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# RESILIENT URBAN MOBILITY IN TORONTO: BRINGING LOCAL IMPLEMENTATION TO GLOBAL PRACTICE

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# What is Urban Resilience?

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# What is Urban Resilience?

- Risk: The combination of the probability of a hazardous event and its consequences which result from interaction(s) between natural or man-made hazard(s), vulnerability, exposure and capacity.
- Hazard + Exposure + Vulnerability = Risk
- RESILIENCE: The ability of a urban system, community or society exposed to hazards to RESIST, ABSORB, RECOVER from the effects of a hazard in a timely and efficient manner, and EVOLVE to adapt to future challenges.

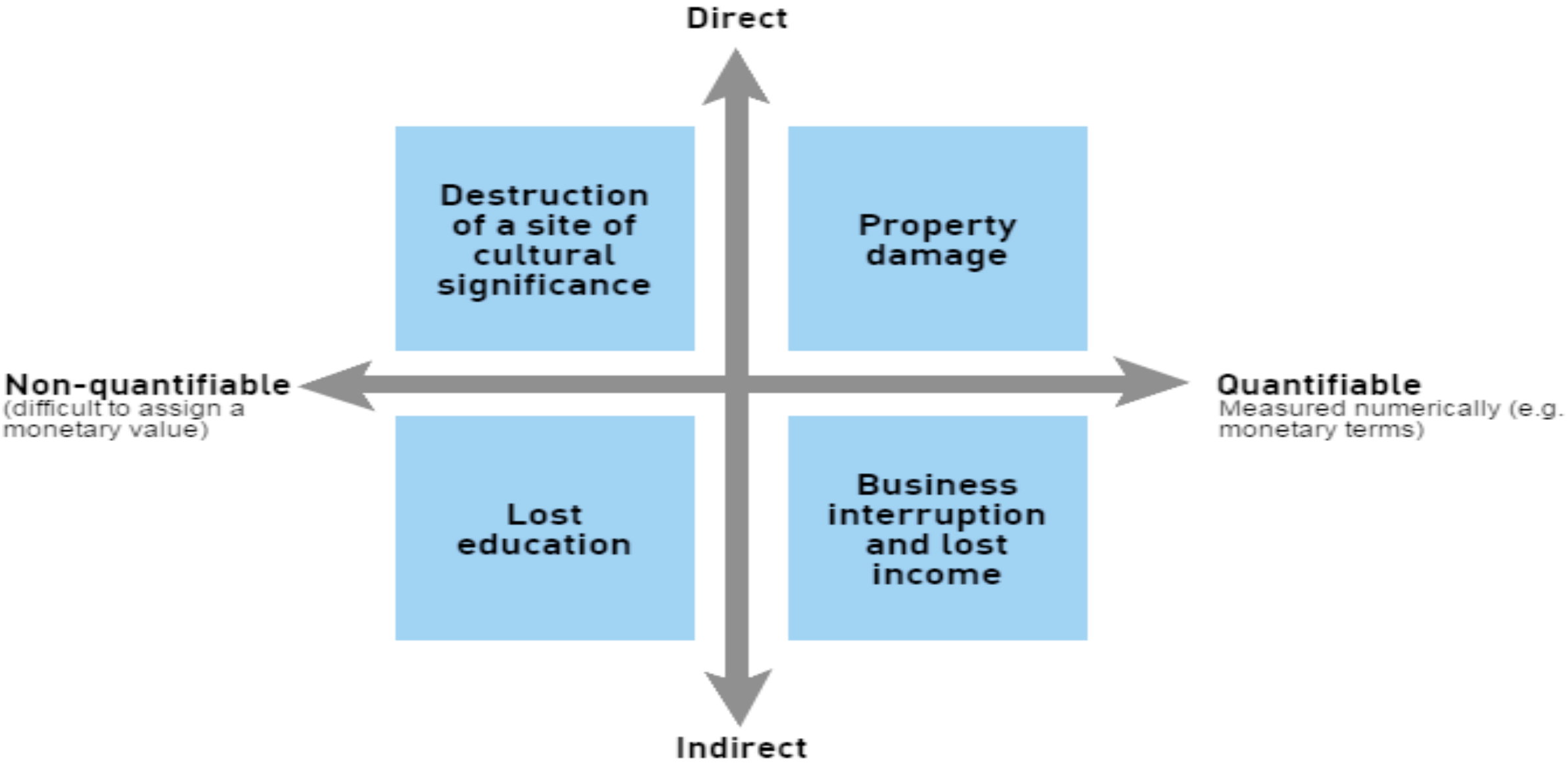
# What Drives Risk? Underlying Risk Drivers

- Badly planned and managed urban development
- Environmental degradation and ecosystem decline
- Poverty and inequality
- Vulnerable livelihoods
- Climate change
- Weak governance/Lack of resilience-based governance
- Knowledge gaps
- Exclusion of key sectors, like transportation, the private sector

By mid-century, 70% of humans will live in urban areas
Cities will need to host 3 billion additional inhabitants by 2050

# Climate Change and Disaster Loss

- According Aon Benfield's "Weather, Climate and Catastrophe Insight – Annual Report 2017"
- 2017 was the costliest year on record for weather disasters
- USD 353 billion of total economic cost
- USD 134 of insured losses
- Over 80% of disaster losses are hydrological – typhoons, hurricanes, coastal and riverine flooding.


Direct
Destruction of a site of cultural significance
Property damage
Non-quantifiable
(difficult to assign a monetary value)
Quantifiable
Measured numerically (e.g. monetary terms)
Lost education
Business interruption and lost income
Indirect

# Urban Resilience and Urban Mobility: A New Opportunity?

- Cities have neglected to understand the relationship between urban mobility and urban resilience
- Urban infrastructure (drainage, roads, transportation) accounts for the vast majority of costs for adapting to climate change
- Costs: Maintenance, repair, reconstruction, disruption and social/ community losses to cities
- No matter how you look at it, urban resilience makes good financial sense:
- Every **1 USD** invested in resilience and disaster risk reduction corresponds to approximately **7 USD** in response, reconstruction and recovery costs.

# Making Cities More Resilient Through Resiliently-Designed Transportation

- According to the World Bank's "Moving Toward Climate-Resilient Transport:"

"Countries are investing massively in transport infrastructure and such spending is likely to rise to meet aspirations from greater mobility and connectivity. Growing climate risks will impact the entire transport value chain. These risks raise the question of whether, and by how much, new or existing transport infrastructure"

- Since cities, national governments and metropolitan areas spent so much of their municipal budgets on transportation, we need to consider integrating resilient design not only to protect that investment, but to bring risk reduction and resilient throughout the city.

| | |
|---|---|
| Nairobi | 49.5m |
| San Fran | 126m |
| Istanbul | 600m |

# Successful Implementation of Resilient Transportation Toronto

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# Waterloo Light Rail Train Streetscapes


# Waterloo Light Rail Train Streetscapes

# VIVA Bus Rapid Transit in York Region of Northern Toronto

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# Subterranean Flood Water Capture: Keeping Risk from VIVA BRT Infrastructure

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# Conclusion: Designing Resilient Transportation for Resilient Cities

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