

Understanding the IoT Project Lifecycle

WHITE PAPER

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“It’s only possible to know what immediate next steps to take when the final destination is clear.”

1. Introduction

Product teams faced with their first Internet of Things (IoT) project are often set up to fail because IoT does not easily fit into an existing hardware or software development process. Whether the company is a startup, an established business, or a Fortune 500 company, their product teams will be asked to overcome many unfamiliar hurdles with IoT and, in the absence of an appropriate planning process, projects often go off the rails in one of a few ways:

- **Failure to launch.** Project teams underestimate the cross-functional nature of IoT and fail to account for the necessary human and financial resources needed to get the project off the ground.
- **Failure to monetize.** Technical stakeholders become hyper-focused on the technology going into a project and forego validating the product business case.
- **Failure to scale.** Business stakeholders fixate on taking advantage of the perceived market opportunity and invest without validating the technical feasibility or usability of the product.

These unbalanced approaches focus too much or too little on one of the three distinct dimensions of IoT project readiness: people, business, and technology. All result in product roadmaps with costly science experiments, marketing teams that struggle to define the real-world value of the products, and warehouse shelves filled with products that never sell.

Because every organization has different levels of experience, actionable market opportunities, or internal resources at their disposal, there is no step-by-step guide to completely avoid this type of dysfunction. However, Exosite has developed the IoT Project Lifecycle framework to help stakeholders and project teams better understand IoT projects and develop a more balanced approach to IoT that greatly increases the chances of success.

This white paper will provide an overview of the IoT Project Lifecycle framework and help organizations understand where they are in the typical lifecycle stages.

It will also provide guidance on how project teams, based on the stage they are in, can gain traction and remain hyper-focused on completing tasks that are critical to immediate success.

2. The IoT Project Lifecycle

Creating successful IoT-enabled products and services is not an impossible task; it's just a challenging one when organizations try to do too much at once, make project commitments without asking the right questions, or do things in the wrong order. To be successful, it's critical to understand what the entire IoT journey looks like and accurately identify where an organization is in that journey—after all, it's only possible to know what immediate next steps to take when the final destination is clear.

The IoT Project Lifecycle framework provides project stakeholders a holistic overview of the connected-product project lifecycle. As seen in Table 2.1 below, it breaks the process down into four stages—explore, validate, accelerate, and commercialize—and identifies key objectives and tasks that project teams should focus on in each stage. The IoT Project Lifecycle framework also helps explain how the definition of success changes over time as a project progresses through each lifecycle stage.

When incorporated into an organization's IoT strategy, the IoT Project Lifecycle provides insight into what actionable tasks are most important at a given time and which tasks have dependencies. As a result, it provides much-needed direction and focus that enables project teams to efficiently focus only on the things that are critical to their success at that moment, while still maintaining a long-term, holistic perspective of the entire process.

The following sections provide additional information about each stage, including common pitfalls encountered and the solutions that can be leveraged to overcome each.

Table 2.1: The IoT Project Lifecycle Framework

Stage	EXPLORE	VALIDATE	ACCELERATE	COMMERCIALIZE
Summary	The organization is exploring how connected products may impact the business model, aid new customer acquisition, and uncover new revenue streams.	The organization is validating both the business case and technical feasibility of a connected product in order to obtain buy-in from organizational stakeholders.	The organization is focusing more significant resources to support connected product development at both the project and organizational level.	The organization is building a production-level connected product with supporting capabilities for commercialization and subsequent iterations.
Project Team Objectives	Find IoT use-cases and business models worth validating.	Validate product concepts and refine the business model as needed.	Perform field tests to get feedback from a lead customer and refine features and pricing.	Get the product into the market quickly and make improvements as needed.
Technical Objectives	Identify gaps in technical capabilities.	Test hypothesis with a minimum amount of engineering effort.	Align the build, buy, and partner decisions to the company's core business needs.	Maintain the product software over time and address changes in market needs.
Organizational Objectives	Survey the IoT landscape and identify interest and opportunities throughout the organization.	Build a case for organizational stakeholders to justify their investment in IoT solutions.	Engage stakeholders responsible for the people, processes, and technology to operationalize IoT and reduce risk.	Identify successful practices that would enable repeatable IoT development throughout the organization.
Anticipated Investment	None to Low	\$	\$\$	\$\$\$

2.1 Explore

Organizations in the midst of the Exploration stage are typically looking to build a case around why they should get involved with IoT, including how it may aid in new customer acquisition or uncover new revenue streams.

2.1.1 Common Pitfalls

- **Analysis paralysis.** With so many options and no obvious path forward, it's easier to do nothing and wait for a competitor to push the organization into acting. The best way to sort through all of the noise is by looking to existing strategic roadmaps for inspiration.
 - **Solution:** Determine how to align product ideas and business concepts to the organization's strategic plan. Most plans will align to one of four growth strategies; these strategies are

identified in Table 2.2 below and can be used as a filter to narrow product-idea focus and provide a significantly higher chance of getting the buy-in and budget necessary to move forward.

- **Imposter syndrome.** Some organizations do not see themselves as a technology company and are hesitant to proceed, even with a strong business case and a compelling product concept to socialize.
 - **Solution:** De-emphasize IoT as the goal of the project and instead focus on IoT as a tool or feature that enables the ability to create new value for customers. This mindset keeps early projects from straying too far from the core business and core product lines.

- **Putting too much value on technology.** Instead of being better at creating the types of products that customers want, some organizations see their ability to control the technology as their key to a competitive strategy and will invest significant resources into reinventing the wheel. Organizations that choose to build and own the bulk of a technology stack often find themselves drowning in technical debt and they lose the ability to focus on their core business. IoT has been heavily commoditized and its real value is derived from the unique solutions that it enables. The most common commodities in IoT include:

- Infrastructure and data storage
- Public cloud hosting platforms
- Analytics
- Security
- Single sign-on (SSO)
- Simple device management

Reinventing some or all of these components creates significant delays, increases project overhead, and turns organizations into their own platform company before they even have a single connected product successfully commercialized.

- **Solution:** Organizations should consider buying and partnering appropriately, allowing for investments in things that competitors can't easily replicate or reverse-engineer. Maximizing ROI and deepening competitive advantages happens not

by investing in more technology, but by investing in people, their knowledge, and the tools to support them. Organizational strategy should be focused on the adoption of new innovation practices around user-experience research and software product management; updating stage gate processes, design frameworks, and evaluation criterion; training project teams; and growing internal understanding of data science and analytics. Investments like those will ensure the roadmap is full of products that address real business problems worth paying for.

2.2 Validate

Organizations that are in the Validation stage should be looking to build a case for advancing the product idea before making the commitments to build a full-blown proof of concept. The business case is typically validated through a variety of research activities, whereas the technical feasibility of the product concept is proven out as quickly as possible through micro-experiments and the use of low-fidelity demonstrations of connectivity.

2.2.1 Common Pitfalls

- **Assuming that a waterfall project plan leads to success in IoT.** One of the great pitfalls that organizations succumb to is assuming that their current waterfall-driven, new-product introduction process

Table 2.2: Key Growth Strategies to Focus Product Ideas

Improve Monetization	Improve Profitability	Improve Current Market Share	Drive New Acquisitions
Improve the sales channel experience, automate fulfillment of parts or consumables, and drive additional after-market sales. Create new value that can convert into more sales to existing customers.	Reduce operational spending or cost of goods through internal efficiency gains, improved supply chain awareness, reduced idle labor, reduced fuel expenses and drive time, route optimization, asset tracking, performance tracking, and more.	Get more customers in markets that exist today by offering more competitive features or more compelling services to allow sales channels to tap into competitor's markets.	Capture new markets or customer segments with a new product offering or service. Convert businesses within partner networks and sales channels into paying customers, not just cost centers.

should be rigidly adhered to for unproven technologies like IoT. Project teams feel like they never have the momentum or support necessary to get off the ground.

- **Solution:** Avoid over-engineering. Getting aligned up front is critical, but it's also important to resist an organizational culture that demands teams answer every question, interrogate every feature, and provide detailed roadmaps prior to the product concept being validated. It's possible to take a balanced approach to vetting product ideas that leverages existing technologies and gives stakeholders the confidence they need to move forward.
- **Including too many people too soon.** The temptation for many mature organizations is to pay the "people tax" up front by bringing too many people into the conversation, which eats into budgets, encourages design-by-committee, and slows the time it takes go to market. Hundreds of hours can be spent sorting out who should be involved, what needs to be accomplished, and how best to move forward with a detailed plan that doesn't break the budget—that type of time commitment is overkill for any validation stage.
- **Solution:** Avoid bringing too many people into the up-front conversations when it's still largely an unproven idea (i.e., "counting chickens before they've hatched"). This can be done by keeping the core team small and limiting participation to those needed to answer the key IoT readiness questions around business case validation and technical feasibility.

2.3 Accelerate

Once a product idea has been validated as valuable to the market and technical unknowns have been largely addressed, organizations in the Accelerate stage should have engineering and development teams off to the races. It's now time to determine who will build it, how to accelerate time-to-market, what processes are needed to support software development, if there are any new roles that need to be

added to the organization (e.g., product owner), what services or roles are best provided by a partner, etc.

2.3.1 Common Pitfalls

- **Assuming that the "proof of concept" is the product that will be commercialized.** The value of a proof of concept is making the first article of the hardware and the initial version of the software faster and the hardware at a lower run rate. It's risky to take what is usually a working prototype and deploy it without sufficient testing.
- **Solution:** This comes down to managing stakeholder expectations and making it very clear that parts of the proof of concept will likely be thrown away and rebuilt from the ground up prior to commercialization. This is a necessary practice to ensure features and functionality are production-grade and scalable.
- **Lack of a pilot testing milestone.** Organizations often skip the valuable step of getting customer feedback from a lead customer after using the product in the field, missing out on key data about how the product works in real-life, real-work situations.
- **Solution:** Ensure a process is in place to both gather customer feedback and incorporate that feedback into a final round of feature enhancements, bug fixes, and installation and support procedures. This will help address any issues that were initially missed by the project team or incorporate missing features that prove important to customers.

2.4 Commercialize

Assuming that the business concept has been thoroughly explored and validated, any go-to-market hurdles should be largely identified or anticipated. In the Commercialization stage, organizations should be focused on ensuring all bases are covered from a logistics and operational perspective before, during, and after the launch. Commercialization also includes all of the ongoing commit-

ments to software iterations, enhancements, and support.

2.4.1 Common Pitfalls

- **The first IoT project sets the tone of all future IoT projects.** For many organizations, the most common pitfall of the Commercialization stage occurs when teams push their product directly into the market in place of a formal Validation stage. If the organization has never launched a connected-product or is looking to overcome the baggage of a past failure, it's critical that the next project is successful because hope is not a recommended go-to-market strategy. Launching a connected-product that fails to perform on multiple levels is the organizational equivalent of poisoning the well.
 - **Solution:** Get early user feedback with prototypes, integrate feedback from lead customers prior to final production, and involve user-experience design, quality-assurance, and other software development professionals early and often.
- **It seems like the project is done, but it's not.** Manufacturing organizations often take for granted that once hardware products are shipped, they are done. With IoT products, there is no end in sight because of necessary ongoing server maintenance, data management, bug fixes, and security patches.
 - **Solution:** Account for new staffing needs that include individuals who can help with software product management experience. This is critical in anticipating future needs and providing support and maintenance for products once they are launched.

3. Gaining Traction in Each Lifecycle Stage

Once an organization has a clear understanding of where they are in the IoT project lifecycle, it's important to identify the key tasks that are of utmost importance to accomplish in that stage. This section provides questions for each stage that can be used to help project teams ensure they are taking an approach to IoT that appropriately balances people, business, and technology, while addressing tasks that are critical to their success within that stage. It also provides insight into how organizations can determine their level of readiness to progress to the next IoT project lifecycle stage.

3.1 Explore

3.1.1 Questions to Create Traction

Below are questions organizations should consider during project planning, research, and early exploration efforts.

- Who are the product's customers?
- Who are the product's users?
- Do they have a problem that the product might be able to solve?
- What are other industries doing in similar situations? What technology are they using and do existing solutions exist that can be leveraged?

3.1.2 Completing the Exploration Stage

Once an organization has a promising product idea or business concept that has more unknowns than knowns, it's worth moving into a quick validation stage to run some experiments and help answer some of the show-stopping unknowns. If things don't check out, it's important to head back to explore to find the next idea and repeat, until an idea is developed that customers and users see value in, they would pay money for, and is technologically feasible.

3.2 Validate

3.2.1 Questions to Create Traction

Below are questions to help organizations create momentum during the validation process.

- Why would customers pay money for the product?
- Why would users adopt the product?
- What needs to be built and where are the biggest technical unknowns?
- How can data be used to create a competitive advantage?

3.2.2 Completing the Validation Stage

Validation is complete when all of the details have been gathered to socialize the business concept, articulate the ROI projections and the business model, and ensure confidence in the project's success. In regards to the level of readiness, the goal is to eliminate as many of the show-stopping unknowns as possible.

3.3 Accelerate

3.3.1 Questions to Create Traction

Below are questions to help organizations accelerate development and go-to-market efforts.

- Who will manage the go-to-market planning and does IoT change the normal process?
- How will the product's market readiness be tested?
- How will the product be built (build/buy/partner) and how will product readiness be evaluated?

3.3.2 Completing the Acceleration Stage

The slow roll-out of technology products often blurs the between late Acceleration and early Commercialization. Typically, once an organization has concluded the pilot program and the go-to-market plan is complete, it's time to look at general avail-

ability and finalizing the production-ready hardware.

3.4 Commercialize

3.4.1 Questions to Create Traction

Below are questions to help organizations prepare for the most common logistical surprises in commercialization.

- Who will provide product support?
- Will the product need installation setup and by whom?
- Will invoices need to be done differently for the product?
- How will upgrades and fixes be distributed?
- Who will manage the sales channel and supply chain?
- Who will support and train users and installers to ensure reliable service?
- Who is responsible for ongoing product iteration and improvements during and after the initial release?

4. Summary

Organizations that successfully transition into the world of connected products have a holistic understanding of the IoT journey and are able to pinpoint where they are in that journey. Exosite's IoT Project Lifecycle framework was designed to help organizations develop this understanding and leverage that knowledge to identify and act on tasks that are critical to their immediate success. When incorporated into an IoT strategy, this framework can be used to identify gaps in knowledge, project plans, or business concepts that might otherwise slow project progress or cripple the project completely. As a result, stakeholders and project teams better understand IoT projects and develop a more balanced approach to IoT that is proven to increase the chances of success.

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successfully navigate
the IoT project
lifecycle for your
connected product.**

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