

WHITE PAPER

# Transforming Digital Innovation to **Business Reality** in Life Sciences

# Introduction

The life sciences industry is at the forefront of physical and digital technologies, with implications for research, development, manufacturing and patient care. In historically physical-centric life science businesses, the move to digital solutions is an essential and increasingly complex transformation imperative. Digital technologies and workflows can unlock our physical discoveries and tools, leading to new markets, opportunities and better outcomes.

Understandably, the market for physical-digital solutions is increasing every year at a steady growth rate, with consumers, regulators and patients demanding more sophisticated and efficient products and services. One prime example demonstrating this growth trend lies in digital twin technology, which has a **projected compound annual growth rate of 35.7% from 2024 to 2030.**

BioPharma and MedTech companies that bring these innovative products together are caught between the benefits and challenges that digital brings to their businesses.



# Physical-Digital Benefits & Challenges

The upside of digital workflows is clear and measurable. Digital innovation benefits our collective abilities and positive patient outcomes; this can be external with collaborative ecosystems and internal with a company's ways of working.

For example, proton beam radiation can aim precise doses of radiation at tumor tissue, leaving surrounding tissue unaffected. This is a massive leap forward from simple X-rays, made possible by the digital technologies and ecosystems that support, manage and deliver treatment. Opportunities for innovations increase as integrations (like those in radiology) change how care is accessed and delivered. The broad digital transformation promises many things, from new organizational efficiency and reporting systems to data insights and more engaged customers – the more specialized your business, the more nuanced your technological stack. MedTech and BioPharma makers are some of the most specialized.

But physical-digital product challenges can be complex to navigate. While market forces and regulatory frameworks push integrated solutions, the result is increasing technical complexity of devices and services. Hardware and software have very different project management styles. Hardware development follows a waterfall methodology, which is prescriptive and gated. The physical product development process requires manufacturing, testing and certifications before product releases. Software development is agile and can produce updates quickly. Releases and user feedback are frequent and, at times, immediate.

These two processes operate on unique philosophies, use bespoke development tools and work on different time scales. The control systems for an MRI machine can be iterated hundreds of times before the first physical components leave the prototype phase. This asynchrony can be the source of bottlenecks, not for any reason other than that they operate, organize and act differently. Missed milestones, complicated integrations and project failures compound into inefficiency and cost overruns.

# Taking on a Systems Thinking Mindset & Product-First Approach

With an emphasis on optimization and digitization, the urgency to advance a digital agenda often leads to 'point solution' thinking. A fragmented approach fails to harness the collective potential of the organization.

By addressing challenges within individual silos rather than pursuing shared objectives, valuable opportunities and time are lost. The compounding bottlenecks and friction create strain, mismatched expectations and broken development cycles. Eventually, this leads back to cost, and a vicious cycle of change continues in the halls of management.

With no incentives to collaborate, teams won't. Even teams dependent on each other can become trapped in their corner of the project. Why would they expect anyone outside their domain to need help understanding their 'ways of working?' That kind of cultural empathy is rare and only cultivated and enforced by a broader company goal. The more complicated the organizational structure and projects, the more chances of getting 'it' wrong.

The complicated push-pull of integrating physical-digital workflows needs recognition. The 'system' of your companies, projects and teams is a spiderweb of interdependencies. Everything impacts outcomes, from procurement and staffing to company strategy. Recognizing that the timescales and styles are asynchronous, leadership teams and program managers can build collaborative teams that understand the friction and plan against it.

Product-centric organizations can find success in addressing the key transformation drivers and business imperatives surrounding physical-digital when they focus on building a culture that constantly looks for new opportunities and rewards new product development. These organizations are structured around product divisions with their own P&Ls.

Products that are doing exceptionally well in the market gain additional funding to support further scaling, while products that are underperforming are de-prioritized or halted, and resources are redeployed to higher-performing products.

A modern, product-centric organization is organized to enable the continuous release of new products and product improvements. Yet, the complexity of scaling to a customer- and product-centric organization involves a monumental change.


Systemic adaptation helps achieve desired business, financial and customer experience outcomes.

Effective leaders will replace business silos with more holistic structures. Teams with shared objectives and incentives thrive. Breaking silos between departments and encouraging a systems thinking approach in a product-led growth model can unify the teams that are necessary to bridge the physical-digital divide.


Companies must also make smart, multidisciplinary decisions around their data, cloud, hardware and AI/ML strategy to bridge this gap, all while ensuring platform interoperability. These many emergent fields with layers of locked-in complexity hold their promise in a maze of integrations and effort.

Cultivating company-wide commitment to product-led change imperatives involves, first and foremost, unified leadership and governance — ideally with a Chief Product Officer at the helm.


Product mindset leaders make key investment decisions...

91% 

of companies planned to invest in product-led growth in 2023

47% 

plan to double their PLG investment

30% 

of Fortune 1000 companies promoted a product leader to CPO in 2023 (up from 15% in 2022)

Establishing a product office as a formal function to manage unified governance of the product portfolio strategies, roadmaps, delivery practices and investments ensures that (a) the next-gen products and experiences solve meaningful “jobs to be done”; (b) the company’s revenue-generating and enabling assets are managed to optimize top-line potential; and (c) they leverage the benefits of centralized and decentralized digital capabilities to manage the cost to build and serve.

Critical imperatives to activating a product office involve bringing on product management leaders with proven experience in orchestrating physical-digital product transformation, active executive sponsorship and organizational realignment to simplify leadership, collaboration and high-touch organizational change management (OCM) with impacted stakeholders.




# The Role of Change Management in Digital Innovation

One of the **top cited reasons** that transformation initiatives fail is change resistance among employees. So, once the proper governance is in place, all departments, teams and individuals involved in these complex transformation efforts must understand their role and how it aligns to overall product-first goals.

Transitioning to a true product-first approach involves applying a holistic strategy to continuously delivering value to customers and the business. It's a revolutionary shift from a fragmented, siloed approach that delivers results that do not align to desired customer needs and business outcomes.

That shift requires OCM to strategically analyze, plan, execute and measure activities for navigating the workforce and workplace impact of modern technologies, operating models or performance expectations involved in the physical-digital product transformation journey. Simply put, OCM addresses the people side of transformation to help reach and sustain product management capability maturity.

**The consequences of poor change management can break the business...**

70% 

of transformation efforts fail, with lack of focus on employee experience being a core problem

**On the other hand, projects are**

7x

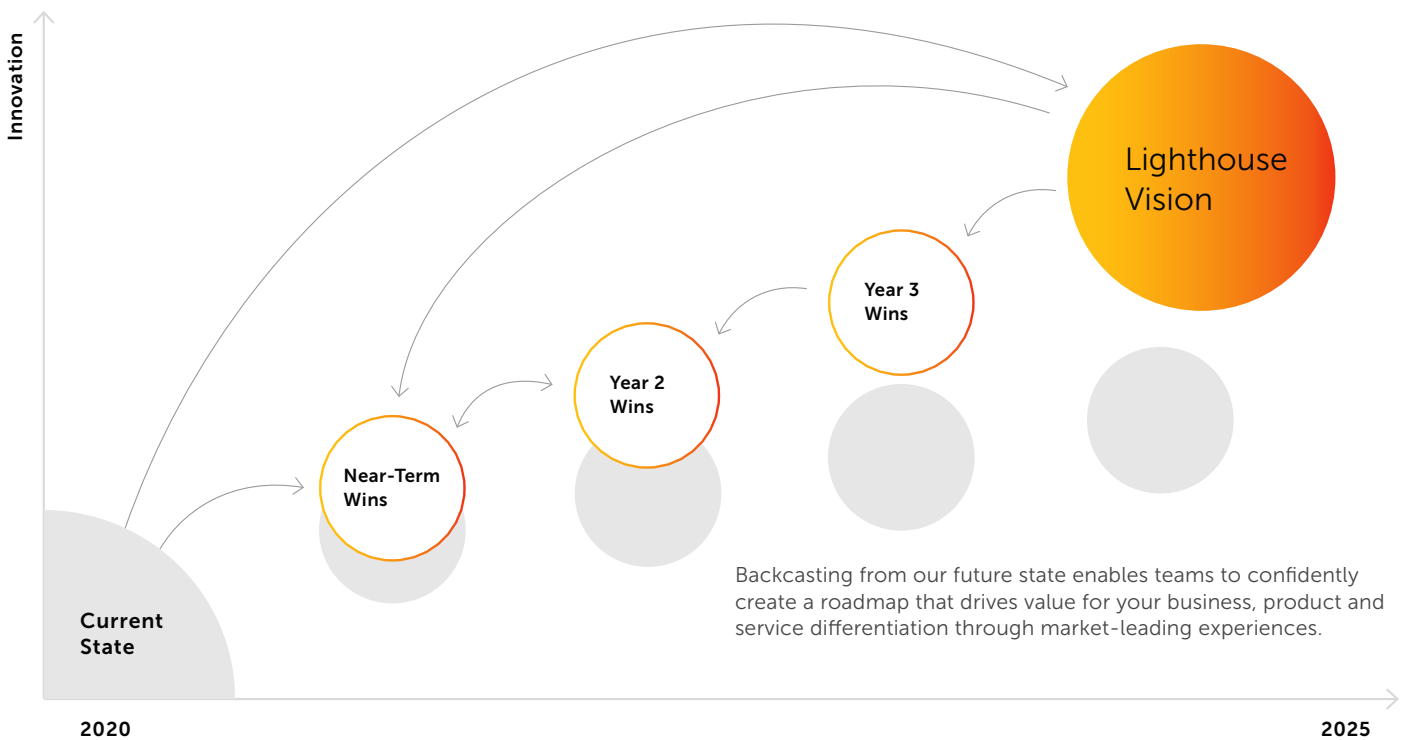
more likely to meet objectives with excellent change management programs

# Making Digital Innovation in Life Sciences Real

Without question, any physical-digital innovation initiative is highly complex – and even more disruptive as organizations adopt new technologies and adapt to new ways of working. By using a holistic approach consisting of a Lighthouse vision (LHV), integrated co-located teams and systems thinking, leaders can harmonize the development cycle. This three-pronged approach is a base to build organizational repeatability and reliability.

First, a LHV or a digital transformation target aligns engineering disciplines, management incentives and corporate governance. Collaboration between departments through that shared LHV is one powerful way to align. More than just lip service to a vague goal, an LHV points to a desired future state or company goal. Working backward from that goal, companies are encouraged to think in systems rather than silos. This backcasting allows the mental space for connections and correlations between workstreams.

## TRANSFORMATION JOURNEY Backcasting to Change Trajectory



# Making Digital Innovation in Life Sciences Real (continued)

Without a 'slow down to speed up' moment, companies fall again into the rut of point-solution thinking. Taking the time to pause and map the complexity of operations, regulations, management styles and markets only leads to better organizational insight. Opportunities to systemically plan around resources and value are rare. By setting an LVH, your company and teams can address the cost, desirability and value equation. These moments of truth, where value and cost to the business are reconciled, are at the heart of positive transformation.

Next, reshaping how teams are organized and projects are structured can reduce internal and external friction. Silos need to be transformed into integrated teams that understand the ways of working across the company/project/objective. Tightly bonded teams are more resilient and productive, leading to better performance. Co-location of teams is essential in spirit, but more than just physical location, cohesion around a shared goal is the driving force. Physical-digital teams need customized approaches and the 'white space' to develop them internally.

SCRUM has an interesting methodology in the morning 'stand-up'; video calls are routine and collaborative environments enabled by Web 2.0 have all evolved to help bring teams closer. Software and hardware developments can be reconciled with virtual environments, rapid prototyping efforts and the often used MVP; picking the tools and methods that fit your development is an art form. The resources to 'work it out' are a deviation from the day-to-day business environment and why management needs to set the tone and pace of discovery. Providing tools and infrastructure is one important part of the equation, but the reasoning and methodology need discipline as well.

Teams need a systems engineering mindset for a holistic approach to planning and development across digital and physical. Identifying and understanding friction points is the only way to plan against them or flow and change with them. A systems-based approach can charge up company culture with a more disciplined approach to development. The timescales of regulatory, prototyping and manufacturing should be accounted for and reconciled against software sprints and lightweight prototypes.

The power of understanding the whole system of a product or project is especially valuable to physical-digital integration. Vendors working outside the company, regulatory expectations and supply chain become measurable with a systems approach. Remember, we didn't have a vaccine manufacturing problem during the pandemic of 2020, but we did have a cooling, storage and glass vial supply chain problem. These issues slowed response and led to global finger-pointing to assign blame.

By creating and mapping the inflows and outflows, your project interdependencies are visible and manageable. With developments like our MRI example, releases can take years and, over such long timescales, having visibility into each component and team is a recipe for success.



# Delivering on the Value of Physical-Digital

Your resilience as an organization creates fiscal stability through steady repeatability and a track record of continuous improvement.

By building resilient organizations and approaches, companies become insulated from market shocks and disruptions. The tighter your teams are integrated, the easier it is to spot inefficiency, cost challenges and supply chain issues and step in to take corrective action. Organizations that share and report bottlenecks more easily break them faster, leading to improved outcomes.

The goal is a change in behavior and priority in your company that spins the flywheel of innovation. Your priority is the project/company/customer values. That flywheel is the gateway to continuous improvement in an organization. Continuous improvement brings a form of resiliency to the landscape of new technologies, methodologies, competition and opportunities. Any process that creates flexibility and stability is desirous.

With a honed methodology for physical-digital product transformation, life sciences companies can help your teams and projects cross this divide. The 'system' proposed in this article is one that we use to 'shoot the rapids' of change management and digital transformation. Because we have enacted these steps ourselves, we know their value in business and with our clients. The three legs are interdependent and need equal attention. Thinking holistically can pose challenges in the rigor of everyday business. Finding a guide to meet you where you are is a great way to begin.



# About EPAM

Since 1993, EPAM Systems, Inc. (NYSE: EPAM) has used its software engineering expertise to become a leading global provider of digital engineering, cloud and AI-enabled transformation services, as well as a leading business and experience consulting partner for global enterprises and ambitious startups.

We address our clients' transformation challenges by fusing EPAM Continuum's integrated strategy, experience and technology consulting with our 30+ years of engineering execution to speed our clients' time to market and drive greater value from their innovations and digital investments.

We deliver globally, but engage locally with our expert teams of consultants, architects, designers and engineers, making the future real for our clients, our partners and our people around the world.

We believe the right solutions are the ones that improve people's lives and fuel competitive advantage for our clients across diverse industries. Our thinking comes to life in the experiences, products and platforms we design and bring to market.

Added to the S&P 500 and the Forbes Global 2000 in 2021 and recognized by Glassdoor as a Best Workplace in 2023 and 2024, our multidisciplinary teams serve customers across six continents. We are proud to be among the top 15 companies in Information Technology Services in the Fortune 1000 and to be recognized as a leader in the IDC MarketScapes for Worldwide Experience Build Services, Worldwide Experience Design Services and Worldwide Software Engineering Services as well as a leader in the 2023 Gartner® Magic Quadrant™ for Custom Software Development Services, Worldwide.\*

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