



By

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IoT: From the Wild West to mainstream adoption

Many of us have experienced the moment when new technology exits the early-adopter “Wild West” days and enters the mainstream. Often, instead of a seamless and delightful experience, we find a frustrating barrage of partially completed services, broken ecosystems, and half-baked UX. This reality can cause migraines for even the most tech-minded early adopters. As a result, mainstream consumers may hold off or even give up on your product entirely.

But if you are working on an IoT product, fear not! In this two-part series, we will explore the challenges of IoT UX. We'll examine ways good UX can help position your product to “cross the chasm” from the Wild West of early adopters to mainstream adoption.

First, we will take a broad look at UX strategy for IoT — how best to leverage UX and user research to get your IoT or smart home project headed in the right direction.

“Grab the bull by the horns”

For those new to the concept, IoT stands for Internet of Things, which refers to the addition of wireless connectivity to various physical tools, devices, and services. In effect, IoT connects the physical to the digital.

IoT devices can take a wide variety of forms and perform any number of services for consumers or enterprises, such as:

- Machine parts in a factory that monitor their condition and send an alert when they need replacement.
- Connected stoplights that can alter their timing based on real-time traffic flow data.
- Motion sensors notify authorities of disturbances or structural weaknesses in important structures before emergencies happen.

Getting a handle on IoT

For our purposes, we'll be orienting toward the consumer and smart home automation space. These are products that make life more pleasant or simpler. Examples include devices such as:

- A [connected fridge](#) that helps manage groceries and optimize freshness.
- A [door lock](#) that enables you to unlock the door for a repair person while you are still at your office.
- [Security cameras](#) that can detect movement and send alerts to your phone when you're out of town.

IoT products offer diverse system structures regardless of the space. For example, your IoT product system could consist of:

- An app tied to a bunch of sensors.
- Hardware with both physical controls and a corresponding app or website.
- Multiple hardware sensors across various locations tied together through the cloud.
- Many of the UX challenges for IoT center on the diffused nature of the products and services themselves. Because of this variance, users interact with IoT products in many different ways. These interactions could occur on a smartphone, on a website, via voice, or by using hardware controls.

Frequency is likely to vary — users might receive intermittent messages from an alert-focused sensor but use other products like home lighting on a daily basis. The location could vary as well, with users able to use your product from the couch, in the car, or their office. That's a massive range of potential design considerations, which presents some challenging — and fun — UX design and user research opportunities.

Howdy, partner!

Understanding your users

To get a handle on this and narrow your design scope, a critical early step in any solid IoT UX project is to understand your product’s potential contexts and the people who will be interacting with it.

Consider the following questions:

- Who are your users?
 - How are they tackling this problem without your product today?
 - Where will your users likely be when they are using your product?
 - How often are your users likely to use it?
- It’s important to note that these questions assume you’ve already got a handle on the specific pain point or opportunity your IoT product is aiming to solve.

Getting to know your users

Research is absolutely critical at this point in the product development cycle. The more you understand who your users are and how your product may fit into their lives, the better your chances of building a product that resonates with them. Gathering research in your target audience’s space through in-person interviews and field visits is extremely valuable.

Challenging your assumptions is critical to understanding the contexts your product will live in, which is why you need to place prototypes of both physical hardware and digital controls in front of real people as early as possible. Be prepared to iterate — doing it all again and again — as you learn more about what works and what doesn’t.

Once you’ve completed user research, you’ll be ready to answer another set of critical questions:

- What are the ways your users will potentially be interacting with your product?
 - What kinds of interfaces will they need?
 - What can you automate?
- With insights from your research, artifacts like storyboards and user journey maps can help you explore and expose these interaction contexts well before your team burns hours designing or developing. We’ve found that these artifacts help unite various stakeholders across design, development, and business leadership, making it easier to keep your users’ needs top of mind.

Some of the business benefits of a good user experience include:

- Happy customers: When you focus on refining the user experience by making your products intuitive and enjoyable, you’re more likely to boost customer satisfaction and increase customer loyalty.
- Capturing user intent: Being able to predict and satisfy user intent is key to ensuring happy customers. User-centered design (UCD) helps you understand what real users want, which leads to user interface (UI) designs that satisfy those desires.
- Returns on investment: One of UX’s most notable business benefits is its tremendous potential for a fast return on investment (ROI). User research and thoughtful UX design can help product teams go to market with profitable products that meet user needs.

Wrangling the herd

As you’ve probably figured out, one thing that ties together the wide variety of IoT products is the physical component. However, user experiences that span both digital and physical bring additional design challenges.

Taming multiple devices, screens, and controls

While many UX designers have wonderfully rich and diverse design talents, you should strongly consider partnering with an industrial designer when moving into products with a physical hardware component.

In an ideal IoT product development scenario, industrial and UX designers and researchers would collaborate throughout the development process. Close collaboration enables both teams to gain an understanding of your users and their contexts, allowing them to design both physical and digital system aspects in concert to best support user needs. This way, you can give careful consideration to what controls should go where and which interfaces and feedback mechanisms will best keep users moving.

How to connect these varying controls? The days of skeuomorphic design — where digital interfaces use tricks of texture and shadow to mimic physical controls — may be long over, but that doesn’t mean your software and hardware should feel disconnected.

It’s important to consider UI usability as well as interoperability for each interface — controls should be usable and intuitive for the context and the device. We’ve found that consistency between app and hardware controls is helpful for many users.

Essentially, if users can easily perform actions using both hardware and app controls without headaches or an additional learning curve, they’re more likely to give you gold stars. Deeper research and usability studies can help uncover which controls need to be duplicated across your system and which are best left for the app only.

IoT and Voice Controls

Speaking of controls, we can’t move on without acknowledging voice. Our research has shown that voice controls are of high significance to many IoT consumers. Voice-related services are most often consumers’ initial entry point into IoT and smart home products. So start thinking early on about whether to make your IoT product compatible with Amazon’s Alexa, Apple’s Siri, or Google Assistant. While it won’t make sense for every product, the ability to control things with their voices is a big draw for many consumers.

Voice controls can also be a means to bridge smart home product ecosystems. For example, enabling hooks to control your product with Alexa is potentially useful to more users than building deeper, full-scale integrations with smart home IoT frameworks such as Apple Homekit or Google Home. But the answer to which integrations or compatibilities your product needs is unique to your users and your product direction.



Iterative product development

Following an iterative design process can help you work toward the perfect union between hardware and software even after officially releasing your product to the public. Iterative design involves designing and testing multiple versions of your product throughout the development process. The goal of this process is continuous improvement — creating a better design with each new iteration.

An iterative process is especially useful for IoT software because it allows you to tweak the appearance and functions of your app. Over time, user feedback will generate new information about how your users interface with your product, helping you perfect the experience.

Consider how Apple and Samsung roll out new OS updates every few years to enhance the user experience. Through IoT testing and accepting user feedback, you can determine what you want to include in your next update.

You also have the flexibility to apply lessons you learned earlier in the process to future stages. For example, if a previous iteration provided a better user experience than the current version, you can incorporate that older design into your next iteration.

Corralling your crew

When you're working on developing a user experience, you may end up having to wrangle many teams and partners as well. Here are some of the experts you may want to consider partnering with to enhance your user experience design:

UX researchers: UX researchers use the latest IoT design trends and tools to make technology accessible to everyday consumers. Thoughtful design centered on UX and UI makes new products easy and enjoyable to use, increasing consumer satisfaction and reducing user frustrations.

UX developers: Good digital UX is important, even if your product is a physical item. Elegant, intuitive web design is essential for creating a website that users can easily navigate to perform functions such as setting up an account, learning about product features, and making credit card payments. A user-focused web developer helps enhance these processes by creating beautiful, structured information architecture.

Software engineers: High-quality software is critical for ensuring that your products run smoothly. Investing in a software engineer who understands UI/UX design is well worth the cost.

Mobile application engineers: Because your customers will likely need to use your mobile app to interface with their products, your software team should include quality mobile application developers fluent in both iPhone and Android app development through React Native. These engineers can help you reach more customers with the best UI design you have to offer.

And here are some of the tools you may want to use to help enhance user experience design:

Evaluative research: Evaluative research-based processes vastly increase data-processing ability by enabling you to [analyze UX metrics](#) such as user location, session time and length, categories and products viewed, pages visited, and more.

Customer experience journey mapping: A [customer journey map](#) helps you visualize your users' customer experience, allowing you to track how users engage with your product. If your project managers see missed opportunities, you can tweak your user interfaces to streamline and enhance those features.

Usability testing: At the end of your design process, you'll need to test your product with a representative sample of users. [Usability testing](#), or user testing, shows how users engage with the product, helping with quality assurance by revealing flaws and areas where you can improve your product.

Look there, way over yonder!

Envision the future early in the development cycle and assume things are going well! Early adopters gushed about your service and provided valuable feedback. Tech blogs gave positive reviews. Now mainstream consumers are buying your product. Sales are ramping up — maybe you even have a big consumer brand on the line for a partnership. That's great!

What happens now? To answer this question, you'll need to consider:

Will users be adding more devices?

Will you be making other products?

How will you be delivering product updates, and how frequently?

Thinking through these questions will help prepare you to tackle success and build a product that consumers can feel good about integrating into their life for the long haul.

Thinking big picture and prepping for the future

Successful IoT product lines, such as those from [Nest](#), have set a relatively high bar for onboarding, support, and service updates. For example, you could make the addition of a second device even easier than the first by allowing devices to share setup information. The August line of smart door locks and WiFi doorbell cameras do this, making the setup process for add-on products painless.

Users don't want to feel like they have to reinvest down the road, especially when hardware devices are involved. After all, you don't want consumers to associate your brand with a drawer full of bricked sensors, so keep the user in mind when planning software and hardware updates.

At Blink, we've learned that users prefer some level of transparency about updates. Most users want a balance that enables critical security update delivery without surprising them with changed controls or deprecated features — or worse, an inability to use your device when they want to.

Lastly, in your vision of success, include the life cycle of physical hardware retirement and replacement. Imagine that your product has been so successful consumers have it embedded in their lives or homes for many years. Will there come a point when a hardware device wears out entirely, and they need to replace it? How can you make the hardware replacement or upgrade experience seamless or even delightful?

Meet me at the roundup

While product development involves a huge array of moving parts, you're more likely to gain traction if you keep your users in mind. We've found through [firsthand experience](#) that adopting a user-centered approach early in the process benefits product development efforts and is of even greater importance when working with emerging tech.

As IoT moves from the "next big thing" to an everyday staple, utilizing these strategies will help you get your project off to a great start and prep you to exit the Wild Wild West of early adoption with ease.

In [Part 2 of this series](#), we take a deeper look at several critical areas of successful IoT UX design, including user onboarding and support.



Conquer the Wild West of IoT UX with Blink

If you're developing an IoT product and need UX help, Blink is here to help. [Our team](#) of world-class UX designers and researchers can meet you wherever you are in the design process so you can create the best user experience possible. [Get in touch with us](#) today to get started.

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