



# Smart control of the climate resilience in European coastal cities

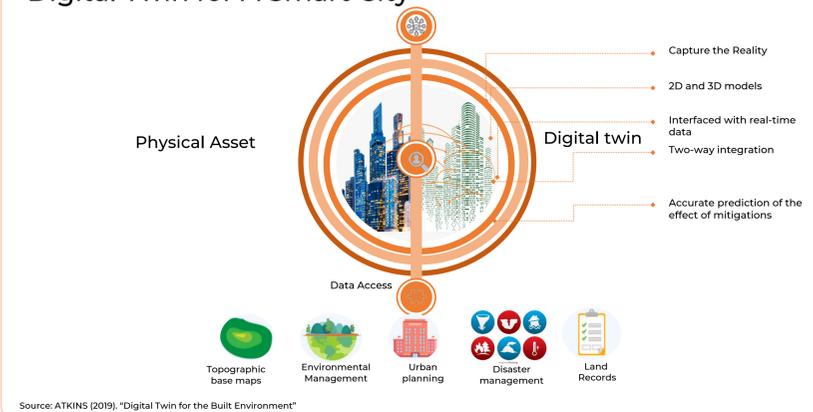
## Conceptualising the management of climate extreme events through a GIS-based digital twin system

Khurram Riaz<sup>1\*</sup>, Marion McAfee<sup>1</sup>, Iulia Anton<sup>1</sup>, and Salem Gharbia<sup>1</sup>

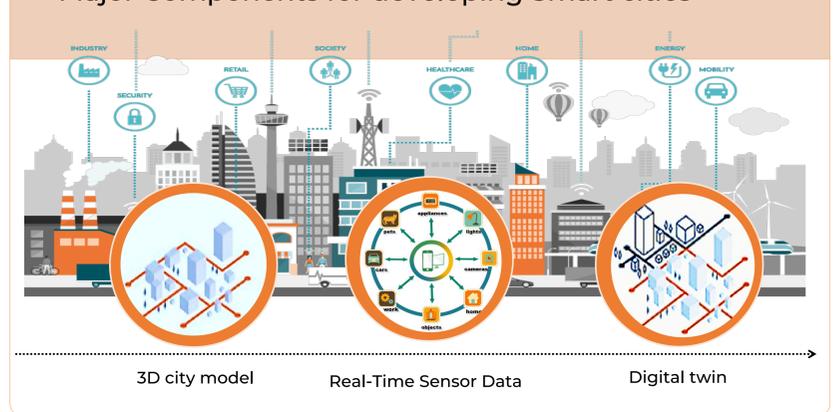
<sup>1</sup>Atlantic Technological University Sligo Ash Ln, Ballytivnan, Sligo, F91 YW50

\*[khurram.riaz@mail.itsligo.ie](mailto:khurram.riaz@mail.itsligo.ie)

### Digital Twin for A Smart City



### Major Components for developing Smart cities



### EU Projects on Digital twin technology for increasing climate resilience

Smart control of the climate resilience in European coastal cities (SCORE)

**About SCORE**  
SCORE is a four-year EU-funded project aiming to increase climate resilience in European coastal cities. The project will tackle specific challenges related to sea levels, coastal erosion and extreme weather events using an integrated solution of smart technologies and nature-based solutions.

- 28 partners
- 12 countries
- 4 years
- 01.07.2021 - 30.06.2025
- 10M euros budget

**The Coastal City Living Lab (CCLLs)**  
CCLL is one of the main concepts behind SCORE. CCLL is an approach that will enable citizens and stakeholders to co-create and co-design the solutions with scientists, researchers and engineers to make sure these are sustainable and acceptable by the society. SCORE includes a network of 10 coastal city 'living labs' that will involve citizens in providing prototype coastal city early warning systems.

<https://score-eu-project.eu/>

### What is Digital twin technology?

- A digital twin is a virtual representation of a physical object, with a continuous flow of data that enables convergence between the physical and virtual state.
- A representation of a physical asset that has a level of accuracy that allows the user to understand and predict its performance.
- NASA introduced the digital twin concept to develop physical models and simulations of spacecraft for the first time in 2010.
- More recently, digital twins have been employed in structures and buildings, energy flow, and in manufacturing.
- Currently, digital twin technology is being explored for developing the smart cities.

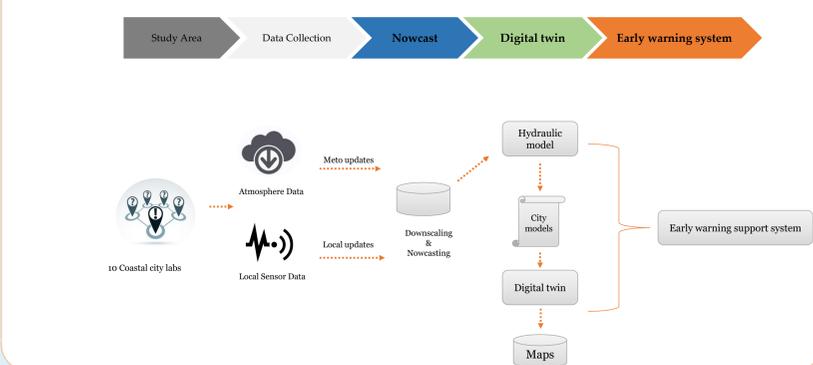
### EU Projects on Digital twin technology for increasing climate resilience

Destination Earth (DestinE) is an ambitious initiative of the European Union to create a digital model of Earth that will be used to monitor the effects of natural and human activity on our planet, anticipate extreme events and adapt policies to climate-related challenges.



<https://digital-strategy.ec.europa.eu/en/policies/destination-earth>

### SCORE Digital twin background methodology for coastal city climate resilience



### Current contribution toward the digital twin

A systematic review on the development of climate-resilient smart cities through digital twin technology

- Findings:
- Limited amount of research conducted on digital twin technology in the process of climate resilience
  - In terms of climate resilience and smart cities, it is a very new phrase, resulting in a small number of relevant articles for this study. However, Due to the rapidly increasing interest of the European Union and other financial agencies in digital twin technology, the number of publications focusing on climate-resilient smart cities is projected to increase dramatically in the near future.



Khurram Riaz  
Ph.D. Student  
Department of Environmental Science,  
Atlantic Technological University  
ATU Sligo, Ash Lane, Sligo, F91 YW50, Ireland  
E: [khurram.riaz@mail.itsligo.ie](mailto:khurram.riaz@mail.itsligo.ie)



Dr. Salem Gharbia



Dr. Marion McAfee



Dr. Iulia Anton



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101003534.

[www.score-eu-project.eu](http://www.score-eu-project.eu) | [contact@score-eu-project.eu](mailto:contact@score-eu-project.eu)