

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

## Digitization - Excellence - Sustainability

### Assessing the Impact of Digital Initiatives on Operational Excellence Using KPIs and AI Analytics in Asset and Facility Management

26-28 January 2025

The Ritz-Carlton Jeddah, Kingdom of Saudi Arabia

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## Introduction

- The increasing digital transformation in asset and facility management presents opportunities for operational improvement.
- Objective: To assess the impact of digital initiatives using KPIs and AI analytics.
- This study aims to provide a comprehensive framework for evaluating the effectiveness of these initiatives.

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## Problem Statement

- Traditional KPIs like energy consumption and uptime are not sufficient to measure digital initiatives' impact.
- There is a need for an advanced framework to integrate AI-based analytics with KPI measurements.
- This study addresses how AI can enhance data analysis for better decision-making in facility management.

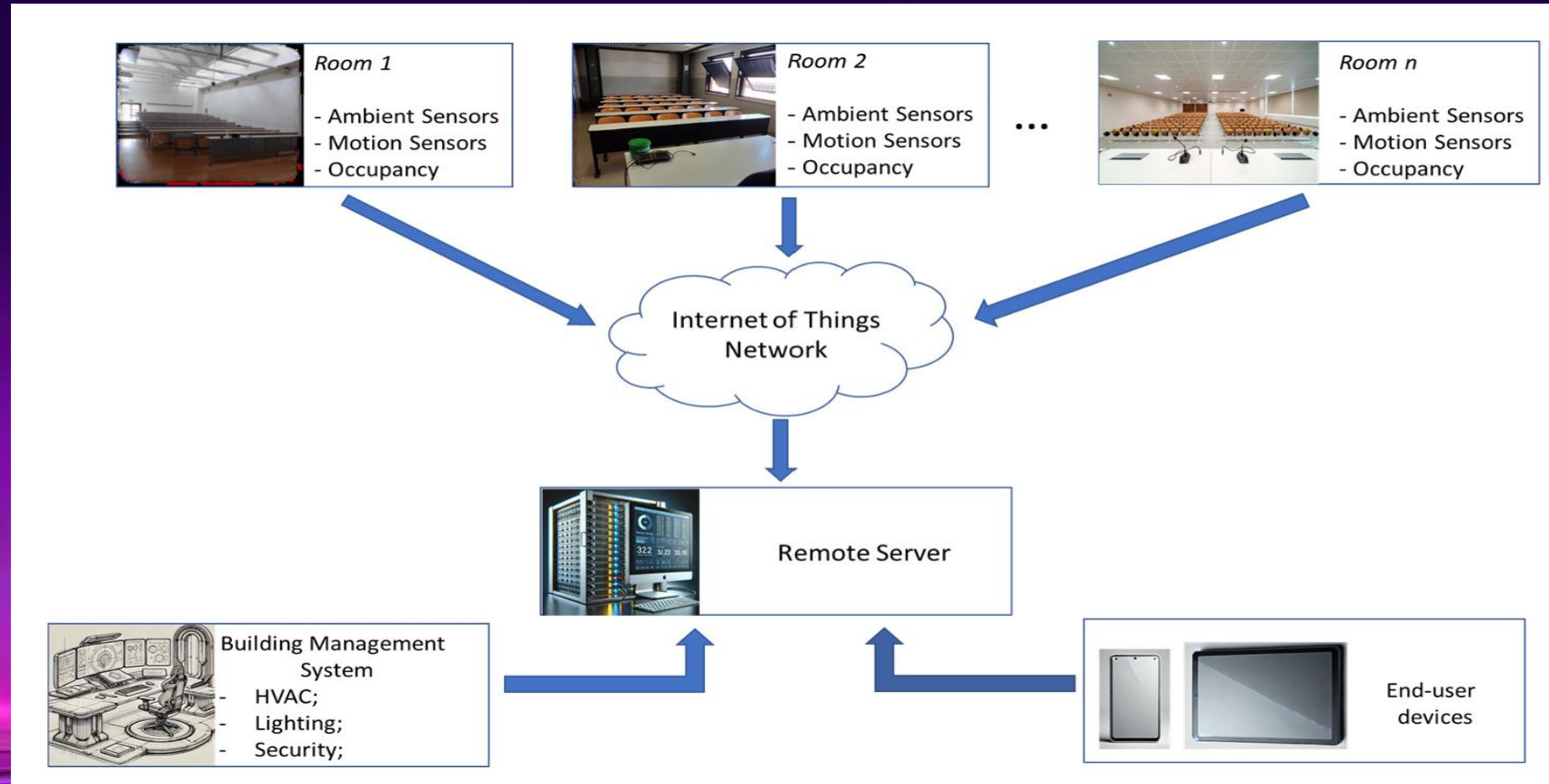




## Case Study: Energy Savings in University Buildings

- Challenges in Energy Management.
- IoT-Based Solutions.
- Cost and Cybersecurity.

# Case Study: Energy Savings in University Buildings



## Challenges in Energy Management:

- Buildings account for 40% of energy use in Europe, with universities being particularly energy-intensive due to their size, variable occupancy, and diverse activities.
- Heating, ventilation, and air conditioning (HVAC) systems represent the largest energy consumers.

## IoT-Based Solutions

- The study emphasizes integrating IoT technologies, such as environmental sensors, to monitor parameters like CO2 levels, temperature, and humidity. This enables real-time control of HVAC systems.
- An IoT-driven system reduced energy consumption by up to 34% in the study's pilot tests.



## CO2 Monitoring:

- CO2 sensors can estimate room occupancy while adhering to privacy concerns.

These sensors enable demand-based HVAC operation, avoiding energy waste when rooms are unoccupied.





## Cost and Cybersecurity:

- While IoT solutions can be low-cost, they require calibration and come with cybersecurity challenges when networks span multiple buildings.

## Results:

- Using IoT and occupancy-based HVAC control significantly improved energy efficiency. The study showcased detailed mathematical models for analyzing energy use under different scenarios.
- In university settings, energy savings are achievable through actions like predictive HVAC controls and reduced over-ventilation.



## Conclusion:

The paper concludes that combining IoT technologies, predictive analytics, and smart monitoring systems can greatly enhance energy efficiency in complex structures like university campuses, reducing operational costs while maintaining occupant comfort and environmental sustainability.

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**Thank you for your attention!**

**I am happy to take any questions.**

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**THANK YOU!**

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