



Best and worst of the Internet of Things

Lessons learned in transforming the hype into business outcomes

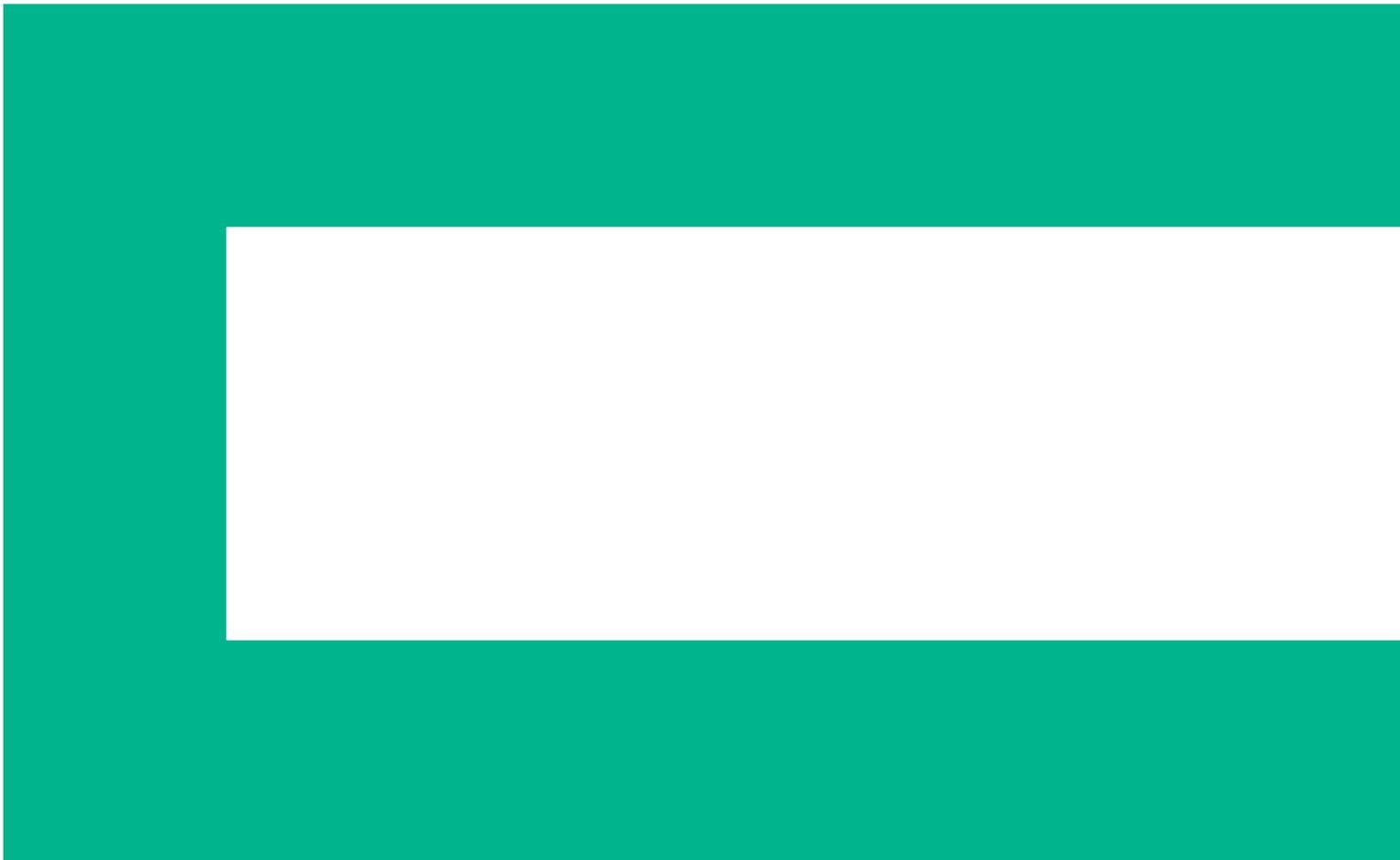




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Introduction

Machine-to-machine (M2M) and control networks have been in use for decades, but it is only in the last few years that they have morphed into the Internet of Things (IoT). The potential of IoT is compelling, but who has actually transformed the promise into results? Hewlett Packard Enterprise decided to survey IT professionals to understand how IoT was working for them. We asked about their IoT projects: what went well, what didn't, and why. We got a wide range of interesting responses with some valuable universal lessons.

This research paper examines the reality of IoT via real-world case studies and examples. It presents real results from real IoT initiatives, sprinkled with advice about how to avoid the pitfalls and maximize the business value and benefits of IoT. While the names of the companies involved have been omitted, we want to thank those who were generous enough to share their experiences. Here are their stories.

Methodology and background

First, a quick recap of the methodology. Hewlett Packard Enterprise surveyed approximately 80 IT professionals across all industries about their IoT deployments. About one-third had deployed an IoT project; another third were planning an initiative; and the final third had no IoT plans.

Of those who were not planning an IoT project, most said the key obstacle was the inability to quantify or achieve adequate ROI. Others were challenged with the definition of IoT, arguing that the term is such a buzzword that it has no specific meaning. Therefore, we want to be explicit that we define IoT as “a network of devices that creates new opportunities to transform industries, disrupt the status quo, and drive superior business results.” This definition is business-centric, focused on benefits and outcomes rather than the underlying technology. Accordingly, in our survey we asked respondents to focus on their business results.

Interestingly, more respondents were eager to discuss lessons learned and pitfalls faced than positive experiences. Whether one attributes this to human behavior or the notion that failures can be more instructive than successes, it is the reason this research paper looks first at lessons learned from failed projects. We've grouped the lessons learned into six categories, as described below.



Six vital lessons

Lesson #1: Make sure change management is prominent in your IoT planning

Several survey respondents related tales of what can happen when employees or partners are affected by an IoT project but haven't been consulted or even notified about its impact. Change management is an important consideration for any project, but it is particularly critical to the success of IoT projects because they can significantly impact people and processes, as survey respondents highlighted in their own words:

“We tried replacing our ‘punch-in-punch-out’ entry system with electronic ‘tagging’ of all personnel with the goal of saving money and getting better data about the location of staff within and between sites—the time they take for lunch, to travel, and so on. The data was fantastic at first—but then personnel started swapping their cards and access bands, providing the system with false data. The original intention was fantastic, but the staff felt imposed on and misused the system.”

In a second example a company overestimated the willingness of key partners to participate in its IoT project:

“This project started out as our worst and eventually ended up as our best. It concerned the production and material sourcing of semiconductors. We wanted to order the optimal amount of substrate circuit board for our microchips across different outsourced production sites. It called for our partners to enter semiconductor property data, such as inventory and supplier lead time, and store it into the cloud. It worked well in our onsite simulation, but then we hit a pothole: our partners were reluctant to enter data online. They weren't familiar or comfortable with IoT, and we ended up missing some shipments—which translated to a big revenue loss—and got sidetracked into micromanaging this new implementation. We had to abandon it for 2.5 years, only to restart the project recently with new, more partner-friendly work flow, predictive models, and hardware, and it has yielded a big success with actual cost savings.”

**Lesson #2: Align business needs with technology by sharing your plans across the organization**

The power of IoT stems from the ability to securely exchange and share information from multiple sources within your organization, and across processes and people. Thus, IoT projects should begin with a holistic, all-encompassing security framework that makes it possible to securely unlock siloed data, share the data, and use it to promote insights, as this respondent affirms:

“While we are certainly moving towards better information sharing among multiple sources in my facility, the bigger issue was that every other facility was working on its own IoT process, but with different systems. In the end we were not able to share and communicate across facilities, which was the initial intent of the IoT project.”

Lesson #3: Define a sustainable framework by starting small and doing your due diligence

IoT often introduces new concepts, new technologies, and new business models. It is important from the outset to define a sustainable IoT framework, assess your implementation capabilities, and identify small projects with quick wins. As one of our respondents put it:

“I would say the worst mistake we made in our initial IoT project was underestimating the level of resources and knowledge we needed. I think we set the bar too low in terms of the amount of time we needed to understand the technologies and implement the project, and therefore we did not assign enough resources. We were able to remedy this shortfall when we did the full rollout, but the initial phase was painful.”



Lesson #4: Security, privacy, and compliance must be addressed holistically from the outset

The scale and diversity of IoT means that traditional security solutions are wholly inadequate. New connections, mobile devices, converged infrastructure, and integrated networks create myriad new security and privacy issues. In today's digital and algorithmic businesses, security must be pervasive from I/O to CEO to ensure business continuity. This new reality was echoed by these respondents:

“We implemented a new form of Internet-connected door locks. The system penetration testers looked at the security around our implementation and discovered that they could be unlocked via mobile devices. When they got within Wi-Fi or Bluetooth® range, the mobile devices were able to unlock the doors remotely! It made me rethink the whole idea of changing the locks for a while...”

“The main driver for our IoT project was to automate customer transactions to reduce cost and increase efficiency by reducing human intervention. It was really going well and other than a few issues, everything was on track. But on our final review with the legal and the compliance team, the security and the privacy issues were raised and ultimately the whole project was scrapped.”

**Lesson #5: Verify reliable access to your data sources**

One challenge with IoT comes from gathering and securely transporting, mining, and storing data that today are locked away in siloed stores. This data must be reliably accessed to obtain actionable insights and expand the value chain. This requires reach and visibility into devices and their data, thereby changing the data lifecycle and opening new privacy and compliance concerns. The best-intentioned IoT initiative can go sideways because of privacy, compliance, and governance issues associated with newly liberated data. This respondent recounts what can go awry:

“A good example of an IoT project gone south? Consider a mobile CRM service that allows users to directly import information into a production environment. What assurance do you have that the information is complete and accurate? Beware! If your home office modeling is based on the underlying data, you need to multi-source and verify collected data before building your business projections on self-reported data. There are many ways for inaccurate data (either intentionally or unintentionally) to wreak havoc on what would otherwise be very predictive models. If income and net worth for example drive some marketing campaign inclusions, and you allow users to input these values directly, you may find that selling agents who desire free marketing support will have an abnormally high number of high-value clients. You need to put safeguards in place.”

**Lesson #6: Deploy a sustainable architecture in which new and old solutions coexist**

IoT often involves merging of new solutions with older technologies and processes. In most cases, the new can't simply replace the old. Instead, the two must be integrated—and this can create incompatibilities, as our respondents can attest:

“I think the main challenge for us has been device capabilities and the absence of any uniform standard across devices. Since there are a multitude of devices with a multitude of technologies, it has been very challenging for us to get a foothold in IoT implementations.”

“Our company IT team, along with a major technology supplier, has collaborated quite well up to this point in our IoT implementation but there have been installation challenges and issues along the way. In particular, compatibility with some legacy systems and data searches sometimes was not working the way we originally envisioned. One of the biggest lessons learned is that rarely do things work straight out of the box. Everything needs customization, subtle ‘wrinkles’ that should not be there, are there, and must be discovered and either worked around, replaced, or permanently patched. Major projects like ours require dedication, persistence, thinking out of the box, management support, and a little luck doesn’t hurt!”

**The benefits of doing IoT right**

While the initial focus of many respondents was on what went wrong with their IoT implementations, many also had positive results. Here are just a few examples of the business benefits they achieved.

Benefit #1: Lower CAPEX, higher capacity

IoT can enable cost reduction by unlocking the value of data or by providing insights that improve efficiency or reduce the need for manual intervention. In building a business case for IoT projects, it pays to address both the hard-dollar cost advantages and the harder-to-quantify, but equally important, soft-dollar benefits, as this example demonstrates:

“We worked with our partner to connect various sensors in our plant—such as vibration, acoustic level, position, and others—to an asset management system via a dedicated wireless network. We then used the network to connect instruments to the plant’s control and monitoring systems. This enabled workers to view sensor data via handheld devices and the asset management system to process a large amount of data and work with smart meters. The results were that capital expenditures were reduced because wireless cut sensor installation costs, and ongoing operational benefits included increased capacity. The asset management software helped reduce commissioning and call-out costs. Overall, safety was also improved by automated monitoring rather than scheduled manual checking, which our workers appreciated.”

Benefit #2: Be proactive on maintenance and downtime costs

At most companies, equipment maintenance is still a highly reactive task—when something breaks, someone fixes it. Or, companies develop conservative maintenance cycles in which maintenance is conducted on a fixed schedule. IoT sensors and data allow companies to move from reactive to predictive maintenance, and in the process cut costs while improving reliability and staff productivity, as this respondent attests:

“We use IoT to connect sensors to analytics and other systems in our company to automatically improve performance, safety, reliability, and energy efficiency. In the past, we had a reactionary approach to equipment failures. But now we can predict when equipment will fail, and it gives us the opportunity to fix small problems before they become major problems, and before such issues cause higher and avoidable costs. We expect in the future that such predictive maintenance services could reduce our maintenance costs by up to 30% and downtime by up to 70%.”

**Benefit #3: Leverage IoT to deliver better customer experiences**

As technological complexity increases so does demand for skilled technicians. And all too often, it is necessary for highly talented professionals to travel and do their work onsite. Through IoT initiatives, some companies are empowering technical staff to do more remotely. By leveraging technology, they can deliver an innovative customer service experience, saving time and money while increasing productivity and customer satisfaction. It is really about getting the right people to the right place at the right time with the right tools. And even better, having people remotely coaching people onsite to complete maintenance:

“We have sensors in place to support process or production control, safety, regulatory compliance, and so on. My team and I wanted to add new sensors to support condition-based maintenance. With the availability of less expensive strap-on sensors, Wi-Fi connectivity, predictive analytics, and cloud computing, condition-based maintenance and other ‘connected world’ applications have now become very practical. These intelligent devices and machines helped us improve performance and reduce downtime through remote diagnostics, trouble-shooting, and condition monitoring capabilities. For example, remote service personnel can now identify specific problems and perform configuration fixes or update software without having to travel to the facility, saving time and travel expense, which is critical since these are typically time-strapped technicians.”



Benefit #4: Optimize asset management

The challenges of controlling inventory include ensuring that the right items are in stock when and where customers need them, and minimizing the costs associated with higher inventory levels. IoT provides new innovative solutions, as described by one respondent:

“We have a significant portfolio of printers across our offices and one of our technical leaders, working collaboratively with facilities department, decided to sponsor a project that could detect their low ink levels and contact a centralized supplier to reorder and purchase a replacement cartridge with an internal approval workflow process built in. The objective of our IoT project was to ensure that inventory was available all the time, with appropriate stock available in key offices. We achieved several advantages, including more information, which translated into making better decisions; better monitoring, which enables us to know the exact quantity of supplies of ink cartridges so we can stay on top of things like product expirations and improve safety; time savings so the individuals managing these processes essentially can be allocated to take on other tasks; and, of course, the biggest advantage was reducing costs and saving money by combining purchasing power across the firm and having an overall view of the inventory.”

Business benefits of IoT: The list goes on

Other reported business advantages attained through IoT initiatives include:

- **Better decision-making through data:** Move from decisions made by gut instinct—doing things the way you’ve always done them, or with incomplete/inaccurate data—to proactive, data-driven decisions.
- **Gain efficiency** through the convergence and operationalization of analytical insights enabled by connected devices.
- **Ability to leverage devices as assets rather than liabilities:** IoT enables industries to extract new and additional value from devices and equipment without replacing or upgrading them.
- **Higher revenues through new customer services:** Data and the insights from IoT enable the creation of new services and business models that broaden the customer base and revenue streams.
- **Risk avoidance** by leveraging increased visibility, control, and security to address environmental, health, and human safety issues.
- **Gain higher customer satisfaction** because products and services deliver on the demand for performance, reliability, uptime, and a great user experience.





An HPE Professional Services IoT Transformation Workshop can help you define an IoT strategy that meets your organization's short- and long-term goals without taking the detours or hitting the speed bumps discussed above. **IoT case studies and examples**, available [here](#), explain our successes with other customers drawn from a diverse range of industries and locales including:

- **BH Technologies**—Optimizing waste management
- **City of Auckland**—Creating a safer city
- **Dubai Police**—Accelerating and sharpening enforcement
- **IAV**—Transforming the automotive industry through hyper-connected vehicles
- **KAESER KOMPRESSOREN**—Reducing maintenance and inventory costs
- **Kyushu University**—Optimizing urban traffic control
- **Philips**—Delivering on the human promise of healthcare monitoring equipment
- **Trane**—Raising efficiency and reliability in high-performance buildings

IoT success: make it real

It's time to move past the hype of IoT implementations and hit the ground running on projects that have tangible benefits like boosting productivity, cutting costs, and building customer loyalty. Hewlett Packard Enterprise has the unique combination of expertise, products, services, partnerships, and vertical-specific experience to help maximize your success and achieve the promise of the Internet of Things. For additional details about the IoT capabilities and service offerings of Hewlett Packard Enterprise, please visit hpe.com/info/iot.



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