CREATING INTELLIGENT SPACES
Five strategies to accelerate smart building transformation

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Introduction

The Internet of Things (IoT) is rapidly transforming the world, delivering connectivity and new experiences in our daily lives. In addition to changing everyday experiences, IoT also provides organizations with innovative ways to gain and apply data-driven insight. This digital feedback loop is fueling a new wave of improvements to operations, products, and experiences. As the benefits of IoT become more apparent, forward-thinking leaders are turning their attention to the spaces we inhabit. In offices, hospitals, schools, factories, and retail spaces around the world, building owners and their tenants are looking to increase energy efficiency, optimize space utilization, and improve productivity through IoT initiatives. Already, nearly 50% of developers, owners, and occupants believe that a smart building strategy will become a competitive differentiator in the commercial real estate market.\(^1\) And as smart buildings and spaces become more ubiquitous and interconnected, they pave the way for entire communities and smart cities built on a foundation of IoT-enabled insights.

It’s no surprise organizations are embracing the opportunities that smart buildings provide. For every square foot of space used, tenants spend roughly $3 on utilities, $30 on rent, and $300 on payroll every year.\(^2\) This guiding ratio, known as the “3-30-300 rule,” highlights the potential cost savings available to companies that optimize their spaces with IoT. But despite the substantial promise of smart building technology, many organizations struggle to get projects off the ground. The cross-organizational nature of smart building projects makes stakeholder alignment difficult, and even engaged project teams often have issues identifying meaningful project goals. Even if they overcome this obstacle to determine what will deliver the most value for their business, measuring ROI may be an elusive exercise. And while ambition is important for any innovative project, a scope that’s too broad can lead to disappointing results or increased security risks. For owners and tenants, such challenges are often enough to stall their IoT investments, much less scale from energy savings to optimized operations and improved productivity.

Thankfully, IoT platform providers are working to help solve these problems. At Microsoft, our partners have firsthand experience working with leaders to navigate the challenges of smart building initiatives. We sat down with several of our partners to get their real-world insight and best practices for addressing common concerns. In these conversations, we identified five key steps you can take to help ensure success for your smart building project—regardless of your industry.
1. Establish your business goals

Define what “smart building” means to you

As with any project, it’s critical to have a clear set of business goals guiding your investment. This is especially important with smart building initiatives, since “smart building” means different things to different people. In fact, many leaders are unsure how to define it. “We have clients who want to build a smart building,” says Chris Palmer, Advanced Technology Services Manager at PCL Construction, an industry-leading family of independent general contracting construction companies. “We tell them ‘great, what would you like in your smart building?’ and they respond, ‘I don’t know, can you help us?’”

When businesses lack the right guidance to focus their thinking on delivering business value, they tend to approach smart buildings like a wish list. This typically consists of stakeholders drafting a lengthy assortment of requirements without identifying the larger problems they’re trying to solve. “People want to make sure they’re getting the most out of their investment, so they try to include everything they believe will make the cost worth it,” notes Melissa Topp, senior director of Global Marketing at ICONICS, a global automation software provider. “They don’t think about what resources it will actually take to tackle each one, which makes it harder to realize their return on investment.”

Prioritize your organization’s use cases

Instead, our partners recommend thinking more strategically about what benefits would have the most impact on your business—whether that’s decreasing overall energy consumption, enhancing parking management
to make spaces easier for employees to find, or designing a workspace that prioritizes employee comfort. Where you start also comes down to your unique industry needs. For example, if you’re a major health system opening a new hospital, optimizing energy efficiency without sacrificing clinician effectiveness or patient experience may be your goal. For a university opening a new library, space utilization and student experience might be higher priorities.

Consider all the factors

Often, the state of your building and whether it’s a brownfield or greenfield project plays a significant part in goal development. “With brownfield projects, we run into legacy equipment that’s performing below acceptable thresholds, resulting in asset inefficiency and downtime that impacts goals,” says Hari Natarajan, Executive Vice President and Business Head of L&T Technology Services, a global leader in engineering and R&D services. “For these buildings, energy efficiency supported by the right asset uptime is a big box to tick. For greenfield projects, we procure new equipment based on an updated Bill of Materials and can therefore jump straight to focusing on the best tenant experience.”

Even geography can play a part in defining an organization’s business goals. “In the Middle East, the focus is on energy and water optimization, and in Europe the focus is on sustainability and citizens,” notes Natarajan. “In the United States, projects are largely driven by employee and tenant experience in addition to sustainability, whereas in Japan, the primary focus is optimizing labor costs through fault detection and diagnostics to offset high maintenance costs.”

At Microsoft, clear business goals were at the heart of our approach to the major corporate campus refresh in Redmond, which encompasses 15.5 million square feet and 129 buildings. We appointed our own Digital Architects to act as trusted advisors across the refresh program, following the same exact approach we take to facilitate our partners’ digital transformation journey through smart buildings.

Whatever your objectives may be, defining them is the first step toward success for your smart building project. Clear goals will serve as a much-needed compass to help you engage with stakeholders company-wide.

2. Get buy-in from across the organization

Treat IoT as transformation—not tech

As IoT moves beyond hype and into the mainstream, it’s become increasingly apparent that IoT implementations require major business changes. “Like any transformation initiative, you need to set yourself up for organizational changes to be successful,” says Palmer. Often, achieving your smart building goals means adopting a completely new mindset—one that leaves waterfall methodologies behind and embraces a more agile, flexible approach across many stakeholder groups.

“Buy-in from the IT organization—the people responsible for protecting and managing the network—is essential.”

Steve Rodden
Director of Product Development for Smart and Connected Workplaces, Steelcase
Engage from top to bottom

When planning your smart building initiatives, there are many voices you’ll want to include in the process or the project may stall out. From a top-down perspective, it’s important to engage business decision makers in senior leadership—especially IT. “Buy-in from the IT organization—the people responsible for protecting and managing the network—is essential,” notes Steve Rodden, Director of Product Development for Smart and Connected Workplaces at Steelcase, a leader in smart furniture and architecture. “That’s why you have to make sure you’re partnering closely with IT from the very beginning.”

For many organizations, a smart building project may be the first project that requires cross-functional collaboration for success. Employees will be affected by your investment at all levels, which means thinking about buy-in from the bottom up is also critical. End users can be some of your best advocates if you include them in the process, but if you skip this step, adoption may be an uphill battle. “Sometimes you have to take a step back to understand your culture and how you can integrate IoT technology into it,” advises Stu Berman, IT Security Architect at Steelcase.

Find champions in every department

It’s also important that departmental agendas don’t impede progress, so identify the people who will help you prioritize the needs and goals of each department to keep building momentum. Whether it’s facilities, finance, human resources, sales, or any other department, determine where your IoT investments will have an impact and find strong evangelists. Early adopters or change agents are especially important. “Targeting these individuals at your organization will drive adoption,” advises Palmer, “and as you gain momentum, they can champion your success to get buy-in from those who are initially skeptical.”

Obtaining buy-in from champions early on will spread enthusiasm for your smart building project and help overcome objections. These champions will also be essential voices to include when determining the right way to measure ROI.

3. Develop clear KPIs to maximize ROI

Justify your IoT investment

Measuring ROI is often a challenge for many businesses, especially when it comes to IoT and smart building initiatives. In fact, 30% of commercial retail stakeholders say their organization can’t measure smart building ROI, and it becomes increasingly difficult as you advance from energy efficiency into areas like space optimization and employee productivity.

Start with a measurable use case

That’s why for organizations starting out with IoT, the best first step is typically energy efficiency. “I definitely think targeting energy efficiency first is a great way to begin,” says Dale Brett, co-founder of Willow, a groundbreaking software platform that re-imagines the digital twin for the built world. “It gives
you clear metrics to measure, whether that's performance or energy consumption, which in turn gives you a tangible way to get stakeholder alignment.” And you don’t have to build a complex dashboard to make an impact—sometimes significant ROI can come from a few well-considered measurements. “The very first project we had with IoT in place, all they had was temperature and humidity monitoring, but they outfitted the entire site with it,” recalls Palmer. “The statistics and metrics they got were phenomenal, and positively changed their business practices as a result.”

This is also our experience at Microsoft. We’ve collected vast amounts of heating, air conditioning, and energy data from our Redmond campus for many years, so we started with energy smart building use cases because the ROI was relatively easy to prove. Then, we expanded across many other smart building scenarios, using a business-benefits-driven strategy to shape the roadmap.

Standing up a digital twin or proof-of-concept (PoC) to quickly deliver a smaller set of results can be a great way to test ROI and identify potential stumbling blocks. “Starting with a PoC helps ensure you’re going to see value without setting off alarm bells,” Berman notes. Whether you tackle a single room, an entire floor, or a whole building, demonstrating ROI is a good way to influence stakeholders and secure approval to move forward. “These are the metrics that get people to buy in and jump on board to try IoT for themselves,” Palmer adds.

Set relevant metrics, then be patient

When you’re ready to move beyond energy efficiency, our partners have found it helps to create metrics that align with the type and scale of your project, such as tenant satisfaction, employee morale, wellness,

Seeing real results with PCL

When PCL installed temperature and humidity monitors at a construction site to control heating, leaks, and moisture, they realized:

- **$180k** in natural gas savings
- **$70k** in rework avoidance
- **$69k** in energy savings
- **$0** in leaks or water damage

“Water and leaks are common problems in construction, but this project had none. That’s virtually unheard of.”

Chris Palmer
Advanced Technology Services Manager
PCL Construction

Calculating ROI with Steelcase

To show clients their potential ROI, Steelcase walks them through an intuitive tool that uses their own building metrics. For example:

- **250,000** total square feet
- **$29.13** average cost per square foot
- **45%** current space utilization
- **55%** desired space utilization
- **10%** annual space reduction

- **$728,250** Annual benefit (year one)
- **$2.91M** Total benefit (over five years)
productivity, or talent acquisition. Once your metrics are in place, prepare to be patient. 63% of organizations who invest in IoT-based smart building projects expect their ROI evaluation timeframe to last for more than 12 months, and 30% say they aren’t sure how long their ROI timeframe is. “Metrics are powerful, but it takes time to get them,” advises Palmer. “With smart buildings, you have to go through all the seasons to truly see the benefits, which means you need a team willing to invest and wait for the results.”

Identifying KPIs that effectively demonstrate project success will go a long way when it’s time to get stakeholder approval. Additionally, being intentional about what you measure provides an enduring structure for sustained, incremental growth over time.

4. Start with a focused, incremental approach

Build the right foundation

“Start small and go big’ really summarizes IoT,” says Tom Buckley, Business Development Director for IoT at ICONICS, a leading industrial automation provider. “Connectivity is the foundation of IoT, so you have to start small before you think about scaling out to ensure you nail that aspect of your investment.” This is especially true for organizations working on a brownfield project, as they must be able to connect disparate legacy systems installed over the building’s entire lifecycle on a single platform.

Once you’ve figured out how to connect the right devices and systems, stay focused and beware of projects snowballing outside of their original scope. While it may be tempting to add more use cases, companies that take on too much too quickly risk investing in the wrong resources. The more you add, the more you dilute your efforts and risk cost overruns, only to have to pivot mid-stream or halt projects entirely while you regroup. “These projects are complex, so if you start too broad, it will take longer and cost more than you originally anticipated,” says Rodden. To avoid this scenario, it’s best to look for the low-hanging fruit. “You get the best value for your money in terms of ROI if you start with just a few sensors, a few implementations,” notes Buckley.

Scale at the right pace

Of course, many organizations do take on bold, ambitious IoT projects—but the success of these projects hinges on being
clear about business goals and realistic about risk tolerance. “Microsoft asked for the most accessible, sustainable, and connected campus in the world,” says Natarajan. “Those ambitions only worked because of the level of transformation they were trying to drive.”

Even then, an incremental approach is key to ensuring a successful project. “With Microsoft, we started on a couple of buildings in Redmond,” says Russ Agrusa, CEO of ICONICS. “We proved after six months that you could get 10% savings, then expanded further—to 125 buildings across Puget Sound, and eventually all of Silicon Valley. Now, 350 buildings worldwide are tied to the Redmond operations center.”

Microsoft also uses its own campuses as a giant smart building lab, learning from mistakes as much as successes. We now have a catalog of amazing learnings that we leverage, along with our partners, to help their customers enjoy the same benefits.

As you pilot additional use cases or expand to more floors and buildings, new stakeholders may come into the mix, and new use cases will likely come up. With this evolution, it can be easy to lose sight of the original intent of your initiative and dilute your focus. Staying grounded in your original goals and KPIs, while carefully prioritizing new ideas, will keep your project from losing value and support.

**Don’t overstep your commitment**

Whether you’re just starting your smart building project or you’re ready to scale, it’s essential to candidly assess your organization’s level of commitment. “Is the organization willing to commit the resources and people that are necessary to making their project a success?” asks Agrusa. “The biggest hurdle is people refusing to assign the resources—if you can’t commit the resources up front, you won’t realize any savings, and you’ll be wasting your time.”

By taking an incremental approach, you put your business in a better position to understand the cross-organizational effects of your investment before progressing to the next step. This incremental approach also enables you to test key aspects of the solution before it scales—particularly security.

**5. Put security first**

**Understand the threat landscape**

“IoT smart buildings are arriving at a time when the stakes are getting higher for building owners, not lower,” warns Josh Ridley, Co-Founder and CEO at Willow. And while adopting smart building technology can help meet sustainability goals, governance demands, and user expectations, it opens businesses up to new cybersecurity threats.
It’s only now becoming apparent to building owners that security needs to be at the forefront of their thinking,” says Brett.

Smart building projects come with a number of security considerations. If IoT devices aren’t properly secured, bad actors can steal sensitive data or even compromise the devices themselves and cause physical harm or invade privacy. The security risks are especially high for brownfield projects, which may connect to networks that haven’t been updated on a consistent basis. “We’ve seen entire buildings running on a single Wi-Fi router without any proper security,” says Brett. “The second we start adding IoT technology, we become the single point of entry for a breach.” Even in greenfield projects, focusing on the protection of individual devices rather than taking a universal, end-to-end approach can result in patchwork security with gaps for bad actors to exploit.

Take steps to reduce the risks

With these risks in mind, security experts are understandably wary of IoT. However, while IoT may expand your potential threat landscape, working with the right IoT platform provider reduces the risks. Look for a commitment to comprehensive, enterprise-grade security and a roadmap for staying ahead of emerging threats. “Ask your vendors how they’re audited,” Berman recommends. “Do they have the proper certifications? Do they have a robust vulnerability management program and conduct periodic penetration tests?” Innovative IoT platform providers are building security systems that apply certificate-based authentication, compartmentalize critical systems, integrate hardware- and cloud-based security, and manage communication between devices and the cloud.

To get security experts in your organization on board, it helps to remind them that even though the threat landscape for IoT devices continues to evolve, the fundamentals for mitigating risks are the same. “Security principles haven’t changed,” Berman notes. “Everything security experts have learned—like staying up-to-date with patches and authenticating users—is as relevant as ever. Their knowledge just needs to be applied in new ways.”

When choosing vendors, businesses should also be realistic about security costs. “If a system has a very low cost, remember security doesn’t come cheap,” advises Berman. Proper security investments are invaluable when compared with the long-term costs of data breaches. For example, in the United States alone, the average security breach costs businesses $7.9 million\(^1\)—before added costs of litigation, clean-up, reparations, and fines.
Conclusion

Smart buildings have the potential to unlock numerous benefits for organizations in almost every industry. With each successful IoT project, companies are paving the way for a better approach—one that advances sustainability goals, improves operational efficiency, and transforms how people interact with their space. In a world of rapid growth and evolution, IoT enables agility, flexibility, and collaboration to help you stay ahead of your competition and lead the way to a more connected world.

Achieve your smart building objectives today

As you embark on your smart building journey, Microsoft and its partners can deliver the platform that enables you to realize IoT’s transformational benefits. Azure IoT combines a portfolio of powerful tools and solutions with the expertise of Microsoft’s extensive partner ecosystem to tackle the technical challenges of integration and interoperability. And when it comes to device security, Microsoft continues to innovate with Azure Sphere, a comprehensive, end-to-end solution that protects your devices from silicon to cloud. Learn more about the Azure IoT product portfolio or contact your Microsoft representative to get started.

Digital twins are a revolutionary way to accelerate your smart building initiatives. Read more about Microsoft Azure Digital Twins here.

Read more about how partners like ICONICS, PCL Constructions, Willow, Steelcase, and L&T Technology Services are making an impact with smart buildings today.

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