

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 22nd International Asset, Facility & Maintenance
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Real-Time IoT (Internet of Things) Monitoring in Medical Equipment

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Introduction

The integration of the Internet of Things (IoT) into the healthcare sector has revolutionized how medical equipment is monitored and maintained. Real-time IoT monitoring involves the use of interconnected devices and sensors that communicate data to enhance the efficiency, safety, and reliability of medical equipment. The global healthcare IoT market is experiencing rapid growth, projected to reach USD 534.3 billion by 2025, driven by the increasing need for efficient patient care and equipment management (Grand View Research, 2021).

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Benefits of IoT in Medical Equipment

Predictive Maintenance:

- Prevents unexpected downtime and reduces costs.
- IoT-based predictive maintenance decreases costs by 25%.

Remote Monitoring:

- Ensures continuous functionality without manual checks.
- Optimizes resources and reduces infection risks

Challenges in IoT Adoption

Data Privacy and Security:

- High susceptibility to cyber-attacks.
- Ensuring personal data protection compliance is critical.

Interoperability Issues:

- Lack of standardized communication protocols and format.
- Leads to integration issue and data inefficiencies.

Hypotheses

- H1: IoT improves equipment uptime and patient safety.
- H2: High costs and security concerns are major barriers.
- H3: IoT for real-time monitoring of medical equipment significantly influence the decision to implement IoT in healthcare facilities.
- H4: IoT-enabled devices for real-time monitoring of medical equipment experience higher operational efficiency and lower maintenance costs compared to those that do not.
- H5: Facilities using IoT have higher efficiency.

Hypotheses

- H1: IoT improves equipment uptime and patient safety.

Are you aware of the use of IoT for real-time monitoring of medical equipment? * Does your facility currently use IoT-enabled devices for real-time monitoring of medical equipment? Crosstabulation

		Does your facility currently use IoT-enabled devices for real-time monitoring of medical equipment?		Total	
		no	yes		
Are you aware of the use of IoT for real-time monitoring of medical equipment?	no	Count	5	2	7
		% of Total	19.2%	7.7%	26.9%
	yes	Count	5	14	19
		% of Total	19.2%	53.8%	73.1%
Total		Count	10	16	26
		% of Total	38.5%	61.5%	100.0%

Hypotheses

- H2: High costs and security concerns are major barriers.

		What challenges have you encountered in the implementation of IoT for medical equipment monitoring?					Total	
		Data Privacy and Security Concerns	Equipment Compatibility Issues	High Initial Costs	Integration with Existing Systems	Lack of Skilled Personnel		
How many years of experience do you have?	Less than 1 year	Count	2	0	4	0	1	7
		% of Total	7.7%	0.0%	15.4%	0.0%	3.8%	26.9%
	More than 10 years	Count	1	0	4	1	0	6
		% of Total	3.8%	0.0%	15.4%	3.8%	0.0%	23.1%
	years 1-3	Count	1	1	3	0	0	5
		% of Total	3.8%	3.8%	11.5%	0.0%	0.0%	19.2%
	years 4-6	Count	3	1	0	0	2	6
		% of Total	11.5%	3.8%	0.0%	0.0%	7.7%	23.1%
	years 7-10	Count	1	0	1	0	0	2
		% of Total	3.8%	0.0%	3.8%	0.0%	0.0%	7.7%
Total		Count	8	2	12	1	3	26
		% of Total	30.8%	7.7%	46.2%	3.8%	11.5%	100.0%

Conclusion

- IoT for real-time monitoring of medical equipment (such as predictive maintenance and improved equipment uptime) significantly influence the decision to implement IoT technology in healthcare facilities.

Recommendation

- Develop standardized IoT device protocols.
- Strengthen data security measures.
- Invest in training programs for healthcare staff.
- Explore scalable and cost-effective IoT solutions.

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THANK YOU!

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