Top Five Challenges for Sustainable Cities

Opening the discussion for how technologies (including AI and IoT) and particularly open source solutions like FIWARE and OpenIoT can help to address those challenges

17th January 2019
Brussels, Belgium

Dr. Martin Serrano
Open Agile and Smart Cities Ireland
Principal Investigator and Data Scientist
IoT, Stream Processing and Intelligent Systems

CONNECTED SMART CITIES CONFERENCE 2019

NUI Galway OÉ Gaillimh

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CREATE-IoT

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Opening Quotes…

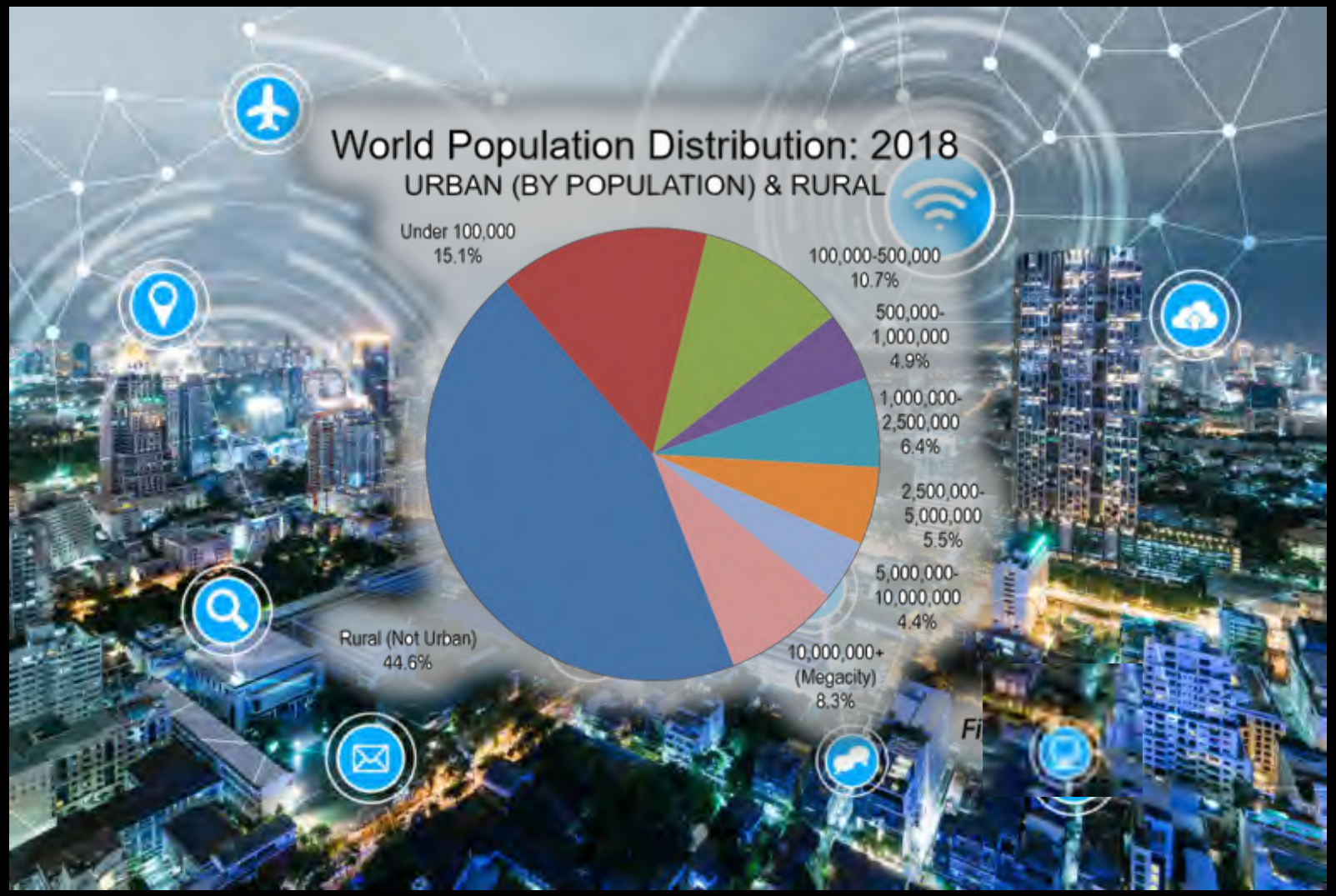
Today, **55** percent of the world's population is thought to be living in an urban area or city, with that figure set to rise to **68** percent over the coming decades…

- United Nations 2018 -

Two-thirds of global population will live in cities by 2050…

- United Nations 2018 -

An urban area or urban agglomeration is a human settlement with high Population density and infrastructure of built environment.
Urban areas are categorized by urban morphology as mega-cities, cities, towns, conurbations or suburbs.



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Dr. Martin Serrano

IoT & Stream Processing Unit Head

Chair IEEE ComSoC IoT Experientation

OASC Board Member, Ireland

TOP 1% OF UNIVERSITIES WORLDWIDE

THE WORLD UNIVERSITY RANKINGS

50 Best Smart City Award 2018

NIST GCTC Smart Cities Project

Technical Coordinator, USA

IEEE ComSoc

Emerging Technologies Chapter

Sub-Committee Internet of Things IoT Experimentation

2017

siliconrepublic

25 key people influencing the internet of things

by John Kennedy

Irish and Ireland-based leaders, scientists and technologists are putting the country on the global map in terms of the internet of things (IoT) revolution.

Santa Clara University Lecturer,

Silicon Valley, USA

R+D+I Advisor, Dew Mobility, Fremont, Ca USA

2015

Research Excellence

President's Award

Nominee SFI-NUIG, Ireland

SHORTLISTED

ISA Software Industry Awards 2014

2014

Industry

California State University Lecturer,

San Luis Obispo (CalPoly), USA

IoT Scientific Director, Galway, Ireland

NUIG-National University of Ireland

Irish Software Association

Software Industry Awards outstanding

Academic Achievement Nominee, Ireland

MIT-IoT Hackaton

IoT Best Industry Solution

IoT Media Lab, Cambridge, Ma. USA

BLACK ROOKIES OF THE YEAR

OPENIoT

Industry

NATIONAL Panasonic

Kumamoto, Japan

Design Engineer Supervisor, AKME-BC

2013

WIT-Waterford Institute of Technology

Cloud Computing & Semantics

Researcher, Ireland

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Challenges Living in Cities (Urban Environments)…

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URBAN

SUBURBAN

Typical home listings on realtor.com

Contemporary style
1,238 sq. ft. (median)
2 bedrooms, 2 bathrooms

Traditional style
1,540 sq. ft. (median)
3 bedrooms, 2 bathrooms

Popular home features

(by percentage of listings that mention it)

Family room
3%

Backyard
6%

Garage
18%

Family room
12%

Backyard
16%

Garage
25%

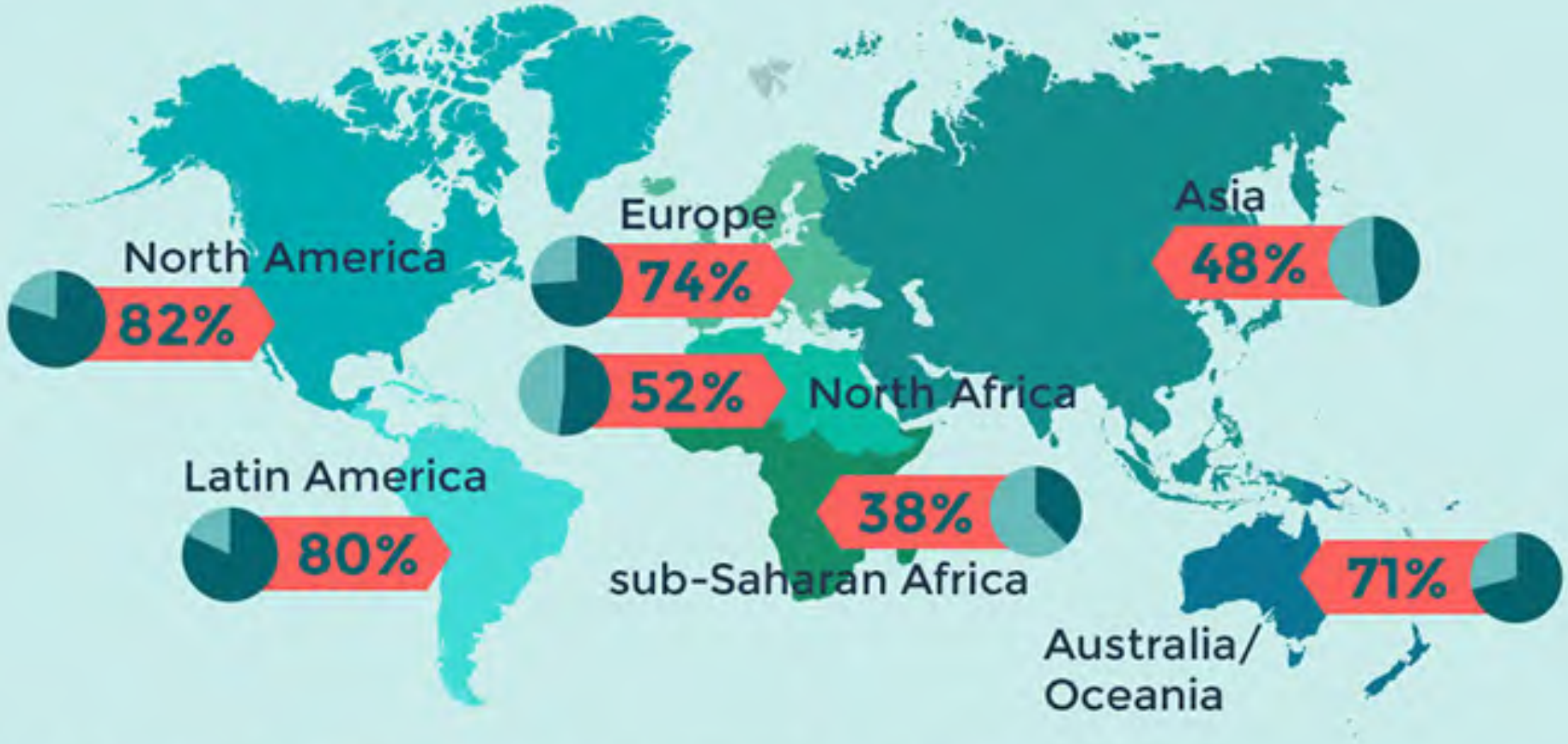
Sources: realtor.com®, iStock (aprilvalery, Meilun, IconicBestiary)

realtor.com graphic

RURAL

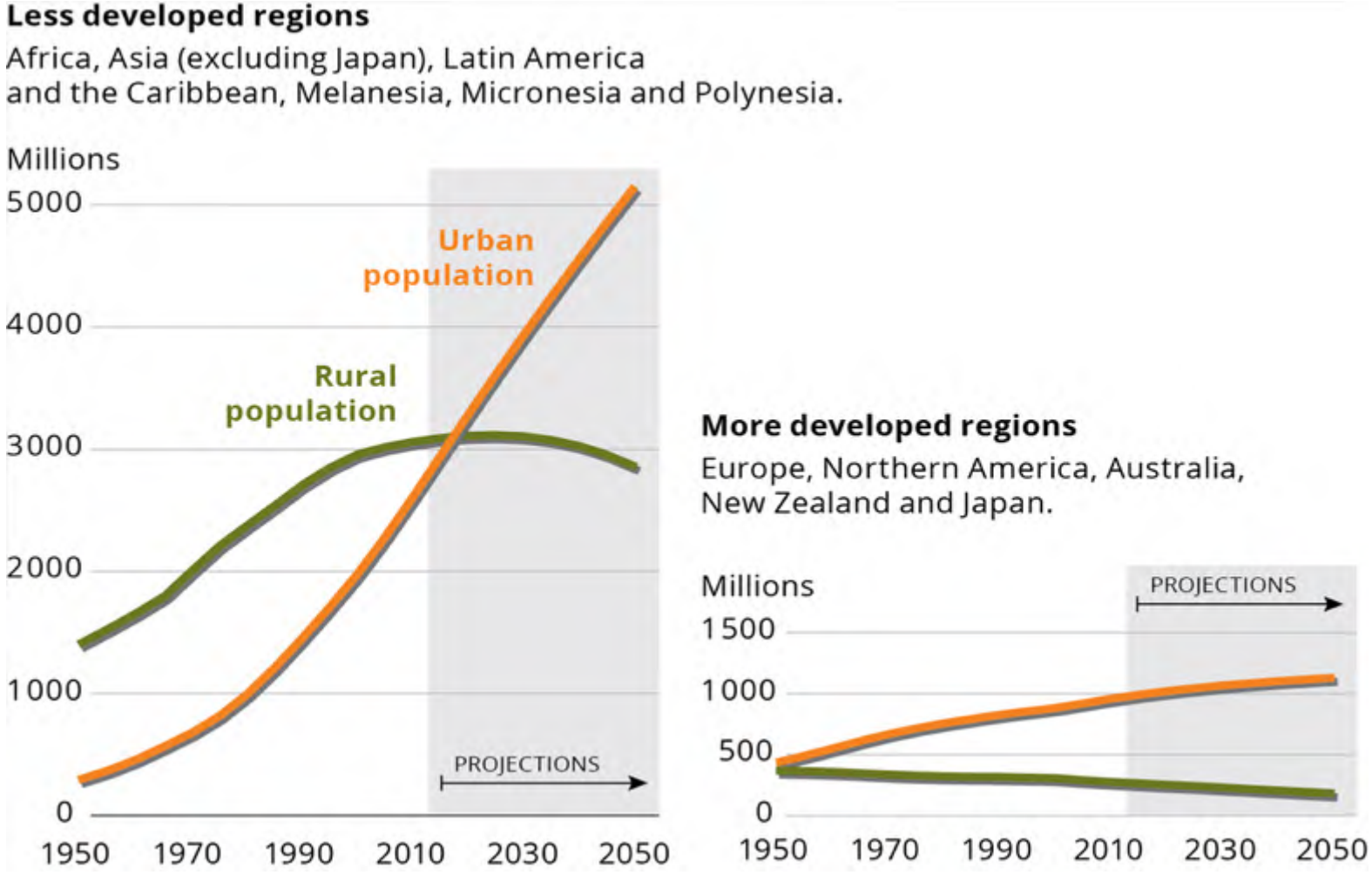
Pros & Cons.

Share of Urban Population on all Continents



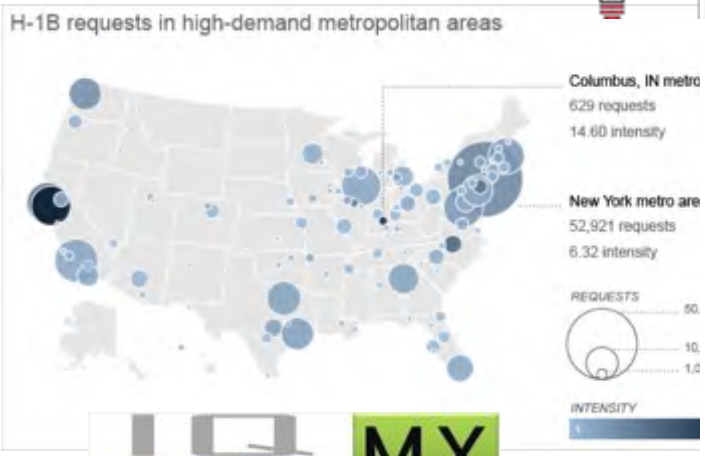
Source: United Nations Department of Economic and Social Affairs (UNDESA) 2016, online database

Urban Population Trends on Developed Vs Less Developed Regions



Global Smart City Up Rising

SMART AMERICA



Smart cities in Europe ©europeansmartcities

Future Cities ASIA

SMART CITIES MEED

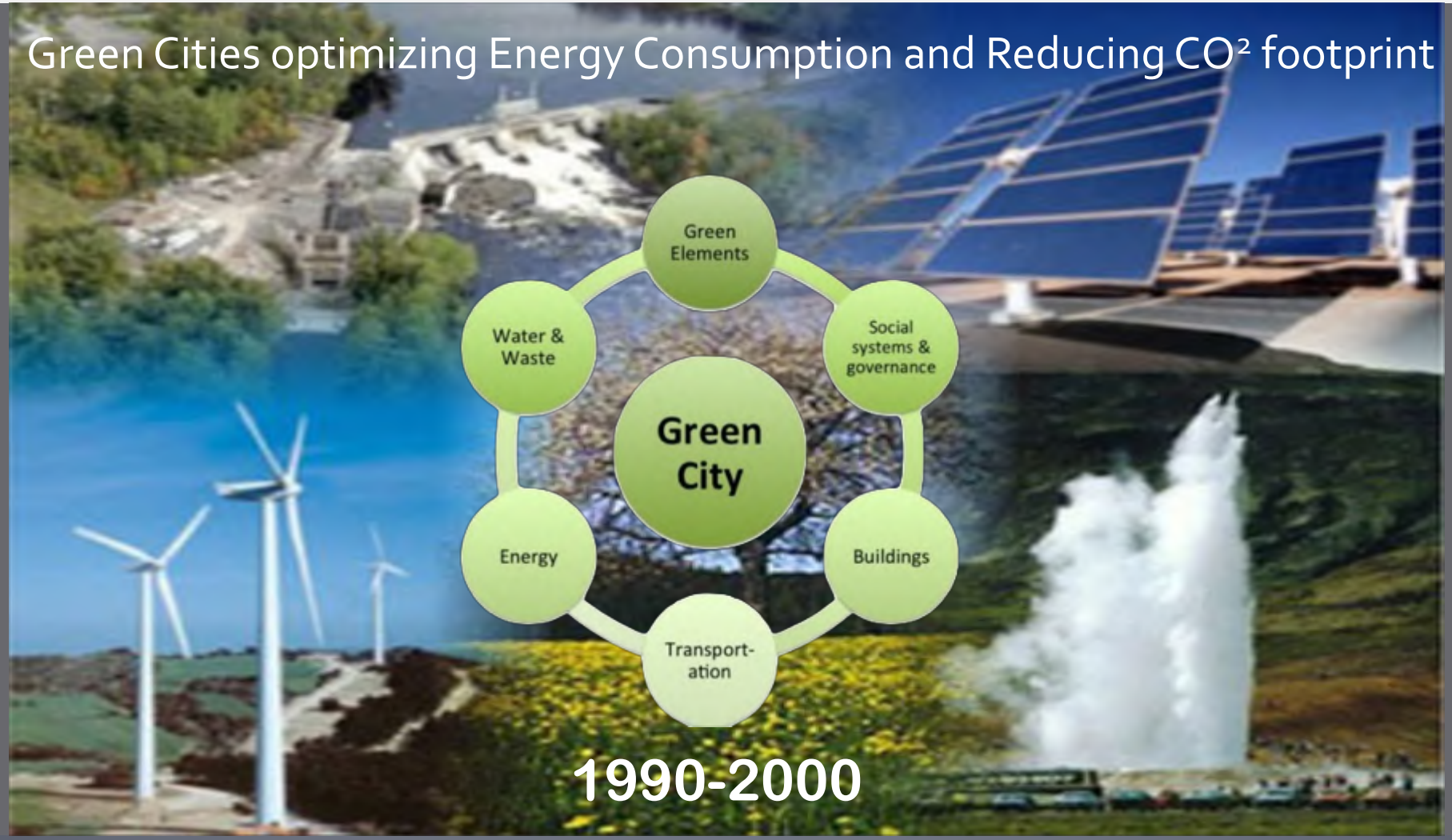
SMART CITY MX

SMART CITY THE NEXT GENERATION
FOCUS SOUTHEAST ASIA

AFRICA

Cities: An Urban Environment → Ecosystems

Green Cities: Cost Reduction and Efficiency



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Digital Cities: Technology and Computing

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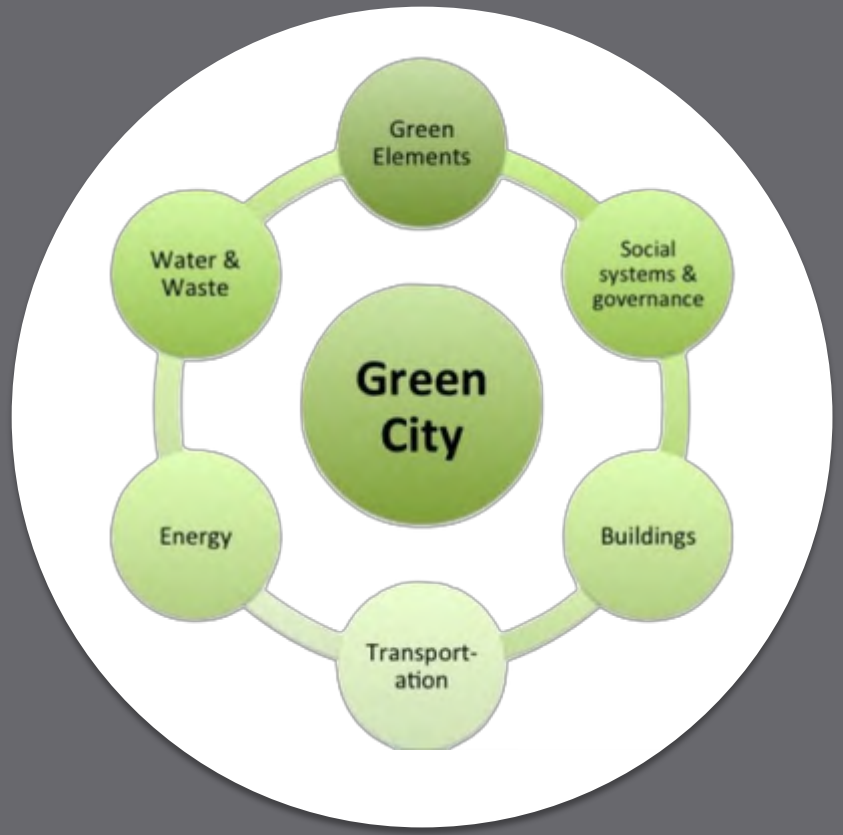
Smart Cities: Interoperability & Services Value

Urban Environments Evolution



1990-2000

2000-2010

2010-2020

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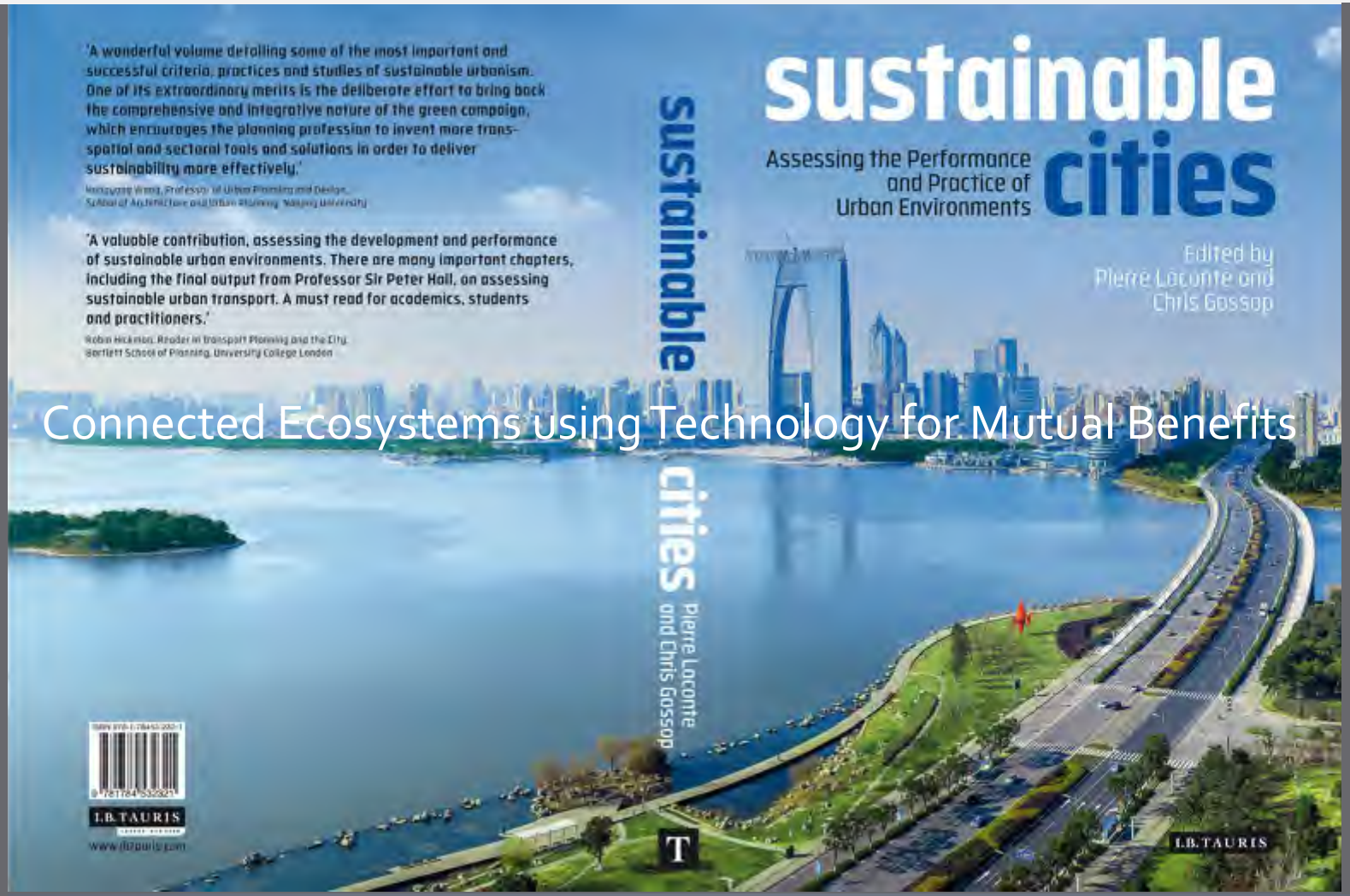
Sustainability as a Common Element

Sustainable Cities: Systems Integration & Connected Services



Connected Ecosystems using Technology for Mutual Benefits

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Cities Top Five (Most Common) Problems

Urban Distribution / Planning

Citizens Mobility

Air Quality / City Pollution

Home Care & Assistance Living

Public Safety

Sustainability Methods

BIM

Generation and management of digital representations of physical and functional characteristics

Green ICT

using computing resources efficiently and effectively with minimal or no impact on the environment.

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Urban Population Most common Problems

Urban Distribution / Planning

Sao Paulo, Brazil

Barcelona, Spain

Canberra, Australia

Urban Population Most common Problems

Citizens Mobility

NYC, USA

Barcelona, Spain

Sao Paulo, Brazil

Urban Population Most common Problems

Air Quality / City Pollution

London, UK

Madrid, Spain

Beijing, China

Urban Population Most common Problems

Home Care & Assistance Living

Miami, FL USA

Weimar, Germany

Beijing, China

Urban Population Most common Problems

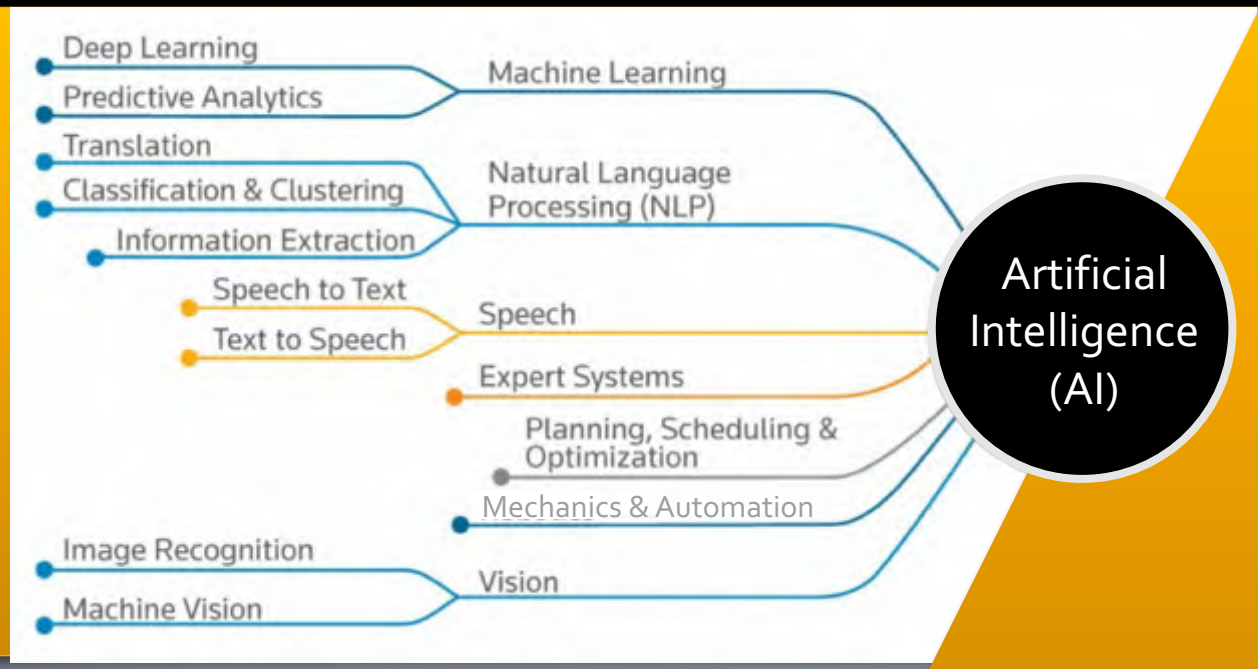
Public Safety

Miami, FL USA

Paradise, Ca, USA

London, UK

Artificial Intelligence Design and Constitution



Artificial Intelligence (AI)

Society

- Social Impact
- Business Impact
- Machine Intelligence (AI)
- Information Processing
- Electrical
- Mechanical

Technology

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IoT and Artificial Intelligence in Smart Cities

National University of Ireland Galway
Galway City, Ireland

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AI / IoT Helping to Solve Urban Problems

Urban Distribution / Planning

- Smart Technology coordination
- Sensors Systems Deployment
- Advanced Data Analytics
- Cloud infrastructure Optimisation
- Improve services time
- increase efficiency and
- Maintenance Services Cost Down.

Urban Planner, Technology Expert, Data Scientist

Insight

AI / IoT Helping to Solve Urban Problems

Citizens Mobility

- Driving in city traffic
- Adaptive signal control
- Better traffic flow
- Improve driving experience
- Economic impact by reducing cost
- On the fly Transport Deployments
- Complex Planning Schemes for Public Transportation

AI / IoT Helping to Solve Urban Problems

Air Quality / City Pollution

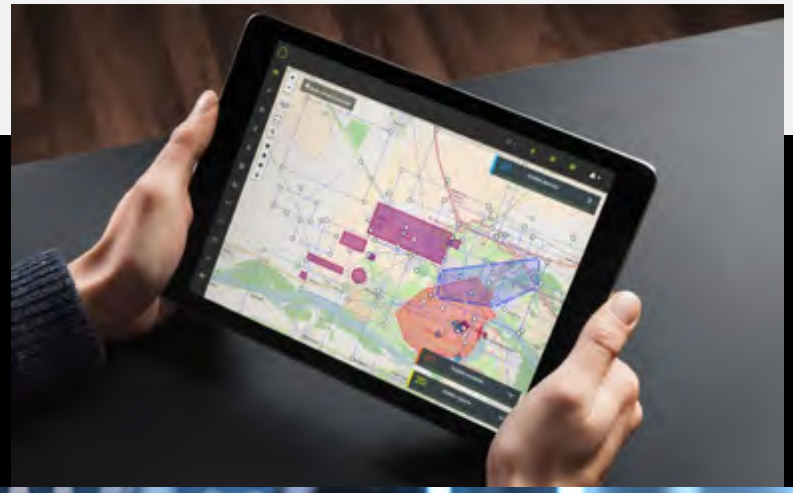
- Better Manage Power Source
- Cleaner Production of Energy
- Optimisation of Fossil Carburant
- Efficient Metering
- Monitoring Systems
- Increase Resilience on critical infrastructures

AI / IoT Helping to Solve Urban Problems

Home Care & Assistance Living

- Medication Support
- Therapy imporvements
- Prescription and Telemedicine
- Medical advice and support
- Home Monitoring Systems
- Remote assistance
- Assistant Living

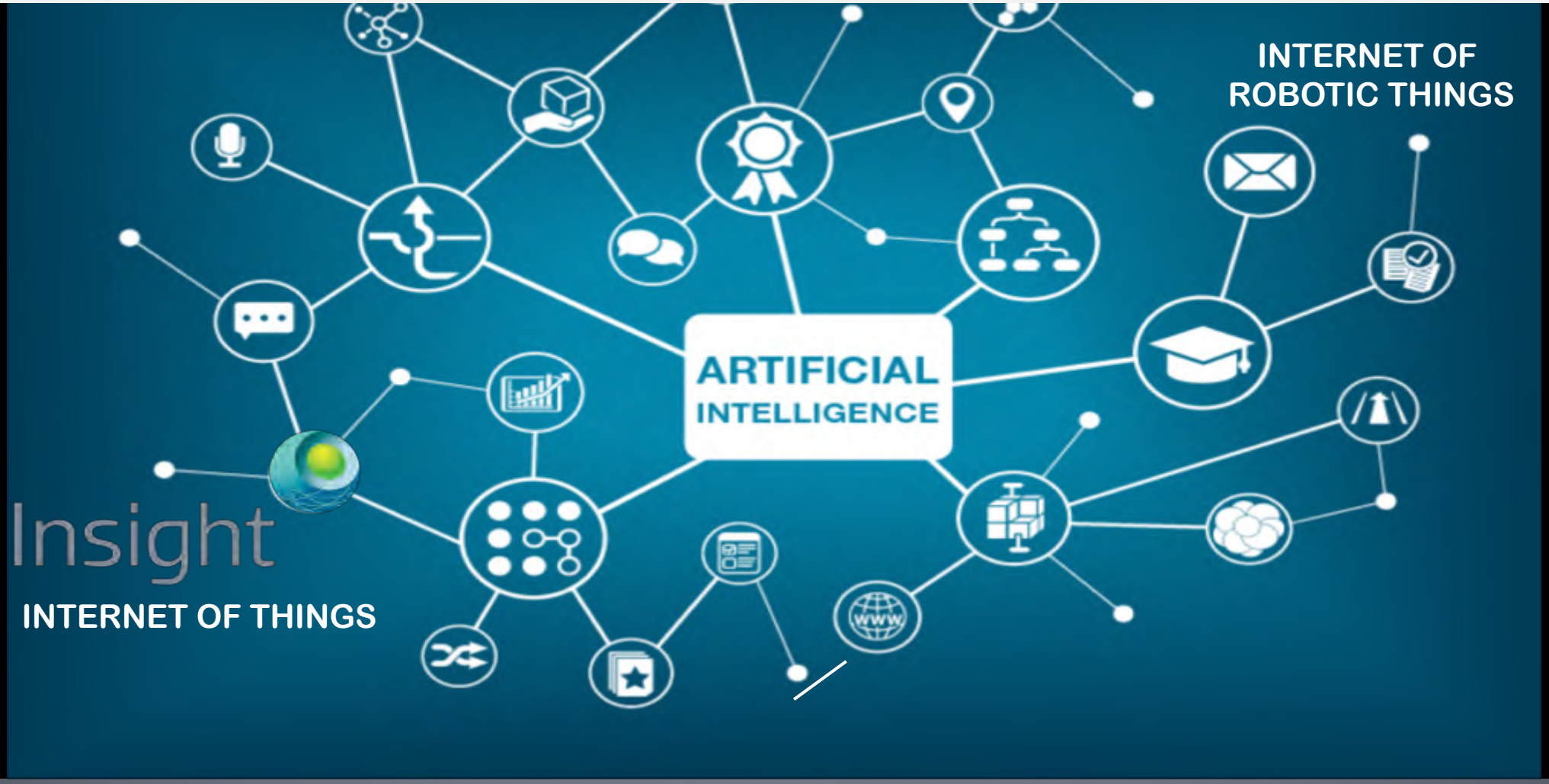
AI / IoT Helping to Solve Urban Problems



Public Safety

- Surveillance synchronisation
- Reduce Crime rates
- Increase Lost and Found rates
- Tracking and Monitoring
- Monitoring Systems
- Specific Object Identification
- Deep Video Analytics.

AI / IoT Research Activities at Insight@Galway



Insight Artificial Intelligence – GENNI Online Services

NUI Galway
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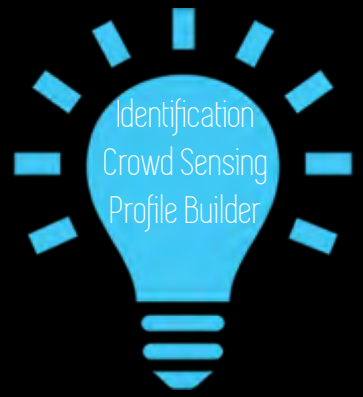
Capture API

Data Processing
and
Data Transformation

Awareness



Situational-Awareness
Virtual Agents

Intelligence

Semantic
Complex Analysis

Feedback API

Internet of
Robotic Things

Continuous
Monitoring

SAVAGE

GENNI
Assistant

IoT-RoboLab

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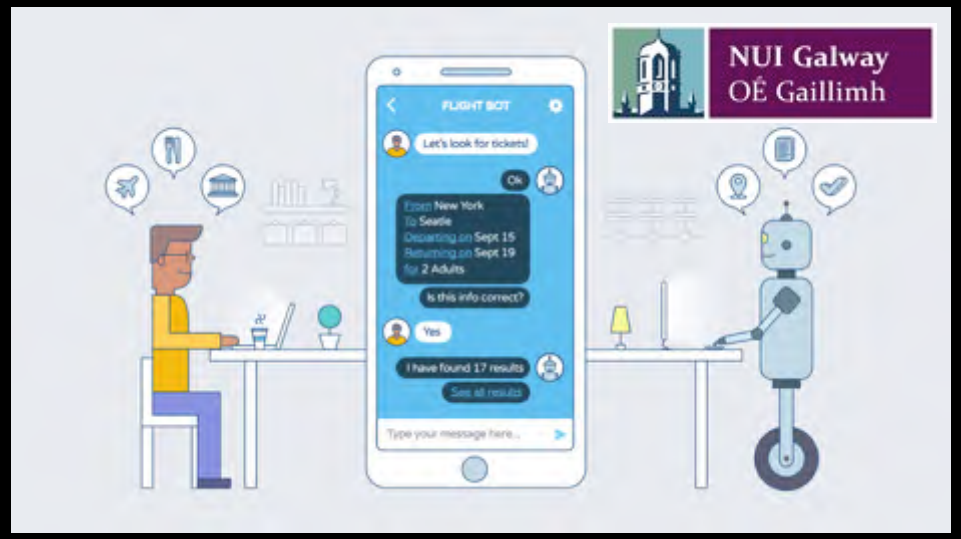
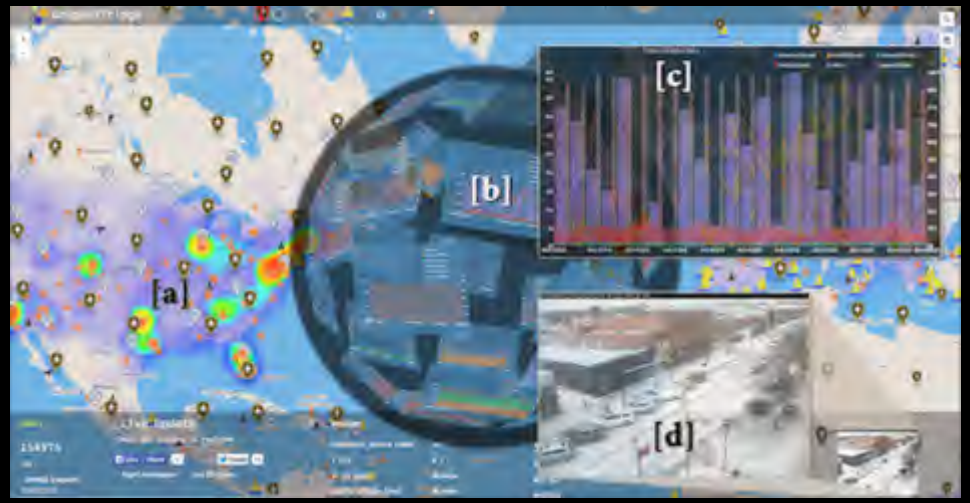
AI & Robotics Systems

Insight Artificial Intelligence Expertise:

+



Artificial Intelligence for Citizens and Cities



Complex Analytics for Citizens and Cities

IoT and Artificial Intelligence - Disambiguation

OASC Ireland – Smart Cities Cluster

Smart City Standards | Internationalisation | Technical Support | OASC Ireland Cities | Activities | About OASC

NIST GLOBAL CITY TEAMS CHALLENGE usignite

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OPEN & AGILE SMART CITIES

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