BSQUARE

How IoT Can Equal ROI
6 Keys to Get More From Your Machine Data

Internet of Things (IoT) solutions can liberate data and deliver significant value for your business. IoT solutions require a thorough understanding of business processes, and should be focused on improving business outcomes. Some commonly-cited components of IoT systems, such as the idea that they require the cloud, are not requirements at all and can get in the way of maximizing ROI. Six key points you should consider to make IoT work for you:

1. Focus on value for users rather than technology.

2. Think big, start small. Have a vision, but start with a small proof-of-concept project to gain experience, and demonstrate viability and value.

3. Let the data model drive, and avoid locking the company into a hardware-centric architecture.

4. Challenge preconceptions. IoT solutions don't necessarily involve big data analytics or cloud computing.

5. Understand that IoT has unique security requirements compared to everyday corporate computing.

6. Outsource intelligently. Partner with successful IoT solutions companies that will work with you to

Introduction

For many businesses, there is tremendous value in capturing, analyzing, and using machine-generated data to enhance business decision-making. "IoT" is the most common term for these scenarios, and it's the one we'll use here. IoT solutions can enable new, innovative business models, improve operational efficiency, and reduce costs. Even small IoT projects can deliver significant return on investment, regardless of whether they make technology headlines.

IoT solutions can be complex and challenging to implement, especially if an organization lacks the specialized expertise required for success. IoT solutions can be more complex than they first appear, both technically and operationally. Many organizations don't realize what they have gotten themselves into until well after the project has started, if only because they "don't know what they don't know."

With IoT solutions, the devil is in the details. They involve technologies unfamiliar to the typical corporate IT department. They require business decision makers to let go of their comfortable data fiefdoms. They may have cross-departmental ownership. Because of these factors, it's important to have a plan for achieving ROI.

Like all "next big things" in technology, IoT gets discussed in sweeping terms with not enough attention paid to the practical value it can deliver — and even less to making it actually work. As a rule it pays to be hard-nosed and laser focused on understanding what you're getting for your investment and making sure the end goal of any IoT solution is improving business outcomes. In this paper, we advocate a practical, bottom-line approach to designing and deploying IoT, with 6 ways to make machine data work harder for your business.

1. Focus on user value

The focus of IoT solutions should be enabling people and businesses to improve business outcomes. A related benefit is to makes someone's life easier by enabling them to work more effectively.

The best IoT solutions are built with a deep awareness of how people do their jobs. If business owners are not part of the process, they won't understand the value, which means they will not champion user adoption. By detailing and articulating the positive business value of the solution, you will increase the likelihood of realizing that value.

Start by working with business stakeholders to clearly outline goals. Do you want to increase the efficiency of field service calls? Reduce energy use? Increase the value of a product to your customers through enhanced warranty service? You may be able to achieve several objectives at once with a properly designed solution, but only if you are focused on the business outcomes. It's critical to base this model on real-world information, which could mean interviewing the people who are going to use the solution, or even shadowing them in their workday. In any case, decision makers and users need to have input throughout the process.

The "black box" IT model in which a solution is designed by experts behind the scenes and then delivered unilaterally can be a disastrous approach for IoT, particularly because application requirements can change rapidly.

The involvement of business stakeholders is important for another reason, as well: you need their data. IoT is all about breaking down data silos. However, those barriers are not only the product of technical limitations or operational complexity — they give business units a certain degree of control and power within the organization, and they are not always enthusiastic about tearing down the walls. If they understand what they are getting in exchange for their data they are much more likely to be accepting and supportive of an IoT solution.

COMMON IoT OBJECTIVES

The scenarios where IoT can drive value are virtually limitless. Some examples include:

- **Predicting equipment failure:** Performance, error, and failure information collected over time can be the basis of a model for predicting failures and scheduling proactive service calls, improving customer satisfaction, and reducing downtime.

- **Pre-service diagnostics:** Detailed information on faults or failures enables fieldbengineers to arrive prepared with the right tools and parts, reducing service time and cost.

- **Enhanced understanding of customer behavior:** Usage information helps sales, marketing, and service teams tailor programs and products to the needs of real-world customer segments.

- **More comprehensive service packages:** Detailed status reports can help service teams deliver superior results for customers and enable advanced remote management scenarios, driving incremental revenue for the vendor.

- **Improved product tracking and trending:** This could be part of a large population study to verify real-world mean time between failures and reliability issues.

- **Faster product optimization:** Collecting usage, variable, environmental, and performance information across an entire population of connected machines can be used to improve the design of the product or to improve customer satisfaction.

Key takeaway: Don't be distracted by the high-tech nature of IoT—the biggest rewards lie in how it adds value to the business. Stakeholder buy-in and user adoption are critical to success.

2. Think big, start small

It's common for the media to portray IoT solutions as sweeping, futuristic networks. Consequently, it often gets lost that small-scale proof-of-concept implementations are a great option to get started. At the same time, even the first small steps need to be guided by a long-term vision.

Long-term goals and objectives should be defined by a "North Star" document, which is visionary and strategic in scope but also lays out a tactical framework for success. In other words, it sets an ambitious goal while setting out practical steps to getting there. It can be used to guide decisionmaking from the very first step, and should be treated as a living document that can be adapted as you learn more. This will help maintain compatibility and scalability as the solution evolves. This is the "think big" part.

The IoT proof-of-concept is the "start small" aspect. It can be important for several reasons. First, no matter how good things look on paper, people want to see tangible proof that the solution will (a) function and

(b) deliver the value it promises. A phased roll-out also enables you to build expertise inside your organization and develop a positive working relationship with your IoT partner. It also will help you to iron out any issues prior to a broader roll-out of a solution.

Ideally, the proof of concept will deliver more than technical assurance; it will show business stakeholders genuine results. The pilot IoT project should be guided and measured by attainable, short-term goals. Remember that business owners don't typically understand the requirements of long development cycles, so an agile, quick-turn process is more effective. Such an approach also provides room for change and adaptation as the solution meets the real world.

The right IoT partner will help you create and optimize your North Star vision document and the proof-of-concept is a great way to make sure this is correct before embarking on the next step of investment.

> **Key takeaway:** Effective IoT projects combine a grand vision with a phased rollout, often beginning with a carefully defined pilot project.

3. Let the data model drive, not the hardware

Data is at the heart of IoT value!

Chances are, the data you need already exists, just trapped in sensors, devices, and subsystems. A successful IoT solution can free it, but first you need to develop a deep understanding of your company's unique data universe, focusing on the area the IoT solution is designed to address. This includes both "input" data coming from

THE FIVE Vs OF BIG DATA: KEY QUESTIONS TO ASK

• Volume: How do companies deal with the sheer amount of data they receive?

• Velocity: How do companies deal with the rapid rate at which they receive data?

• Variety: How do companies deal with the vastly disparate types of data, from vastly disparate sources that collect and feed this data?

• Validity: How do companies ensure the data they receive is reliable and valid?

edge devices as well as "output" data that is designed

to help people do their jobs better or drive better business decisions. An IoT solution should also integrate with your existing software and hardware infrastructure – IoT does not mean rip and replace in order to access your data. A future proofed solution stays true to your data model in order to support different devices and machinery.

A common mistake many companies make is to start from the specific hardware pieces they have, accept their limitations and then write hardware constrained applications – applications that need to be rewritten anytime the hardware changes. Another common mistake is to assume new IoT solutions always require significant new hardware or peripherals to make them work. World-class IoT solutions are flexible, modular and scalable. They allow businesses to get started no matter where they currently are in the progression of turning their raw data into actionable data. They are also designed to work in heterogeneous sensor environments and hardware architectures and should not require significant rewrites when businesses grow, change or upgrade their vendors, or hardware.

Implementing an IoT, data-focused solution requires examining technical and operational aspects of the data. It should encompass:

• Data sources, types, and protocols

• How people use the data today, and how they could use it in the future, including details such as how data is visualized on various platforms

• How data moves from place to place in your organization and where bottlenecks lie

• Network bandwidth requirements to support IoT data flow

• Mechanisms for validating data accuracy

• Existing and potential data integration issues

• Consider the 5 Vs of Big Data (see sidebar)

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4. Challenge preconceptions

IoT is commonly associated with two other IT buzzwords: the cloud and big data. The assumption is that IoT always involves both, when, in fact, it can work without either.

Regarding the cloud, it can be a useful tool, but not in every case. IoT data can be stored on-premises for reasons of cost, security, or performance, and edge devices may be within a single facility or network rather than spread across the globe. Vendor claims that the cloud always wins on those points should be examined

critically, especially given the unique requirements of IoT compared to basic productivity or storage applications.

Take the example of a smart light switch. If one took an extreme cloud-only approach to the solution, you'd need a functioning Internet connection just to turn on the lights. A more sensible approach in this case is to keep some intelligence at the edge device—the switch—so you have basic functionality without the cloud. Additionally, with billions of connected devices coming online in the world, there is simply not enough processing power to centralize every function—and with the power of embedded hardware growing all the time, there's no need to. Very inexpensive and robust chipsets can now provide surprising amounts of processing power in extremely small and reliable form factors, delivering everything from data analysis to graphical user experiences without needing to connect to the data center.

The same thing goes for big data analytics: it may or may

not be the right solution to your problem. It's true that IoT systems typically generate a lot of information, but not always so much that analyzing it requires a Hadoop cluster or a team of data scientists. You might be looking for very specific kinds of information that don't require massive analytical power. In many cases, the value of IoT is in unlocking fairly basic types of information that were simply inaccessible before. Of course, even if your data storage and analysis needs are humble in the beginning, they can grow rapidly as the solution matures. And, in some cases it makes sense to build that capacity in up-front—but certainly not in every deployment.

> **Key takeaway:** The cloud and big data analytics are not always part of IoT. These decisions should be based on the organization's specific needs and goals.

5. When it comes to security, make no assumptions

Traditional IT security approaches may not apply to IoT scenarios. For example, identity management is a cornerstone of access control, but is typically designed with a human being at the center. IoT endpoints often cannot be authenticated based on an individual's identity because there is no human involved. Even security basics such as malware scanning become unwieldy when endpoints number in the thousands or do not have sufficient processing power to run an antivirus program. IoT devices may need to run unattended for weeks, months, or years without being serviced or experiencing a failure.

There are solutions to all of these issues, but they do not lie in the traditional on-premises PC/server security model. Even identifying the security challenges related to IoT systems can be challenging. This is where an experienced partner can be a critical asset.

> **Key takeaway:** IoT security is a critical consideration and will not be adequately addressed using standard enterprise IT security approaches

6. Outsource intelligently

Many businesses with even very sophisticated IT departments dive into IoT and find themselves out of their depth. Getting divergent data protocols, disparate applications, and heterogeneous networks to work together as a seamless whole is rarely simple, even without the operational and organizational challenges presented by IoT. It is important to honestly evaluate whether your IT department can handle the project given the necessary skills, time commitment, and scope.

This means understanding what your team is good at

and not good at. If you have competencies in specific areas, you can partner with a vendor and combine your expertise with theirs. The same goes for IT infrastructure: as talked about above, just because IoT seems new and shiny doesn't mean you have to rip-and-replace your existing systems. It's likely that you can leverage or repurpose much of what you already have to implement your IoT solution. Beware of options that demand costly new platforms or lock up all of your functionality inside cloud services. Where users are concerned, integrating with existing tools is almost always better than giving them yet another dashboard or data feed.

Key takeaway: IoT is not yet plug-and-play. Usually there is no need to rip and replace your existing systems. Partnering with someone who has done it before can make a major difference in the success of the project.

Conclusion: Have a vision, keep your feet on the ground

The value of IoT solutions should be measured by what they can do to improve your business outcomes and for your users. To use IoT effectively, you need to get beyond the sound bites and understand how it will work in your company's specific circumstances. That means talking to users, partnering with business owners, critically evaluating your IT capabilities, and getting to know your data not only in its technical features, but in how it is used in day-to-day operations. IoT should be looked at as an enabler of business value—not a business value in itself. In other words, the question shouldn't be, "what can IoT do," but "what can IoT do for me?"

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The world moves fast. Bsquare helps you stay ahead. Every day, Bsquare helps companies forge smart connections — providing the technology, people, and services to quickly take ideas from concept to market.

As a global leader of embedded software solutions, we enable smart connected systems at the device level and beyond that millions use every day and provide actionable data solutions for the growing Internet of Things (IoT) market. We empower our world-class customers with our products, services and solutions to achieve innovation and success.

Whether you need to fill gaps in your internal capabilities or want to completely outsource an IoT effort, we have the people, tools, and experience to help you get to the end result faster and with better return on investment. Contact us today to learn more about what IoT can do for your company.

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