




DIGITAL TRANSFORMATION OF CITIES AND BUILT ENVIRONMENT

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Global Trends

 **39%**
AEC industry accounts for 39% of all energy consumption

 **19%**
AEC industry is responsible for 19% of energy related green-house gas (GHG) emissions

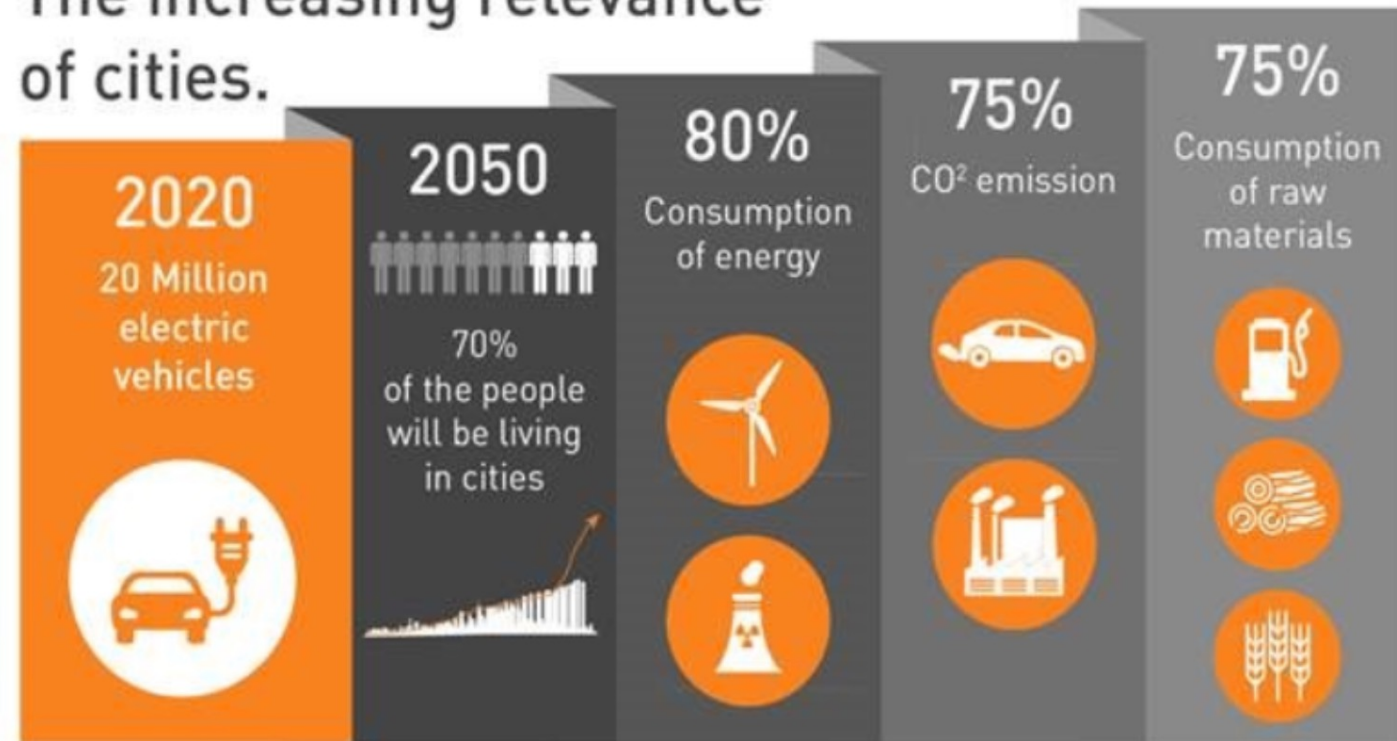
 **42%**
Buildings are under-utilized and jobsites are unproductive

 **30%**
Construction activity is rework

 **30%**
Construction material is wasted on-site costing time, money and natural resources

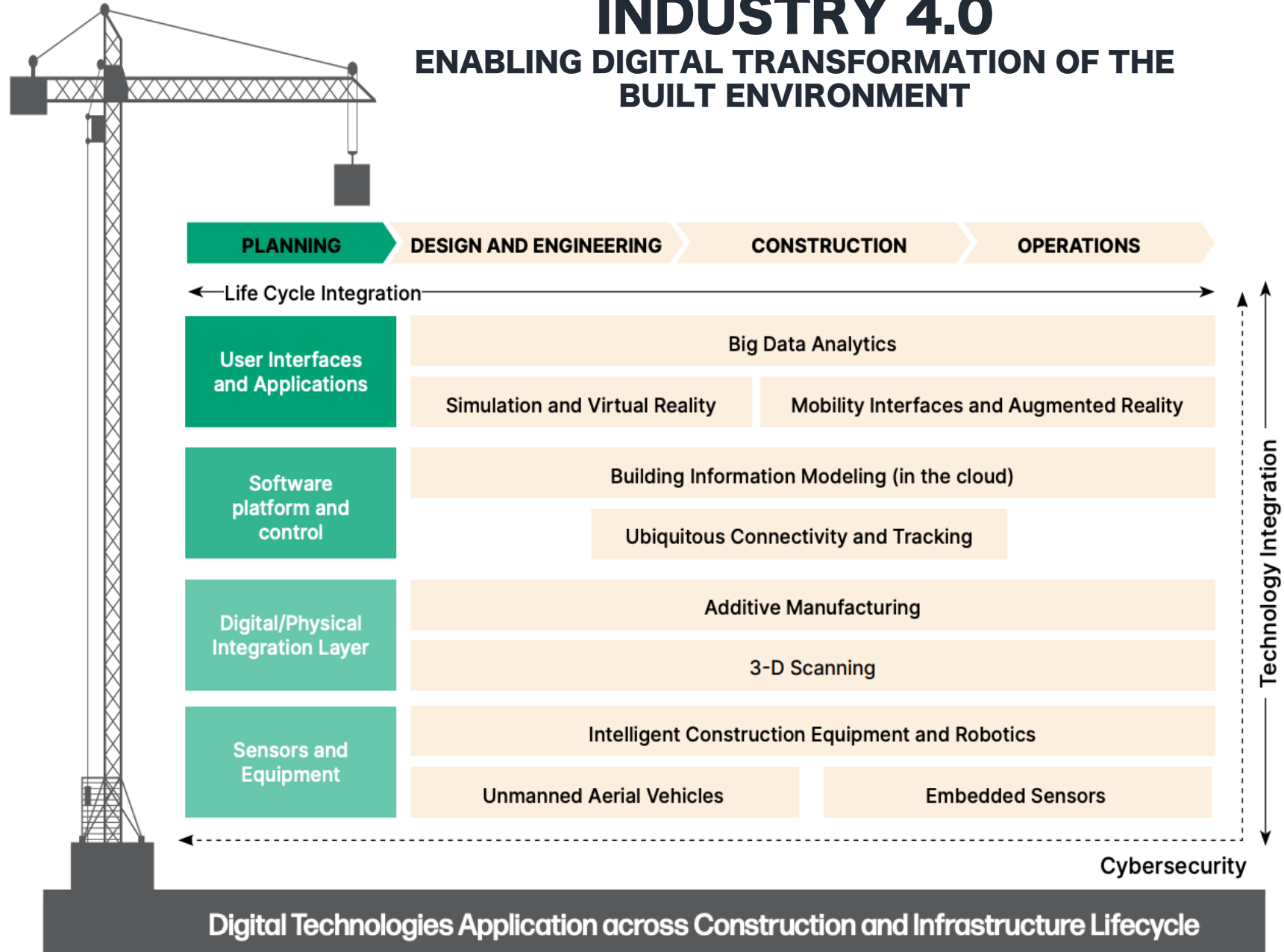
NEED FOR DIGITALIZATION

The increasing relevance of cities.



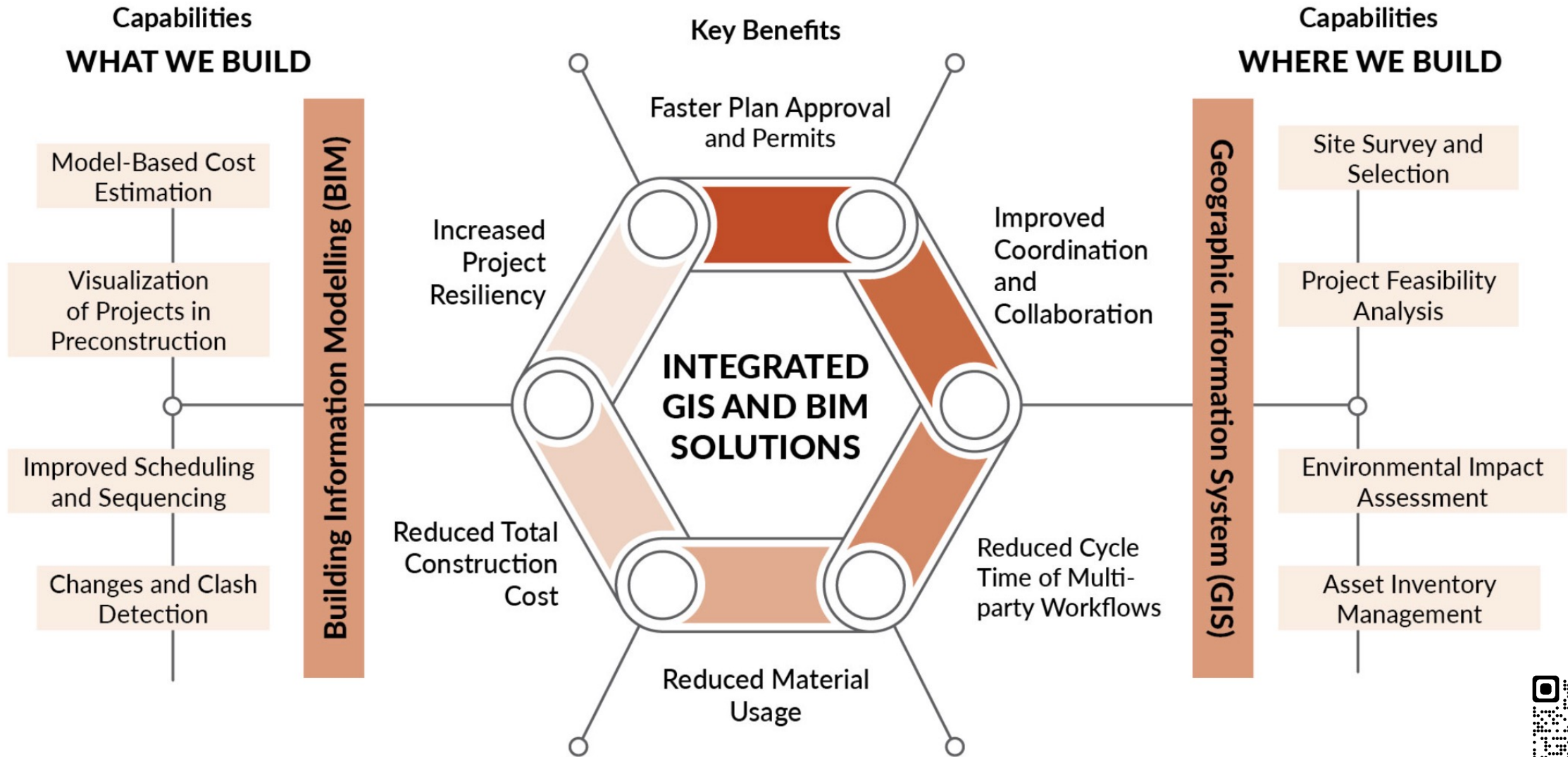
INDUSTRY 4.0

ENABLING DIGITAL TRANSFORMATION OF THE BUILT ENVIRONMENT

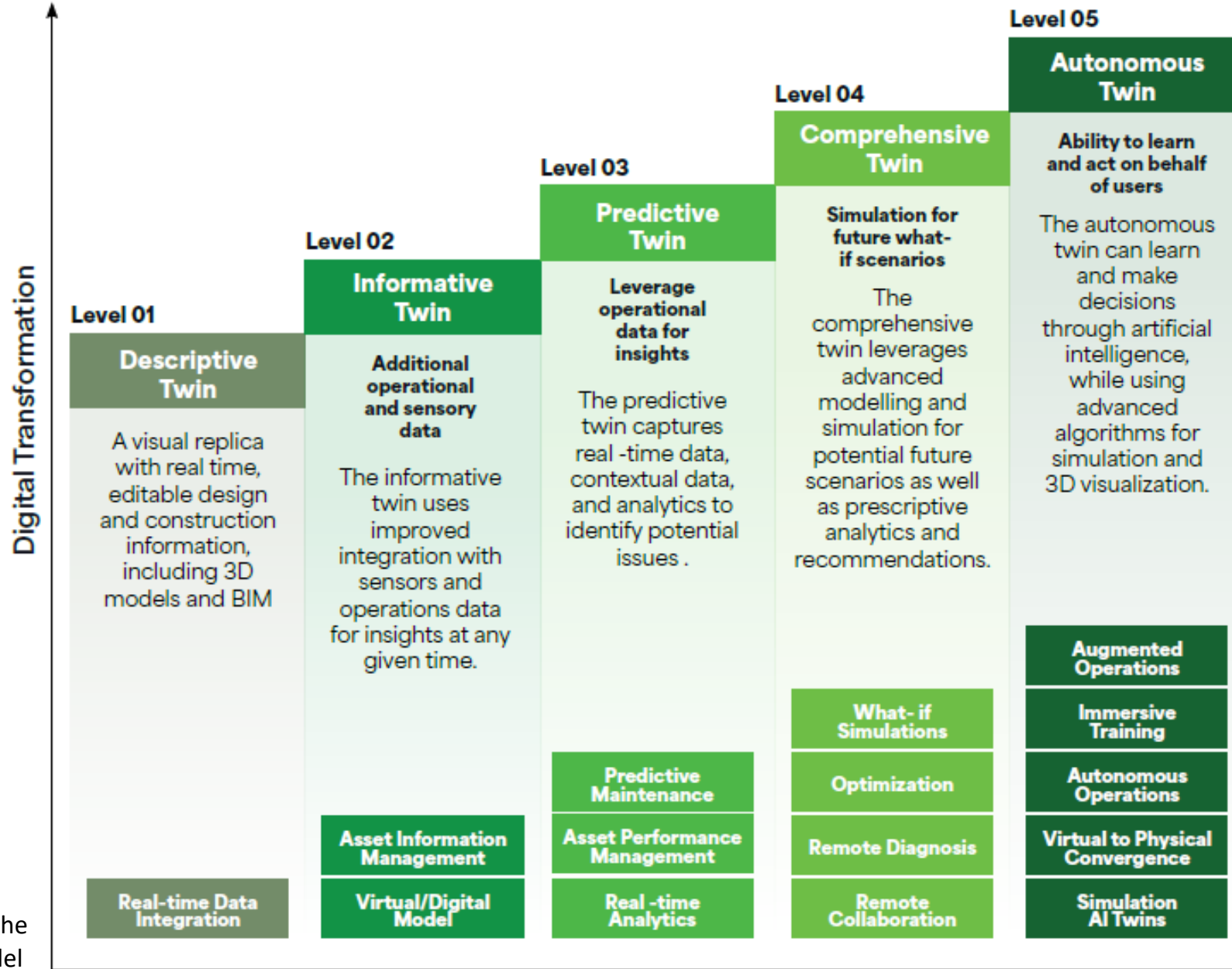


GEOSPATIAL AND BIM CONVERGENCE

BENEFITS AND CAPABILITIES



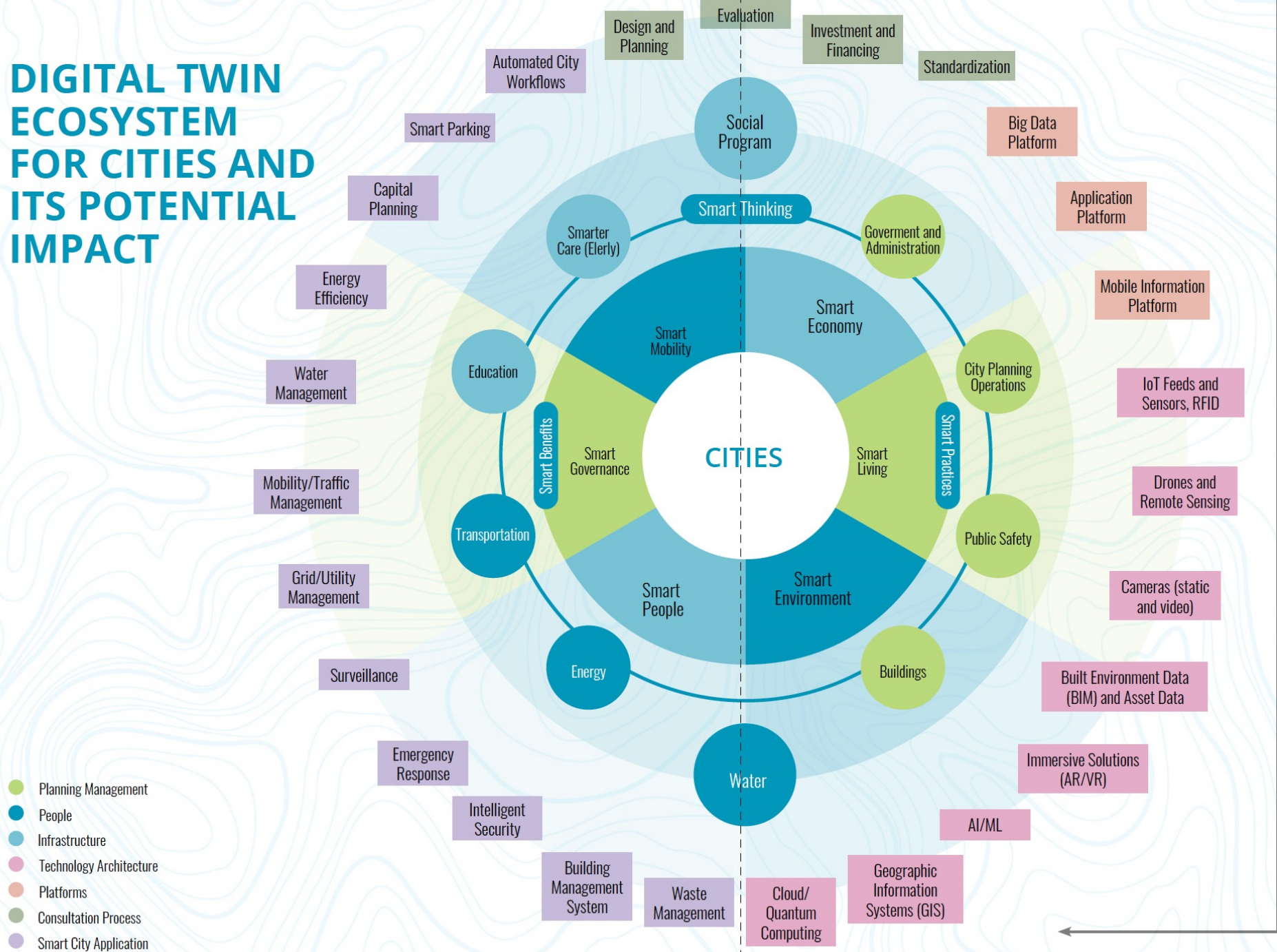
DIGITAL TWIN MATURITY MODEL



Source: National BIM and Digital Twin Strategy Report; GW Consulting Analysis; Inspired by the Verdantix five step Maturity Model



DIGITAL TWIN ECOSYSTEM FOR CITIES AND ITS POTENTIAL IMPACT



Impact

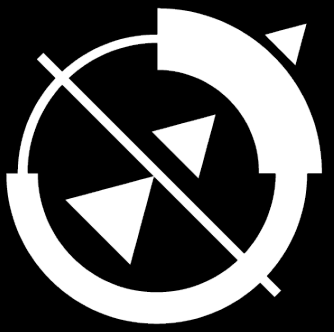
- Improve Workforce and Process Efficiency
- Achieve Sustainability Goals
- Maximize Productivity and Cost Savings
- Increase Resiliency
- 3Cs- Communicate, Collaborate and Coordinate Efficiently
- Predictive Analysis and Proactive Response
- Improve Citizen Satisfaction
- Increased Security and Safety

KEY BENEFITS OF DIGITAL (TWIN) TRANSFORMATION

Architects	Business Benefits <ul style="list-style-type: none"> Improved client satisfaction Improved design quality Increased recognition as an Industry Leader 	Sustainability Benefits <ul style="list-style-type: none"> Exceeded performance requirements Better ability to consider environmental impact during design Reduced material usage 	Risk Reduction Benefits <ul style="list-style-type: none"> Improved ability to manage complexity Reduced errors and reworks Better ability to meet customer and design requirements 	Operational Efficiency Benefits <ul style="list-style-type: none"> Improved Team Collaboration Improved Data Handover Increased Workload Capacity 	
	<hr/>				
Contractors	Business Benefits <ul style="list-style-type: none"> Increased percentage of successful projects Improved stakeholder engagement Expanded service offerings 	Quality Benefits <ul style="list-style-type: none"> Reduced number of constructability issues on-site Reduced rework during construction Improved handover experience 	Cost Control Benefits <ul style="list-style-type: none"> Improved cost control Improved forecast accuracy Improved subcontractor qualification 	Schedule Benefits <ul style="list-style-type: none"> Improved schedule control Improved resource planning Optimized schedule duration 	Health & Safety Benefits <ul style="list-style-type: none"> Reduced number of person-hours on-site Improved safety awareness Reduced incident frequency rate
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Asset Managers/ Operations & Maintenance	Business Benefits <ul style="list-style-type: none"> Improve client satisfaction Expand service offerings Improve stakeholder engagement 	Quality and Cost-Control Benefits <ul style="list-style-type: none"> Improved efficiency and faster project delivery Cost Savings at both delivery and operation stages Greater project predictability and early modification 			



GEOSPATIAL WORLD

A stylized globe icon is integrated into the letter 'O' of the word 'WORLD'. The globe is represented by a circle with a diagonal line through it, and four triangular shapes pointing towards the center, suggesting a globe or a map.

ADVANCING KNOWLEDGE FOR SUSTAINABILITY