

Under the patronage of **HRH Prince Khalid Al-Faisal**  
Advisor to the Custodian of the Two Holy Mosques & Governor of Makkah Region



المؤتمر الدولي الثاني والعشرون لإدارة الأصول والمرافق والصيانة  
The 22<sup>nd</sup> International Asset, Facility & Maintenance  
Management Conference

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# THE IMPACT OF DIGITAL TWIN

A Roadmap for Facilities Management into  
Implementation of DT Technologies

**26-28 January 2025**

The Ritz-Carlton Jeddah, Kingdom of Saudi Arabia

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## Outline

- Overview of Digital Twin Technology & Facilities Management
- Benefits of Digital Twin in Facilities Management
- Applications of Digital Twin in Facilities Management
- Implementation Roadmap
- Key Cybersecurity Aspects to be Considered
- Conclusion and Future Outlook
- Recommendation

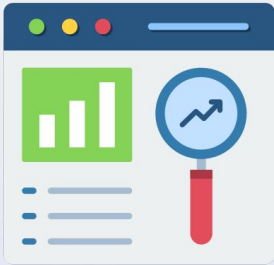
## Overview of Digital Twin Technology & Facilities Management

- Digital Twin is a digital replica of physical assets or systems that integrates real-time data using IoT, AI, and advanced analytics.
- Facilities Management is the crucial link in built environment disciplines that enable physical assets to create desired organizational outcomes.



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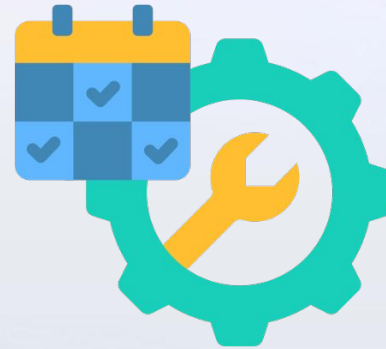
## Benefits of Digital Twin in Facilities Management



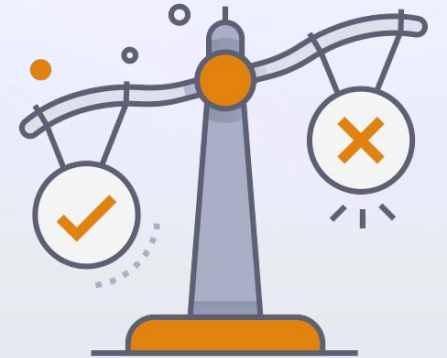
**Real-Time Monitoring**



**Enhanced  
Operational Efficiency**



**Predictive  
Maintenance**



**Smart Decision-Making**

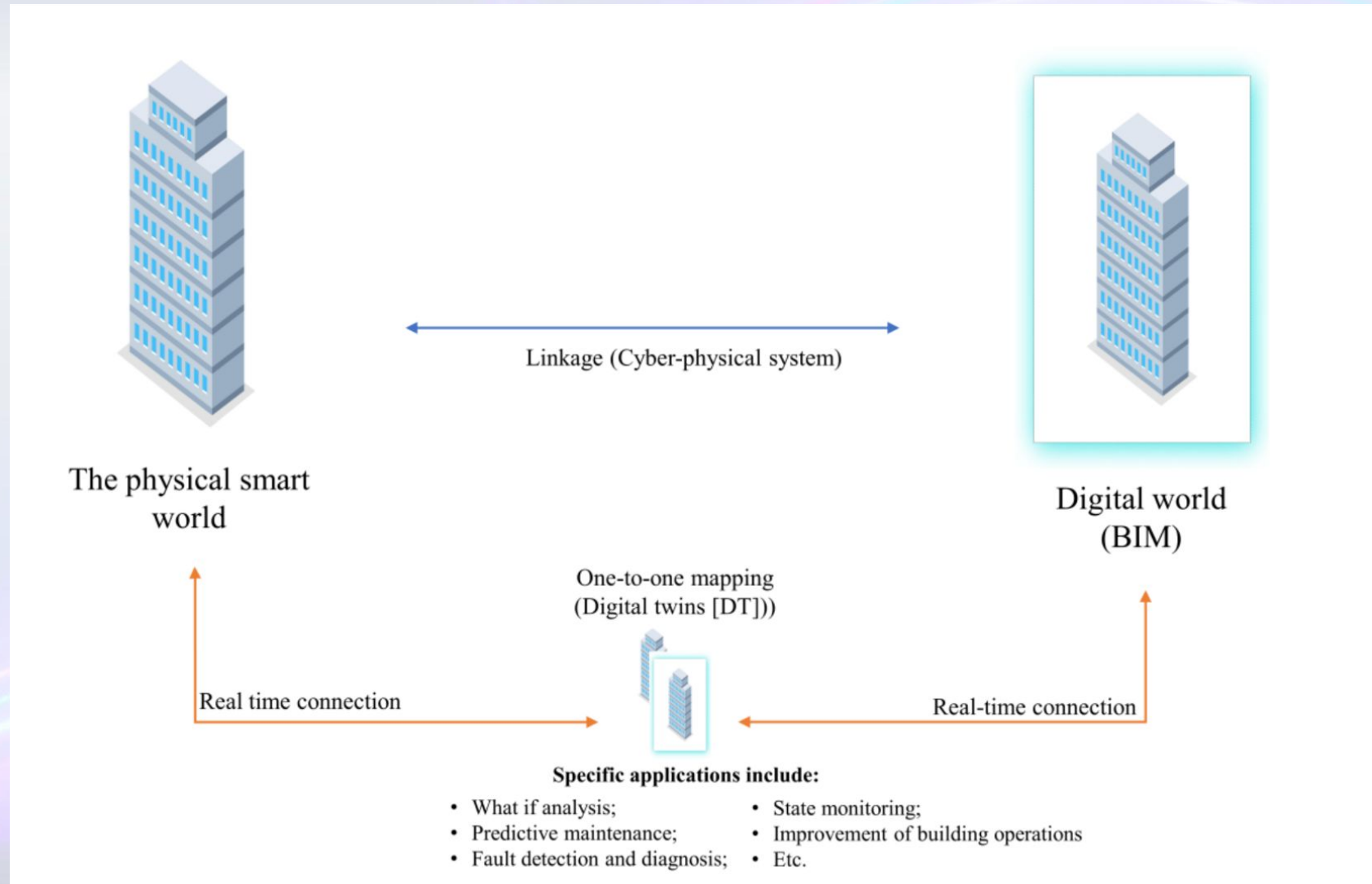
Local experience: AI+ investment. DT Implementation journey at Oil & Gas: OQ & LNG

# Applications of Digital Twin in Facility Management

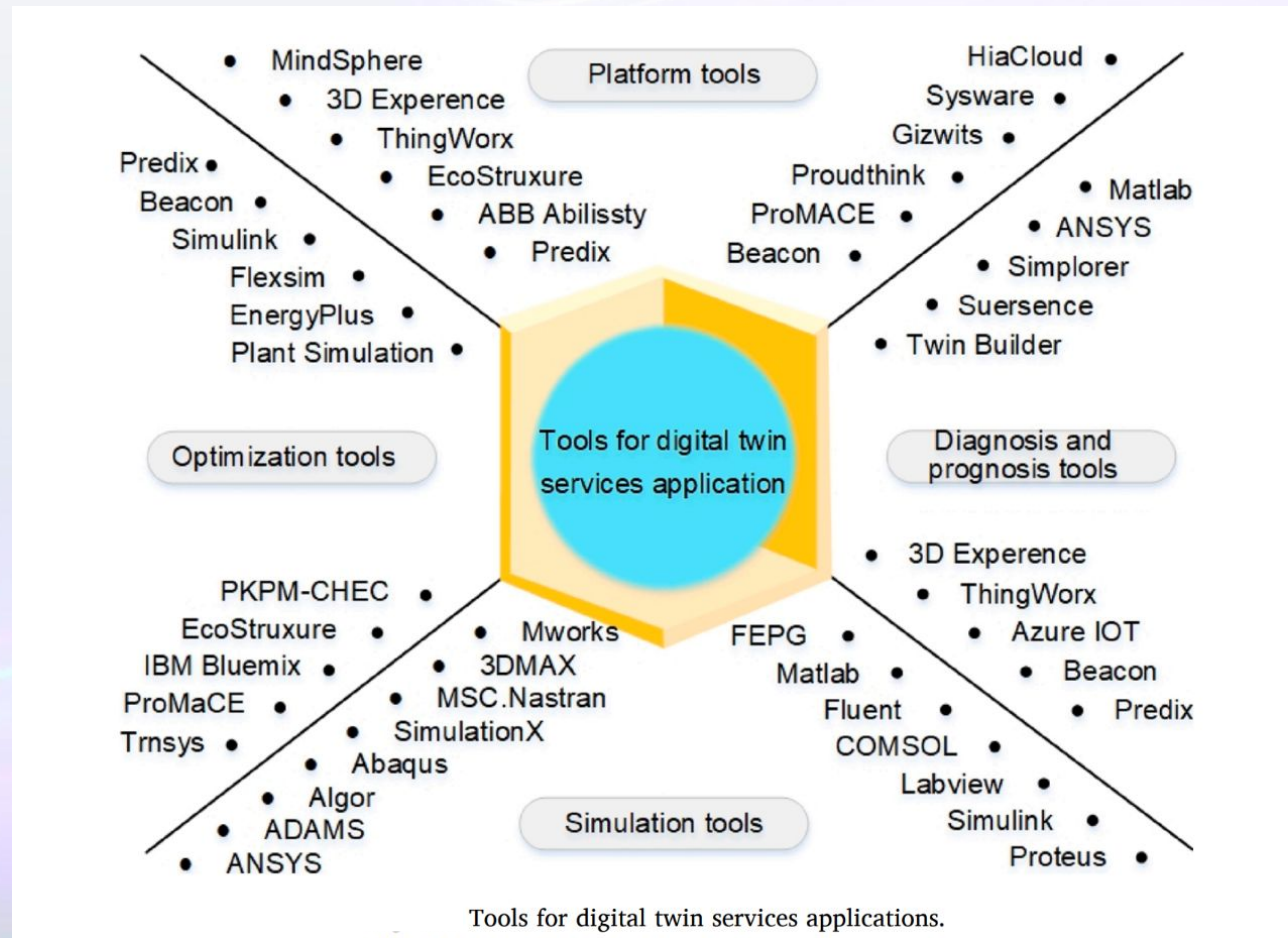
**Table 1. Applications of DTs in facility management- Smart Buildings (Adopted from Ghansah, F. A., 2024)**

Categories	Applications
Efficient operation and service monitoring	<ul style="list-style-type: none"> <li>● Efficient Gesture control</li> <li>● Human-computer/machine collaboration</li> <li>● Emergency evacuation</li> <li>● Improve occupants' comfort</li> <li>● Real-time building management systems</li> <li>● Remote control of the building to ensure security via virtual reality</li> <li>● Systems thinking for aiding sustainable decision makings</li> </ul>
Efficient building energy management	<ul style="list-style-type: none"> <li>● Real-time monitoring of energy consumption and utilisation</li> <li>● Real-time monitoring, control, and minimisation of energy consumption</li> <li>● Real-time tracking and understanding of energy consumption</li> </ul>
Effective smart building maintenance	<ul style="list-style-type: none"> <li>● Building maintenance and performance monitoring</li> <li>● Accident prevention and effective fault detection capability</li> <li>● Real-time connection and information for risk assessment in buildings</li> </ul>

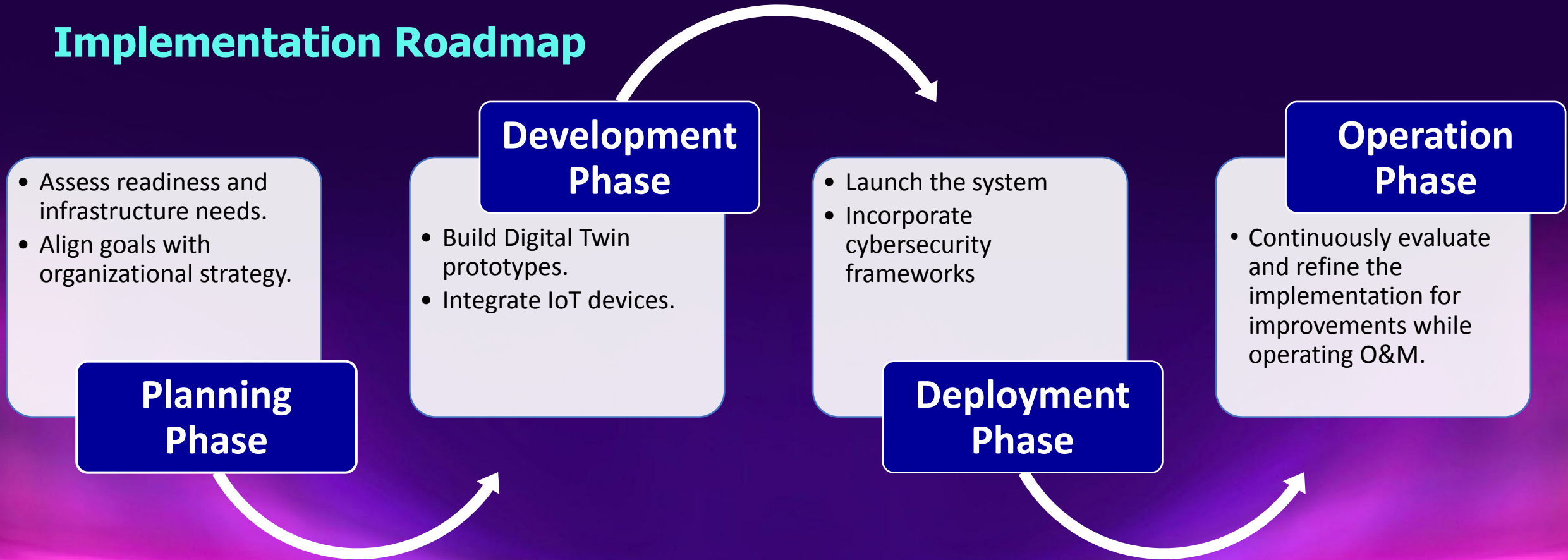
# Applications of Digital Twin in Facility Management



# Tools for Digital Twin Applications



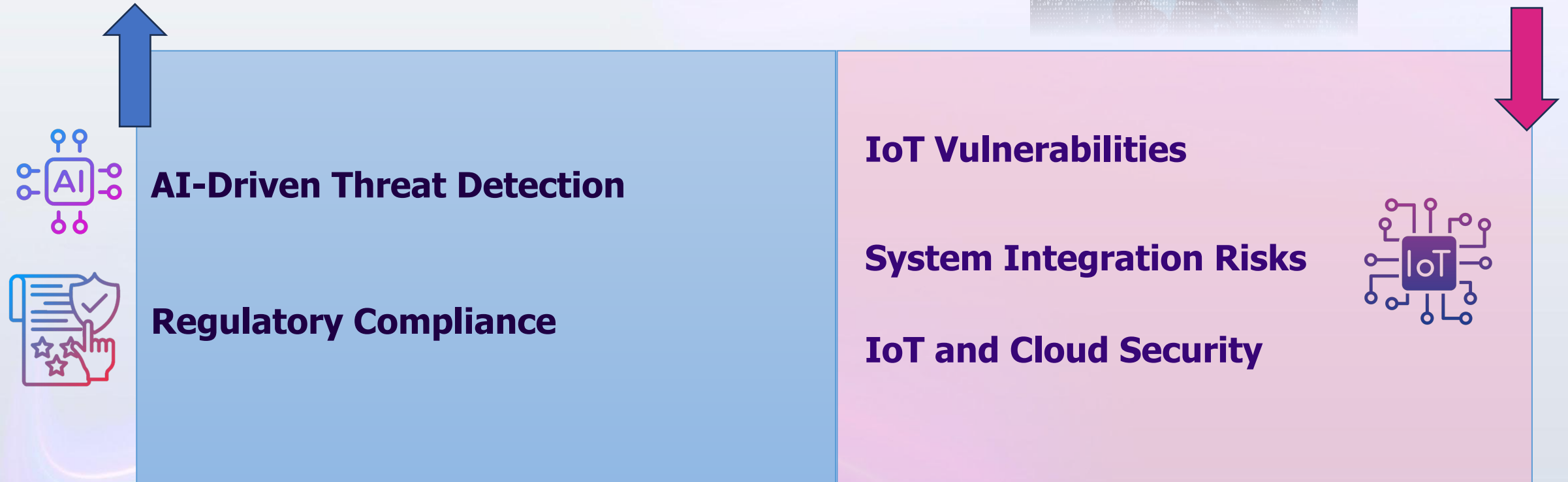
## Implementation Roadmap







## Key Cybersecurity Aspects to be Considered



## Conclusion and Future Outlook



Digital Twin technology enhances efficiency and decision-making in facilities management.



The future lies in integrating sustainability goals with Digital Twin technology and advancing AI-driven analytics for proactive risk management.



With a strategic approach, organizations can unlock the full potential of Digital Twin technologies while mitigating risks, paving the way for smarter and more resilient facilities management.

## Recommendation



**Establish a step-by-step protocol for Digital Twin implementation in buildings, extending beyond BIM standards. By aligning interoperability, data governance, and security measures, this approach ensures seamless adoption and long-term sustainability in the interconnected built environment.**

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