- Also Refer to **EN-C01 / IM-H01**

*Template for hiring a Public Relations agency to analyze potential risks, plan and implement a TOD communications strategy within a community. Applicable at all scales and contexts*



## PLAN+DESIGN PD

The 'Plan+Design' stage focuses on formulating context specific planning and design solutions and priorities

### 'HOW-TO' GUIDE - H -

PD-H 01 - How To Prepare A City-Wide TOD Plan- Also Refer to PD-H05/07 / PD-R02

A step-by-step process guided by a series of task-based actions that will assist **urban and transport planners** in planning and implementing TOD at the city-wide level. Applicable at the city-wide scale and across all contexts.

PD-H 02 - How To Prepare A Corridor TOD Plan- Also Refer to PD-H05/07 / PD-R02

A step-by-step process guided by a series of task-based actions that will assist **urban and transport planners** in planning and implementing TOD at the corridor level. Applicable at the corridor scale and across all contexts.

PD-H 03 - How To Prepare A Station Area Plan- Also Refer to PD-H06/07 / PD-R02

A step-by-step process guided by a series of task-based actions that will assist **urban and transport planners** in planning and implementing TOD at the station level. Applicable at the station area and across all contexts.

PD-H 04 - How To Prepare A Site Level TOD Plan- Also Refer to PD-R02

A step-by-step process guided by a series of task-based actions that will assist **urban and transport planners** in planning and implementing TOD at the site level. Applicable at the site level scale and across all contexts.

PD-H 05 - How To Develop TOD Supportive Zoning Framework - Also Refer to PD-H01

A guideline for **city leaders** and **policymakers** to prepare/revise TOD-supportive zoning ordinances, including revisions for pedestrian activities, urban design and parking restrictions. Applicable at all scales and contexts.

PD-H 06 - Land Amalgamation Framework- Also Refer to IM-H01

A step-by-step process that details the process of land amalgamation for **urban and transport planners** and **policymakers**. Applicable at all scales and contexts.

PD-H 07 - How To Plan Safe Access for TOD- Also Refer to PD-H01/02/03 / PD-R02 / FI-R01

A guideline on TOD area network planning to ensure safe access to stations for **urban and transport planners** and **policymakers**. Applicable at station area scale and all contexts.



## PLAN+DESIGN PD

### RESOURCE - R -

PD-R 01 - TOD Zoning Code Template- Also Refer to PD-H05

Template zoning ordinance/guidelines for **policymakers** to use, including provisions on pedestrian pathways, activity generating uses, porous urban design, parking restrictions, shared parking provision, etc. Applicable at all scales and contexts.

PD-R 02 - TOD Planning Principles & Design Guidelines- Also Refer to PD-H01/02/03/04/05/07

A series of detailed planning principles and design components to help **urban and transport planners** formulate TOD plans at various scales and contexts of intervention. Applicable at all scales and contexts.

Case study examples of land use and transportation integration for **urban and transport planners** that influenced significant improvements and found great success in cities globally. Applicable at corridor and station area scales and all contexts.

PD-R 04 - Pedestrian Friendly Design Best Practices- Also Refer to PD-R02

Small-scale, iterative, pedestrian-friendly examples in low-middle income countries for **urban and transport planners** that depict significant improvements in an area brought forth by pedestrian-oriented and walkable design. Applicable at corridor and station area scales and all contexts.

### PROCUREMENT - P -

PD-P 01 - TOD Plans Terms of Reference- Also Refer to PD-H01/02/03/04 / PD-R02

Template for **city leaders** to hire a consultant to prepare TOD plans at the required scale and context. Applicable at all scales and contexts.

# FINANCE FI

The 'Finance' stage focuses on the dynamics of real estate financing, infrastructure investments and the role of private developers in TOD.

## ANALYTICAL - A -

### FI-A 01 - Infrastructure Capital & Operating Cost Estimates/Ranges- Also Refer to AS-H03 / AS-P03

An interactive Excel spreadsheet available online to **urban and transport planners** to help estimate the capital and operating costs of TOD projects, based on examples in low and middle-income countries. Applicable at all scales and contexts.

### FI-A 02 - Real Estate Development Pro-Forma- Also Refer to AS-H01 / AS-R01 / AS-P01

A working spreadsheet to help **economists** gauge the potential return on investment (ROI) based on certain basic development parameters for a given TOD project. Applicable at all scales and contexts.

## 'HOW-TO' GUIDE - H -

### FI-H 01 - Land Value Capture Framework- Also Refer to FI-R02

A step-by-step process for **economists, urban and transport planners and city leaders** with a variety of alternative approaches to adopting Land Value Capture (LVC) in TOD projects of varying scale and context. Applicable at all scales and contexts.

### FI-H 02 - Private Sector Participation Framework- Also Refer to FI-R03

A project structuring process for **economists** to plan financial resources to meet the project cost using a PPP financing framework. Applicable at all scales and contexts.

## RESOURCE - R -

### FI-R 01 - Development Incentives- Also Refer to PD-H07 /FI-R03

A guide of the potential financial tools **urban planners and economists** can use to finance a TOD project. Applicable at all scales and contexts.

### FI-R 02 - Land Value Capture Mechanisms Best Practices- Also Refer to FI-H01

Examples of land value capture tools employed in low and middle-income countries to help **economists and urban planners** fund major transit projects globally. Applicable at all scales and contexts.

### FI-R 03 - Municipal Finance Tools - Also Refer to FI-R01 / FI-H02

Collection of the most commonly used tools for TOD and urban development financing around the world to guide **economists and urban planners** in their TOD financing. Applicable at all scales and contexts.

# IMPLEMENT IM

The 'Implement' stage ties the diverse interventions needed to 'Make TOD happen' from prioritizing projects, to capacity building, and monitoring.

## ANALYTICAL - A -

### IM-A 01 - Monitoring and Evaluation - Also Refer to IM-A02

Methodology for **city leaders and urban and transport planners** to define the appropriate monitoring and evaluation framework for a TOD project or program to track project success. Applicable at all scales and contexts.

### IM-A 02 - Key Performance Indicators for TOD - Also Refer to IM-A01

A framework for **city leaders and urban and transport planners** to measure TOD plans or practices in individual cities against global performance indicators. Applicable at all scales and contexts.

## COMMUNICATION - C -

### IM-C 01 - Applying Safe Access in TOD Areas - Also Refer to EN-C02

A guide for **urban and transport planners and policymakers** to identify road safety concerns in a station area and formulate ways to address them. Applicable at station area scale and all contexts.

## 'HOW-TO' GUIDE - H -

### IM-H 01 - How To Undertake Capacity Building - Also Refer to IM-P01

A guide for **city leaders and policymakers** to build the institutional arrangement for TOD project or programs. Applicable at all scales and contexts.

### IM-H 02 - How To Develop A TOD Phasing Strategy - Also Refer to PD-R02

Methodology for **urban and transport planners** to help develop phasing strategies for a TOD project or program. Applicable at all scales and contexts.

## PROCUREMENT - P -

### IM-P 01 - Capacity Development Strategy Terms of Reference- Also Refer to IM-H01

Template to help **city leaders** outsource capacity building and training exercises to spread awareness about TOD. Applicable at all scales and contexts.

## GOOD PRACTICE NOTE

Integration of Road Safety Considerations In  
Transit-Oriented Development projects

## CONTENTS

<b>Abbreviations</b>	<b>3</b>
<b>List of Tables</b>	<b>4</b>
<b>List of Figures</b>	<b>4</b>
<b>Introduction</b>	<b>9</b>
Road crash and impact	9
Safe system approach	10
Case for transit-oriented development (TOD)	12
<b>Scoping</b>	<b>13</b>
<b>Assess</b>	<b>14</b>
Road safety capacity reviews: Policy, Regulatory and institutional framework	14
Road inventory, road crash data collection and analysis	15
Road safety assessment and engineering tools	17
<b>Enable</b>	<b>19</b>
Planning of TOD networks	21
<b>Plan+Design</b>	<b>21</b>
Design of Elements within TOD Network	22
<b>Finance</b>	<b>23</b>
<b>Implement</b>	<b>24</b>
Institutional set-up and Capacity building	24
Execution of design	25
Monitoring and evaluation	26
<b>Appendix a</b>	<b>27</b>
<b>Appendix B</b>	<b>33</b>
<b>References</b>	<b>59</b>

Where to find  
the toolkit

Further  
questions



[www.thegpsc.org/tod](http://www.thegpsc.org/tod)

Full document:

<http://hdl.handle.net/10986/31121>



Email:

[gollivier@worldbank.org](mailto:gollivier@worldbank.org)

# TRANSIT ORIENTED DEVELOPMENT (TOD) AND ROAD SAFETY

WORKSHOP SERIES

SESSION # 1  
TOD PROCESS MAPPING AND ROAD SAFETY

1 October 2020



*Supported by:*



*Conducted by:*



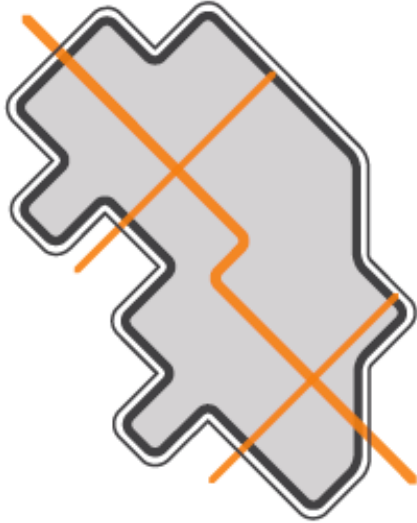
# TRANSIT ORIENTED DEVELOPMENT (TOD)

TOD is a planning approach that calls for concentrating **urban densities, communities and activities** ideally within a **500 - 800m radius or 5-10-minute walking distance of mass rapid transit stops/stations** (both bus and rail-based), developing quality urban space and providing convenient and efficient access to a diverse mix of land uses.

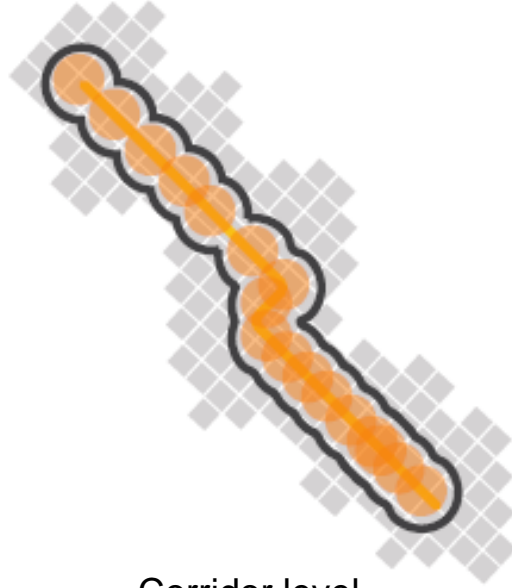




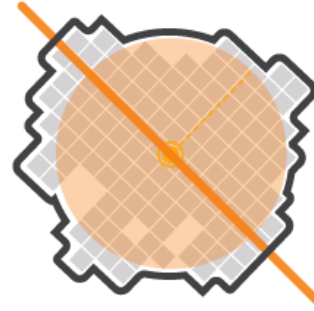
# SCALES OF PLANNING



Region/City Level



Corridor level

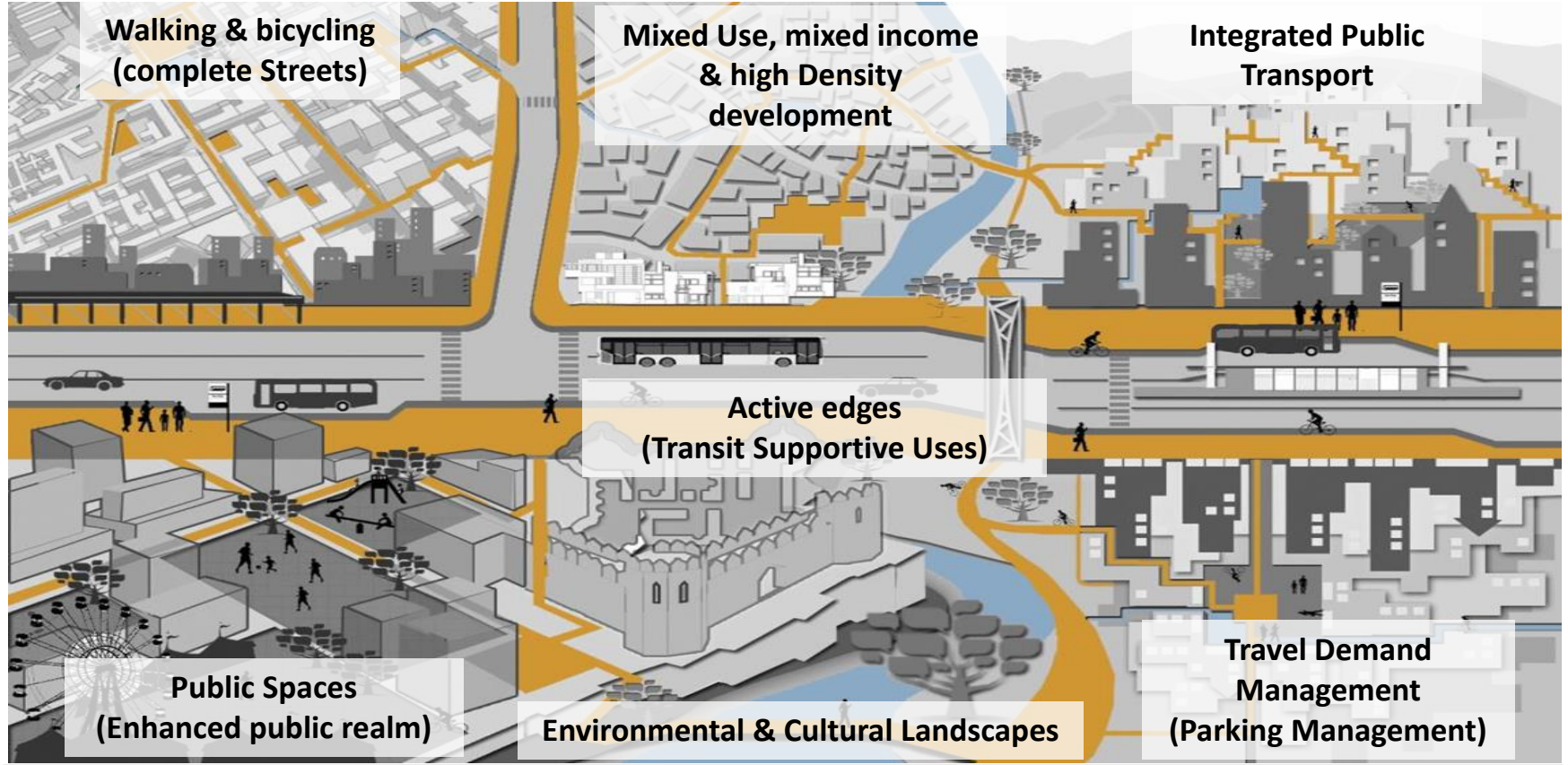


Station area level



Site level

# TOD PRINCIPLES



# CATEGORIES OF TOD



Greenfield

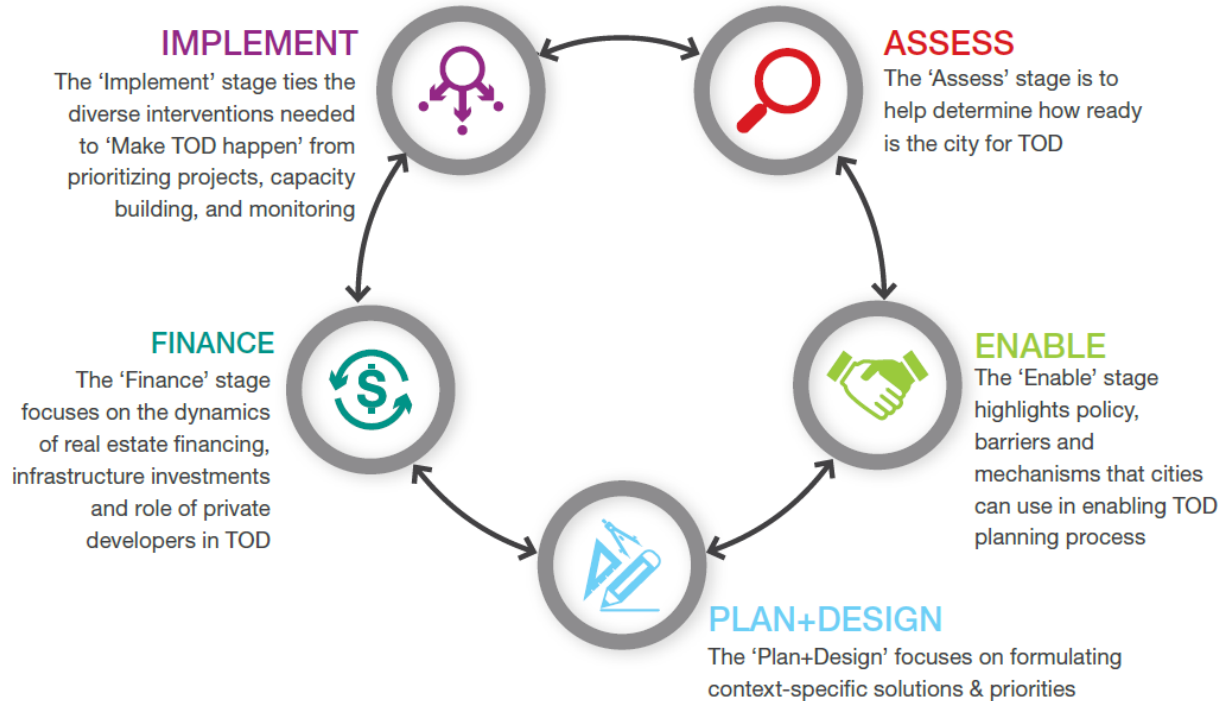


Suburban



Urban

# TOD FRAMEWORK



# TOD PROJECT LIFECYCLE AND ROAD SAFETY



# TOD AND ROAD SAFETY

## Assess

To assess the road safety readiness of a city, to understand the need for TOD project implementation

## Enable

To enable the institutions and stakeholders about the challenges of road safety and how TOD project development can be a catalyst for achieving road safety.

## Plan & Design

To ensure that planning of network and facilities and designing of various elements of the network aligns with the requirements for smooth functioning of a TOD station area and caters to the requirements of all road users to ensure safety.

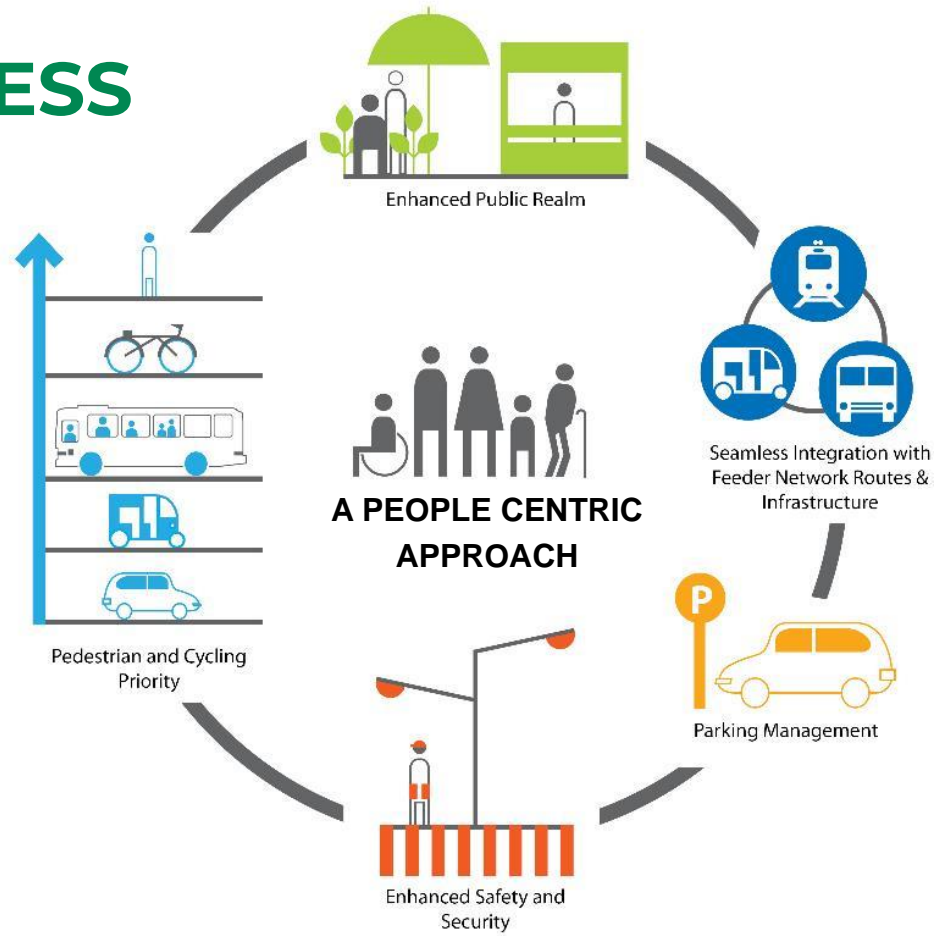
## Finance

To allocate funds, provide incentives and develop innovative financing tools for the local authorities, enabling institution, developers and property owners to ensure road safety

## Implement

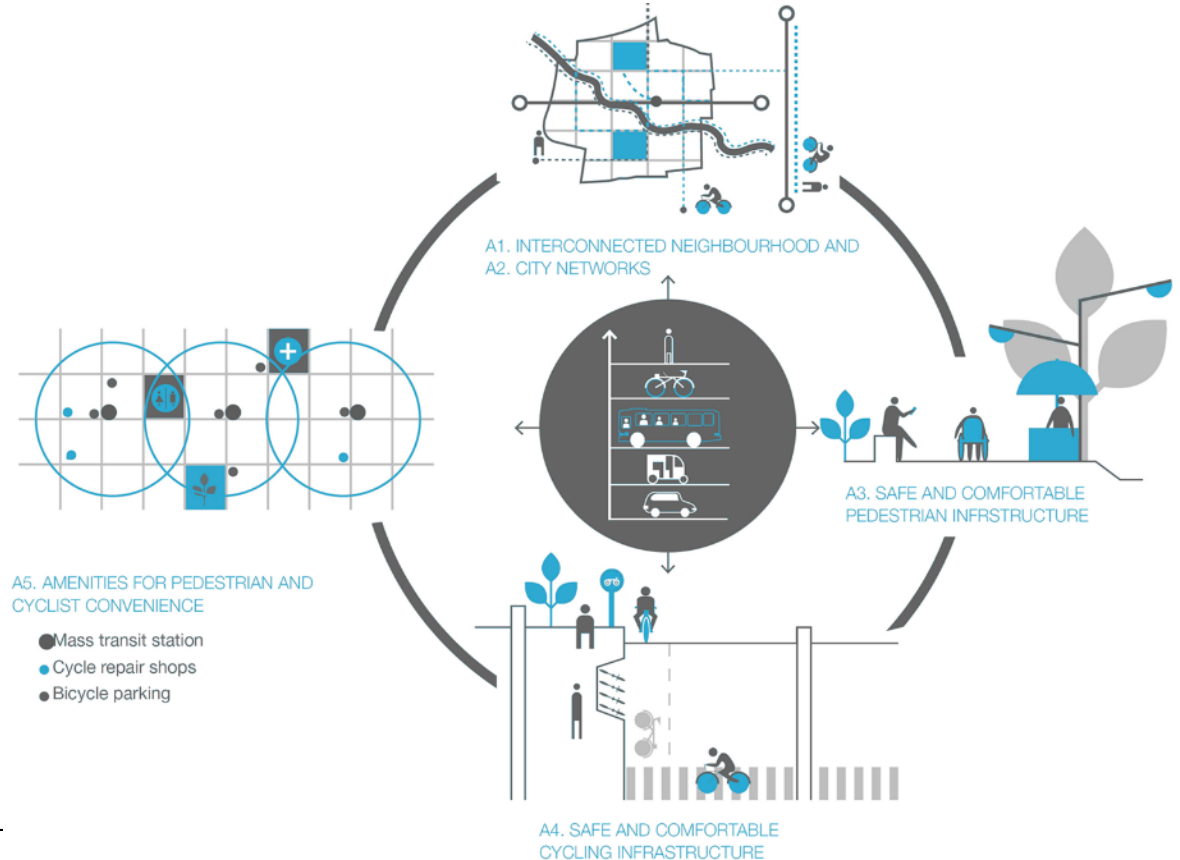
To overcome barriers for implementing road safety within a TOD station area by addressing institutional gaps and performance indicators

# SAFE ACCESS



# PEDESTRIAN & CYCLING PRIORITY

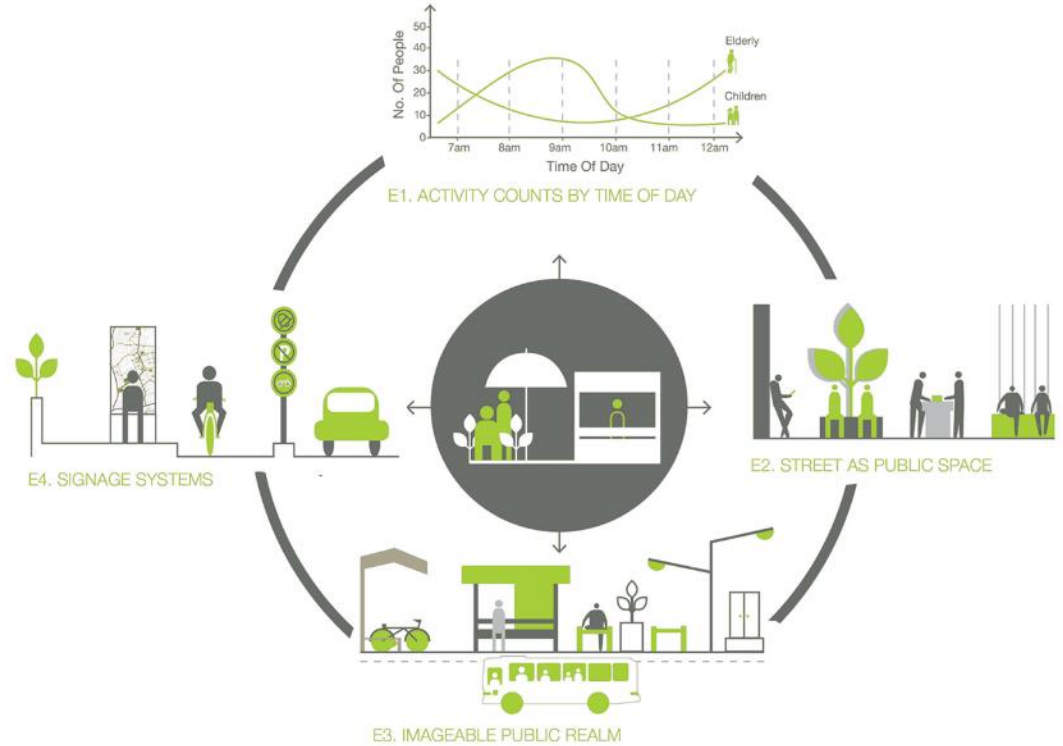
- Interconnected neighbourhoods & city networks
- Safe and comfortable pedestrian & cycling infrastructure and services
- Provision of amenities for pedestrian and cyclists.





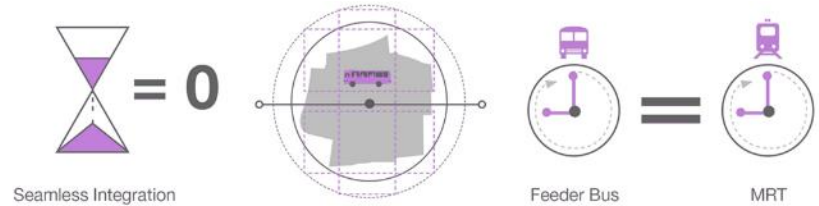
# ENHANCED PUBLIC REALM

- Streets as public spaces
- Imageable public area
- Signage systems
- Activities by time of the day

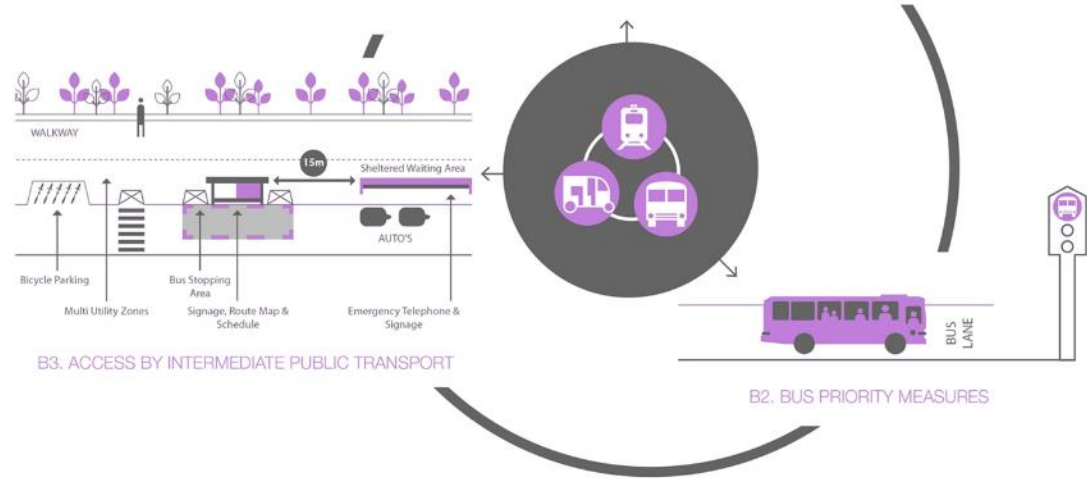


# FEEDER INTEGRATION

- Access to IPT
- Seamless integration of various modes including information systems
- Bus priority measures

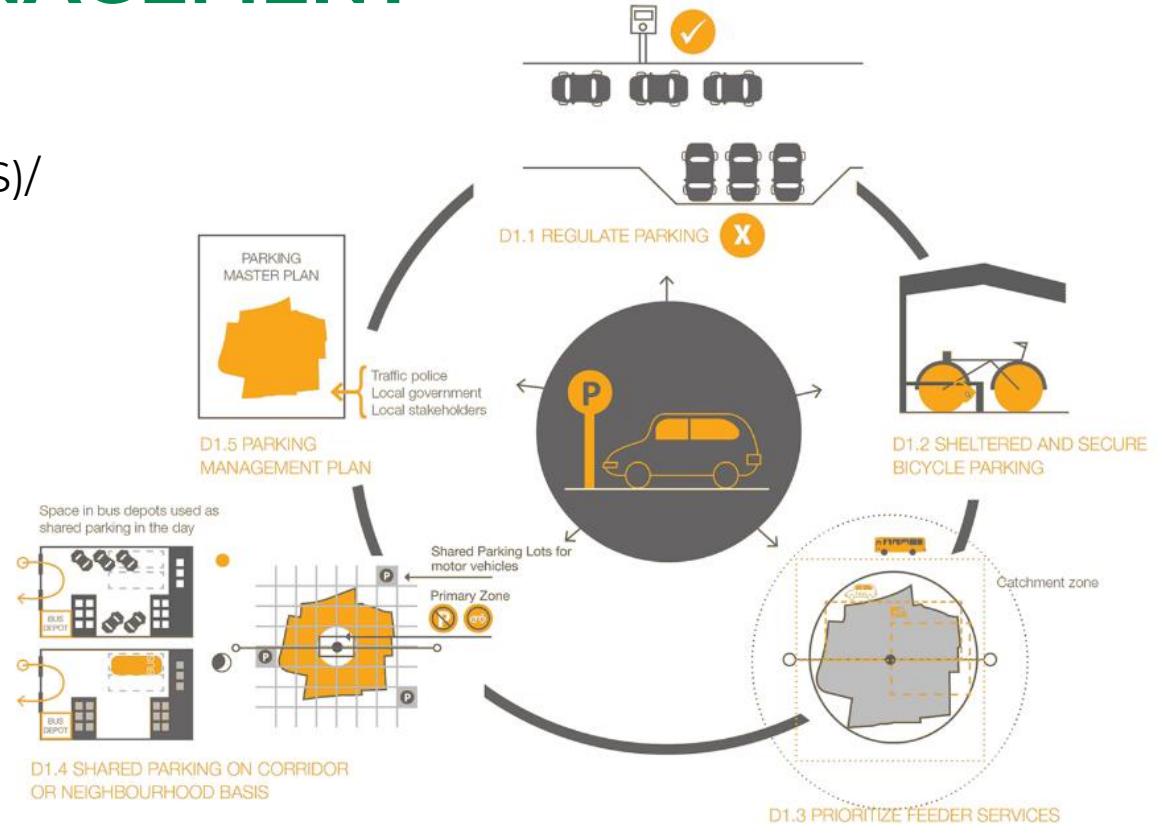


B1. FEEDER BUS NETWORK AND OPERATING TIMES



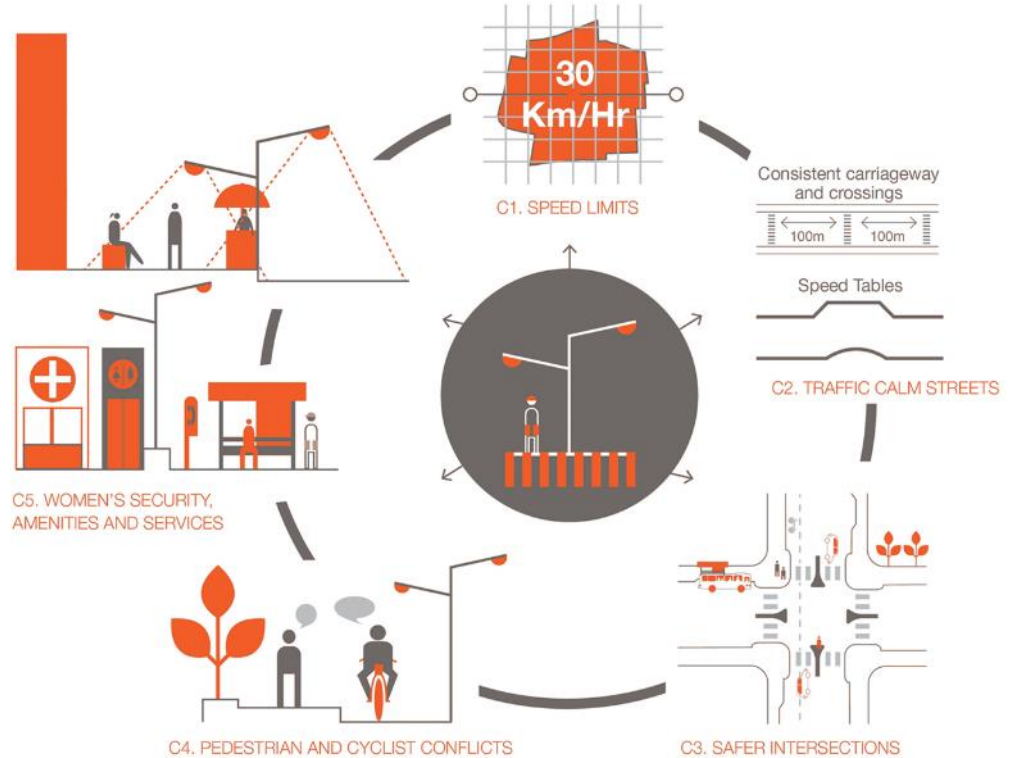
# PARKING MANAGEMENT

- Regulate parking
- Public Bike Share (PBS)/  
Bicycle parking
- Prioritize feeder bus services
- Shared Parking
- Parking Management Plan



# ENHANCED SAFETY AND SECURITY

- Road Geometrics
- Speed limits, Traffic calming pedestrian & NMT movements
- Safe streets and amenities



# THANK YOU

Perna Mehta

Lead - Integrated Urban Development

[perna.mehta@wri.org](mailto:perna.mehta@wri.org)

# TRANSIT ORIENTED DEVELOPMENT (TOD) AND ROAD SAFETY

WORKSHOP SERIES

SESSION # 1

THE SAFE SYSTEM APPROACH PRINCIPLES

1 October 2020



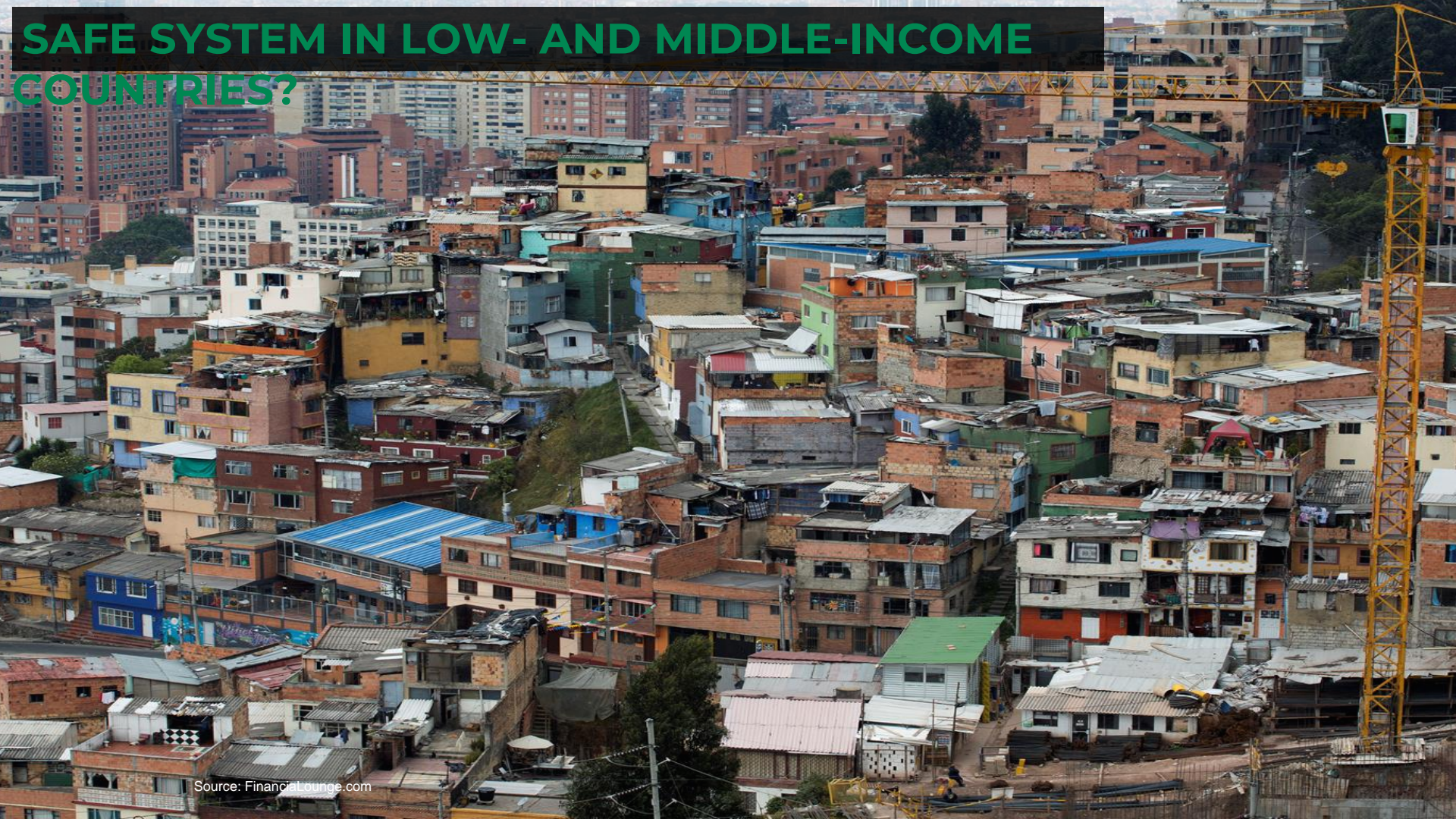
Supported by:

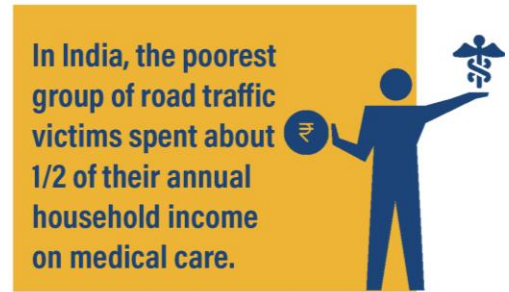
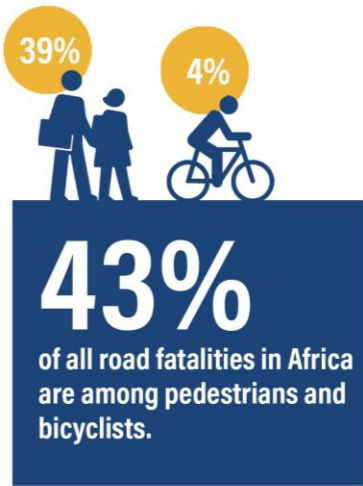


Conducted by:



# SAFE SYSTEM IN LOW- AND MIDDLE-INCOME COUNTRIES?





**1.25 Million**  
people die each year as a result of road traffic crashes.

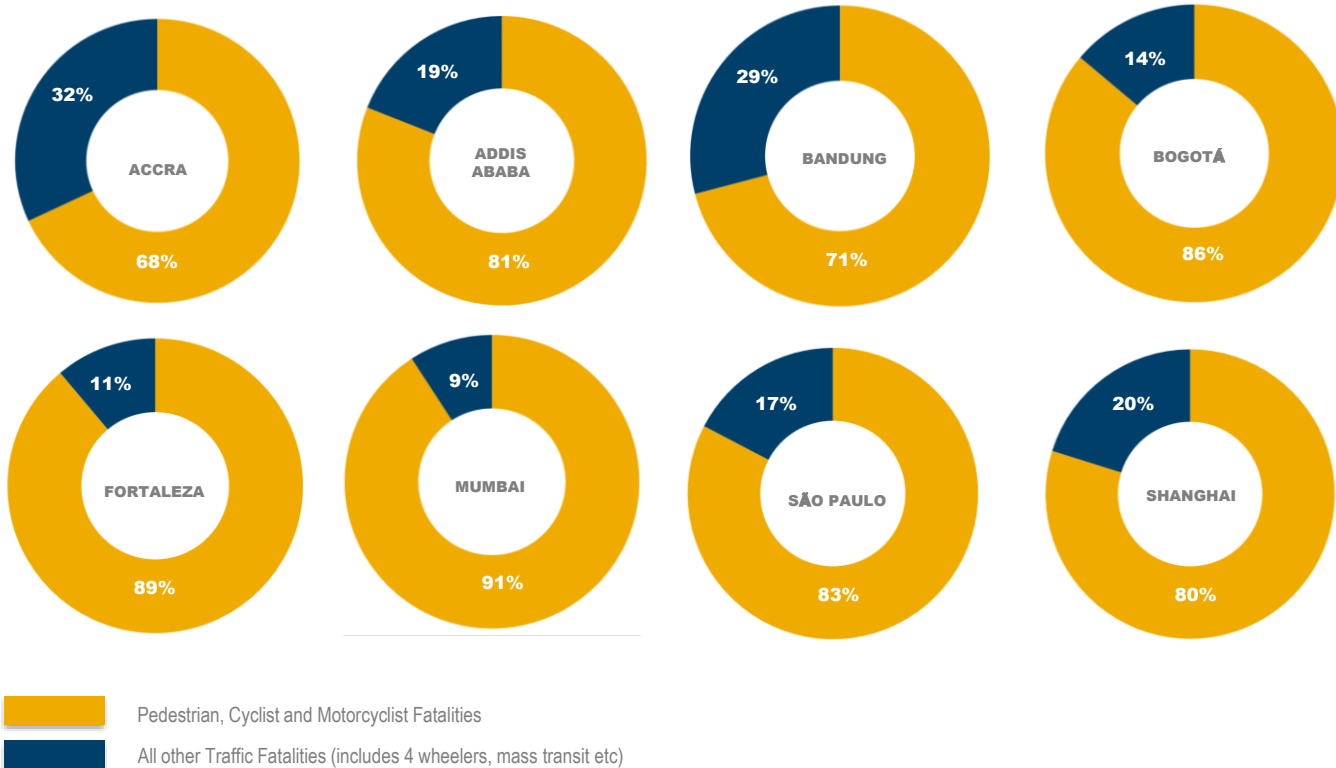
Out of which, **90%** of the world's fatalities on the roads occur in low- and middle-income countries.



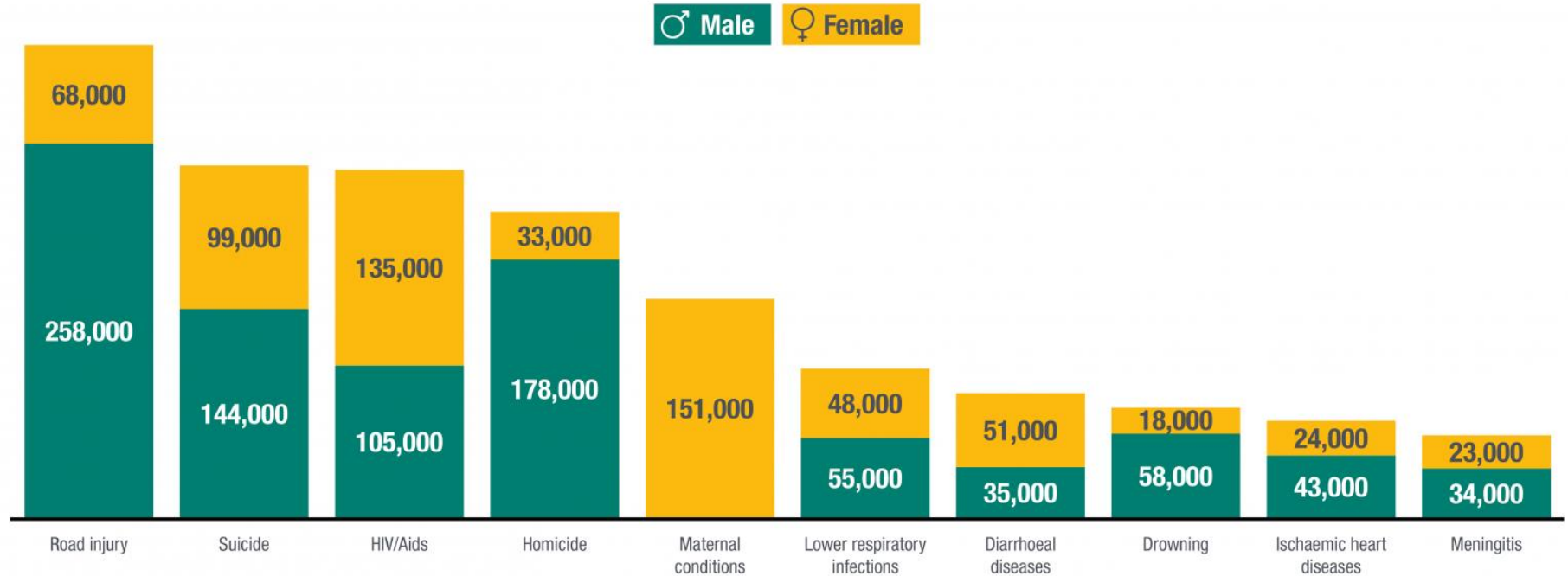
Source: WHO 2015, Juillard et al. 2010, Kumar et al. 2012, WHO 2018



# AT GREATEST RISK: PEOPLE WALKING, BICYCLING AND RIDING MOTORCYCLES



## Top ten causes of death among people aged 15–29 years (2012)



Source: WHO, 2015

© Overseas Development Institute (ODI) and World Resources Institute (WRI) 2018

## BEHIND THE STATISTICS: HUGE SOCIAL COSTS

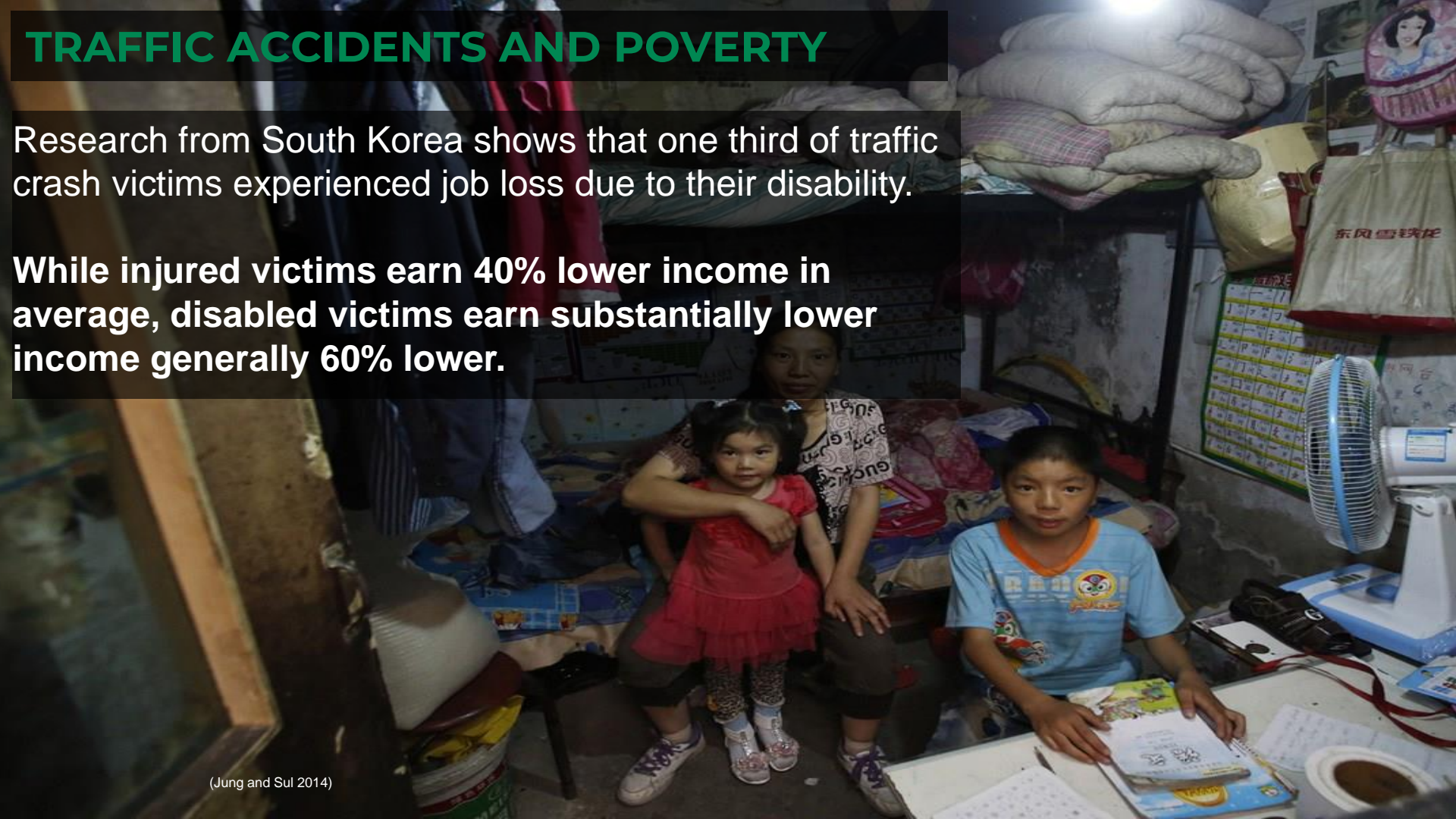
A serious injury might mean months of lost work and impaired mobility – consequences that hit the poor disproportionately hard.



# TRAFFIC ACCIDENTS AND POVERTY

Research from South Korea shows that one third of traffic crash victims experienced job loss due to their disability.

**While injured victims earn 40% lower income in average, disabled victims earn substantially lower income generally 60% lower.**



# BEHIND THE STATISTICS: DELAYING DEVELOPMENT

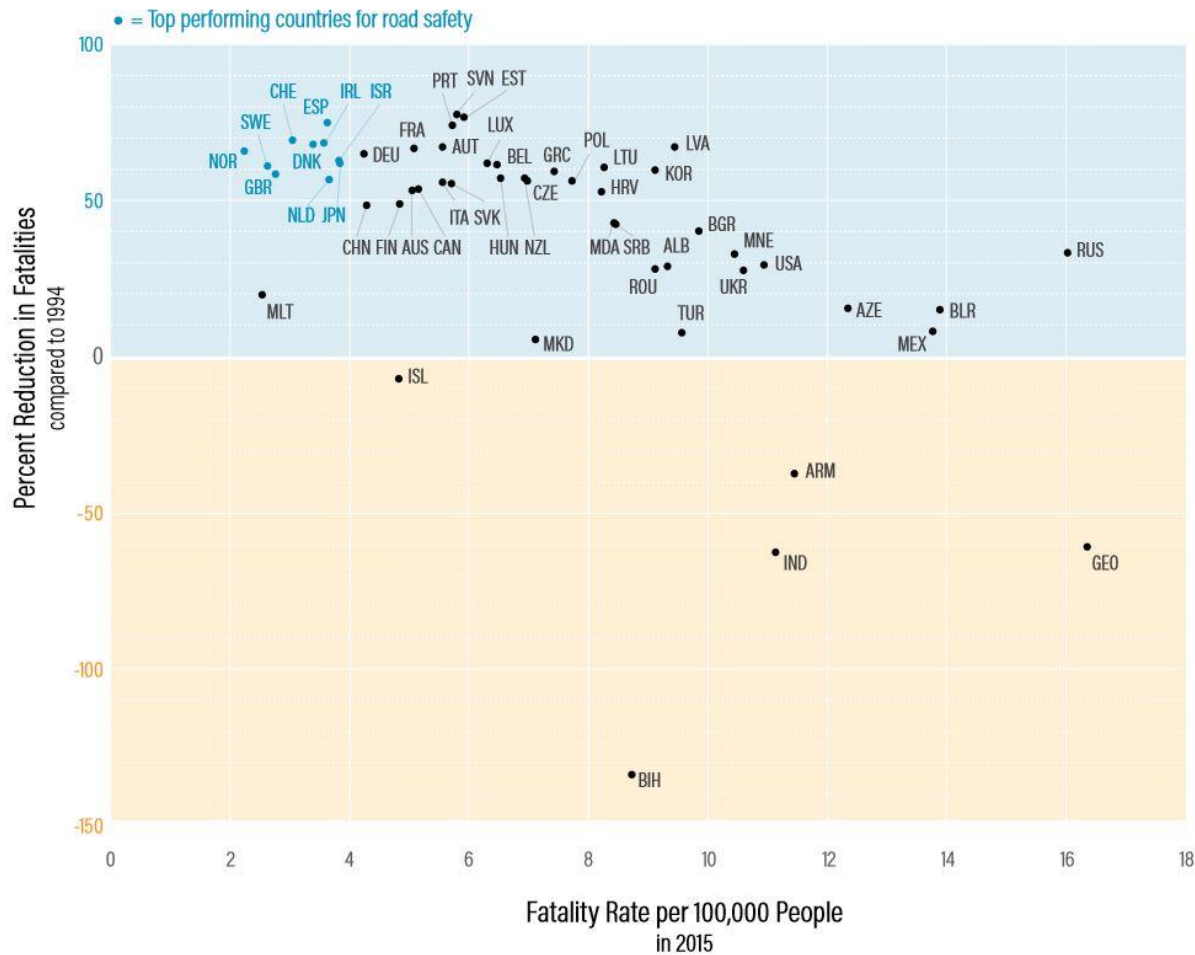
7% to 22% increase in GDP per capita over 24 years - can be achieved through substantial reduction in road traffic injuries.

Welfare benefits equivalent to 6% to 32% of the national GDP can be realized from reducing 50 percent of road deaths and injuries over a period of 24 years.



**SO WHY IS ROAD SAFETY NOT IMPROVING IN MANY LOW AND MIDDLE-INCOME COUNTRIES? AND MANY HIGH-INCOME ONES TOO...**

# SAFE SYSTEM: MOST RAPID REDUCTIONS AND THE LOWEST FATALITY RATES



# TRADITIONAL APPROACH TO ROAD SAFETY

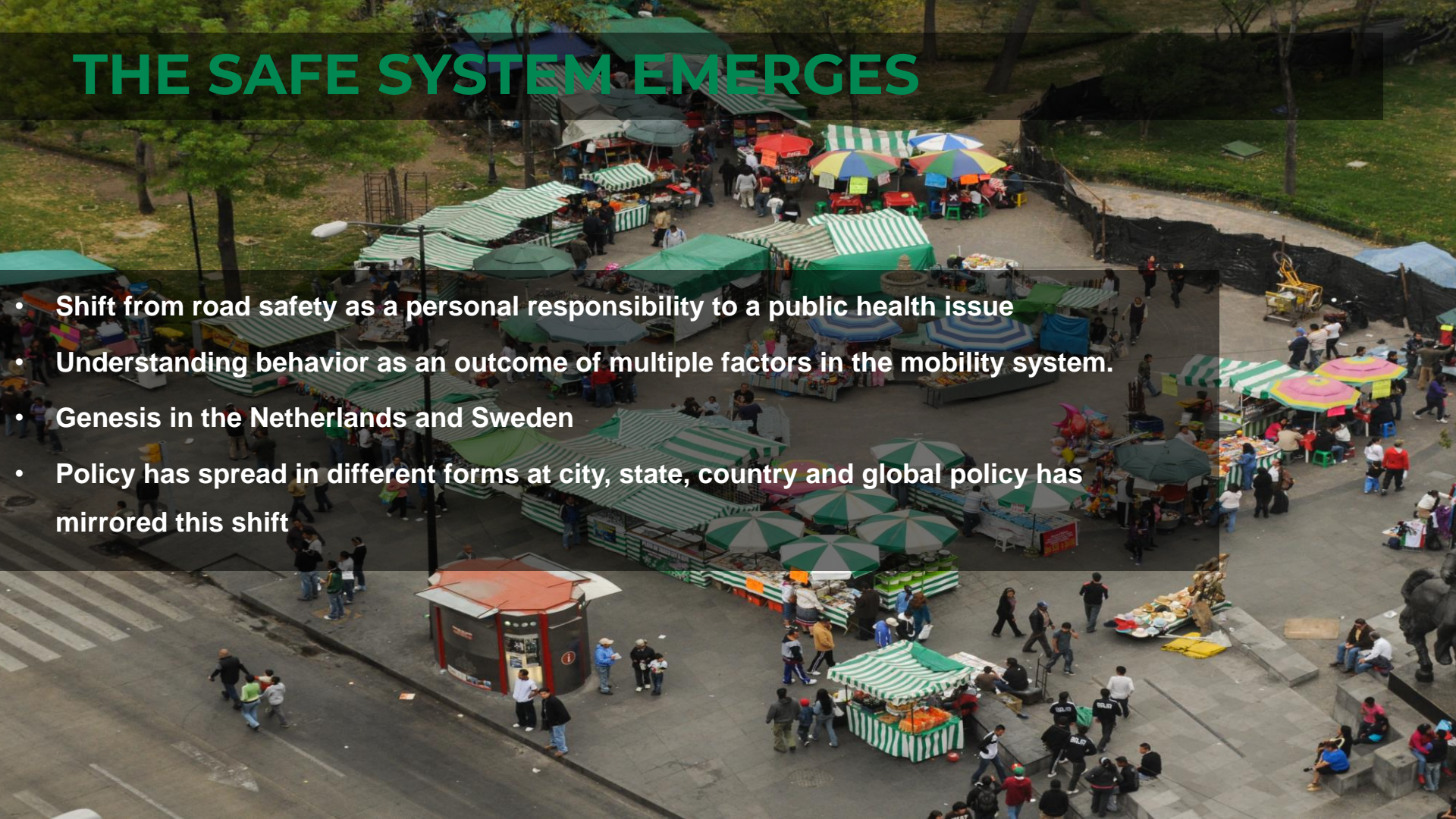
A woman in a black top and yellow skirt is walking on a road, carrying a black bag. In the background, there are several cars and a large apartment building. The scene is set in a city environment with a clear sky.

- Emphasis on individual responsibility and road user behavior – “bad drivers”, “reckless cyclists”, “distracted pedestrians”
- Dependence on public education and media campaigns
- Road safety training for road users based on car dominance
- Safety regulations focused on vehicle occupants



# THE SAFE SYSTEM EMERGES

- Shift from road safety as a personal responsibility to a public health issue
- Understanding behavior as an outcome of multiple factors in the mobility system.
- Genesis in the Netherlands and Sweden
- Policy has spread in different forms at city, state, country and global policy has mirrored this shift



# VISION ZERO: A ROAD SAFETY POLICY

## INNOVATION

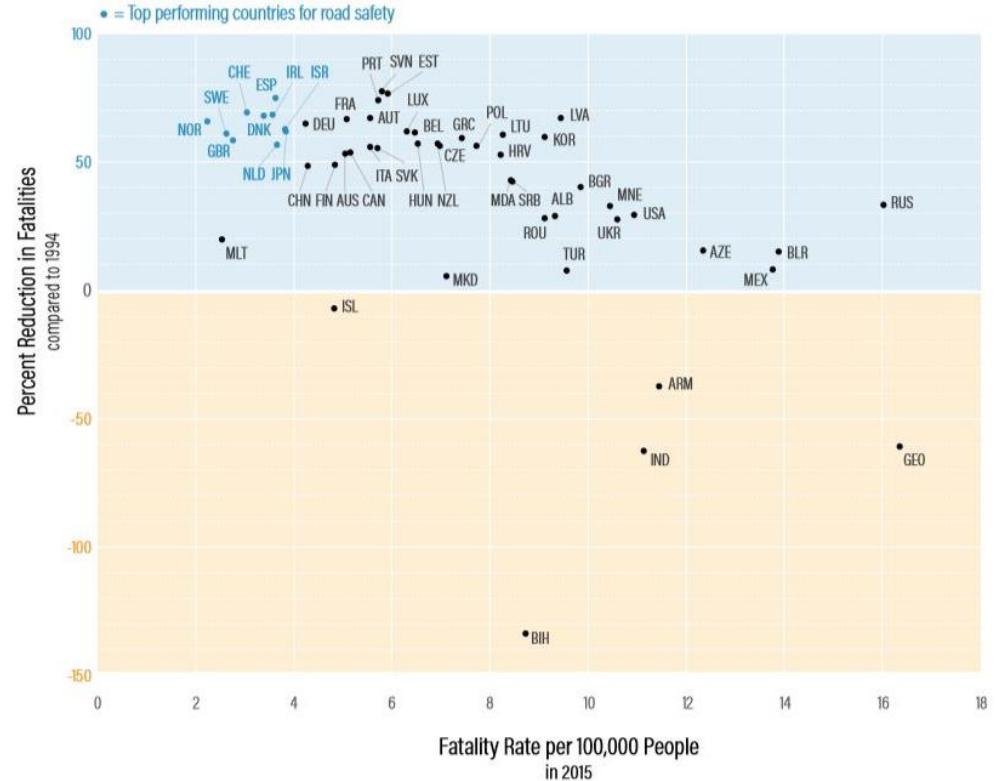
	TRADITIONAL	VISION ZERO
What is the problem?	Accidents Risk	Fatalities & Serious injuries
What causes the problem?	Human Factors	Humans make mistakes & Humans are fragile
Responsibility?	Individual Road Users	System Designers
People's demand for road safety	People dont want safety	People want safety
What is the appropriate goal?	Optimum number of fatalities & serious injuries	Eliminate fatalities & serious injuries

*In Sweden, Vision Zero fundamentally changed how traffic safety was addressed and approached from policymakers.*

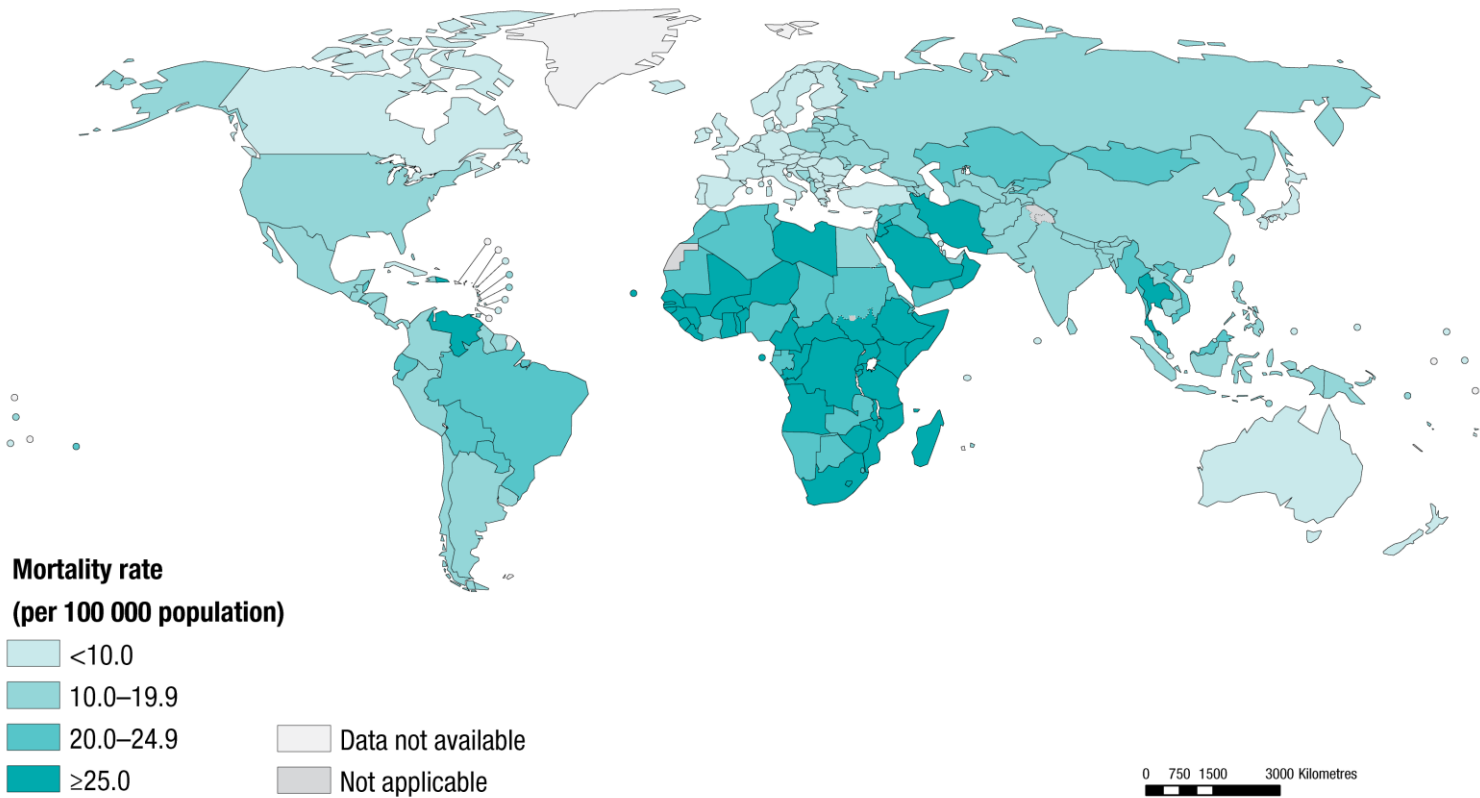
# SAFE SYSTEM IMPACTS

A study of 53 countries found that those that have taken a 'Safe System' approach to road safety have been able to reduce traffic fatalities faster and to lower rates.

*If the rest of the world had rates seen in the leading Safe System countries, there would be 1 million fewer road deaths every year.*



# Road traffic mortality rate, 2013\*



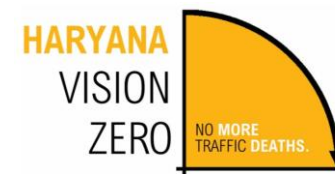
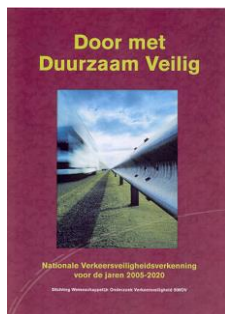
\* WHO Member States with a population of less than 90 000 in 2015 who did not participate in the survey for the Global status report on road safety 2015 were not included in the analysis.

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement. © WHO 2016. All rights reserved.

Data Source: World Health Organization  
Map production: Information Evidence and Research (IER)  
World Health Organization



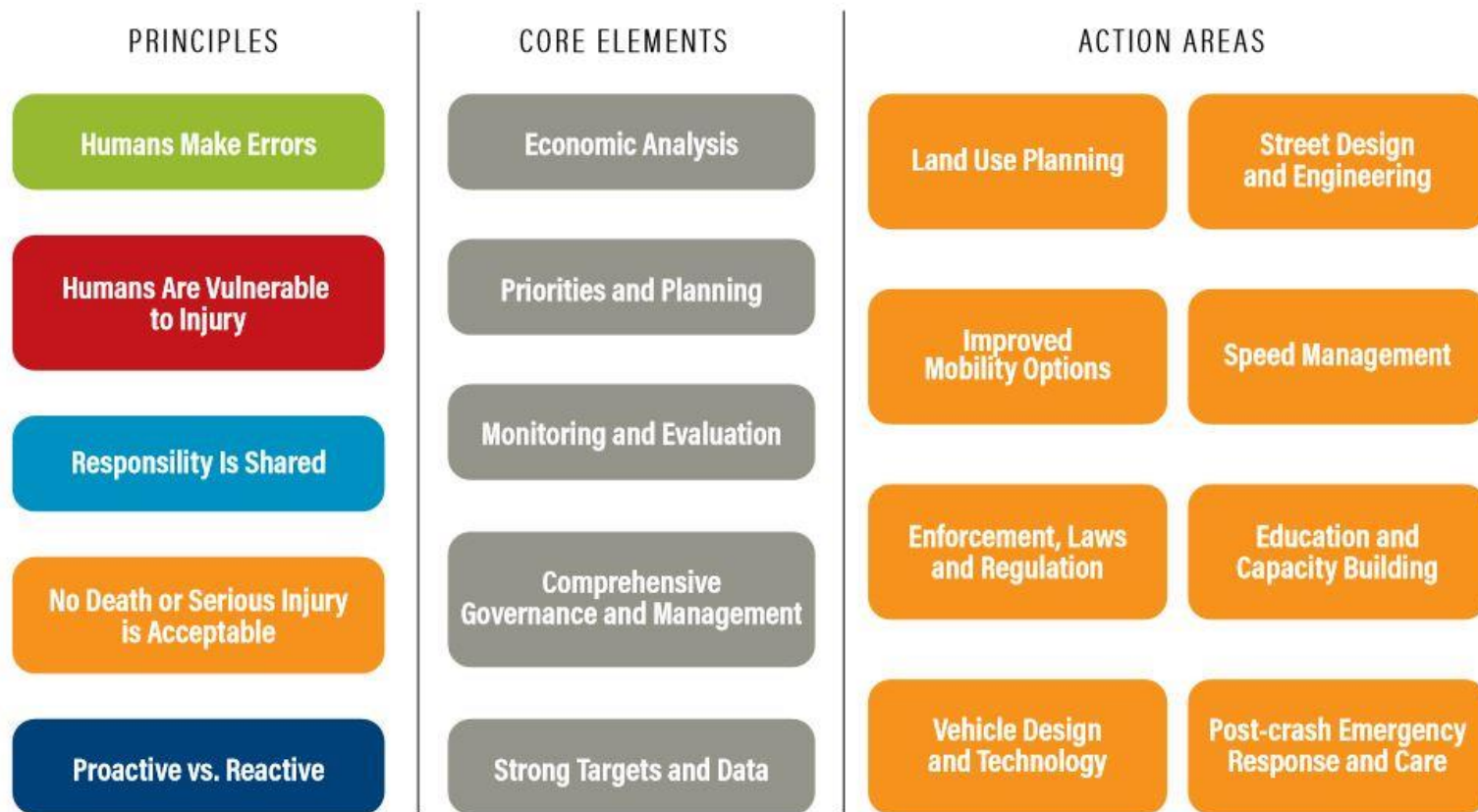
# SAFE SYSTEMS IN THE WORLD



#HRYVisionZero

Sarika Panda Bhatt  
Manager, Cities & Transport, WRI India

# SAFE SYSTEM APPROACH



Note: Principles are multicolored, core elements are in grey, and action areas are in orange.

# SAFE SYSTEM PRINCIPLES



Humans Make Errors



Humans Are Vulnerable to Injury



Responsibility Is Shared



No Death or Serious Injury is Acceptable



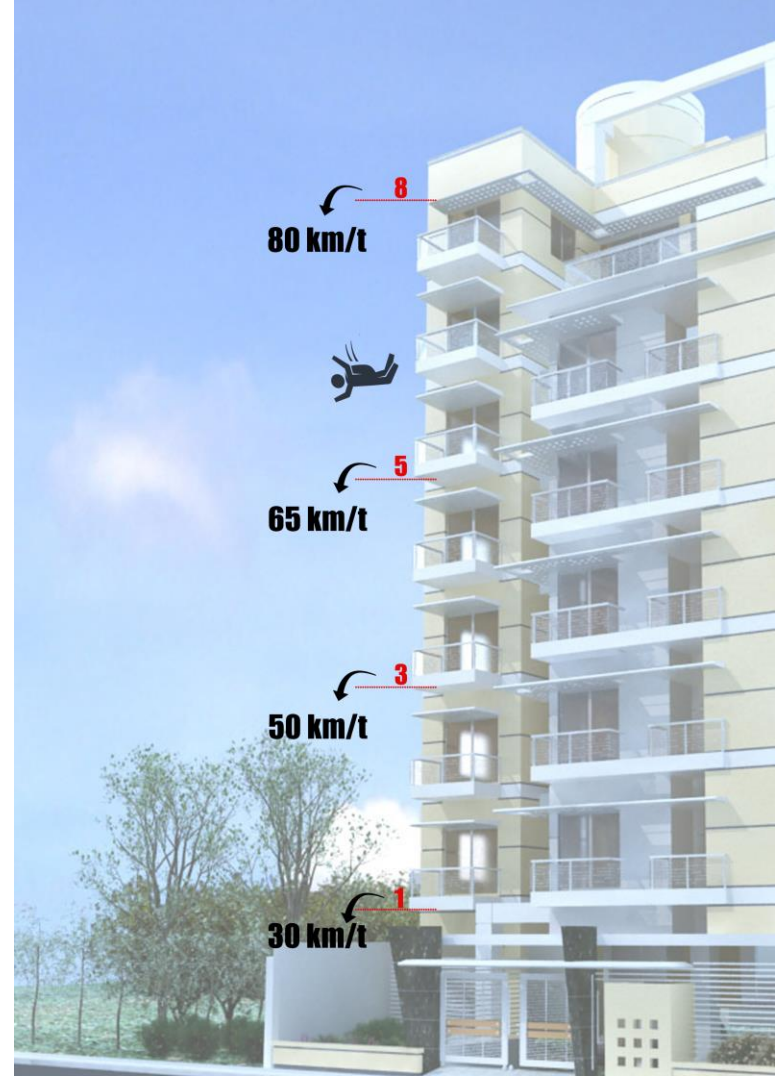
Proactive vs. Reactive



## Humans Make Errors

An effective road safety system needs to take human error – forced and unforced – into account through design of infrastructure that reduces the impact when human error inevitably occurs.

*94% of crashes in the US can be tied back to either human error or bad decisions, according to the National Highway Traffic Safety Administration (NHTSA)*







## Humans Are Vulnerable to Injury

**To build a safe road system and to reduce deaths and serious injuries, the human body's tolerance to impact forces should be used as a guiding tool.**

*In 2010 and 2015, pedestrians accounted for 88% of fatalities in Addis Ababa, Ethiopia, where there is a lack of adequate sidewalks and pedestrian crossings and vehicles move at unsafe speeds.*





## Responsibility Is Shared

**Responsibility for road safety should be shared between the public and decision makers including policy and lawmakers, law enforcement, planners, administrators, designers and engineers, amongst other actors.**

*Only a few countries or cities have road safety policies in place. According to the World Health Organization (WHO), only 7% of the world's population is governed by comprehensive road safety laws and policies.*





No Death or Serious  
Injury is Acceptable

**Fatal and serious traffic crashes are preventable and should not be acceptable.**

***Evidence from crash frequency models in Latin American cities suggests that medians can reduce crashes, including severe crashes, by 30-40 percent.***

Source: (Duduta et al. 2015)





## Proactive vs. Reactive

Addressing and preventing fatal and serious crashes before they occur should be a main goal of a safer road system.

*Use of side guards on large trucks reduced cyclist fatalities by 61% and pedestrian fatalities by 20% in side-impact crashes.*



# THANK YOU



# TRANSIT ORIENTED DEVELOPMENT (TOD) AND ROAD SAFETY

WORKSHOP SERIES

SESSION # 1  
ENABLING SAFE ACCESS TO MASS TRANSIT

1 October 2020



*Supported by:*



*Conducted by:*



- ‘Mentimeter’ Ice breaker
- ‘Role-play’ activity briefing
- Role play exercise in groups
- Group presentations
- Learnings and conclusion

# ICE-BREAKER

Go to [www. menti.com](https://www.menti.com) and use the code **27 30 16 9**



# ICE-BREAKER

*What challenges have you faced while accessing public transport you cities*

Go to [www. menti.com](https://www.menti.com) and use the code **27 30 16 9**

# ICE-BREAKER

## WHAT CHALLENGES HAVE YOU FACED WHILE ACCESSING PUBLIC TRANSPORT IN YOUR CITIES?



# ICE-BREAKER

*What do pedestrians and cyclists lack in terms of safety during their commute?*

Go to [www.menti.com](https://www.menti.com) and use the code **27 30 16 9**

# ICE-BREAKER

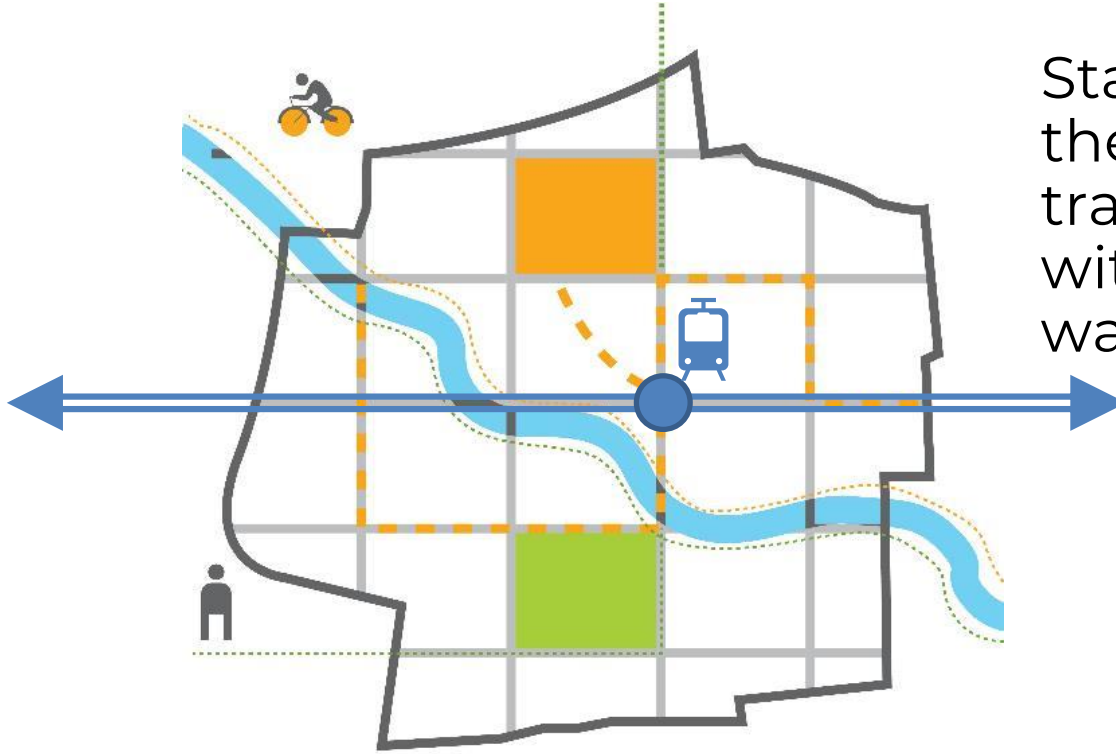
## WHAT DO PEDESTRIANS AND CYCLISTS LACK IN TERMS OF SAFETY DURING THEIR COMMUTE?



# WORKSHOP OBJECTIVE

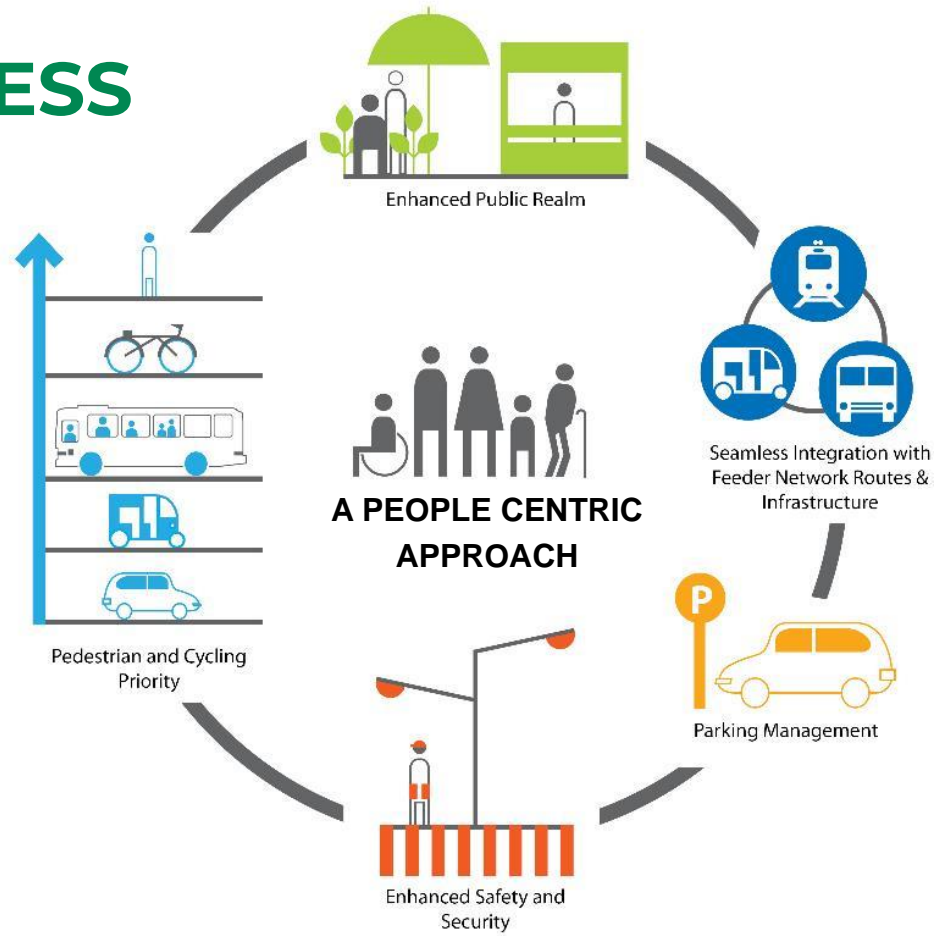
- Ideate and co-create solutions for Safe Access
- Understand and establish each stakeholder's role
- Bring consensus through collaboration

# A LIVABLE STATION AREA



Station Area – refers to the area around a public transit station that is within a 10-minute walking distance.

# SAFE ACCESS



# THE INTERACTIVE EXERCISE





# INTERACTIVE BOARD

Public Realm	Recommendations	Government		Private		People			Final Collaborative Choices
		W	G	T	C	W	G	T	
	a. Provide and maintain universally accessible amenities (bus stands, drinking water fountains, street benches, toilets) in the station area.								
	b. Provide basic amenities at lower costs with no special considerations given to vulnerable groups in the station area.								
	c. Provision of minimal amenities (only public toilets) in the station area.								
	d. Provide designated vending spaces distributed at key vantage points in the station area.								
	e. Restrict vendors to one location in the station area.								
	f. Designate the station area as a vending free zone.								

Pedestrian and Cycle Priority	Recommendations	Government		Private		People			Final Collaborative Choices
		W	G	T	C	W	G	T	
	a. Provide universally accessible footpaths and optimal carriageway in the station area.								
	b. Focus on ensuring adequate carriage way for smooth movement of traffic, and also provide adequate footpaths which may not be universally accessible in the station area.								
	c. Provide maximum carriageway with minimal footpaths in the station area.								
	d. Provide segregated and protected bicycle lanes with dedicated signals at junctions in the station area.								
	e. Provide cycle lanes by marking on existing carriageway but not necessarily dedicated signals at junctions in the station area.								
	f. Cyclists are required to share carriageway with the traffic in the station area.								

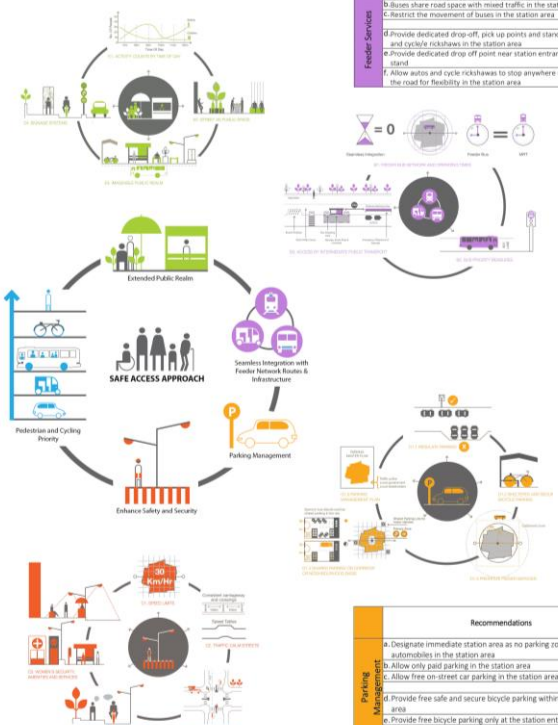
Safety and Security	Recommendations	Government		Private		People			Final Collaborative Choices
		W	G	T	C	W	G	T	
	a. Design streets to reduce automobile speeds (speed tables, speed bumps, signal etc.) in the station area.								
	b. Focus on one regulating speed in station area.								
	c. Allow unobstructed flow of traffic in the station area.								
	d. Create active street edges with adequate illumination to improve safety for all especially women and vulnerable groups in the station area.								
	e. Create street edge with adequate illumination but no activity in the station area.								
	f. Allow high compound walls and on-street parking for safety and convenience of private property owners in the station area.								

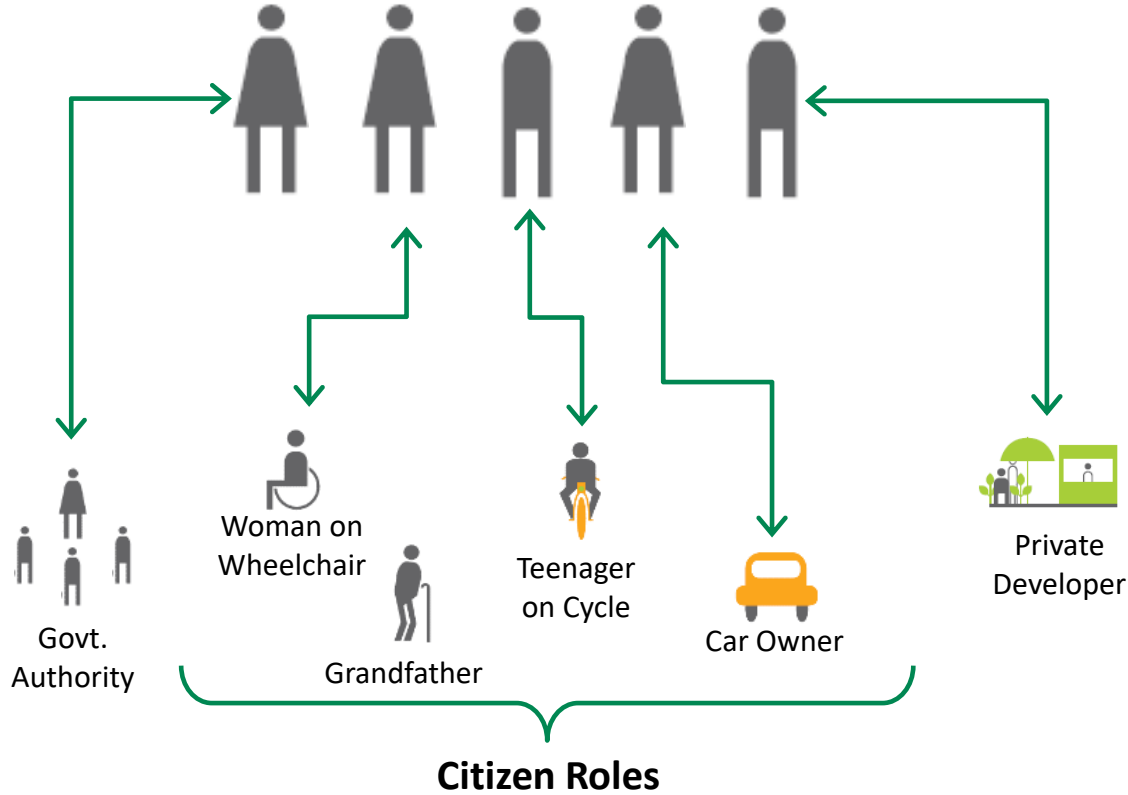
Feeder Services	Recommendations	Government		Private		People			Final Collaborative Choices
		W	G	T	C	W	G	T	
	a. Provide segregated bus lanes in station area.								
	b. Buses share road space with mixed traffic in the station area.								
	c. Restrict the movement of buses in the station area.								
	d. Provide dedicated drop-off, pick up points and stands for autos and cycle rickshaws in the station area.								
	e. Provide dedicated drop off point near station entrance but no stand.								
	f. Allow autos and cycle rickshaws to stop anywhere on the side of the road for flexibility in the station area.								

Parking Management	Recommendations	Government		Private		People			Final Collaborative Choices
		W	G	T	C	W	G	T	
	a. Designate immediate station area as no parking zone for automobiles in the station area.								
	b. Allow only paid parking in the station area.								
	c. Allow free on-street car parking in the station area.								
	d. Provide free safe and secure bicycle parking within the station area.								
	e. Provide free bicycle parking only at the station entrance.								
	f. No designated bicycle parking in the station area.								

# ROLE PLAY CARDS



# CHOOSE A PRINCIPLE

Public Realm	Recommendations	Government		Private		People			Final Collaborative Choices
		W	G	T	C	W	G	T	
<ul style="list-style-type: none"> <li>a. Provide and maintain universally accessible amenities (bus stands, drinking water fountains, street benches, toilets) in the station area</li> <li>b. Provide basic amenities at lower costs with no special considerations given to vulnerable groups in the station area</li> <li>c. Provision of minimal amenities (only public toilets) in the station area</li> <li>d. Provide designated vending spaces distributed at key vantage points in the station area</li> <li>e. Restrict vendors to one location in the station area</li> <li>f. Designate the station area as a vending free zone</li> </ul>									

Pedestrian and Cyclist Priority	Recommendations	Government		Private		People			Final Collaborative Choices
		W	G	T	C	W	G	T	
<ul style="list-style-type: none"> <li>a. Provide universally accessible footpaths and optimal carriageway in the station area</li> <li>b. Focus on ensuring adequate carriage way for smooth movement of traffic, and also provide adequate footpaths which may not be universally accessible in the station area</li> <li>c. Provide maximum carriageway with minimal footpaths in the station area</li> <li>d. Provide segregated and protected bicycle lanes with dedicated signals at junctions in the station area</li> <li>e. Provide cycle lanes by marking on existing carriageway but not necessarily dedicated signals at junctions in the station area</li> <li>f. Cyclists are required to share carriageway with the traffic in the station area</li> </ul>									

Safety and Security	Recommendations	Government		Private		People			Final Collaborative Choices
		W	G	T	C	W	G	T	
<ul style="list-style-type: none"> <li>a. Design streets to reduce automobile speeds (speed tables, speed bumps, signal etc.) in the station area</li> <li>b. Focus on one regulated speed in station area</li> <li>c. Allow unobstructed flow of traffic in the station area</li> <li>d. Create active street edges with adequate illumination to improve safety for all especially women and vulnerable groups in the station area</li> <li>e. Create street edge with adequate illumination but no activity in the station area</li> <li>f. Allow high compound walls and on-street parking for safety and convenience of private property owners in the station area</li> </ul>									

Flexible Services	Recommendations	Government		Private		People			Final Collaborative Choices
		W	G	T	C	W	G	T	
<ul style="list-style-type: none"> <li>a. Provide segregated bus lanes in station area</li> <li>b. Buses share road space with mixed traffic in the station area</li> <li>c. Restrict the movement of buses in the station area</li> <li>d. Provide dedicated drop-off, pick up points and stands for autos and cycle rickshaws in the station area</li> <li>e. Provide dedicated drop off point near station entrance but no stand</li> <li>f. Allow autos and cycle rickshaws to stop anywhere on the side of the road for flexibility in the station area</li> </ul>									

Parking Management	Recommendations	Government		Private		People			Final Collaborative Choices
		W	G	T	C	W	G	T	
<ul style="list-style-type: none"> <li>a. Designate immediate station area as no parking zone for automobiles in the station area</li> <li>b. Allow only paid parking in the station area</li> <li>c. Allow free on-street car parking in the station area</li> <li>d. Provide free safe and secure bicycle parking within the station area</li> <li>e. Provide free bicycle parking only at the station entrance</li> <li>f. No designated bicycle parking in the station area</li> </ul>									

# 6 (3+3) STRATEGIES WITHIN EACH PRINCIPLE

	Recommendations	Government	Private	People				Final Collaborative Choices
				W	G	T	C	
Public Realm	a. Provide and maintain universally accessible amenities (bus stands, drinking water fountains, street benches, toilets) in the station area							
	b. Provide basic amenities at lower costs with no special considerations given to vulnerable groups in the station area							
	c. Provision of minimal amenities (only public toilets) in the station area							
	d. Provide designated vending spaces distributed at key vantage points in the station area							
	e. Restrict vendors to one location in the station area							
	f. Designate the station area as a vending free zone							

- A strategy is designated for the table
- There are two sub-items per strategy

# CHOOSE STRATEGIES - INDIVIDUALLY

	Recommendations	Government	Private	People				Final Collaborative Choices
				W	G	T	C	
Public Realm	a. Provide and maintain universally accessible amenities (bus stands, drinking water fountains, street benches, toilets) in the station area	●		●				
	b. Provide basic amenities at lower costs with no special considerations given to vulnerable groups in the station area		●			●	●	
	c. Provision of minimal amenities (only public toilets) in the station area				●			
	d. Provide designated vending spaces distributed at key vantage points in the station area	●		●		●		
	e. Restrict vendors to one location in the station area				●			
f. Designate the station area as a vending free zone						●	●	

## Step 1

Choose **2** of **6** strategies '**individually**' based on your role

**1<sup>st</sup>** from Option **a,b,c** and

**2<sup>nd</sup>** from option **d,e,f**

# CHOOSE STRATEGIES - COLLECTIVELY

	Recommendations	Government	Private	People				Final Collaborative Choices
				W	G	T	C	
Public Realm	a. Provide and maintain universally accessible amenities (bus stands, drinking water fountains, street benches, toilets) in the station area	●		●				✓
	b. Provide basic amenities at lower costs with no special considerations given to vulnerable groups in the station area		●			●	●	
	c. Provision of minimal amenities (only public toilets) in the station area				●			
	d. Provide designated vending spaces distributed at key vantage points in the station area	●	●		●			
	e. Restrict vendors to one location in the station area				●			
f. Designate the station area as a vending free zone						●	●	✓

## Step 2

Choose **2** of **6** strategies '**collectively**' based on common consensus

**1<sup>st</sup>** from Option **a,b,c** and

**2<sup>nd</sup>** from option **d,e,f**

# GROUP PRESENTATIONS

1. Why did you choose these strategies?
2. How did you arrive at this decision?
3. Was this a smooth decision?

**Government** is the spokes person

# GROUP ACTIVITY





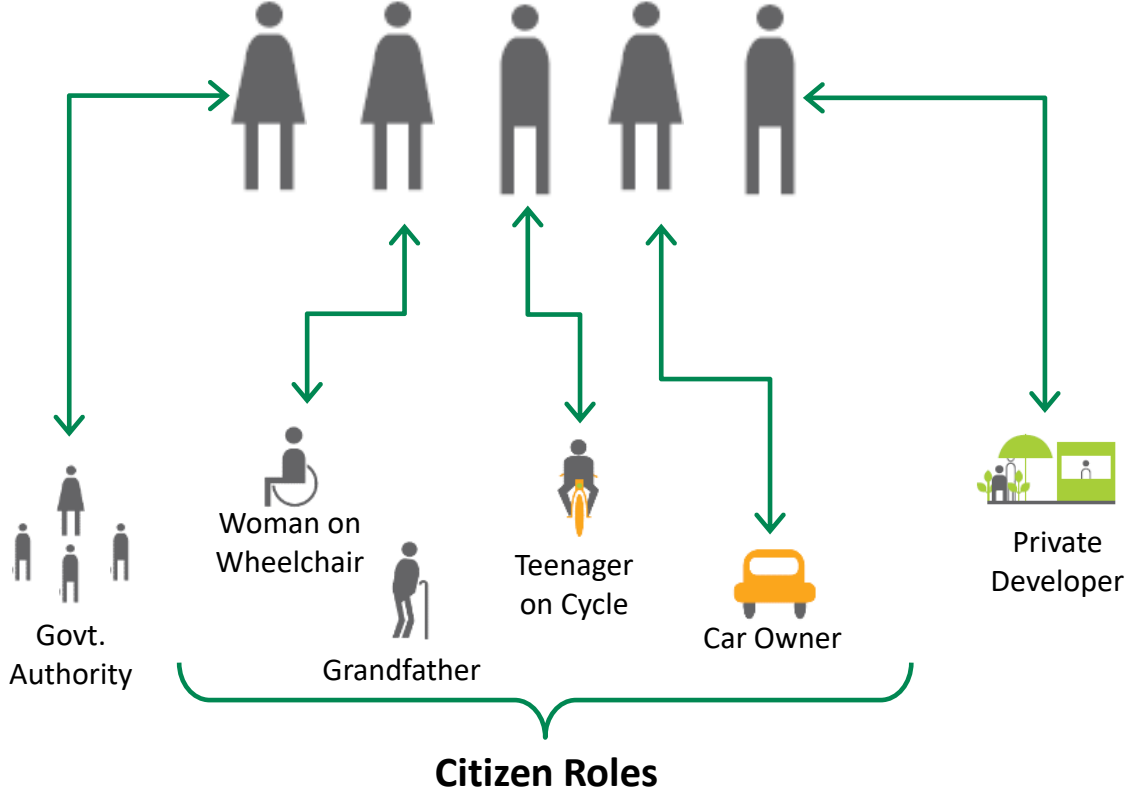
# GROUP PRESENTATIONS

1. Why did you choose these strategies?
2. How did you arrive at this decision?
3. Was this a smooth decision?

**Government** is the spokes person

# PEDESTRIAN & CYCLING PRIORITY

# ROLE PLAY CARDS



# ASSIGNING ROLES

## Roleplay Card

### Teenager with a cycle

- Be able to cycle safely in the city
- Have safe and secure spots to park cycle
- Have safe cycle-friendly spaces to gather in



#### Public at Large

You are a part of the citizenry  
By living & working in the city  
you generate economic activity

You demand adequate  
infrastructure & mobility  
options for your needs

You demand clean air & a safe  
environment to live a healthy  
and prosperous life

Day to day activities take up  
your time & you can only focus  
on your needs

You are not able to spend time  
studying or solving the needs  
of other city dwellers

Unless specified public at large  
does not have access to a car



## Roleplay Card

### A Grandfather

- Travel safely and in a self-reliant manner in the city
- Have safe public spaces to gather in
- Have access to adequate amenities such as drinking water, seating spaces, toilets in public spaces



#### Public at Large

You are a part of the citizenry  
By living & working in the city  
you generate economic activity

You demand adequate  
infrastructure & mobility  
options for your needs

You demand clean air & a safe  
environment to live a healthy  
and prosperous life

Day to day activities take up  
your time & you can only focus  
on your needs

You are not able to spend time  
studying or solving the needs  
of other city dwellers

Unless specified public at large  
does not have access to a car



## Roleplay Card

### Woman using a wheelchair

- Travel safely and quickly in the city
- Be able to move independently in all parts of the city
- Be able to access public spaces such as parks, transit stations etc.
- Be able to avail economical modes of travel



#### Public at Large

You are a part of the citizenry  
By living & working in the city  
you generate economic activity

You demand adequate  
infrastructure & mobility  
options for your needs

You demand clean air & a safe  
environment to live a healthy  
and prosperous life

Day to day activities take up  
your time & you can only focus  
on your needs

You are not able to spend time  
studying or solving the needs  
of other city dwellers

Unless specified public at large  
does not have access to a car



# ASSIGNING ROLES

## Roleplay Card

### Car-owner

- Travel safely and quickly on roads in the city
- Find adequate parking spaces at destination
- Have shortest possible walk from parking space to destination



#### **Public at Large**

You are a part of the citizenry  
By living & working in the city  
you generate economic activity

You demand adequate  
infrastructure & mobility  
options for your needs

You demand clean air & a safe  
environment to live a healthy  
and prosperous life

Day to day activities take up  
your time & you can only focus  
on your needs

You are not able to spend time  
studying or solving the needs  
of other city dwellers

Unless specified public at large  
does not have access to a car



## Roleplay Card

### Private Business

- You are a private business such as
  - auto drivers association
  - bank
  - contractor
  - hotel owner
  - private bus corporation
  - real estate developer
  - taxi aggregator
  - taxi cab service
  - telecom service provider
- You provide a service or product to the city or to private citizens at a fee
- Profit is your primary motive
- You also want to sustain yourself financially over a long term



## Roleplay Card

### Government Authority

- You are a government authority like the urban development body, Municipal Corporation or traffic police.
- Your charge is to provide services and infrastructure in the city which are usable and accessible to all citizens
- You engage with the public at large to understand the needs and requirements of the people
- You engage with private businesses to negotiate benefits for the city and its citizens
- You must balance the demands of smaller yet powerful groups with the needs of the majority of users



# PEDESTRIAN AND CYCLING PRIORITY

Moderator: Shabna

	Recommendations	Government	Private	People				Final Collaborative Choices
				W	G	T	C	
Pedestrian and Cyclist Priority	a. Provide universally accessible footpaths and optimal carriageway in the station area			●	●	●		■
	b. Focus on ensuring adequate carriage way for smooth movement of traffic and also provide adequate footpath which may not be universally accessible in the station area	●						
	c. Provide maximum carriageway with minimal footpaths in the station area		●				●	
	d. Provide segregated and protected bicycle lanes with dedicated signals at junctions in the station area				●		●	
	e. Provide cycle lanes by marking on existing carriageway but not necessarily dedicated signals at junctions in the station area	●				●		■
	f. Cyclists are required to share carriageway with the traffic in the station area			●			●	

● Individual choice (a,b,c)

■ Collaborative choice (a,b,c)

● Individual choice (d,e,f)

■ Collaborative choice (d,e,f)

# CONCLUSION & LEARNINGS

- Transit station design cannot be looked into isolation
- Station areas to be considered as an integral part of TOD
- Create safe access measures at a station area level (*750 m radius around station*)
- Integrate road safety as a critical aspect of safe access process

# APPLICATIONS OF SAFE ACCESS TOOL



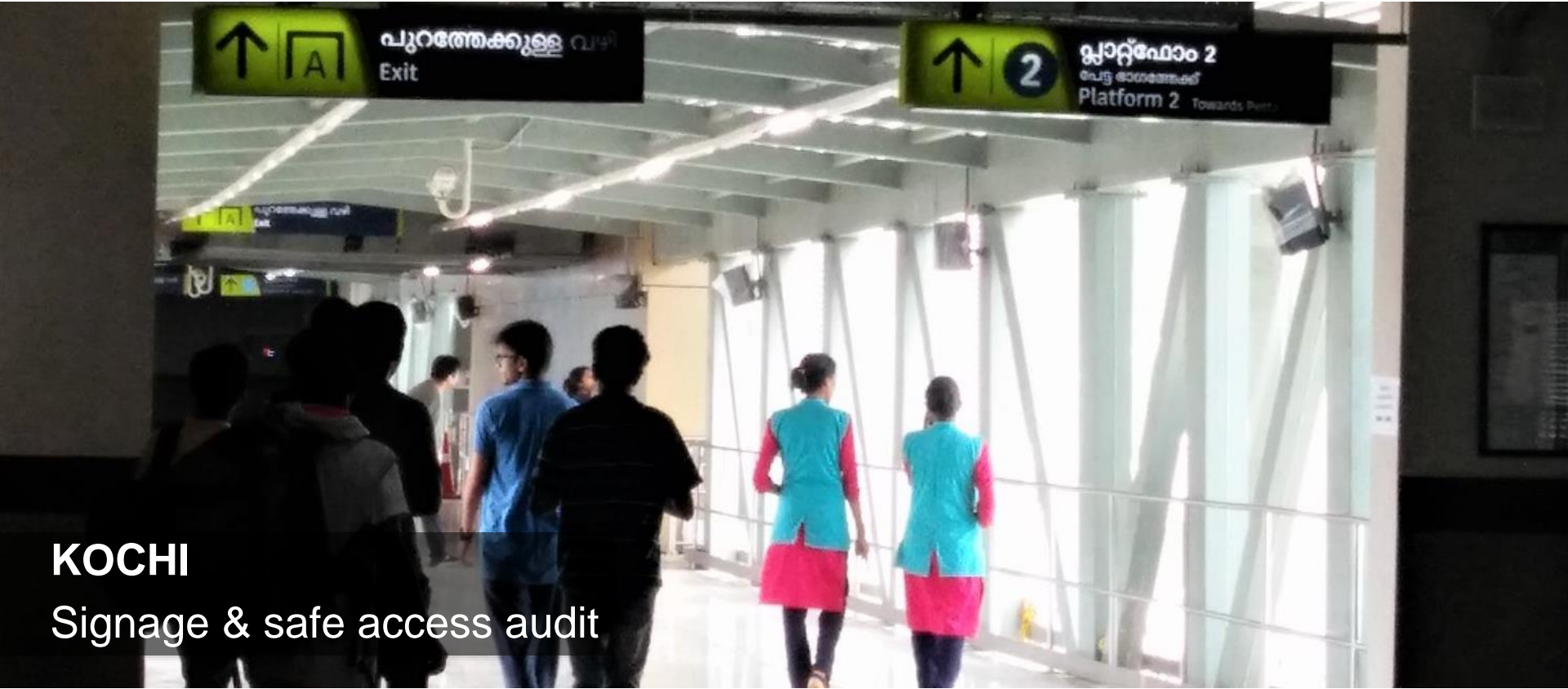


# ENGAGEMENT WITH PEOPLE ON GROUND



Engagement with local communities  
for 2 station areas

# INFORMING POLICIES



**KOCHI**

Signage & safe access audit

# ENTREPRENEUR ENGAGEMENT



**STAMP**

Station Access & Mobility Program

# CITIZEN ENGAGEMENT



STAMP

Station Access & Mobility Program

# SMART CITY ENGAGEMENTS



Kick off workshop for Area based development work

# BUILDING CAPACITIES



**Nagpur**  
Training the trainers

# MASTER CLASS



Kaohsiung, Taiwan  
Eco mobility conference



# TRAINING THE EXPERTS



Addis Ababa, Ethiopia  
LUTP workshop

STAMP





# CONNECT WITH US



WRI INDIA  
— ROSS CENTER



## ENABLING SAFE ACCESS TO MASS TRANSIT

A toolkit for community engagement and decision-making



WORLD BANK GROUP



UKaid  
from the British people



Global Road Safety Facility



WRI INDIA

Workshop series on

## INTEGRATION OF ROAD SAFETY CONSIDERATIONS IN TRANSIT ORIENTED DEVELOPMENT PROJECTS

October, 2020

### Session 2: Assessing and Enabling road safety for TOD

8th October, 2020. 6.30pm IST (9.00am ET).

*Session type: Online presentation. 90 minutes. Open invitation.*

Speakers: Shigeyuki Sakaki (Senior Transport Specialist, The World Bank) and Project team, The World Bank & World Resources Institute India.

Guest speakers: Juan Miguel (Transport Specialist) and Alina Burlacu (Senior Transport Specialist), The World Bank

The session focuses on the first two steps of TOD Framework, looking at assessing the road safety readiness for implementing safe TODs and ways of using road safety as a messaging to set up and institutionalize an enabling environment for TOD. This would be followed by case study presentations by guest speakers focusing on road safety needs assessment and mechanisms like policies, institutional setup, community engagement etc for enabling TOD planning process.

### Session 3: Planning and Designing road safety measures in TOD

15th October, 2020. 90 minutes. 6.30pm IST (9.00am ET).

*Session type: Online presentation. 90 minutes. Open invitation.*

Speakers: Project team, The World Bank & World Resources Institute India.

Guest speakers: TBC

This session will discuss the planning and designing of physical infrastructure and strategic solutions that ensure road safety within a TOD project. A case study presentation will highlight the 'Tianjin Urban Green Mobility Project' emphasizing on alignment with the City's vision and goals for ensuring road safety, identifying challenges and applying design solutions within the TOD station areas in Tianjin, China.

### Session 4: Financing and Implementing of road safety in TOD

22nd October, 2020. 5.00pm IST (7.30am ET)

*Session type: Online presentation followed by panel discussion. 90 minutes. Open invitation.*

Speakers: Project team, The World Bank & World Resources Institute India.

Panelists: TBC

The final session will discuss allocation of funds, innovative financing tools and incentives for ensuring road safety within the TOD that benefits both the public and private sectors; and actions to be undertaken for implementing the project including project prioritization, capacity building, and monitoring will be discussed. The panel discussion would discuss the challenges related to incorporation of roads safety considerations in the five-steps of TOD framework. It intends to explore solutions for these challenges through case examples and project implementation experiences and discuss different short-, mid- and long-term strategies that could be adopted for implementation of road safety in TOD projects.

Photo credit: Nicholas Mirguez/ flickr