

اینترنت اشیا در مدیریت دارایی‌های فیزیکی

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برنامه نویس ارشد

کارشناس مهندسی برق

رضا آزادگان

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کارشناس ارشد مهندسی تعمیر و نگهداری هواپیما، ESTACA

سید رضا هاشمی

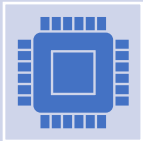
برنامه نویس تکنولوژی های وب

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What is IoT?



Internet of Things (IoT)



IoT Analytics defines the Internet of Things as connected physical objects that can exchange data to or from one location to another. These objects need to be uniquely identifiable and possess the ability to autonomously collect data about their environment. IoT devices typically consist of embedded computation hardware and software and some form of network connectivity to an edge or remote computing resource.



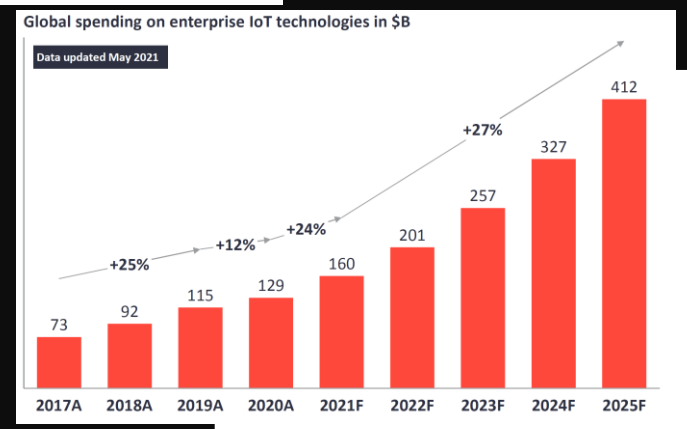
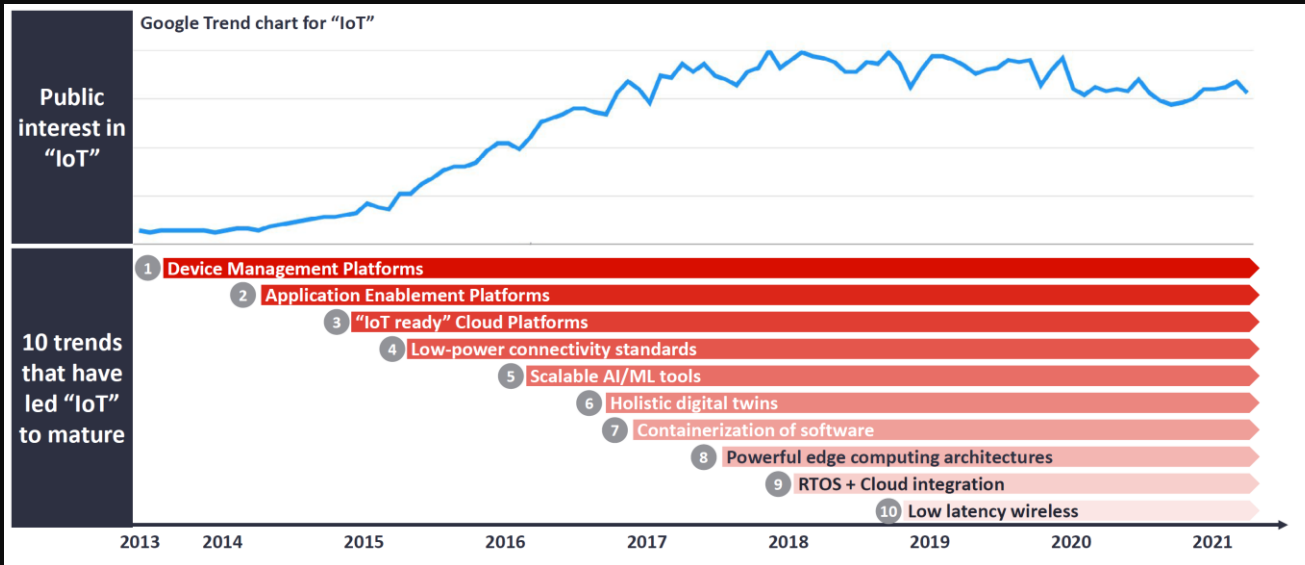
آیا در سازمانتان از اینترنت اشیا استفاده صنعتی می‌کنید؟

- خیر. چنین برنامه تدوین شده‌ای نداریم
- در یک سال آینده استفاده خواهیم کرد
- در کمتر از شش ماه به بهره‌برداری می‌رسد
- استفاده محدود می‌کنیم
- استفاده گسترده می‌کنیم

Submit

<https://b2n.ir/q00839>

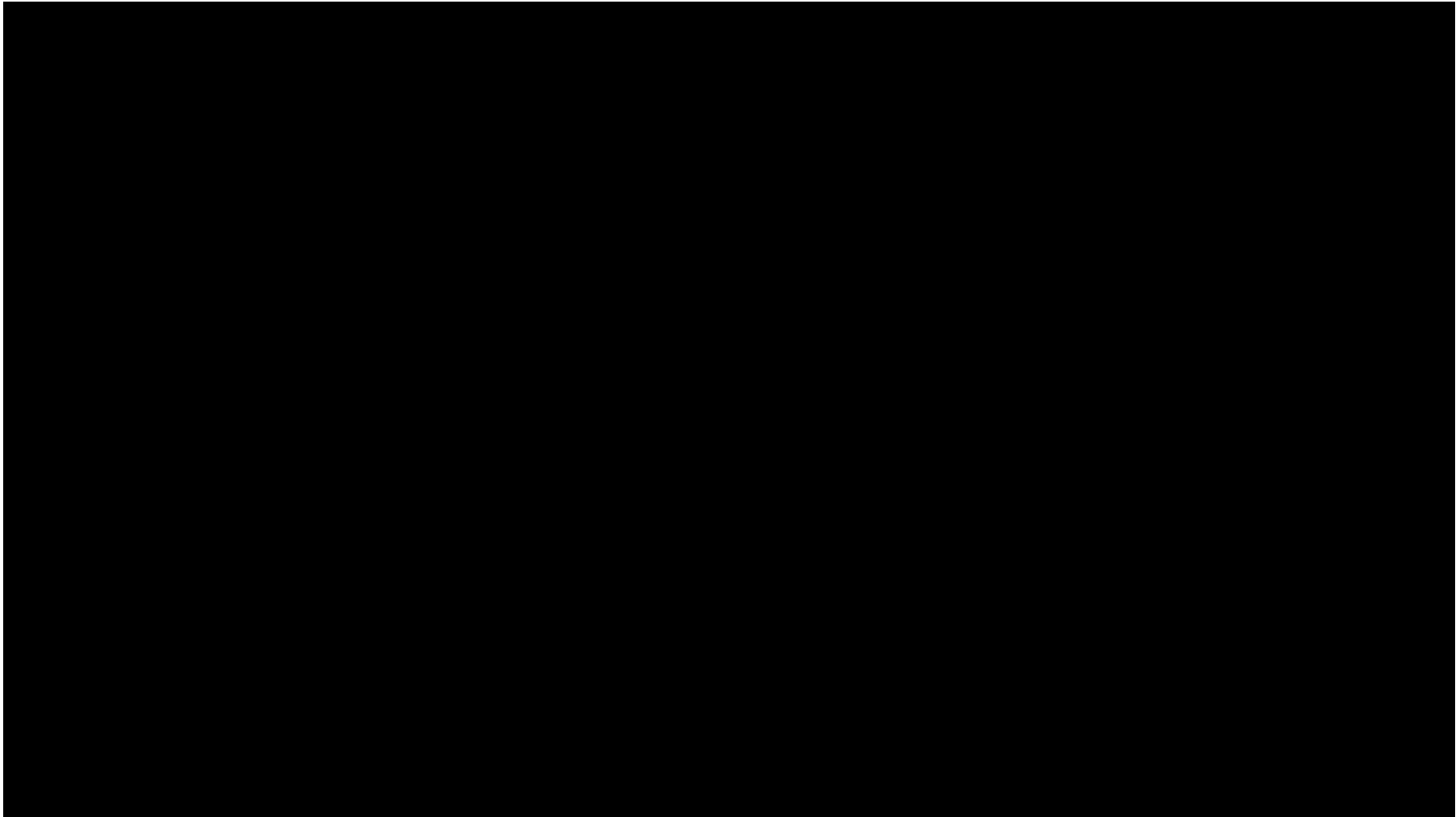
A Brief History of IoT



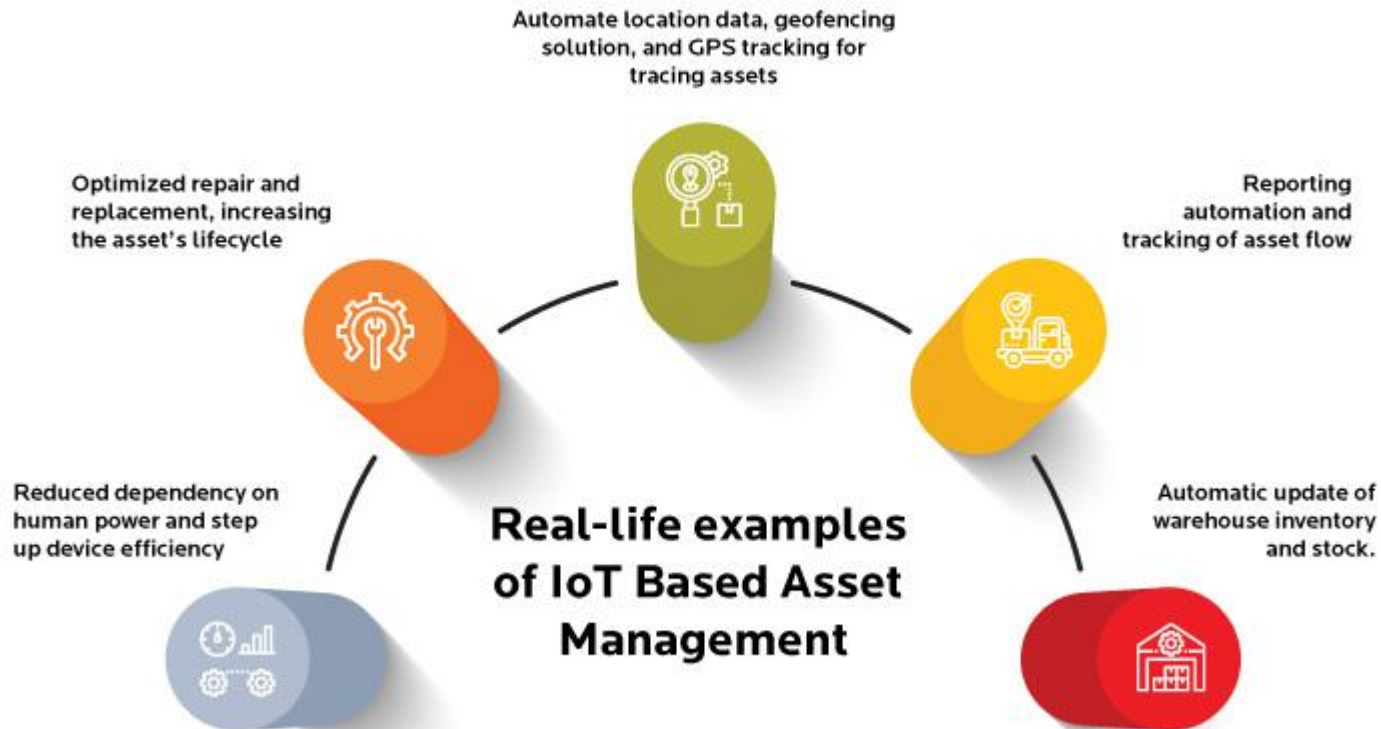


Connectivity

- Cellular Networks
- Wi-Fi
- Bluetooth
- Zigbee
- LoRaWAN



Benefits of IoT in Physical Asset Management



Case Studies: Big Players

Top 5 elevator manufacturer

Thyssenkrupp aims to connect **over 1 million assets** - elevators & escalators and offer predictive maintenance with Microsoft Azure.



World's largest ag. equipment vendor

John Deere is creating an ecosystem around its connected farm machinery, **enabling new solutions and services**, such as precision farming and asset monitoring.



World's largest retailer

Walmart is building its global IoT platform on Azure to connect HVAC and refrigeration units to **reduce energy usage** and apply machine learning when **routing thousands of trucks** in the supply chain.



Largest port outside of Asia

Port of Rotterdam is using Watson IoT to connect port sensors and identify **more efficient ways to manage port operations**.



World's largest power company

Enel, an Italian multi-national energy company achieved a **2X performance increase** by identifying unbilled energy using C3's platform.



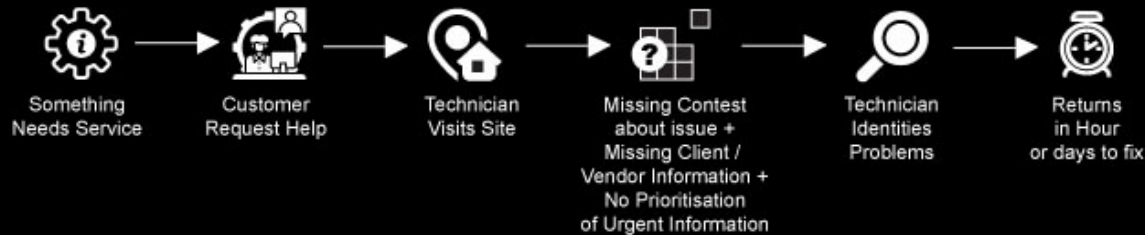
World's largest automaker

Volkswagen is partnering with AWS and MindSphere to create its "Industrial Cloud," which seeks to **connect all elements of the value chain** and enhance it with a marketplace and app store.

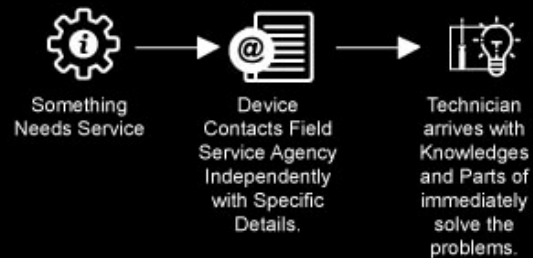


Case Studie: Smart Maintenance

Before IOT:

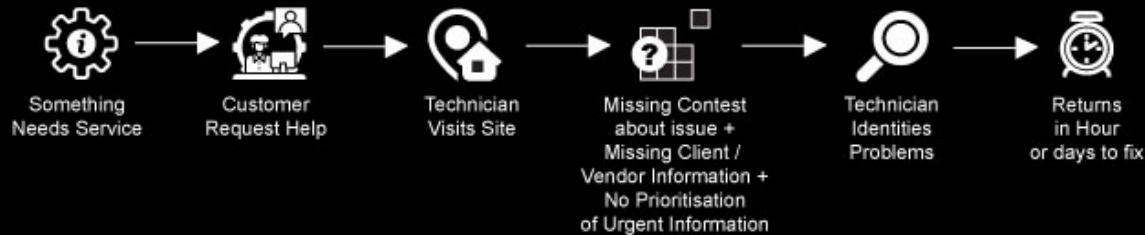


After IOT:

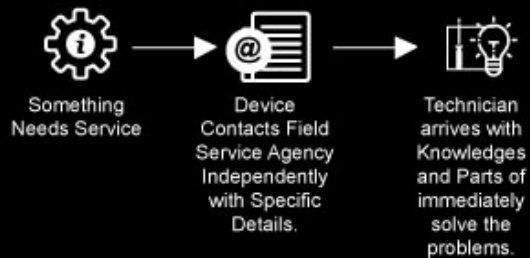


Case Studie: Smart Maintenance

Before IOT:



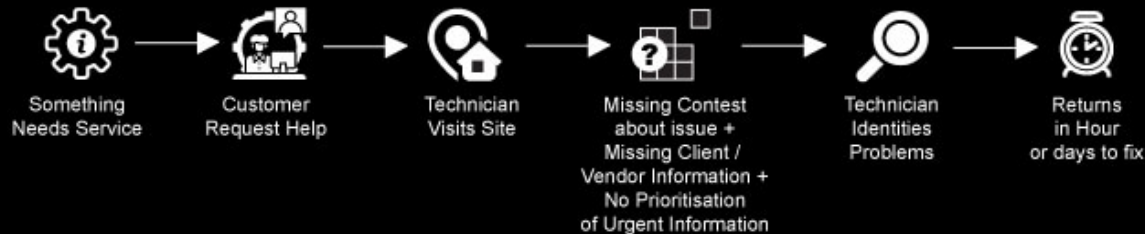
After IOT:



- Reactive Maintenance

Case Studie: Smart Maintenance

Before IOT:



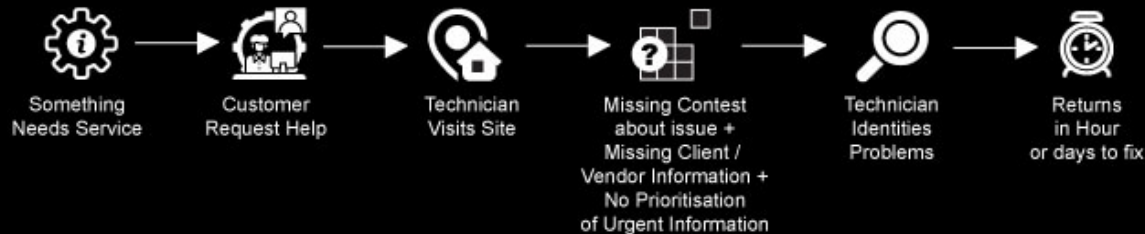
After IOT:



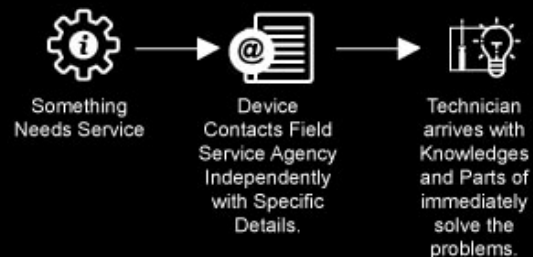
- Reactive Maintenance
- Preventive Maintenance

Case Studie: Smart Maintenance

Before IOT:



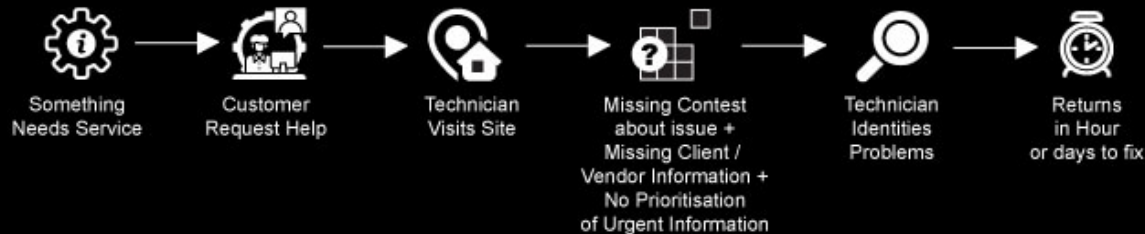
After IOT:



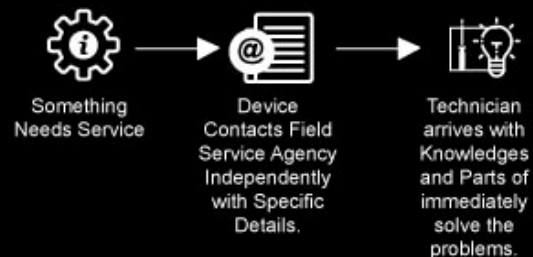
- Reactive Maintenance
- Preventive Maintenance
- Predictive Maintenance
 - Preset Alarm Levels
 - General ML Algorithms
 - PHM Models

Case Studie: Smart Maintenance

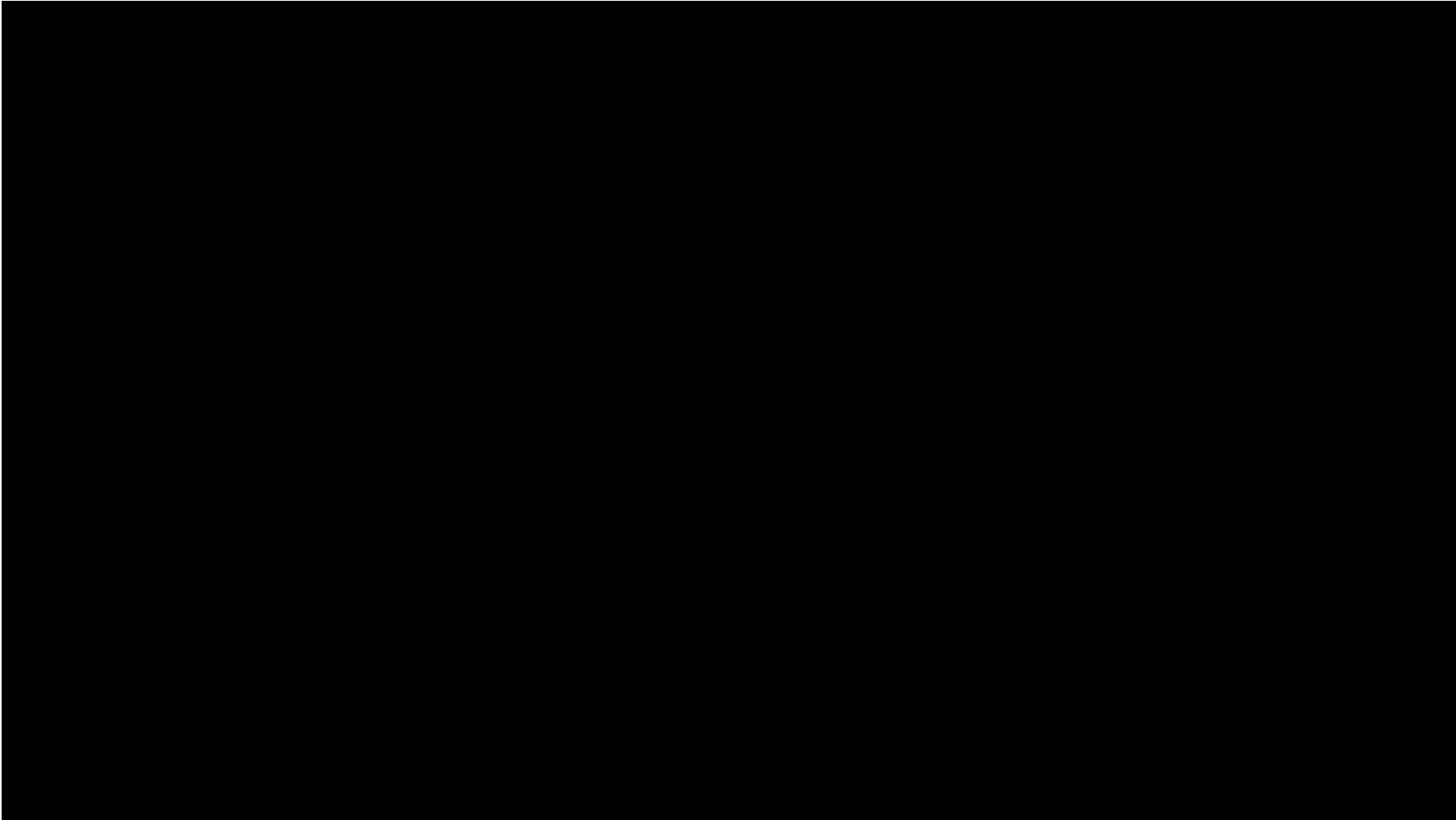
Before IOT:



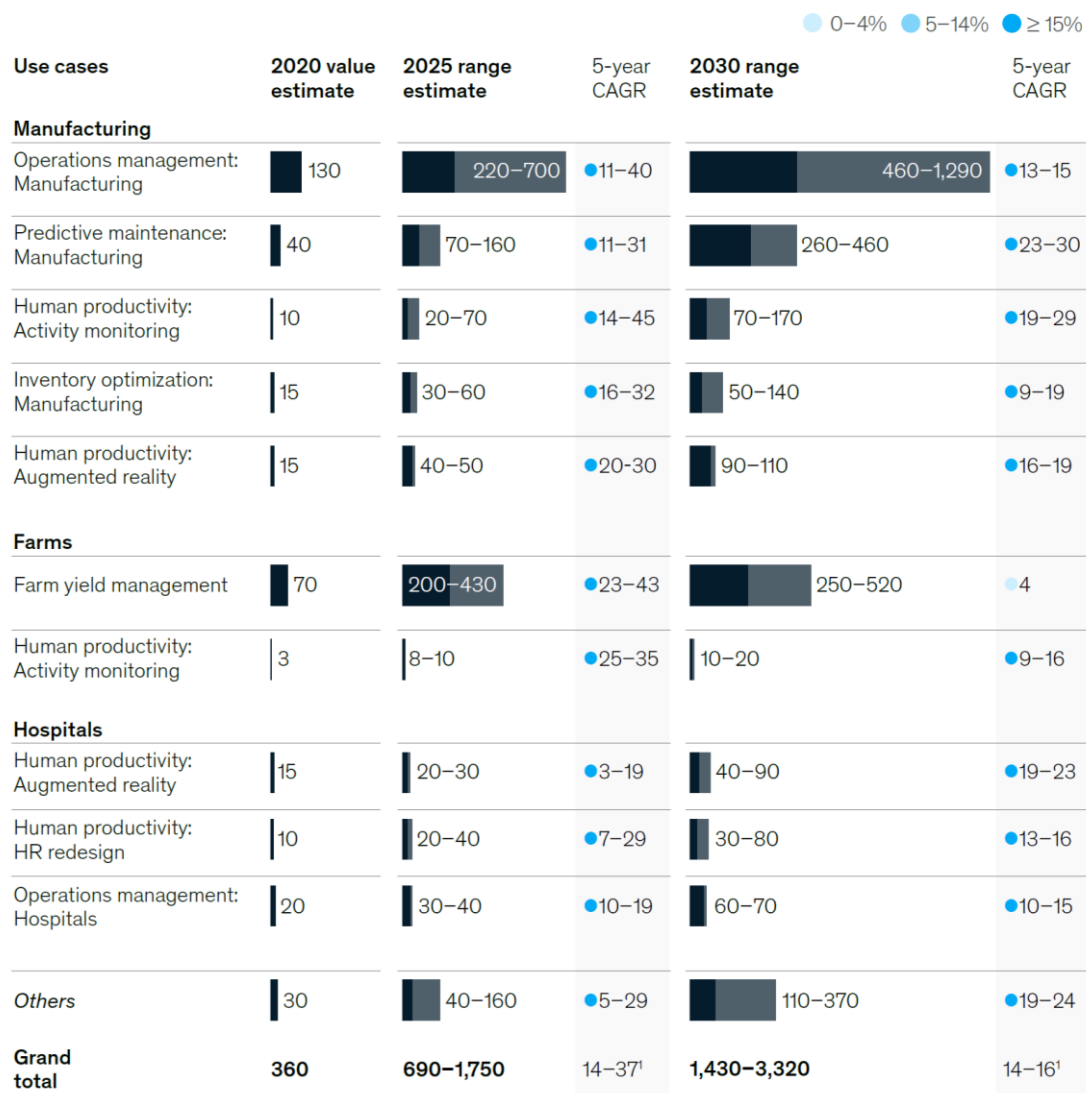
After IOT:



- Reactive Maintenance
- Preventive Maintenance
- Predictive Maintenance
 - Preset Alarm Levels
 - General ML Algorithms
 - PHM Models
- Overall Asset Health



Estimated economic value by use case, 2020–30, \$ billions



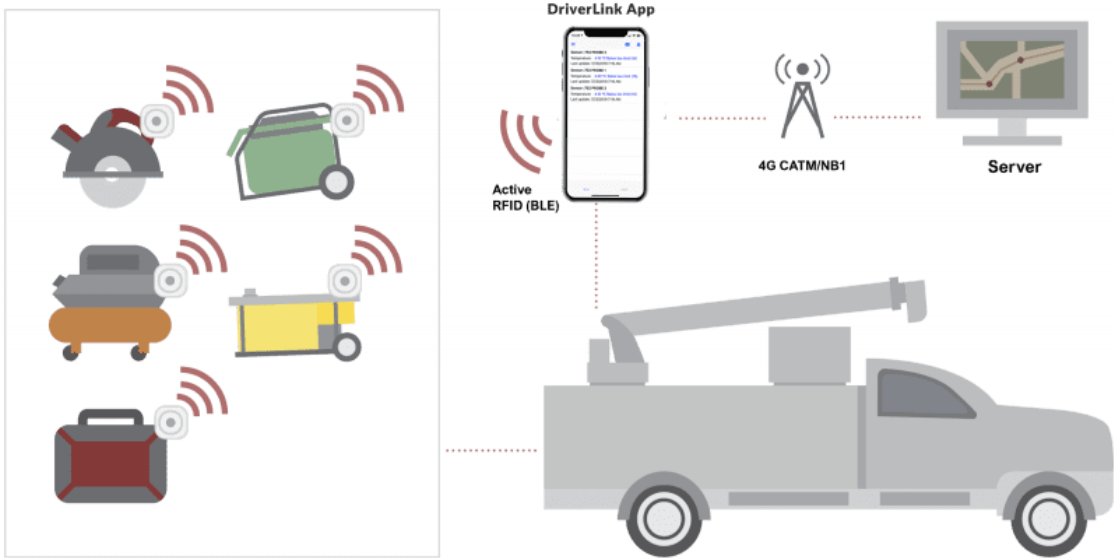
Note: Figures may not sum, because of rounding.
¹CAGR totals are averages.

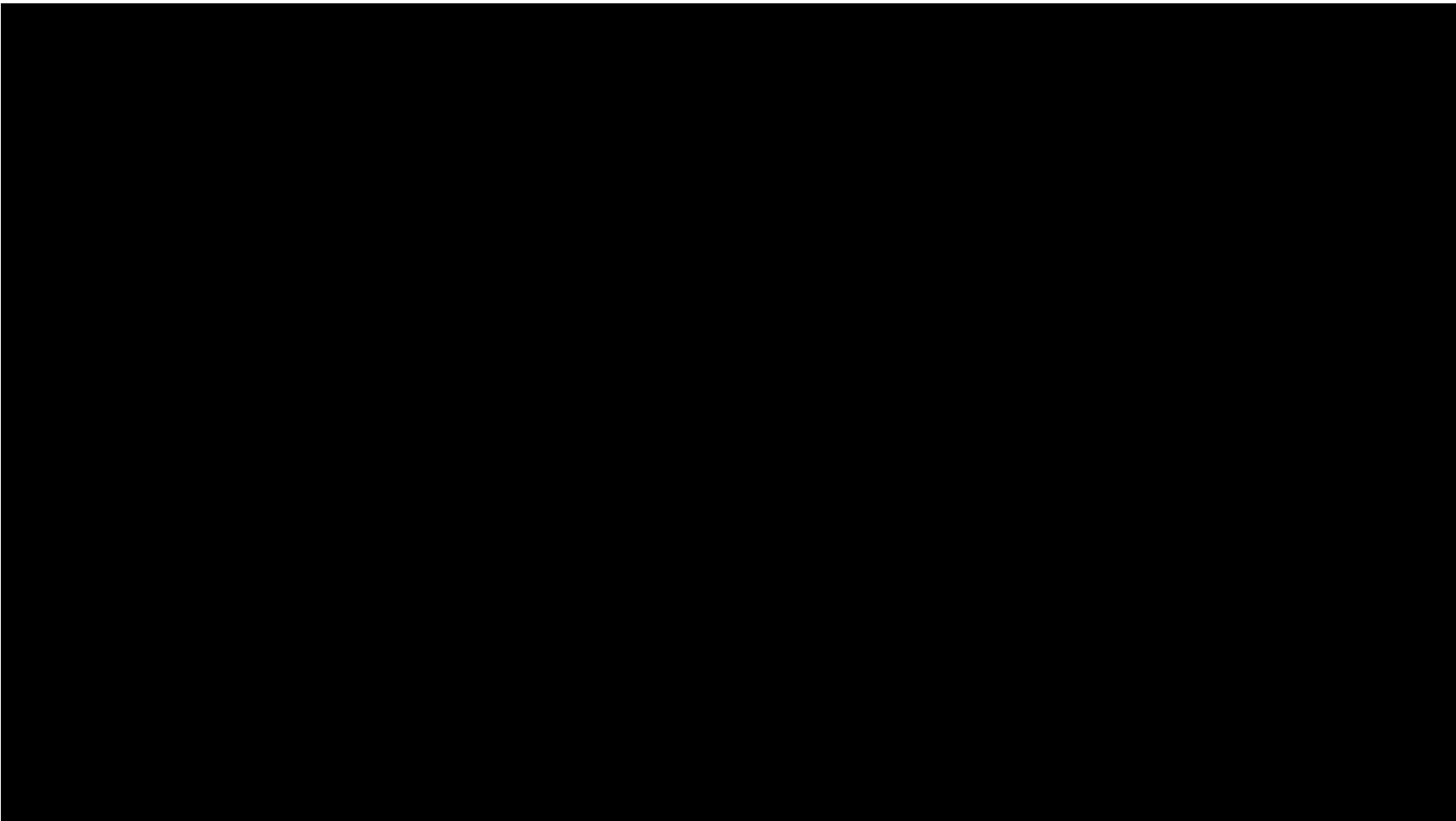
Estimated economic value by use case, 2020–30, \$ billions

Use cases	2020 value estimate	2025 range estimate	5-year CAGR	2030 range estimate		5-year CAGR
				0–4%	5–14%	
Construction						
Operations management: Construction	15	30–230	17–71	70–540	14–18	
Improved equipment maintenance: Construction	2	20–60	58–102	20–220	4–30	
Human productivity: Activity monitoring	8	10–20	5–21	10–30	6	
Mining						
Operations management: Mining	20	40–180	19–58	80–190	2–12	
Improved equipment maintenance: Mining	7	20–60	25–52	50–150	16–21	
Health and safety: Mining	1	1–2	27	1–4	14	
Oil and gas						
Operations management: Oil and gas	50	50–140	2–23	80–300	9–17	
Improved equipment maintenance: Oil and gas	20	30–60	6–23	60–210	16–27	
Health and safety: Oil and gas	2	2–6	1–27	7–20	32	
<i>Others</i>	6	9–30	7–34	20–60	15–16	
Grand total	130	220–790	11–43¹	400–1,730	12–17¹	

Note: Figures may not sum, because of rounding.
¹CAGR totals are averages.

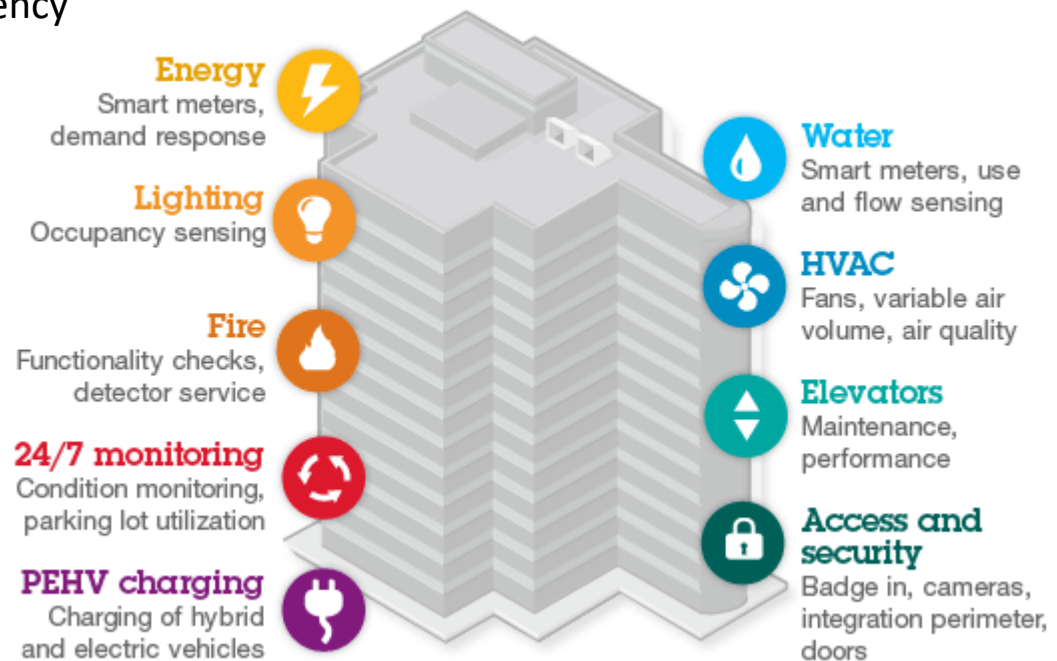
Case Studie: Asset Tracking and Optimization



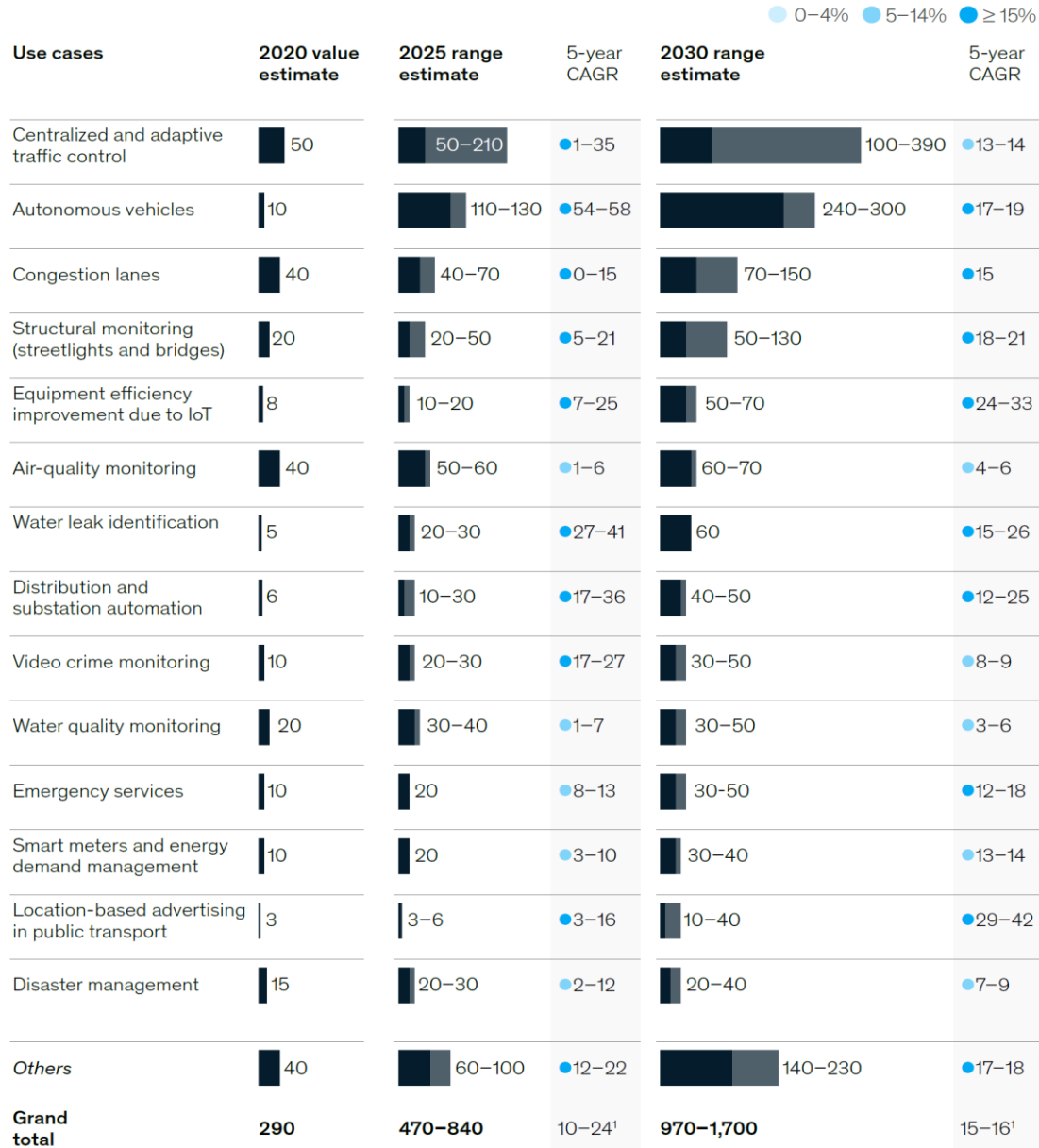


Case Studie: Smart Building Management

- Reduced energy consumption
- Enhanced occupant productivity
- Improved building efficiency
- Data driven decisions

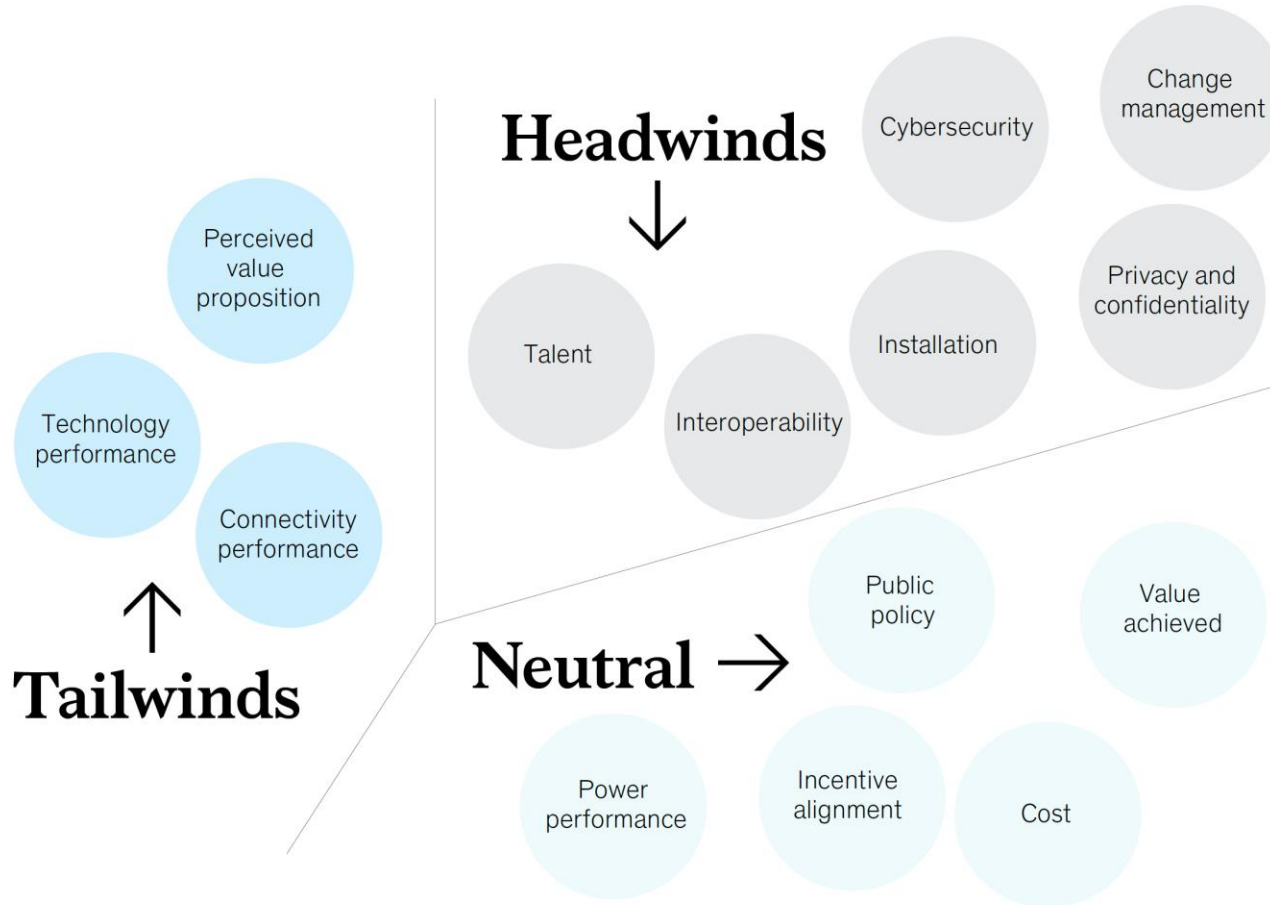


Estimated economic value by use case, 2020–30, \$ billions

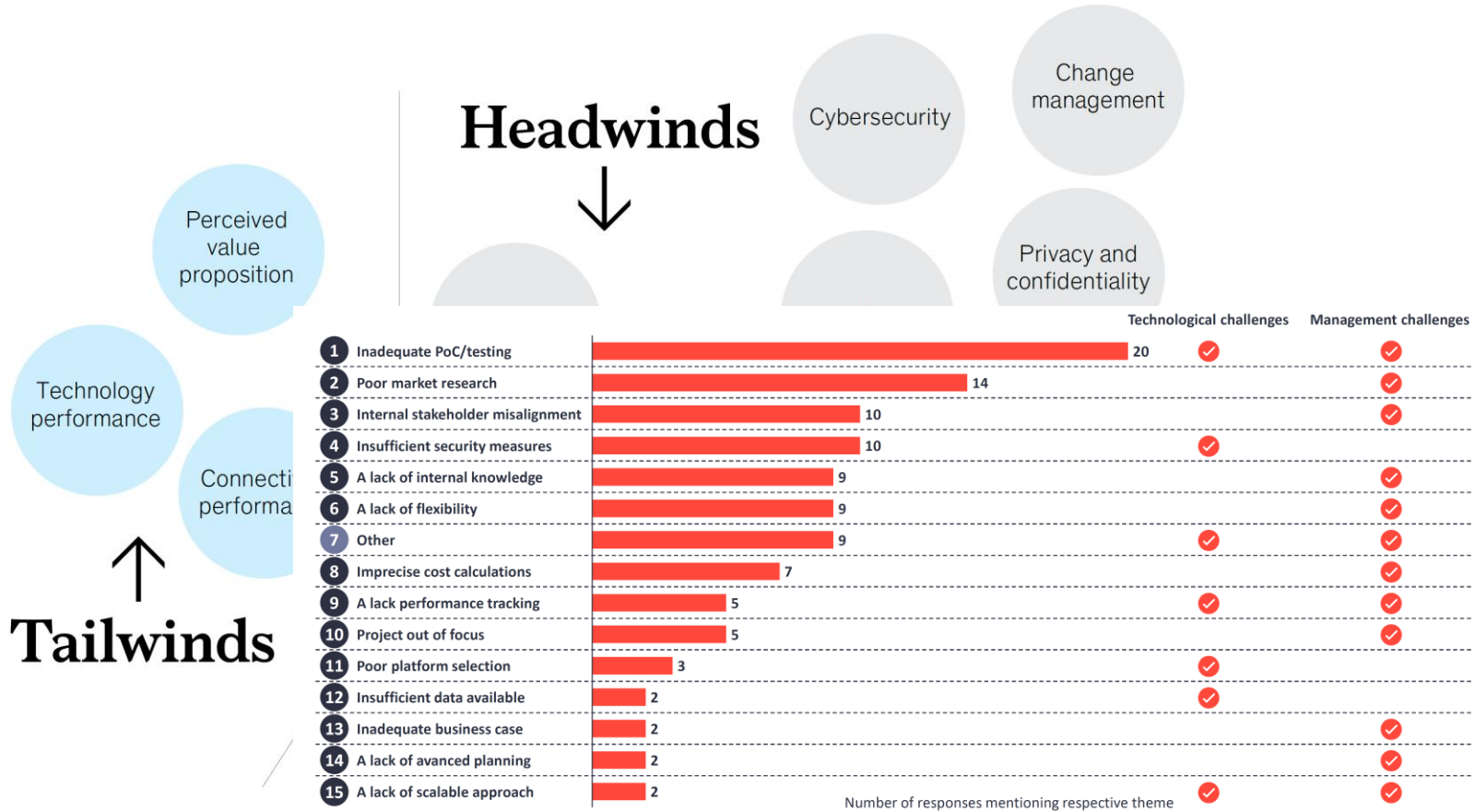


¹ Note: Figures may not sum, because of rounding. Percentages are averages.

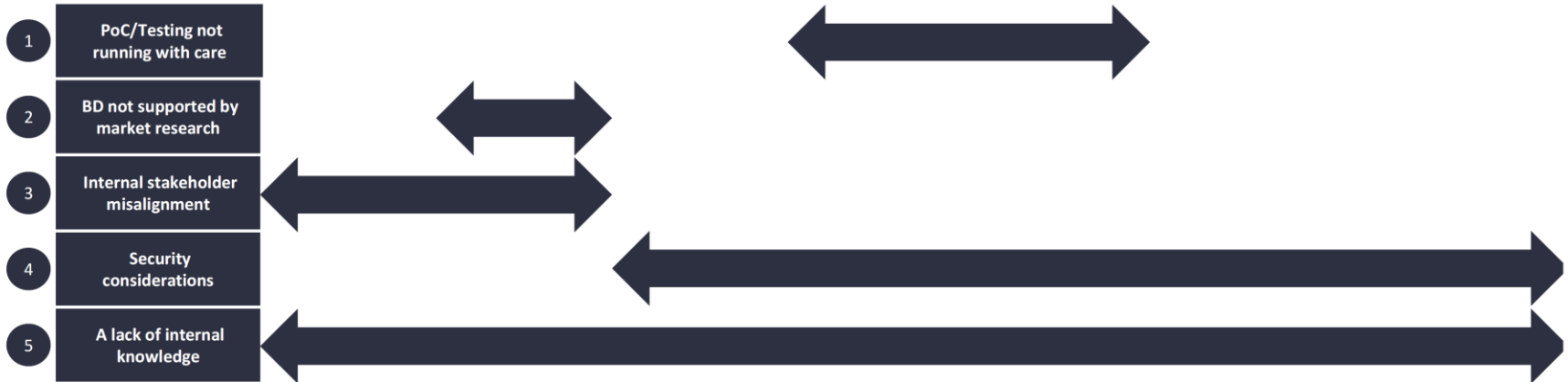
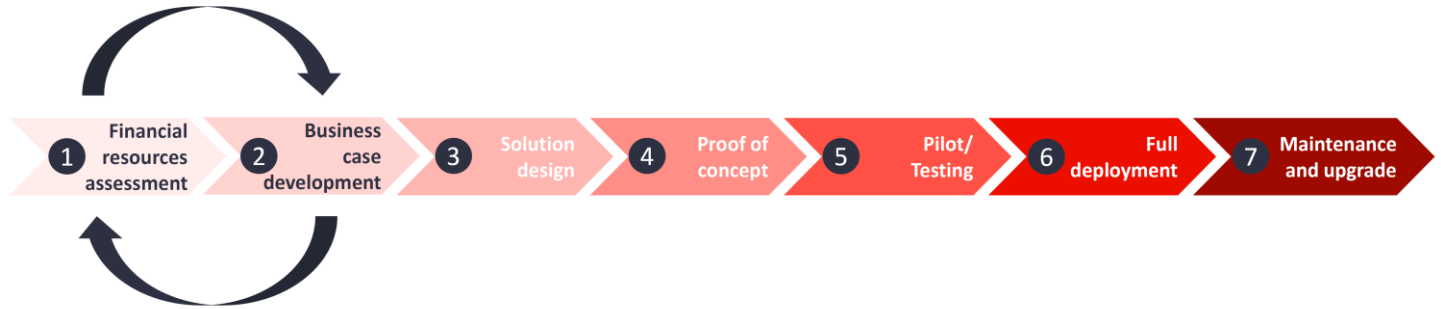
Key Challenges



Key Challenges



IoT Analytics Survey



Key Challenges

IoT Architecture

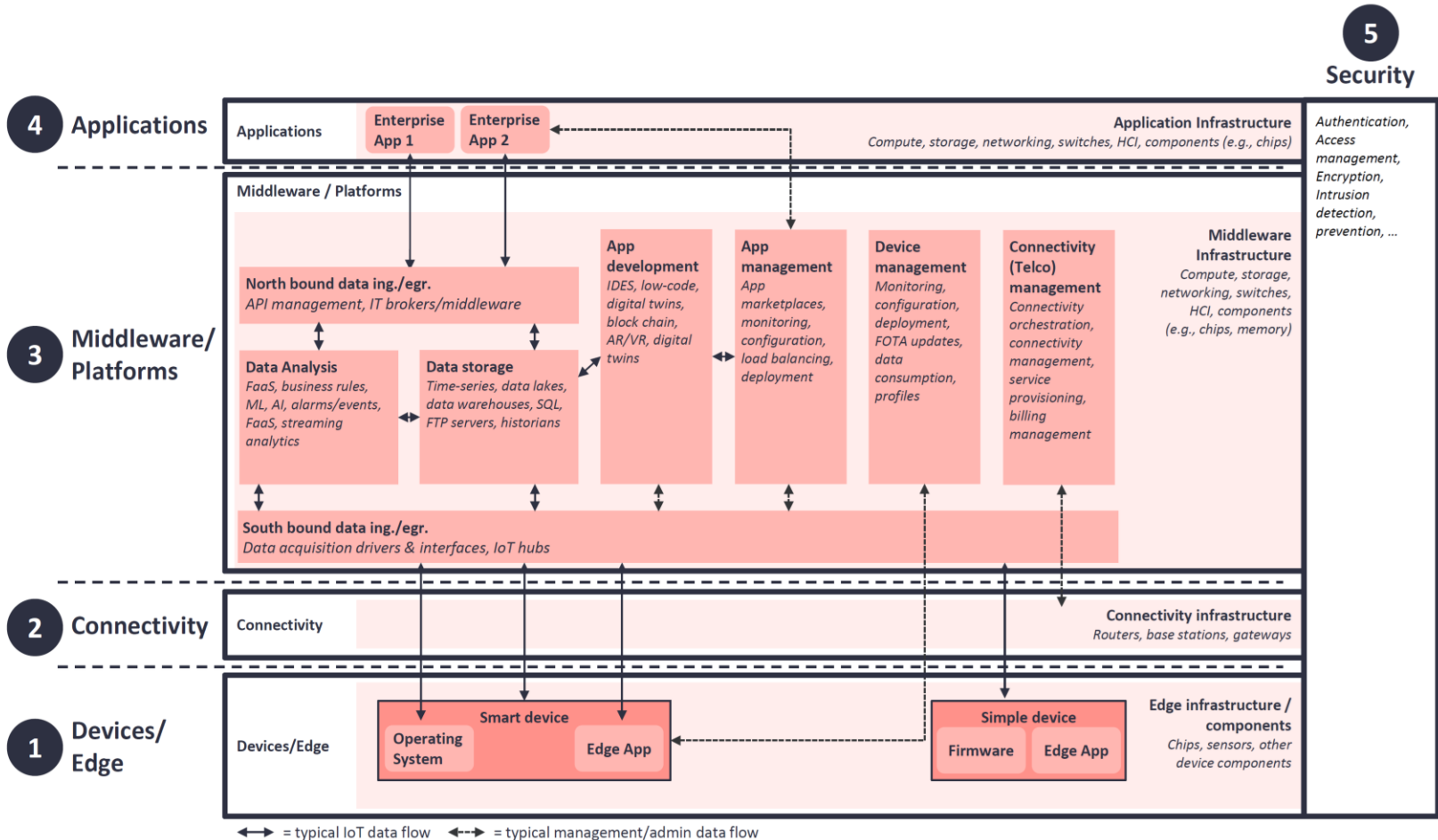
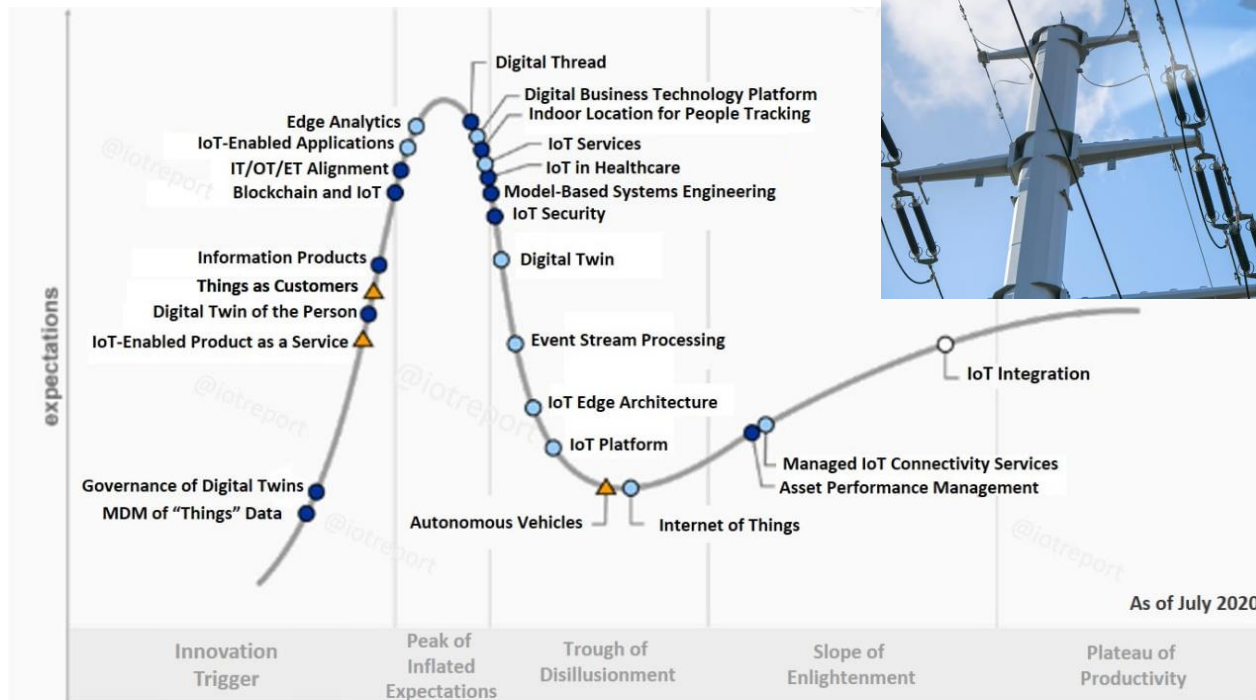


Figure 4: Generic End-to-end IoT Solution. Source: IoT Analytics.

Security and Privacy Considerations in IoT-based Asset Management



Future trends of IoT in Physical Asset Management

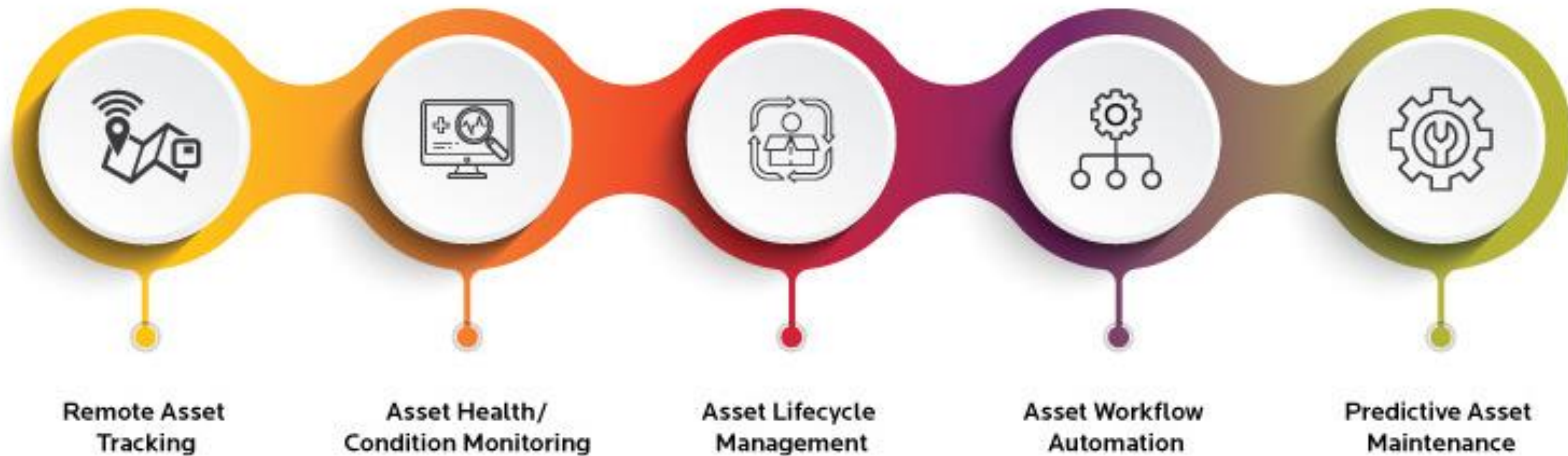


Plateau will be reached:

- Less than 2 years
- 2 to 5 years
- 5 to 10 years
- More than 10 years
- Obsolete before plateau

Source: Gartner
ID: 441743

Conclusion: Key Takeaways and Recommendations



Keep in Mind:

- Benefits
- Challenges
- Security and Privacy

What will be your next action to implement IoT technologies in managing your assets?