Smart Streets: Definition, Principles, and Infrastructural Elements

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Presenter Bio

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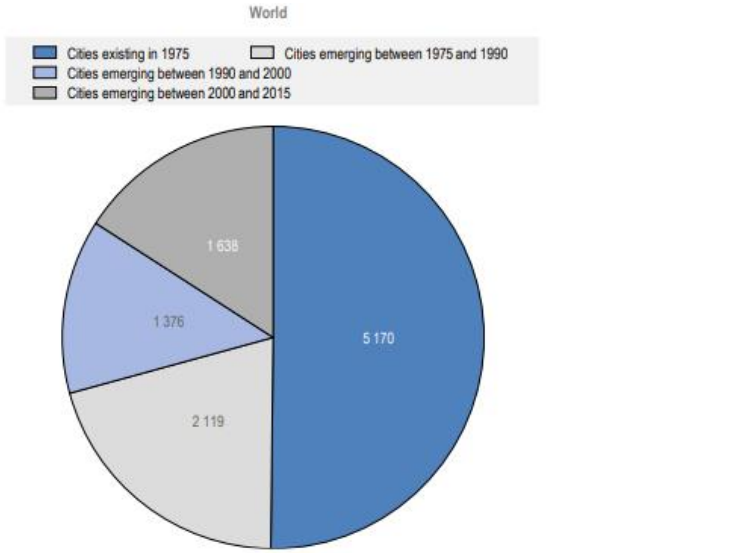
About Theo Lynn

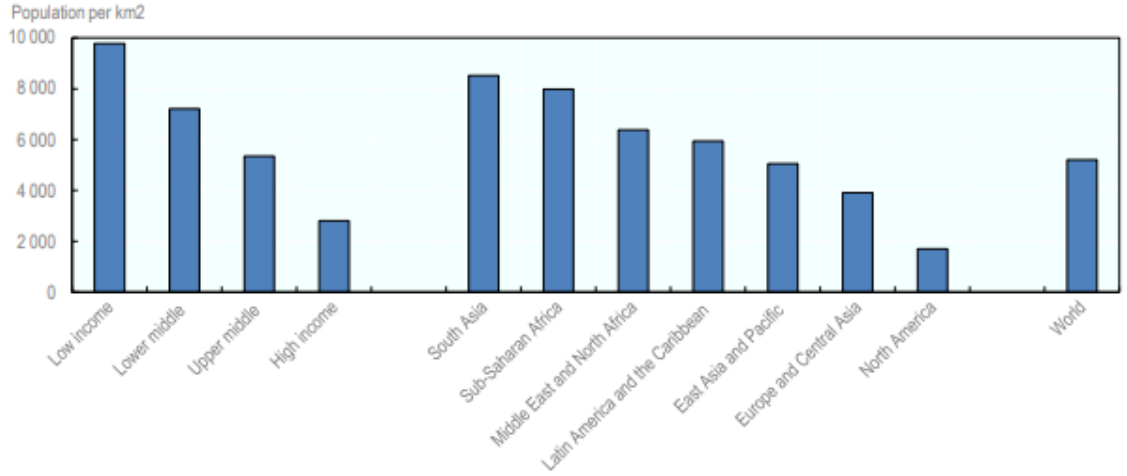
Professor Theo Lynn is (Full) Professor of Digital Business at DCU Business School and is Associate Dean (Strategic Projects) at DCU Business School. Professor Lynn specializes in the role of digital technologies in transforming business processes. His main teaching areas are strategy and digital marketing.

Prof. Lynn was Centre Director at the Irish Institute of Digital Business (2018-2019), Principal Investigator of the Irish Centre for Cloud Computing and Commerce, an EI/IDA funded Cloud Computing Technology Centre (2011-2018), Associate Dean (Industry Engagement and Innovation) at DCU Business School (2015-2017), Business Innovation Platform Director for DCU (2015-2016) and Director of the Leadership, Innovation and Knowledge Research Centre at DCU (2009-2011). He has won over 200 grants representing over €20m in total project funding. He was a PI on the Horizon 2020 CloudLightning Project (2015-2017) and Horizon 2020 RECAP Project (2017-2019); he is currently a PI on the Horizon 2020 RINNO project (2020-2023).

There are more cities and more people living in cities than ever before. By 2050, over 55% of the population worldwide will live in urban areas.



Source: Calculated by EC, based on the Urban Centre Database GHS-UCDB R2019A, Florczyk, A. et al. (2019[1]), *GHSL Data Package 2019 (database)*, http://dx.doi.org/10.2760/06297.



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Increased urbanization causes significant strain on housing, transportation, energy systems and other infrastructure (DESA, 2018)

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Smart city initiatives leverage advances in sensor, cloud computing, networking, and data science technologies are widely cited as a key solution to rapid, global urbanization (Hoornweg & Freire, 2013; WEF, 2018)

The Public perform a wide range of activities in streets that can be categorised as mandatory, selective, or social (Jung et al., 2009).

Activity	Moving	Behaviour Visual Perception	Resting	Impact of Public Realm
Mandatory (Must be performed)	Going somewhere	Seeing out of necessity	Stopping or resting on the way to somewhere	Not significant
Selective (Undertake at will and as space allows)	Wandering for something	Seeing out of interest	Stopping or resting out of interest	Sensitive
Social (Undertake because they are in a public space)	Going to do something	Seeing to do something	Stopping or sitting to do something	More active in a conducive environment than a poor one

Streets are a public realm that is actively and passively consumed depending on how it is structured as a public space (Lee & Lee, 2013; Song, 2006)

Tangible Elements	Primary	Vertical	Buildings, Railway Bridges etc.	
		Horizontal	Floors	Roadbeds, footpaths etc.
			Ceiling	Skyline, covering etc.
			Underground	Utility channels etc.
	Secondary	Street Furniture	Benches, lamp posts, waste receptacles, storage units, utility cabinets, signage etc.	
Intangible Elements	Natural	Short term	Light, seasons, organic growth etc.	
		Long term	Precipitation, wind etc.	
	Human	Administrative, Economic, Social, Culture, History etc.		
	Behavioural	Humans, Moving objects		

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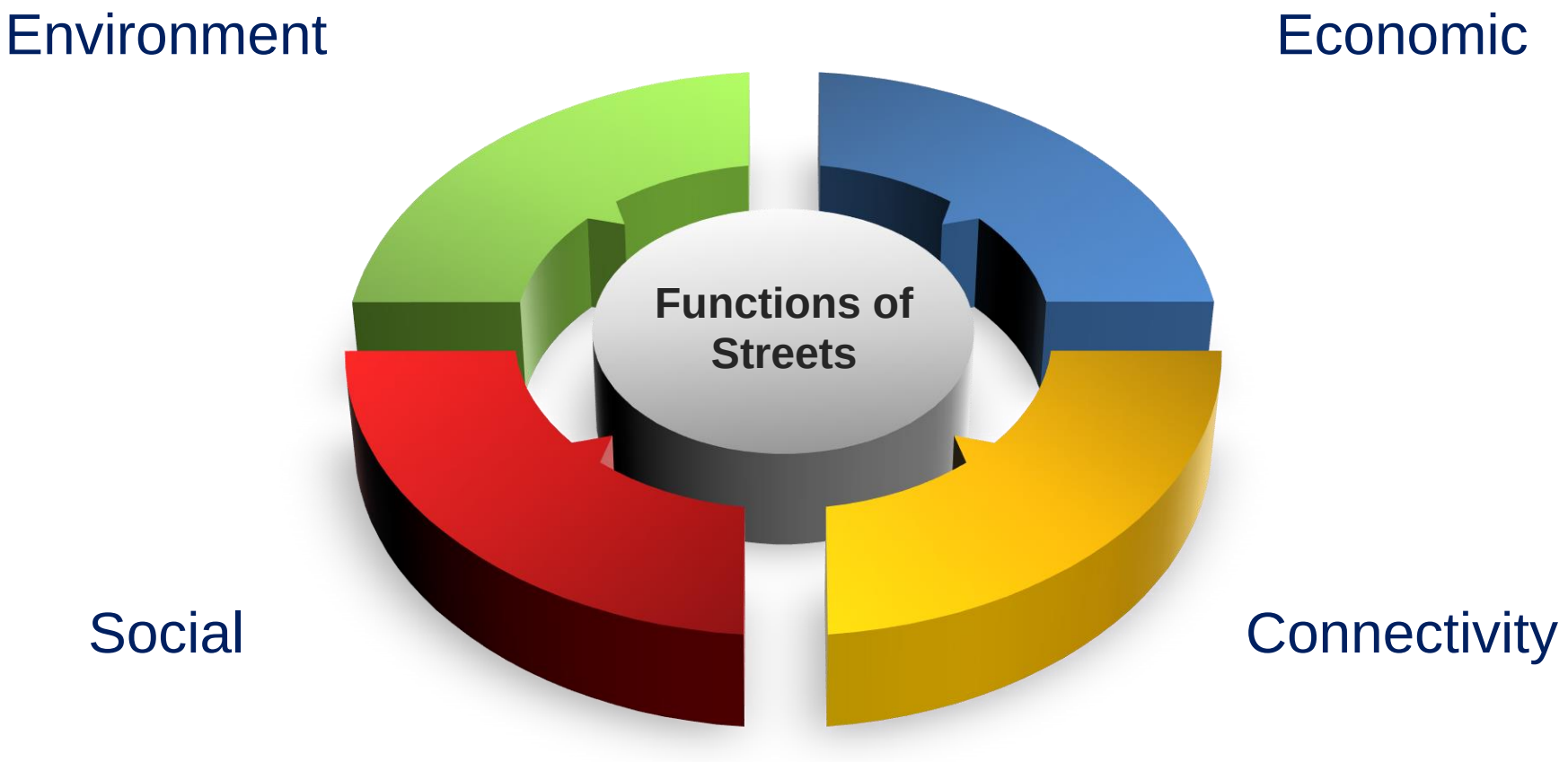
Shopping streets are the lifeblood of rural towns and perform a number of functions (Jones et al., 2016)



Objectives

01 To define a smart street

02 To identify design principles for smart street initiatives

03 To identify exemplar infrastructural elements for smart streets

WHAT IS A SMART STREET?

The ‘smart city’ literature includes both broad and narrow perspectives on the quality of smartness but the urban focus may not be useful for rural policy and development

01 Structures

02 Functions

03 One or more foci

04 Semiotics

Ramaprasad et al. (2017)

- Identify over 22,500 factors
- Academically sound but unworkable in practice

Yadav (2020), Naldi et al. (2020)

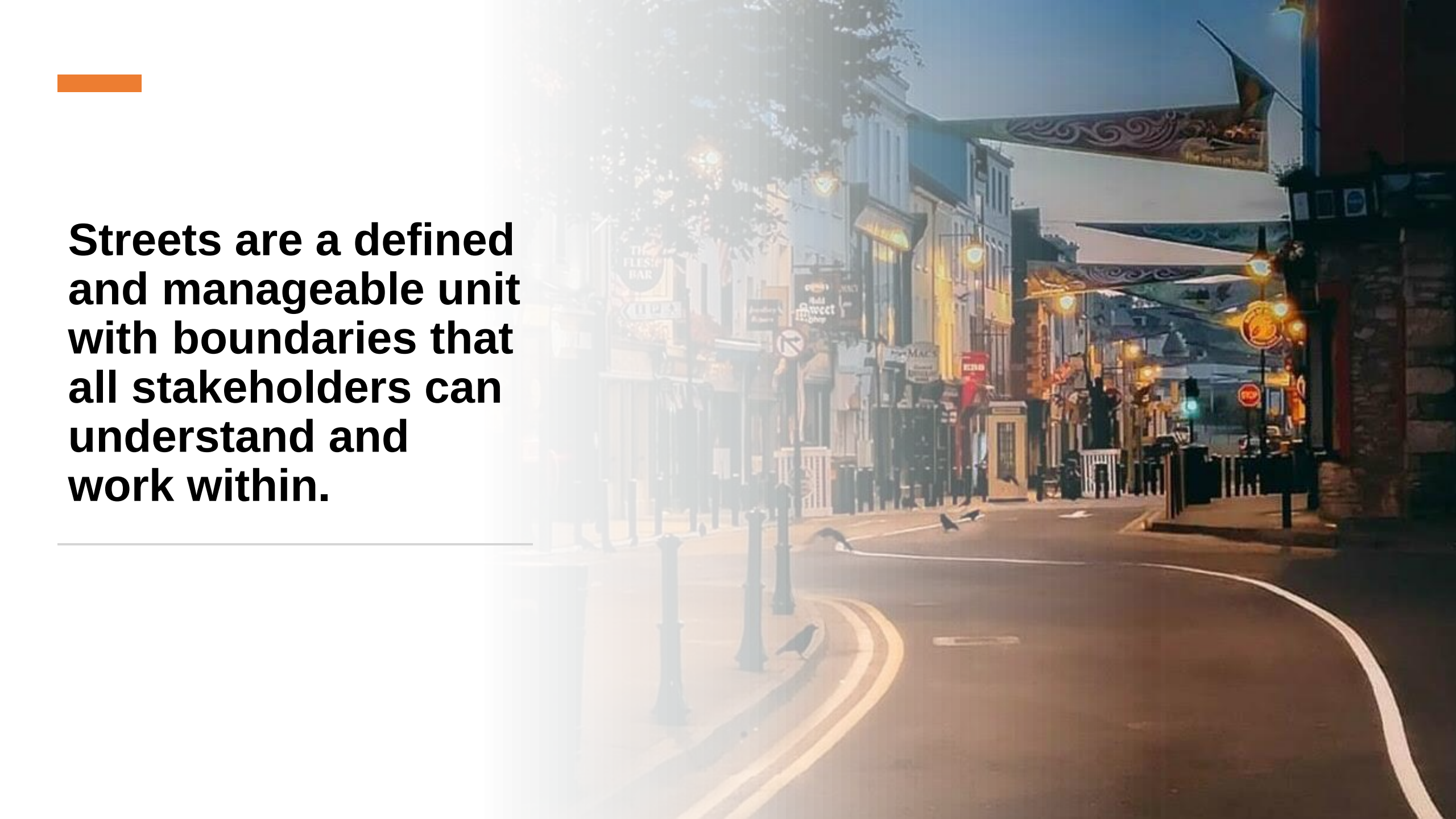
- Include broader concepts

01 Technological

02 Sustainability

03 Inclusion

Streets are a defined and manageable unit with boundaries that all stakeholders can understand and work within.



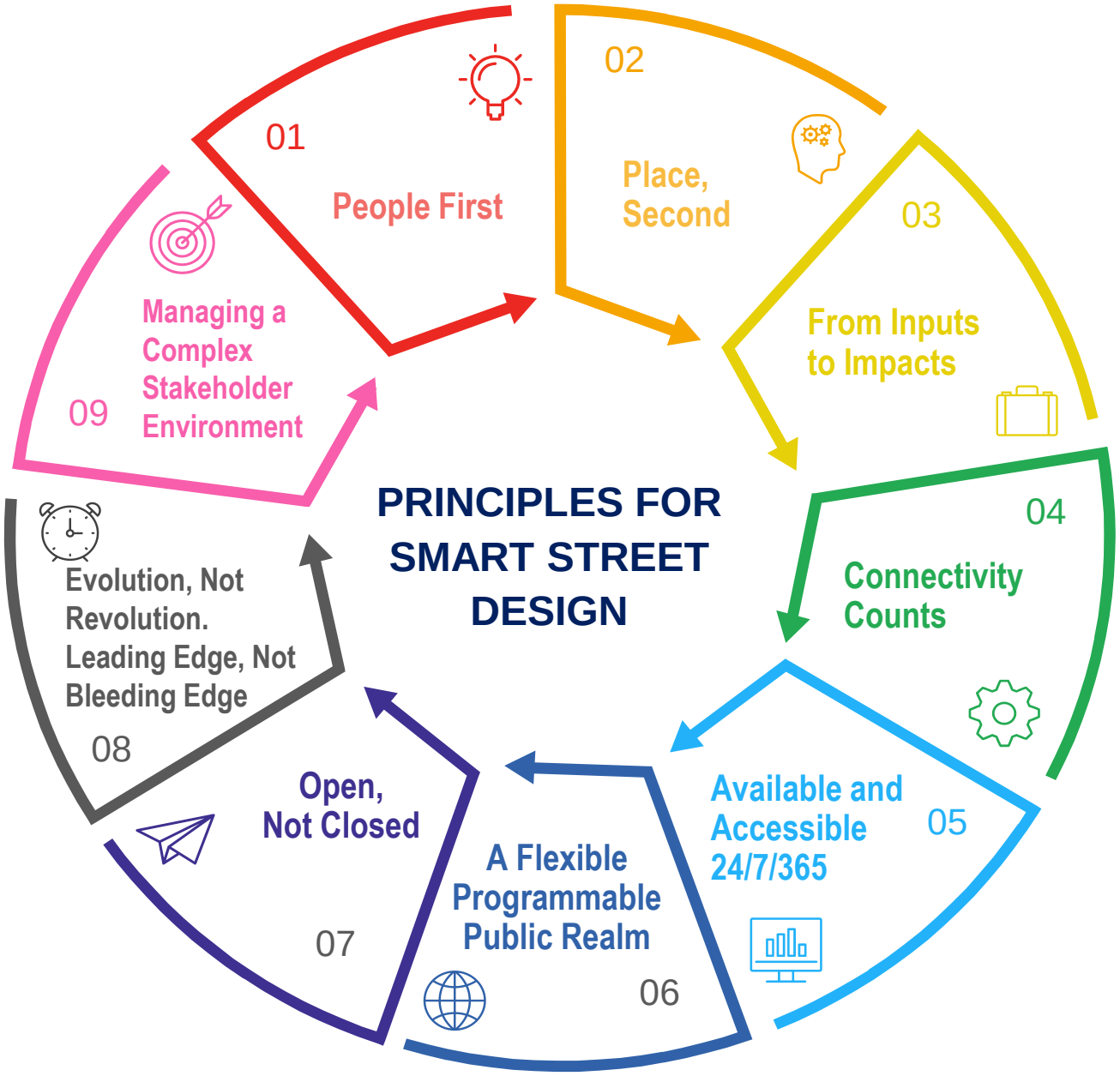
Following Harrison et al. (2010), we derive the quality of smartness in smart streets from the use of:

i. **near-real-time data** obtained from physical and virtual **sensors**;

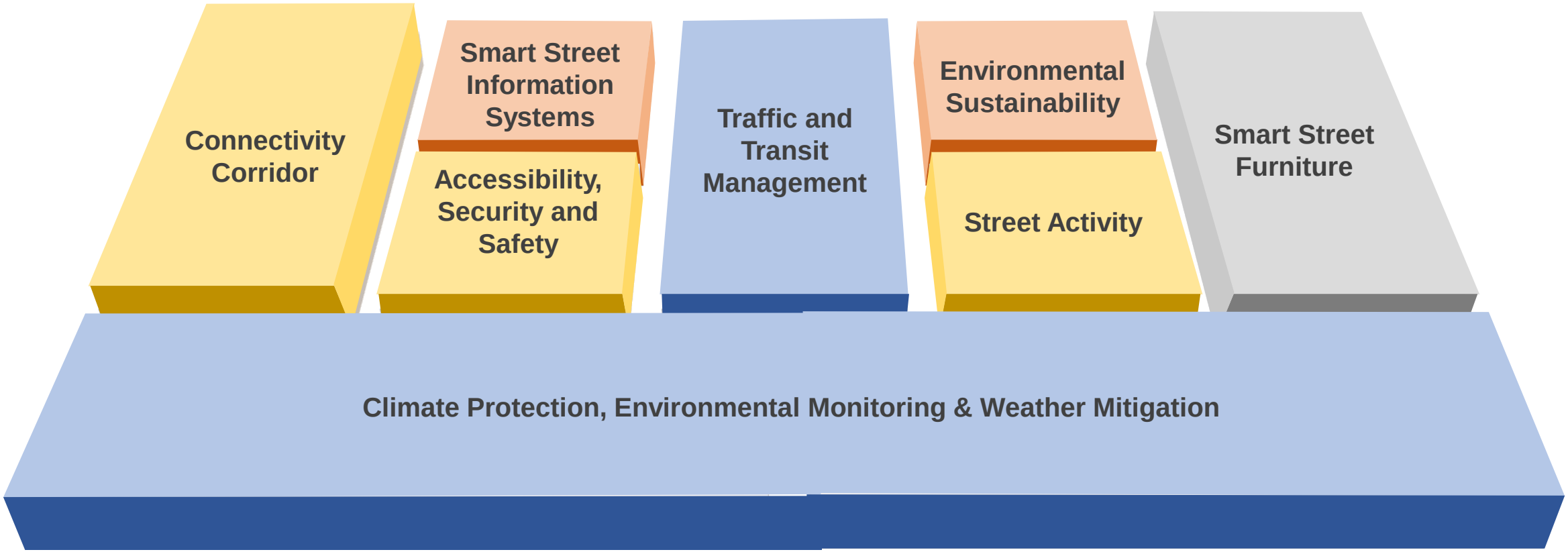
ii. the **interconnection** between different services and technologies within a street;

iii. the **intelligence from the analysis** of the data, and the process of visualising it; and

iv. the **optimisation of operations** resulting from this analysis.


PRINCIPLES FOR SMART STREET DESIGN
01
People First
02
Place, Second
03
From Inputs to Impacts
04
Connectivity Counts
05
Available and Accessible 24/7/365
06
A Flexible Programmable Public Realm
07
Open, Not Closed
08
Evolution, Not Revolution. Leading Edge, Not Bleeding Edge
09
Managing a Complex Stakeholder Environment

Eight elements of Smart Streets



Conclusions and Next Steps

- Rural towns, communities, and their citizens are in danger of being left behind through increased urbanisation and the digital divide.
- Digital technologies can play a significant role in sustaining and revitalising rural towns, and building economic and social linkages between urban and rural areas.
- We suggest the first step in the digital transformation of rural towns is sustaining rural shopping streets, often the economic core of rural communities.
- Smart streets are a manageable and feasible investment for rural towns that can sustain rural shopping streets while enhancing the lives of those who live in and around rural towns.
- We are specifying a smart street with Wexford County Council and developing a set of tools for describing, visualizing, assessing and designing smart street initiatives.

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