Internet of Things:
6 steps to successful IoT projects
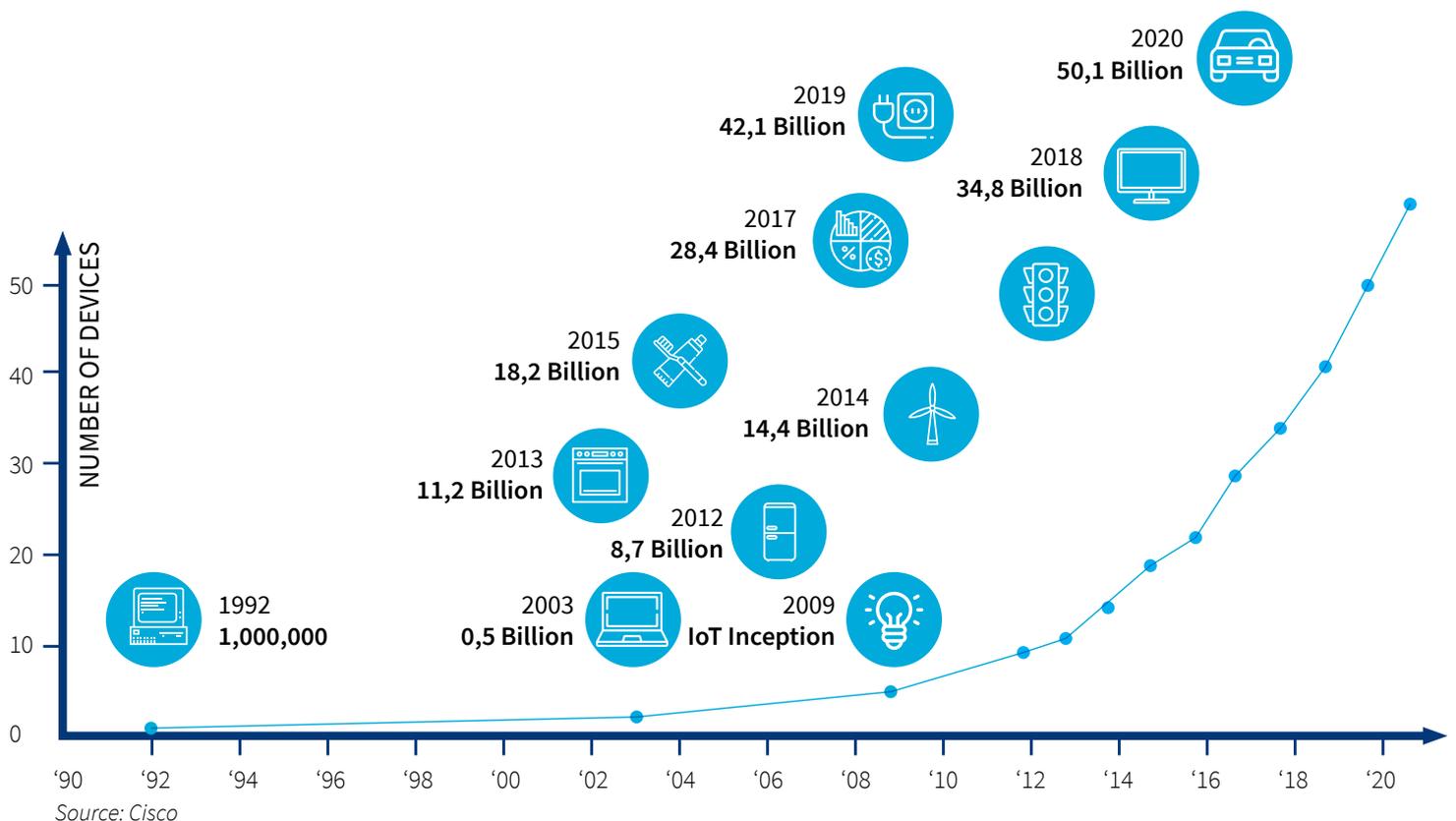
Internet of Things: 6 steps to successful IoT projects

More than 50 billion devices will be connected to the Internet by 2020. Among them refrigerators, wind turbines, smart traffic lights and cars.

Internet of Things (IoT) is the broad term for the interconnectivity of physical objects that enables sending and receiving data. It is also one of the core concepts of Smart Factories that improves manufacturing processes by bringing the intelligence to the table.

With IoT, even the smallest part of a machine can be connected with a single protocol that sends messages, instructions and alerts. In addition, all the data is collected and analysed in a Cloud system that acts as a big, central "brain" of the plant.

NUMBER OF DEVICES

2020
50,1 Billion

2019
42,1 Billion

2018
34,8 Billion

2017
28,4 Billion

2015
18,2 Billion

2014
14,4 Billion

2013
11,2 Billion

2012
8,7 Billion

1992
1,000,000

2003
0,5 Billion

2009
IoT Inception

50
40
30
20
10
0

'90 '92 '94 '96 '98 '00 '02 '04 '06 '08 '10 '12 '14 '16 '18 '20

Source: Cisco

IoT as a paradigm shift

For any company just starting out with IoT or simply considering implementing it into their factory, it's important to understand that IoT is more of a concept than a technology that you simply install. This paradigm shift will present a cultural challenge for many organisations as they try to derive the most value from IoT. The cultural issues related to IoT are in some ways similar to those encountered during the adoption of enterprise-based Cloud services, as the Cloud isn't really a technology as much as a new way of working. Getting the benefits of the Cloud requires a shift towards a self-service or IT-as-a-service mentality. Such changes are often met with strong organisational resistance. Maximising the benefits of IoT data might present similar challenges. A self-service analytic insight creation mindset (for example correlating data from within disparate organisational silos) requires the managers to be willing to tear down territorial walls.

A change of mindset

IoT requires a complete change of how a factory is operated and managed. And we are talking a complete change in the company's mindset about how the manufacturing works and what departments take part in it. For example, IoT calls for a much bigger involvement of IT departments and reducing the number of the factory's floor workers.

Here are some helpful questions to ask yourself before implementing IoT in your factory:

1. How can your company profit from connecting machines and tools in the manufacturing process?

2. What issues and bottlenecks does the manufacturing process have that are important to change?

3. Can your current networks and infrastructures support IoT in terms of data storage and security?

4. Can your legacy systems and existing equipment be connected through IoT?

5. Are all the important stakeholders within your company onboard?

Benefits of IoT

The benefits of IoT are many, but something that is common for most of them is cost reduction. Whether it is through better quality of products, fewer work-related accidents, or better tracking of shipments – the implementation of IoT typically brings in significant cost savings for a company. In our experience with clients, we've identified the following benefits:

Increased efficiency and quality.

When all the machines in a plant are connected, a higher level of automation and control is achieved. Predictive Maintenance enables a higher and more stable quality of products, as mistakes due to human error are eliminated.

More accurate deliveries.

Adding IoT to shipping boxes and vehicles increases delivery efficiency, both in terms of delivery time and how intact the products are.

Expanding on AI capabilities.

As mentioned earlier, a Smart Factory gets better at its job the more data it analyses. The benefit of having access to massive amounts of data that are specific to your products and manufacturing processes is creating your own AI model that is curated to your needs.

Freeing up human resources.

Routine and mundane tasks can be eliminated and experts can be assigned to more complex tasks instead of everyday work processes.

Safer working environments.

With IoT, an intelligent camera can monitor unsafe environments or recognise when a light on a machine is indicating abnormal conditions. The same technology can even be embedded in a safety suit.
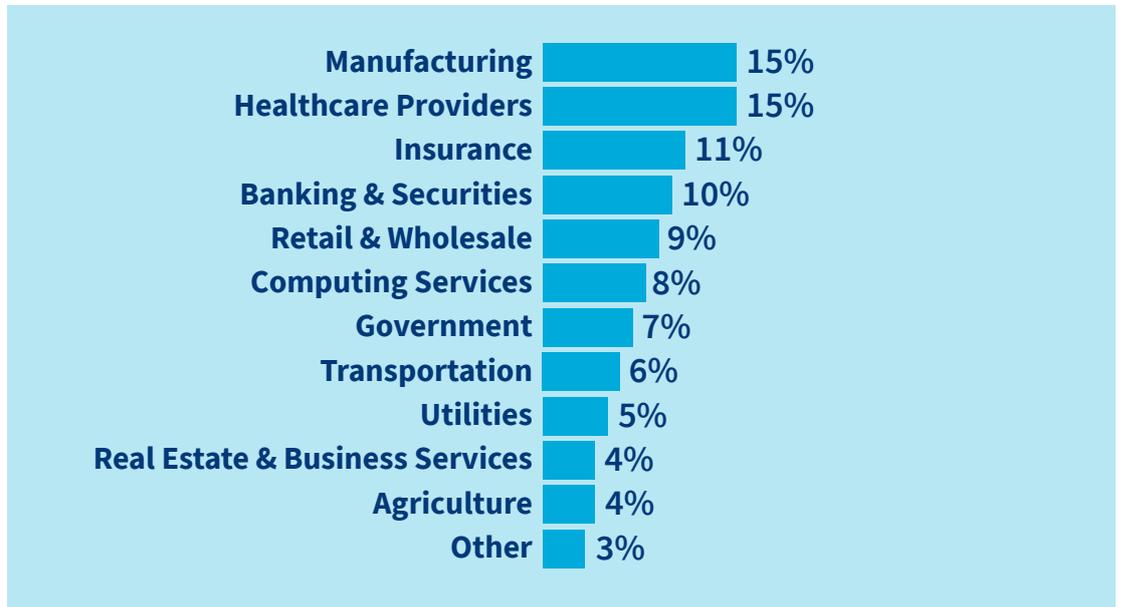
Real-time decision making.

The connectivity of IoT devices allows you to monitor every part of the plant, from the presence of toxic particles in the air to stock levels of spare parts, and make adjustments as the day progresses.
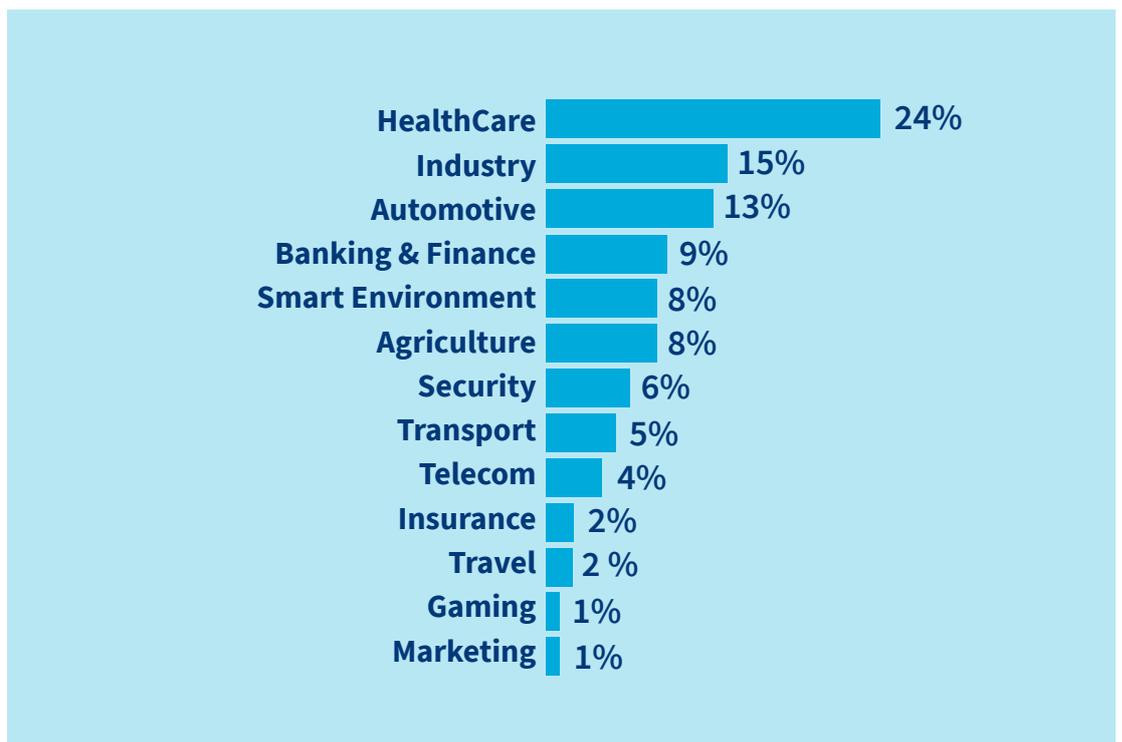
Internet of Things Value Add by 2020
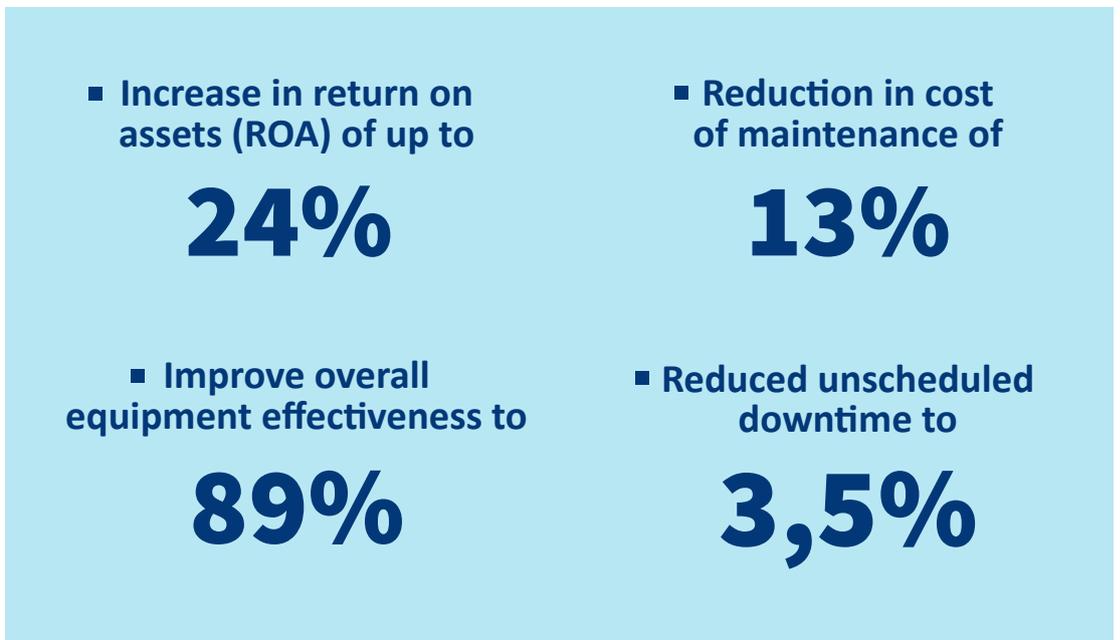## $ 1,9 Trillion

Sector	Percentage
Manufacturing	15%
Healthcare Providers	15%
Insurance	11%
Banking & Securities	10%
Retail & Wholesale	9%
Computing Services	8%
Government	7%
Transportation	6%
Utilities	5%
Real Estate & Business Services	4%
Agriculture	4%
Other	3%

ERNI Projects by sector 2019

Sector	Percentage
HealthCare	24%
Industry	15%
Automotive	13%
Banking & Finance	9%
Smart Environment	8%
Agriculture	8%
Security	6%
Transport	5%
Telecom	4%
Insurance	2%
Travel	2 %
Gaming	1%
Marketing	1%

How to implement IoT in your factory

The Industrial Internet of Things can collect an impressive amount of data from manufacturing equipment in production and transmit it to devices that can store and analyse it. The main obstacle when trying to implement the technology used to be analysing the data that had been collected. By using an Edge Computing-Servers, this analysis can easily be done on site and in real time. This greatly diminishes the burden on networks and also keeps the costs low. An Aberdeen Group study found that the best-in-class organisations (top 20 percent) that employ predictive analytics for asset management attained:

- **Increase in return on assets (ROA) of up to**
  # 24%

- **Reduction in cost of maintenance of**
  # 13%

- **Improve overall equipment effectiveness to**
  # 89%

- **Reduced unscheduled downtime to**
  # 3,5%

The roadmap to IoT success that we shared earlier might look simple, but IoT implementations are far more complicated than software updates or supply chain integration projects. They require new skill sets and involve multiple business units and operational teams across the company.

Objective #1

Gaining **better visibility** into and control over business-critical equipment is the number one objective in using IIoT (Industrial Internet of Things).

Whether you decide to execute the implementation alone or choose to work with an external partner, here are some of the skills that are vital for a successful IoT project:

Project management.

As mentioned above, an IoT implementation project has a lot of moving parts and stakeholders. In our experience, really good project management skills are important when working with both hardware and software development. All of our team members are therefore certified SAFe practitioners, which allows us to manage complex projects with our clients.

Innovative design thinking.

No IoT solutions are alike. To find the right use case and solution, one must be solution-focused, not problem-focused.

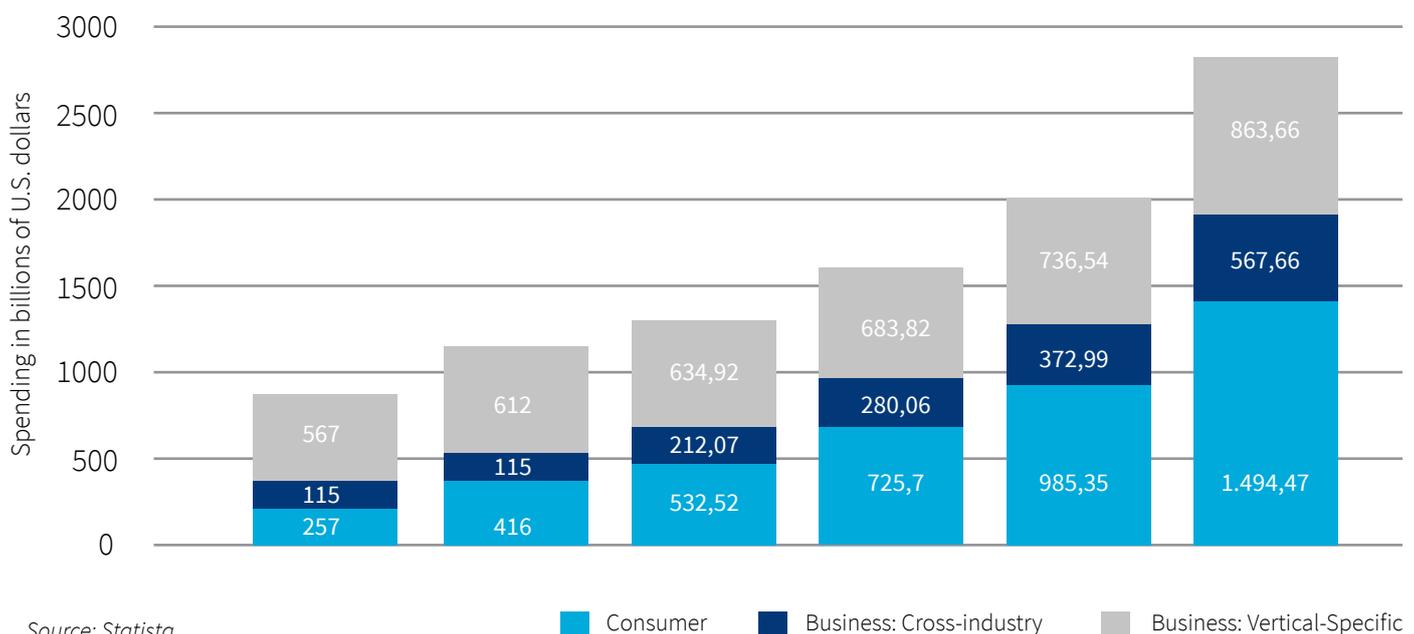## Robust computer engineer capabilities.

In an IoT implementation, it is important to have engineers to determine which is the right equipment to use, developers/QA for testing, Cloud engineers for the data storage, BI engineers/developers to prepare the Big Data, etc.

Data storage and security.

IoT is driven by data, which means proper storage is essential.

Spending on IoT, by industries like manufacturing, transportation and logistics, healthcare, retail, government, utilities, energy and natural resources, or insurance.

Spending in billions of U.S. dollars

	Consumer	Business: Cross-industry	Business: Vertical-Specific
Bar 1	257	115	567
Bar 2	416	115	612
Bar 3	532,52	212,07	634,92
Bar 4	725,7	280,06	683,82
Bar 5	985,35	372,99	736,54
Bar 6	1.494,47	567,66	863,66

Source: Statista

8 billion IoMT devices

Predictions say that there will be 8 billion IoMT devices worldwide by the end of this year and **up to 21 billion by 2020.**

Why Internet of Medical Things matters and what to do about it

The Internet of Things is gaining momentum in MedTech. What kind of new challenges would this area pose for established hardware companies?

Medtech companies traditionally manufacture highly technological, autonomous devices. The IoT enables those instruments to be connected together and connected to instruments from other companies or even different industries.

Integration

Integration will be one of the most challenging aspects. Proper and easy integration of the vast numbers of devices is a market demand and necessary to keep key advantages.

Agile Management

Companies often struggle to align practices in hardware development with more agile processes necessary for digitized industries, so a more flexible approach will be in high demand. Our consultants promote best agile practices and standardised processes in developing IoT systems and digital transformation.

How can the industry profit from the IoT and connecting medtech devices to other industries?

First of all, the IoT means better, fact-based diagnosis. Data science allows us to analyse numerous sources regarding a patient's condition of illness or disease and recommend treatments or preventive action to a doctor. Thus, the doctor does not need to rely solely on his experience but can assess and complement the outcome from a sophisticated computer-assisted analysis.
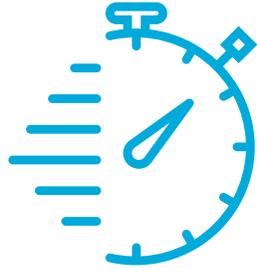
30% Time effectiveness during treatment

Healthcare plans of the future place a key responsibility on clinical IoT devices. These wearables' data will speed up a clinician's assessment significantly by 2019. We're talking a time savings of up to 30 %. Hospitals will start to rely on robots for the delivery of medication and supplies and as IoT-enabled biosensors. (Source: IDC Future Scape: Worldwide Healthcare IT 2017 Predictions)

There are also other uses such as personalisation or remote healthcare. For example, the data from your smartwatch can improve diagnostics and help you receive more personalised treatment. Also, various sensors, cameras and devices can help with monitoring patients who are treated at home, allowing them to function more independently. There is a lot of space for new ideas and innovation.
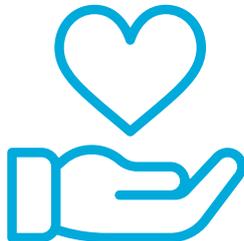
Remote Healthcare

A revenue of $169.3 billion is expected in the global smart healthcare market by 2020. Remote monitoring will play a prominent role in the future.

Another IoT potential lies in much simpler visualization of the health conditions of individuals, which can lead to greater motivation to live a healthy lifestyle and to better prevention of illnesses.

3.2 billion downloads

Health apps are in high demand now, as the download numbers show. (Source: mHealth App Economics 2017 report)
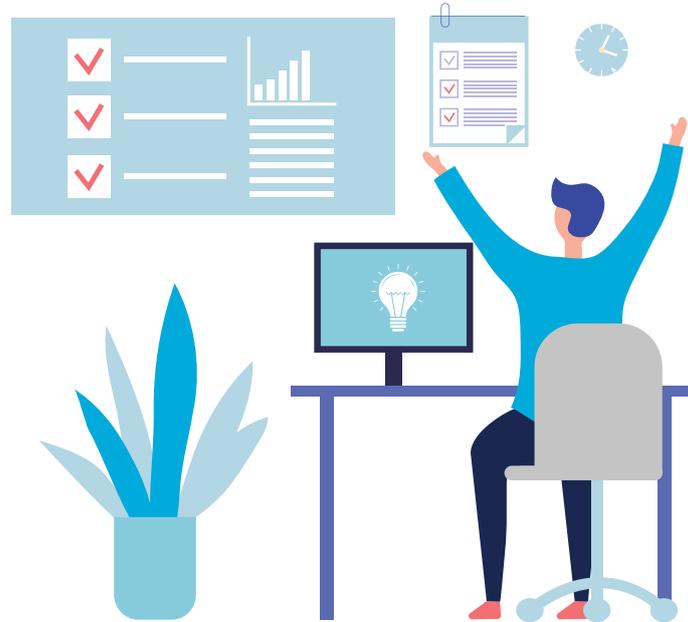
6 Steps: How to be successful in IoT and what to focus on

1.

The organisation should have competence in the field of technology and a good business model.

The first step to a successful IoT journey is to have a goal and an ROI model, and to understand the market. The best way to initiate IoT is by employing Agile development and systems engineering. Systems engineering practices are vital for managing the complexity and creating the best solutions for the devices. This is connected with system architecture (the overview of the whole system and its components), requirement engineering and system testing. With the Agile methodologies, KANBAN and sprint planning, the teams are able to collaborate better and stay on the right path throughout the whole process.

2.

The companies should know what the system requirements are and choose a suitable strategy accordingly.

For example, companies will need a cloud solution that will connect their apps with devices. They can either go with proven cloud service vendors or develop their own cloud-based solution from scratch.

3.

Try out the use cases in a real-life setting and also assess the feasibility.

The best practice is to work on the IoT solution and use "security by design."

4.

A pilot product should be launched to test the product on a small scale.

5.

Identify meaningful data.

There is nothing to be gained from simply collecting data itself; there must be some business value in the insights. In the industrial world, downtime is a major cause of lost productivity and cash. As such, it represents one of the key areas where IoT can help.

6.

And finally, after successful evaluation of the use cases and pilot product, the solution should be scaled up so that it can be rolled out for a larger number of consumers or regions.

TOP 4

reasons why
IoT projects fail

1. **Failure to capture business opportunities**

2. **Missing critical data**

3. **Skills or capacity gap to build IoT**

4. **Failure to ensure market fit**

ERNI and IoT projects

Many of our customers' data projects are subsets of larger Internet of Things initiatives. Although the IoT produces data, the scope of the IoT projects is usually more extensive and covers a broader pool of activities. This illustration describes/shows the ERNI collaboration model for IoT projects.

VISION

Through a series of workshops, we reach a common understanding of your needs and **objectives**. We then **develop a vision** showing you how to reach your business objectives with the help of cutting-edge digitalisation technology.

1. Stakeholder analysis
2. Create overall vision

3. Identify use cases
4. Select ´low-hanging fruit´

USE CASES

We identify use cases with the highest return and **decide** on what to **implement based on ROI.**

ARCHITECTURE

Next, we **outline the architecture** and the realisation of the vision for achieving identified objectives.

5. Identify building blocks
6. Identify technologies and rate them

7. Deliver prototypes
8. Validate

RAPID PROTOTYPING

We evaluate platforms and **implement prototypes**. In later stages, ERNI supports your teams or carries out a full-scale implementation on its own.

Throughout the first stages, ERNI can offer proven consulting patterns for innovation workshops, gap analysis and fast prototyping. In the implementation phase, a global shoring platform with more than 500 people is available for our external partners, enabling from sensor to the app cost-effective custom software solutions.

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