



AN IoT PLATFORM AND BUSINESS FRAMEWORK FOR INDUSTRIAL OEMS

WHITE PAPER

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1. INTRODUCTION

The Internet of Things (IoT) is one of the most significant technology movements in recent years. For industrial manufacturers, IoT represents an opportunity to drive new sources of revenue, decrease operational expenses, grow after-market services, and improve overall market position under increasing pressure from low-cost competitors.

However, rolling out a corporate-wide IoT strategy amongst multiple business units poses significant challenges. Developing a clear strategy, aligning the organization around that strategy, executing on projects with excellence, identifying pricing plans, mobilizing new types of partnerships, and integrating secure communications and data with corporate IT require non-trivial efforts.

This white paper highlights key challenges that multi-divisional industrial original equipment manufacturers (OEMs) face when developing and executing a corporate-wide IoT strategy. It also highlights best practices leading organizations can leverage to overcome these challenges. Finally, this white paper recommends an integrated approach that combines technology frameworks, business-model innovation, data integration, and user-experience design that organizations can use to turn their ability to quickly change and innovate into a competitive advantage.

2. KEY SOLUTIONS FOR CORPORATE-WIDE IoT ADOPTION

According to Harvard Business Review, 70% of internal change initiatives fail.¹ Add in the technical complexity IoT brings to the table, and a corporate-wide transition from a traditional-product company to a connected-product company can seem impossible.

The reality is that enterprises are as unique as the IoT solutions they seek to create. Many operate with varied combinations of parent companies, sub-divisions, branches, and divisions, each of which can have different products, services, P&Ls, billing needs, and accounting structures. As these diverse enterprises look to enter the IoT space, things can become further complicated if individual divisions develop one-off solutions. Rather than learning from each other and developing a standard framework each division can then customize, individual divisions work through the long and often complicated process of developing an IoT solution on their own. This creates fragmentation that compromises efficiency and consistency.

The sections below will provide an overview of seven key challenges that large, diverse organizations face when attempting to implement the corporate-wide adoption of a common IoT platform, processes, and tools, as well as best practices for long-term success.

¹<https://hbr.org/2000/05/cracking-the-code-of-change>

2.1 LONG-TERM STRATEGY

In a recent survey, Fortune 500 CEOs were asked about their single biggest challenge.² The number one answer was the rapid pace of technological change. The world is turning digital, and it has never been easier to rapidly assemble technology solutions to meet new market needs.

If we measure technology by the speed at which it can be deployed to reach 50 million customers, we see that the telephone took seventy-five years. Facebook took three years and eight months. And Pokemon Go took nineteen days.³ Fast is indeed the new big—it is no longer about the big fish eating the small fish, but rather the fast fish eating the slow fish.

Forward-looking companies find ways to innovate quickly, efficiently absorb non-core external technology, and disrupt traditional business structures. Conversely, stagnant organizations (e.g., Eastman Kodak) become historical case studies. Although it is unclear how IoT will unfold over the next decade, it is nearly certain that the way organizations respond to the trend of product digitization will define their ability to compete.

Organizations with multiple business units cannot afford to build multiple IoT platforms. Therefore, a unified strategy is needed that can meet the needs of each business unit, yet be flexible enough to grow and change with the business as it evolves.

Successful organizations adopt the following practices as they develop their long-term IoT strategy:

- **Strategic clarity and executive sponsorship of corporate vision:** If corporate leadership doesn't understand and communicate the *why*

behind their IoT initiatives, then the *how* does not matter. Piercing clarity from the top about how IoT affects the strategic success or failure of a company leads to a greatly increased probability of success.

- **Organizational alignment around corporate objectives:** If organizational structures (for example, a business unit, a cross-departmental steering committee, or a corporate innovation team) are not aligned toward—and empowered to—execute the IoT vision of a company, failure is near certain. Leading companies mobilize an IoT steering committee or form a new business unit empowered with leading the charge.
- **Agile culture that adopts necessary organizational changes:** Change is hard for people; organizations are made of people, and so change is hard for organizations. Corporate cultures that are able to adapt quickly to new market pressures, new technologies, and new ways of doing business are best equipped to carry out a digital transformation initiative effectively.

2.2 STANDARDIZED PROJECT-SELECTION PROCESS

As multi-divisional companies delve into the implementation of corporate-wide IoT adoption, it can be difficult to envision how every department or division will participate. Some areas of the organization may be quick to see the value of connectivity or may already be developing connected-product ideas. Other areas may lag behind, unsure about how IoT can add value to their internal processes or external customer experiences.

²<http://fortune.com/2016/06/03/challenges-facing-fortune-500>

³<http://expandedramblings.com/index.php/pokemon-go-statistics>

Organizations that are successful in overcoming this challenge do so by creating a standardized project process to encourage IoT innovation across the entire company and coordinate efforts to identify, compare, and select promising IoT projects. When done well, this type of process enables intelligent, informed decisions to be made about which projects move forward and helps identify a connected-product roadmap.

The following best practices are used by leading organizations to survey, select, and fund IoT project initiatives that have a high chance of success:

- **Encourage IoT innovation:** A process that catalyzes internal innovation around IoT can help encourage individual divisions or departments to creatively think about how connectivity can improve internal efficiencies, generate new revenue, or streamline the customer experience. This can include internal competitions, like a call for papers or a hackathon, that compare and fund winning projects to not only generate potential connected-product ideas, but also garner corporate-wide participation.
- **Develop a framework for data-driven decisions:** Connectivity for connectivity's sake rarely leads to success. Established guidelines should be created that require product teams to prove they have considered the viability of their connected-product ideas from both a technical and business perspective, including business plans, revenue models, customer needs, etc. Vigorous research and vetting up front will enable more intelligent, informed decisions to be made about which projects will be successful based on tangible aspects like cost, technical feasibility, time-to-market, revenue, and customer demands.

- **Establish a corporate-minded task force:** A core group of cross-functional individuals who can make collaborative decisions about which IoT projects should move forward, while keeping the larger, strategic goals of the organization in mind, is key to the success of a standardized project selection process. This group should include a mix of executive, business, and technical representatives to ensure connected-product ideas are considered from a variety of angles.
- **Identify near-term wins:** The initial focus of any standardized project-selection effort should be to identify connected-product ideas that have the potential for fast time-to-market or significant ROI. These types of projects contribute to quick wins that will build trust in the long-term commitment to IoT, encourage hesitant divisions—or departments—to join in, and provide the type of immediate results needed to finance the longer-term IoT goals of the organization.

2.3 CROSS-FUNCTIONAL COLLABORATION

Because of the complex, far-reaching, and potentially costly implications of IoT, organizations must create both a technology framework and an organizational culture that promotes cross-functional collaboration between departments, divisions, and business units in order to be successful implementing IoT on a grand scale. Although seemingly straightforward, many organizations stumble on this hurdle—making the leap from understanding the importance of technological and organizational collaboration to actually achieving it is difficult.

Organizations that can successfully accomplish this type of cross-functional collaboration are able to

break down organizational barriers to create alignment around their long-term strategy, while still respecting the natural diversity of individual departments and divisions. They also encourage individuals to learn and grow from the experiences and challenges faced by others in the organization. As a result, less time, money, and effort are wasted on fruitless endeavors or painful lessons learned.

In order to promote a collaborative culture from both a technological and organizational perspective, successful organizations:

- **Identify reusable components:** A standardized process to review and select connected-product ideas, as suggested in the previous section, will provide insight into the key technology pieces that are similar across multiple projects. This information can then be used to develop standardized, reusable components to enable an IoT framework the entire company can leverage. As a result, organizations are able to maximize effort and investment, while minimizing the need for costly, one-off solutions within individual divisions. Section 2.5 below provides a more in-depth discussion of this concept.
- **Centralize key functionality:** IT integration, documentation, support, continuation, and security are key areas that should be developed and maintained centrally at the corporate level. Individual divisions and departments then have the autonomy to innovate, while working within collaboratively developed parameters for important solution aspects like security, user experience, and brand standards.
- **Identify a corporate sponsor:** As mentioned in Section 2.1 above, executive sponsorship is key to success, and selecting a leader dedicated to

championing IoT is an integral piece of the puzzle. McKinsey Global suggests that change initiatives are twice as likely to achieve success when the leaders of those initiatives spend more than half of their time on the transformation.⁴ This is particularly relevant where IoT is concerned—where gaining buy-in and ensuring participation in collaborative efforts is increasingly difficult because of the inherent complexity of the subject matter. IoT may also require organizations to look to a different leader than has been typical; instead of the CEO, a CIO or an entirely new IoT-based position may be a better fit.

- **Inject processes that engage relevant parties:** Adding connectivity to a product impacts every area of an organization, requiring new engineering skillsets, business models, distribution channels, support options, and sales processes. Successful organizations develop and implement processes early on that require all relevant parties—from marketing and sales to manufacturing and support—to actively engage with each other to understand the functional impact of connectivity on their roles, responsibilities, interactions, and deliverables.

2.4 LIMITED INITIAL SCOPE

As an organization develops new capabilities in connected-product definition and delivery, there is a lot to learn. For example, connected-product development may require different engineering skills than a team currently has; pricing and product definition are different for software products than they are for manufactured goods; and software product development cycles are also faster than they are for hardware, which will require a different pace for decision making.

⁴<http://www.mckinsey.com/business-functions/organization/our-insights/how-to-beat-the-transformation-odds>

To overcome these learning curves, successful development teams seek to limit the scope of early IoT projects in order to maximize success. Developing a new connected-product carries enough challenges of its own—over-complicating it with non-critical features only impedes development and extends the timeline for deployment.

A common best practice includes deliberately starting with the development of one connected product using a process with several common stages (though perhaps using different names):

- **Proof of feasibility:** Connectivity of even a single signal to a low-fidelity interface can be used to demonstrate the validity of the idea and start conversations about the possibilities.
- **Prototype:** Connection of an initial build of the device to a functional interface helps to confirm design assumptions, complete initial user testing, and gather feedback for improvement.
- **Pilot:** Limited release of a complete product, including hardware and software, enables a test audience to validate the business case and catch any design errors prior to the commercial release.
- **Commercial release:** Full release of the product to the marketplace, plus careful observation of how users interact with the device and data, provides insight for continuous improvement.

As a product team learns about developing their first connected product in this initial development cycle, a separate team can begin to document and define the interfaces between the product and the rest of the organization. This provides the foundation for a common set of tools and corporate services to properly support a suite of connected products.

2.5 REUSABLE COMPONENTS

Even with the use of a platform to reduce the upfront cost of connectivity, developing and delivering a single connected product can be costly. If an organization's long-term IoT strategy includes growing into a connected brand, there are efficiencies in overall implementation costs and time-to-market that can be gained from centralizing some aspects of the IoT development program, while pushing other responsibilities out to the divisions or product teams involved.

Also, as previously mentioned, new connected-product development impacts a lot of other corporate realms, including marketing, engineering, manufacturing, pricing, sales, delivery, support, and billing. Some traditional manufacturing companies find the speed of web and mobile development disruptive.

Successful organizations implement the following components to both enable their growth into a connected brand and ease the internal burden of bringing new software products to market in a matter of weeks, rather than months or years:

- **Implement a product development toolkit:** The decisions made in the first connected-product effort that are validated in the marketplace should become the foundation for a reusable software development kit that can be leveraged by other product teams across the organization. Common software assets provide a consistent, branded user experience while reducing development times for new products. This ensures many of the decisions are made up front, and the common software can be maintained by a separate team as needed. This development kit, distributed to the product development teams in each division or department, allows rapid development of new connected products across

the entire organization, lowering friction for innovation at the departmental level.

- **Establish a business framework:** A common software framework also allows deep built-in connections between connected products and corporate services. For example, single-sign on for employees and clients can be built across all connected products; device provisioning and secure token exchange can be integrated with the manufacturing and installation workflows; and data collected from devices in the field can be added to the corporate data warehouse for long-term analysis.

2.6 COMPETITIVE DIFFERENTIATORS

What an organization must provide their customers (the IoT product or service) is a separate decision from the means by which the solution elements are developed and deployed (e.g., a detailed build/buy/partner analysis for each subcomponent of the system). Often these two decisions are conflated, leading to strategic resource planning mistakes that increase time-to-market, cost, and distraction from high-value activities that maximize competitive differentiation.

In many industries, IoT is altering partnership ecosystems, injecting ripples into the competitive landscape, changing customer expectations, and disrupting supply chain dynamics. Successful organizations evolve their competitive IoT strategy to:

- **Focus on the areas of historical strength:** Organizations that get caught up in the IoT frenzy and start reinventing the wheel face steep learning curves in areas they are not differentiated in. Instead, leading organizations focus on

product performance, algorithms, and analytics that are enhanced because of their historical knowledge and user experiences. All other areas of an IoT solution are strong candidates for organizations to purchase or partner on.

- **Develop user experiences that customers want:** Although seemingly simple, in practice user-centered design is complex. Even with business-to-business sales, understanding the customer along with their pains and potential gains is critical to success.
- **Embrace the emerging digital ecosystem:** Technology is changing more rapidly than any one company can keep up with on their own. Companies that look only to internal resources to develop IoT solutions are missing the strategic picture and wasting time. Leading organizations make intelligent build/buy/partnership decisions that enable and reinforce their focus on core IP, while relying on outside vendors to provide everything else. See Exosite's [Solving the IoT Puzzle white paper](#) for more information on this topic.⁵

2.7 FREQUENT MARKET FEEDBACK

Most OEMs leverage indirect sales channels such as distribution and retailers to reach customers. Consequently, OEMs are multiple steps removed from the customers using their products, and warranty cards are notoriously inadequate. However, IoT brings new technology advancements that enable OEMs to get better insight into how users interact with their products. As a result, OEMs have an opportunity to establish stronger relationships with their customers.

⁵<http://info.exosite.com/build-vs-buy>

However, in order to gain frequent and consistent market feedback, OEMs must become experts in conducting user research, market surveys, and user-experience design. If an organization is not historically strong in these areas, they would be wise to seek outside help. Leading organizations follow these practices:

- **Validate innovative ideas with the market:** Without exposing an IoT project idea to the tough love of real-world objections and contrarian lines of questioning, it can never be fully prepared or conditioned for long-term success. A lack of early and frequent market feedback leads to incestuous thinking that is antithetical to success.
- **Establish market metrics that represent success:** In addition to product sales metrics, organizations should establish a set of usability metrics that enable them to gauge the experience customers have with the product and adjust the course of their development efforts accordingly.
- **Embrace agile development and fast feedback loops:** If services are not useful, people will not pay for them. In addition, web and mobile applications need to be updated every quarter to keep up with browser and mobile-operating system updates. Because of this, it is critical that organizations seek agile development processes that shorten the feedback loop with customers.

3. CONCLUSION

The IoT trend is forcing organizations out of their comfort zones to rapidly innovate new technology and business offerings in order to remain competitive on the global stage. To succeed, industrial OEMs must develop a corporate-wide implementation plan that focuses on overcoming the internal barriers IoT commonly presents. This includes developing tactics and processes that provide a forward-thinking vision, promote cross-functional collaboration, create efficiencies in cost and time-to-market, and leverage market knowledge to increase differentiation and customer satisfaction.

Exosite has proven experience helping large, multi-divisional companies chart and execute corporate-wide IoT strategies to overcome these challenges. This experience has been incorporated into Exosite's **Mosaic IoT business framework**, a tailored process designed to drive strategy, products, processes, standards, training, and alignment around connected products and services.⁶ Combined with **Murano**, Exosite's enterprise IoT platform, Exosite works with companies to develop an integrated approach to IoT implementation that combines technology frameworks, business model innovation, data integration, and user-experience design in a way that creates competitive advantage and defines long-term success.⁷

⁶<http://transform.exosite.com/mosaic>

⁷<https://exosite.com/platform>



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