PLM Modernization: Secrets to Successful PLM Adoption

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> *Change is inevitable.*
> *Growth is optional.*
>
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As it relates to business, Maxwell's point is worth considering – change is constant and unpredictable. Those who passively observe change will be left behind, to fade away and become part of "the past." Leaders who choose to harness change shape their own destiny and deploy it as an engine of growth.

The velocity and complexity of change in modern discrete manufacturing require the application of increasingly powerful enterprise software technologies. Without the right tools, companies can't measure up to market demands, compete against formidable rivals, win market share - and grow. The ubiquity of systems like enterprise resource planning (ERP), manufacturing execution systems (MES), and customer relationship management (CRM), to name just a few, is proof of the foundational nature of a capable, versatile technology stack.

For manufacturers today, product lifecycle management (PLM) is one of the most essential of these systems. Manufacturers who fail to master change management across the entire dynamic spectrum of product development inputs risk losing competitive advantage and stunting future growth.

FOR MAXIMUM ROI, RECRUIT THE ENGINEERS

Among the challenges companies most commonly face when considering a new enterprise system is internal resistance from the design engineering and manufacturing engineering disciplines. Each can be quite resistant to change, and such resistance can take both active and passive forms. This friction is largely due to the perception that new systems will be complex, monolithic, hard to use and expensive - in terms of both time and money.

While every company is different, it's often the case that manufacturing engineers are more resistant, as they tend to have relied more heavily than design on traditional spreadsheet-driven systems and point solutions. Nevertheless, it's critical that both disciplines adapt to evolving requirements, and adopt new systems and technologies that promise the most positive impact for the enterprise.

Acquisition of a PLM tool such as PTC's Windchill can involve major financial investment, like any other new enterprise system. This investment can only deliver a sound return – in growth, revenue, margin and share – if the potential of the tool is realized by widespread and uniform user adoption. But where company executives, who consider the big picture, see the value and aspire to the vision promised by these systems, too often its engineering users balk. Why? Often, users focus on PLM as merely a data storage mechanism and see little need to exploit its extended capabilities.

More importantly though, when standing up any new PLM system, it's the engineering users who shoulder the lion's share of work, which requires deep interaction with a new form of product data management. The medium-to-long-term payoff opportunity is obscured by the perception of the labor required to transpose existing product data from one system to another.

SAFEGUARD YOUR DATA

The data entry initially required to fuel a new PLM system is, by definition, more structured, rule-based and "systemic," than traditional, Excel-based data management techniques. When managing data in Excel, engineering teams benefit from its speed, flexibility, and familiarity. But this approach tends to be strongly single-team-oriented, even though it involves data that is critically relevant to the whole organization. Once exported, and transposed into other spreadsheets by other teams, it essentially dies. That is, the data is disconnected from its original source, and any changes made at the source – engineering – remain isolated there until the next "export."

So as other parties work and make decisions with the last round of data they received via Excel export, changes may be occurring to the source engineering information that remain isolated within the engineering team. That isolation seriously endangers the integrity of the product as it moves through its lifecycle. That's a risk companies can no longer afford to take.

A comprehensive PLM environment can mitigate that risk by centralizing product data and providing a single source of truth for all stakeholders, accessible when it's needed and in the form most salient to the user. Once product data is entered into the PLM system, it remains current and actionable - "alive" - as it's shared with all involved teams and individuals. That is, all changes are propagated throughout the enterprise, in real time. It's not only safer, but also a lot faster, and accommodates innovation and continuous design and manufacturing improvements much more efficiently.

OVERCOMING DECADES OF INERTIA

The benefits of PLM that will eventually accrue to the manufacturing organization are self-evident. But the inertia of operating in a document-centric environment for decades prevails, and engineering resistance to a part-centric data model persists. The good news is that this resistance is fueled not by simple obstinacy, or failure to understand the big picture, but a perceived lack of the scarcest resource of all – time. Add to that disincentive a reluctance to move to a process-centric system that links them to ERP, requiring even more work now to save time, work (re-work) later, in the downstream phases.

As noted already, the initial stand-up phase, which needs to be executed by engineering, is the most demanding. But by allocating additional resources specifically to the stand-up phase, relieving engineers of a burden they simply can't shoulder given the scope of their day-to-day responsibilities, companies can incent more enthusiastic adoption, particularly if the time saving benefits to engineering in the medium-to-long term are thoroughly communicated.

Furthermore, after the initial exercise of entering the required data components of a project into the PLM system, full and enthusiastic adoption can fuel the day-to-day success of the engineering teams involved, and the individual engineers themselves. An array of powerful, measurable positive impacts is revealed:

- Higher financial bonuses resulting from improved financial performance of the enterprise
- Elimination of redundant work, one of the most wasteful and unnecessary tasks with which engineers routinely deal
- Less time searching for needed information and/or providing engineering information to downstream stakeholders (who can now self-service)
- Improved product quality, bolstering the brand's reputation externally, and the internal esteem in which the company's engineers are held
- More time for creative, strategic, and innovative engineering pursuits
- Faster, more confident, lower-risk, and accurate data-driven decision-making

Over the course of its nearly 40-year history, PTC has worked with hundreds of the world's largest manufacturers in every vertical industry, from agriculture to aerospace, and medical devices to military weapons systems. We understand the time pressure under which engineers operate, and the scarcity of extra heartbeats available for implementing new systems. We design our PLM software to help companies achieve long-term success and work hard in the process to keep barriers to adoption as low as possible.

It's critical that engineering leaders understand the organizational dynamics that influence user adoption of new systems, both positive and negative, to guide their organization toward all the benefits that lie on the other side of the adoption barrier.

INCENTIVIZING ADOPTION: PRACTICES TO EMPLOY – AND PITFALLS TO AVOID

Nevertheless, as with any new system, once the monetary investment in PLM has been committed, an initial investment of time is necessary to stand up the system and get it running. Here we'll discuss the keys to user adoption that PTC has uncovered over its history in manufacturing. What best practices can leaders employ to help drive thorough and inclusive adoption of this new tool? What are the common adoption pitfalls to avoid? Understanding these dynamics will help realize not only the potential product advantages that a PLM system promises, but the enterprise-wide economic advantage that will follow.

WHAT DOES ADOPTION REALLY MEAN?

Adoption is commonly understood to describe a state in which users accept a new digital platform, embrace the practical vision it embodies, and use it as intended. At the C-level and across senior management, executive enthusiasm and representation can fuel adoption (or, if absent, impedes it.) Generally, though, individual engineering users demonstrate varying levels of enthusiasm and commitment. This inconsistency is based on their ongoing workloads, and how thoroughly they understand – and believe in – the eventual benefits to be gained.

More broadly, effective adoption requires the organization to embrace the platform in a concerted effort to achieve continuous improvement and streamlining across all business processes. Only such broad, authentic digital adoption can pave the road to success promised by digital transformation.

UNDERSTANDING THE ENGINEER'S MINDSET

Imagine sitting and discussing problems that you know an engineer may be having reconciling BOM data for a given product in the PLM system, like PTC's Windchill. Together you click through various PLM screens, as this diligent and well-meaning professional describes the issues he or she faces with the system. Then, the user pulls up an Excel spreadsheet with all relevant product data displayed and begins doing comparisons and VLOOKUPs to compare this data to that in another spreadsheet.

Naturally, you're incredulous. Why would this highly intelligent professional avoid the system intended to centralize all their data, and document the thinking behind it, in favor of an unsophisticated, disconnected tool like Excel? They'll likely explain that the system is "hard to work with" and they prefer to manually manipulate the data, mark it up, leave comments and take other similar actions.

However, if you then demonstrate Windchill's BOM comparison utility, you'll likely hear the engineer exclaim that they never even knew about it – and want to know more. The engineering users are of course familiar with manufacturing bills of materials (MBOMs), which encompass all the parts, packaging, labels, and assemblies required to build and ship a finished product to customers. Interest in the system spikes when engineers understand that PTC's Windchill can provide a graphical and associative user interface that helps the manufacturing engineer leverage 3D data and structured meta-data with systematic traceability (equivalent links) and reconciliation between related BOMs. In this case, the barrier to user adoption was not functionality, but simple ignorance. The obvious remedies? Education, communication, and reinforcement.

WHAT IS ORGANIZATIONAL CHANGE MANAGEMENT (OCM)?

Organizational change management has many different aspects, and the scope of a given initiative can scale from minor, department-specific adjustments in procedure to major strategic initiatives affecting the whole company. The more comprehensive organizational shifts can involve changes in reporting structure, training curricula, communication programs, and more. The type of change that's being contemplated will determine which tools and support mechanisms, if any, should be introduced to help deploy, manage and optimize it.

Regardless of the specific tools deployed, however, initiatives that are thoughtfully and carefully managed can overcome natural inertia to change and win over skeptics for the long run. That's been the experience at Michigan's Cooper Standard, a leading global supplier of sealing and fluid handling systems and components. Scott Prygoski, the company's Senior Director of Information Technology, shared his perspective. "I think we've built a level of trust over the last decade, such that I honestly can't think of a time in the last three to five years we've had difficulty appealing to our senior leadership to approve a major initiative. They know what we're doing, they know why we're doing it – and there's just no controversy. We're at a point now where we're measuring real things, real data. There's no resistance based on a plan involving more work, or incorporating new techniques. Being data-driven, decisions are based on what clearly either is or isn't the right move. "We see the data, and you're correct. It does look inefficient. Let's take this on."

KEYS TO USER ADOPTION: COMMUNICATION AND EDUCATION

As the organization considers how to effectively energize user adoption for any new tool, long experience tells us that communication and education are the most critical and strategically important. Users must obviously understand what specific processes and tools are being changed or introduced. Critical, however, is the rationale for the change. They need to be educated on "the why's" behind any initiative to which they'll be expected to contribute.

Mandates promulgated from above without adequate explanation are likely to face resistance. That resistance, active or passive, often reveals itself first in engineering. That's where a PLM initiative, for example, must be "activated" through the potentially labor-intensive task of initial product data entry into the new system. A cadence of thorough and clear explanatory communication, coordinate in a comprehensive plan, should address the benefits the company and its shareholders will enjoy once the program is launched and underway.

Conveying the "business rationale" is of course necessary, but it's not sufficient. For an engineering user contemplating the extra work it may require, those benefits may seem distant and even abstract, relative to their current workload.

For adoption efforts to gain real traction, equal if not greater emphasis needs to be placed on communicating the individual user benefits. Although the user may do more work upfront during the stand-up phase, the eventual reduction in work – not only through reduced rework but in more streamlined and profitable processes overall – can more than compensate. And in the form of higher bonuses, for example, that compensation can be very tangible.

TRAINING: THE HEART OF USER ADOPTION

Good communication can lay the groundwork for adoption, cultivating a curious, open-minded and even eager user base. But to take advantage of those fertile conditions, robust training programs must be carefully planned and effectively delivered, or the change may never take root at all. Effective training has several critical aspects. Training should be made available in multiple formats, accommodating the learning styles and preferences of a wide array of user types. These formats may include live and virtual sessions, videos, webcasts, and reading-based options – it's good to survey the base and ask what their preferences are.

Different formats also enhance the flexibility of the training programs, allowing users to train at the time and in the manner most convenient for them. This is crucial when they're being asked to take on change-related work in addition to their ongoing responsibilities.

FLEXIBLE TRAINING YIELDS BETTER ACCOUNTABILITY

It's also important to note that providing multiple vectors of training access does not in any way impair accountability. Some may speculate that unless trainees are "in class with attendance being taken," they may be shirking their obligations. In fact, when a wide selection of training options is offered, accountability is greater. Furthermore, individuals – even engineers within the same discipline – have different learning styles and preferences. Accommodating as many of these styles as possible, and chunking the curriculum into concise, high-value, quickly digestible units of knowledge, creates a more welcoming and accessible training experience.

Programs that seek to be as accommodating and flexible as possible not only create a more powerful incentive to engage but eliminate excuses for not completing training. And testing, of course, is and should be employed as a checkpoint for all associates to ensure that, however users choose to access their training, it's being completed.

THE ENGINEERING MINDSET - CONTINUED

Consider again the hypothetical engineer we sat with earlier, cultivating a personal spreadsheet environment for product data management even though he had access to a powerful PLM tool. This well-meaning individual was unaware of critical functionality within the PLM system that could improve on his tried-and-true habitual approach. Unknown to him, as is too often the case, is that in a PLM system like Windchill, many different functions are available for the comparison and analysis of product data.

For example, it's often necessary to compare different revisions of the bill of materials (BOM) for a specific product. In a modern PLM platform, the user can make these comparisons on multiple levels and according to various parameters. It can show part, quantity, and attribute differences; whatever is most appropriate for the analysis or insight the engineer is seeking.

It can also present these comparisons graphically. All these views are comparatively quite difficult to generate in a spreadsheet (setting aside the even greater difficulty created by the isolation of the data from the rest of the organization.)

Too often, critical details like these, covering the new system's full capabilities, are overlooked in the training protocols, or are simply subsumed via information overload because the volume of training required is so great. Training must be thorough, but also carefully sequenced and properly and realistically paced, so that users can absorb all they need to know to have a positive experience.

SELLING PLM INSIDE THE TEAM: MARKET THE UPSIDE

Clear communication, and thorough, properly paced training protocols help promote the new system to the user base. In truth, creating the conditions in which adoption can thrive is an exercise in internal marketing; in formulating and presenting a truly persuasive value proposition. And like all value propositions, to gain traction it must be effectively and responsibly "sold" by its internal sponsors and champions.

Chris Couch, President of the Fluids Business Segment and Chief Technology Officer at Cooper Standard, notes "The more we can pull things together, the more we can pull them into common platforms, the more that we can provide common interfaces into the data, in the analytics we need - the better it will be for our user base. And then, if it makes their life truly easier, adoption follows. If it's just another assignment to enter something else somewhere, it's going to be like pushing on a rope, and wondering why compliance and usage isn't what we expected." Expanding on Couch's theme, some other recent real-world examples of PLM implementation can provide insight into key success factors, as well as approaches to avoid, in driving user adoption.

TURNING THE TIDE IN TURBINE MANUFACTURING

A globally recognized manufacturer of industrial gas turbines for onshore and offshore electrical power generation recently undertook several significant, coordinated process upgrades. One aspect of this change initiative required the company's manufacturing teams to get involved in the product design process much earlier than had been the case historically.

Overcoming some natural built-in inertia, the manufacturing organization appointed several "champions," who took the opportunity to step up, learn the technology thoroughly, map out a path to adaptation, and help define the target process end-state. The path to adaptation was not entirely without challenges, but the perspectives of those champions and their status as company employees and manufacturing insiders eliminated a lot of friction from the change process. Their presence and participation accelerated user adoption across the enterprise. For the first time, the manufacturing organization was able to begin transforming EBOMs to MBOMs, as well as to make process plans and deploy 3D visuals, on the shop floor.

ORGANIZING AGAINST ADOPTION IN MEDICAL MANUFACTURING

Real-world experience can also provide guidance on implementation practices which, though superficially logical and well-meaning, acted as actual barriers to user adoption.

A major global medical device manufacturer sought to integrate its primary CAD tool with PTC Windchill, their chosen PLM platform. The initial phases of implementation were burdened by several challenges. These were mainly related to the significant chore, correctly assigned to engineering, of initially entering product data into the new system. But due to engineering resistance, the company chose to assign a separate internal team to do that work.

Although this reassignment got the engineers off the hook for that first tranche of work, the approach ended up slowing down the process, and causing an inability to scale key data sets for release to production. Only that specially assigned team of subject matter experts and program champions ended up having to learn the new system. In effect, they became gatekeepers for the new process – and gates, regardless of the competence of the gatekeepers, are barriers by definition…not connections. While the quality of the data entered was high, the long-term business efficiency of the enterprise was impeded by the broader organizations' failure to adopt. Most unfortunately, the realization of the PLM system's full potential to improve business results was significantly delayed and will be more difficult to attain.

OVERCOMING USER RESISTANCE

A classic maxim in certain forms of military training is that "Slow is smooth. Smooth is fast." It's important to state that overcoming the intrinsic tendency of an engineering organization to resist transformational change is not achieved quickly – or, if forced through quickly, is rarely done well. And the larger the organization, the longer full adoption may require.

Even with a clear vision and articulate, energetic champions, expect full and effective adoption to take at least six, and as many as twelve, months. However, long experience and an intimate knowledge of the software itself, and the organizational dynamics that develop around any major new program, point to several best practices for maximizing adoption.

START FROM THE TOP: SECURE EXECUTIVE BUY-IN

When transforming any business process with an approach that requires new software tools, a significant financial investment is generally required. Executive sponsorship is therefore a crucial first step. Not only can executive sponsors help secure the all-important funding, but their authority may also be required to communicate the value of the initiative to the company.

Additionally, the executive can assist meaningfully in actual enforcement of the requirements that all concerned employees participate at a level appropriate to their roles. From the top floor to the shop floor, the executive sponsor can help overcome institutional roadblocks, and generally "cheerlead" for the program at all levels.

UNCOVER THE RIGHT LEVEL OF DETAIL FOR THE EXECUTIVE

An important area of focus and attention in enlisting the executive sponsor of a PLM initiative is to understand their level of technical competence and personal interest at the outset. Gaining this insight will help provide them with the level of detail that's most appropriate to their role and motivations.

Some executives may be best-served with a "birds-eye" view of the landscape – a broad understanding of the process, business, and organizational benefits to be gained. Others, especially those with engineering backgrounds, may desire and have the technical chops to assimilate and communicate at a higher level of detail. This may be not only to demonstrate to "the troops" their command of the new program, but based on a real interest in understanding the actual mechanisms of improvement it delivers.

At a minimum, every sponsor should understand and be able to forcefully advocate for PLM: how it's far more than simply an engineering tool or a data repository; it's a tool on which the company can build a strong foundation for business acceleration and general excellence.

EVANGELIZING THE VISION: ENSURING PROPER FLOW-DOWN

In addition to their first-person role as spokesman and promoter of the new PLM system, the executive sponsor must work to propagate the message down through the various management ranks. Middle management needs to be aware of, and prepared for, the change, or roadblocks can develop needlessly due to simple ignorance of the planned change and its implications.

Overcoming these roadblocks can be a far greater challenge than avoiding them in the first place. Consider a scenario in which a senior director approves of a high visibility project but encounters disagreement from a more junior manager who reports to him. Without proper organizational preparation, the junior manager may impair progress simply because he wasn't personally ready to adopt the technology. His position may be, "We're fine the way we do things today." He's not held accountable to follow his director's guidance because the proper groundwork wasn't laid by senior executives. Then, after months of stasis and zero progress, the junior manager moves on from the company.

Now, progress immediately resumes and the program advances quickly. This scenario is not unrealistic, but proper preparation of the organization through communication and training would have avoided it altogether.

EMPOWER YOUR TEAMS WITH REAL AUTHORITY

Assigning big new responsibilities to already-busy teams, without considering the need to carefully rebalance their workloads, is a recipe for failure. Too often, subject matter experts are allowed a voice to shape the transformation vision but not the time to devote appropriate attention to the effort.

It's critical for engineering associates, especially those who are paramount to the success of the initiative, to be allowed to divert or re-assign other work. A clear definition of responsibility is crucial, but totally ineffective without assigning the decision-making authority to properly attend to those responsibilities.

IDENTIFY AND CULTIVATE CHAMPIONS

The right project champions can make or break successful adoption. Complementing and collaborating with the executive sponsors, project champions not only help define the best target solution, but function as training resources for peers, as well as key players in the communications game. As day-to-day participants in the processes most affected by the new system, they are also critical in the early identification of problems that may arise so these issues can be addressed before they become real roadblocks.

REWARD SUCCESS, BUT ACKNOWLEDGE STRUGGLES

As suggested already, sponsors and champions must communicate the "what's" and "why's" explaining and justifying any new PLM program in the context of its enterprise and individual benefits. This helps the program break institutional inertia and get moving in the first place. Once the implementation is underway, it's equally important to share early and intermediate successes with the organization.

Sharing and rewarding success helps maintain overall morale as well as program momentum. When engineering leaders publicize the efforts and achievements not only of champions, but of regular users who have stepped up the bar and invested their time, that appreciation energizes everyone associated with the new system.

At the same time, specific struggles and challenges with the program should be acknowledged openly, as well as how they were overcome. Organizations that don't do this risk demotivating the teams who may have been working hard and well but faced unforeseen setbacks. In the context of the organization's ongoing efforts to enhance its competitive position through continuous improvement, an open and honest dialogue with the organization throughout the entire process encourages trust and candor - which themselves will accelerate adoption.

COMMUNICATE EARLY, OFTEN AND WELL

Sharing successes and struggles only really matters for projects the organization knows about. Nothing's worse than laboring on a project you believe in when few others are aware of it— especially projects whose results will affect many users and disciplines.

As already discussed, it's vital to inform the organization about the strategy justifying any new system, what to expect, and key milestones as defined by the project team. Training requirements and the scheduling and release of training materials should be actively shared, but also made easily available for employees' consultation at will. It's also important to inform the team about what additional resources will be made available over the course of the implementation phase, to help users learn and effectively adopt any new technology platform.

SHARE THE BIG PICTURE – AND START WITH A ROADMAP

Large, monolithic projects, such as installing a new PLM system, often take a long time to complete, even more time to fine-tune, and rarely generate the expected outcomes precisely on time and in the manner forecast at the outset. To set the project up for success through continued and ongoing user adoption, it's critical to craft a deployment plan, publicize it, follow it carefully, and update it frequently.

Among other benefits, this will define critical dependencies, ensuring foundational elements of the new system are completed before the organization tries to implement capabilities or attributes that build on that foundation.

A published, continuously updated, multi-generational plan also helps communicate how the project aligns with the company's business objectives. The company needs to make money to grow, and that growth may rely on improvements expected from the new systems' contribution to productivity and efficiency. Defining what specific improvements can be expected, and on what timeline, helps convey that the project is part of an ongoing commitment to continuous improvement, and not simply a "one-and-done" that engineers can wait out.

SHOW ALIGNMENT WITH CORPORATE OBJECTIVES

It's also important to build on the expected business objectives of the new system – efficiency and productivity, for example - with information about alignment with the highest-level corporate objectives, such as sustainability. When the engineering team sees the project being framed in the same terms the company uses to speak with its shareholders, the project's credibility is strengthened. No longer is the effort "isolated," invisible to outside observers, but woven into the fabric of the company's strategy – and visibly so.

In terms of immediate practical effect, this open and visible alignment with corporate objectives can bolster the confidence of internal executives, as well as engineers, to support the program. Particularly when regular progress is being made and published milestones hit, this visible link between the company's highest-level strategic objectives and shop-floor-level investments like PLM can help secure the ongoing funding and other resources needed to sustain progress. Early, incremental wins are like money in this context – and money talks.

TALK ABOUT GROWTH AND PROFITABILITY – AND THEIR IMPLICATIONS

Most engineers worth having around care about their company's success and wish to contribute to its health and prosperity – at least in an abstract way. But when seeking to drive user adoption, it's also essential that engineering leaders remove the effects of proper adoption from the realm of the abstract to the most highly tangible: financial reward for the individual users.

This is achieved through messaging about the program's ability to improve profitability and how that has a direct impact on the users' wallets. Through increased productivity, fewer quality defects, reduced cost of raw materials, and of course, streamlined innovation, the company's fortunes can only improve – and so should the fortunes of its individual engineers and other workers.

Bonuses, benefits packages, the value of vesting or fully vested company shares...all these are vectors of personal reward that should be leveraged in messaging to the user base. Of course, management must have the foresight and commitment to materially incentivize adoption. (And if senior executives are properly cultivated as described above, it's more likely that they will.)

SOW CUSTOMER DELIGHT. REAP COMPETITIVE ADVANTAGE.

As we all know, customers are becoming more and more impatient with their manufacturing partners. As their own end-users demand more innovative products, and more of them, at a faster pace than ever before, that pressure flows down to manufacturers. Another real-world experience involving PTC's Windchill illustrates the potential impact of the new system to accelerate time to market when user adoption of PLM is healthy and robust. Let's take a look.

Under-promise. Over-deliver.

When ordering complex products, reasonable customers are willing to wait a reasonable amount of time for delivery. In this case, however, a customer was being told to expect an 18-month delivery schedule from its vendor. This vendor, a PTC Windchill customer, sought to reduce that delivery time significantly—not just to be competitive with its rivals but to stand out among them, to achieve a real competitive advantage.

This PTC customer set the goal of reducing delivery time by two-thirds, from 18 months to 6 – a big goal; some might even say audacious. The company strategically aligned its PLM project with other ongoing internal digital transformation initiatives, and, thinking creatively, lubricated the customer's transition with multiple pre-configured, long-lead-time products.

The result was an astonishing reduction in lead time of nearly 78% - from 18 to 4 months. Through careful coordination of projects, alignment with business and corporate objectives (and a lot of hard work) PTC's customer fueled the project, its funding, and its team to drive the project to the finish line. Its customers are delighted.

ADOPTION SOLUTIONS: CHALLENGES AND OPPORTUNITIES

Just as every manufacturing company is different, no two PLM implementations will proceed identically, and each will face different challenges. But certain real and potential situations share common dynamics that are worth exploring in more detail.

MOVING MANUFACTURING INTO PLM

One of these dynamics is the amount of resistance often encountered when the manufacturing organization is asked to move its data and manage its operations into a new PLM environment. A frequent issue is for manufacturing to perceive (incorrectly) that PLM is "only for engineers." Another is that, over time, manufacturing has developed any number of home-grown tools to address its specific needs and situation. Although data in these (usually Excel-based) tools is, by definition, disconnected from the enterprise – and therefore effectively "dead," as discussed earlier

– organizational inertia, long-established habits, and reluctance to take on new work conspire to create obstacles to change.

As with other situations already discussed, this roadblock can be removed through education and clear communication. Project champions should emphasize how manufacturing engineers will be able to collaborate more easily and effectively – not only with each other but with design, quality, and other engineers across the enterprise.

If engineering changes are made in an external system like those home-grown Excel tools we've discussed, extensive manual work would be required in manufacturing. Mistakes would likely be introduced in the form of manually mistyped data, and out-of-date information might be introduced. The Excel approach is fraught with potential errors.

But in a PLM system like Windchill, engineering changes and the data that define them are accessed, processed, and revised faster and more accurately in manufacturing. When ongoing revisions are made by the engineering department, updates to the manufacturing side are completed much more efficiently. The changes and required manufacturing updates are quickly accessible and can be easily identified and reconciled. The PLM approach is more cohesive, less error-prone, and much faster – with zero threat to data accuracy. What all that boils down to is that a manufacturing engineer previously responsible for maintaining 100 to 500 bills of material can now support ten times that number.

THE PROMISE OF ARTIFICIAL INTELLIGENCE: AUTOMATION DRIVING ADOPTION

One of the most promising technologies for fueling the adoption of new PLM systems is artificial intelligence (AI). Because AIs "learn" according to the specific sets of data they're trained on, an AI system can learn the common rules, intended practices and specific parameters of the business. This points the way to the potential automation of some of the most arduous hands-on work engineers are called on to perform.

For example, AI could be used to train on change management data to assist with process improvements - bottleneck detection, forecasting, understanding root causes. Or to manage duplicate data and recommend classification metadata improving part re-use.). Engineers can review work that's already been done to ensure accuracy just before it's released rather than doing the work from scratch themselves. The engineering team's effectiveness could improve far beyond the ten-fold increase already described for PLM - to potentially more than 100X.

Consider also that AI does not have to be trained on PLM data. Leveraging out of the box large language models (LLMs), engineers can search and analyze documents and create content without any fine tuning or foundational model building.

DRIVING ADOPTION: TEAMING UP TO WIN

In summary, the key to enlisting robust user adoption for new PLM implementations in the engineering corps is to treat user adoption not as an afterthought but as a critical workstream that is woven into every aspect of the program. It requires a user-centric mindset, cross-functional collaboration, communication, education, and sustained focus and resourcing at every level of the organization. Some key practices:

Secure executive sponsorship and alignment.
Confirm and work to ensure that that top leadership is fully bought in and actively advocates for the PLM implementation. Their visible support is critical for driving adoption.

Develop a compelling vision and value proposition.
Clearly articulate the business benefits and goals of the PLM program. Help users understand "what's in it for them" in terms of making their jobs easier and improving business outcomes.

Define clear success metrics.
State specifically at the outset what success looks like. Establish key performance indicators (KPI's) that can be objectively measured. Define both end-state and interim success targets so that small wins early can build momentum and "proof of concept" as the organization works toward a fully functioning, value-maximized PLM environment.

Engage users early and often.
Involve representatives from engineering, manufacturing, and other impacted departments from the very beginning. Solicit their input on pain points, requirements, and design. Incorporate their feedback to build a system that meets real user needs.

Appoint "project champions" as change agents.
Recruit confident, influential employees who are enthusiastic about the PLM system to serve as departmental advocates, agents of change and "super users." Delegate to these trusted champions the authority to evangelize on behalf of the new system, provide support to peers, and give feedback to the project team.

Deliver robust training and support.

The importance of investing heavily in user training can't be overstated. This should include multiple available formats, role-specific instruction, hands-on exercises, and reference materials. Provide clear support channels like help desks, FAQs, and other forums for education and Q&A-type interactions. Training should cover not just system features but how PLM integrates with and impacts cross-functional business processes.

Communicate frequently and well.

Develop (and follow) a comprehensive communication plan designed to build awareness, understanding, and excitement leading up to and following the rollout. As with training, multiple channels should be utilized, including email, intranet, videos, and "lunch-and-learns." Don't forget to celebrate milestones, publicize successes, and acknowledge challenges – including how they are being overcome.

Deploy in phases.

Consider a sequenced rollout by department, product line, or geography rather than what might be termed a "big bang," all-or-nothing, overly aggressive project plan. This will allow incremental wins that build momentum, as well as allow for the testing, refinement, and scaling-up of deliverables in a controlled manner.

Monitor, measure and iterate.

Regularly monitor system usage, data quality, user feedback and – critically – real business impacts according to the established KPI's. These kinds of insights can be used to continuously improve the system, processes, and training so the overall project gets stronger over time. In line with the theme of continuous communication, these results should also be publicized to fuel progress and enthusiasm. Only what's measured can be shown to have improved.

Align incentives and maintain accountability.

Link PLM adoption and data quality metrics to individual and departmental goals and incentives – including individual compensation. Make it clear not only that PLM is a "must have" rather than a "nice to have" for the company to thrive, but that the result will be personally rewarding to responsible adopters.

USER ADOPTION: AT THE HEART OF DIGITAL TRANSFORMATION

A clear understanding of the organizational dynamics that influence user adoption will help ensure the kinds of early results that can add momentum and help power the implementation to success. It's vital to treat the PLM initiative not just as a systems project, but as an opportunity to transform engineering and cross-functional processes. Most critically for adoption, share how the program will deliver powerful benefits to the company and its shareholders, but most importantly, to the individual engineers who fundamentally define the enterprise, its strategy, and its position in the market.

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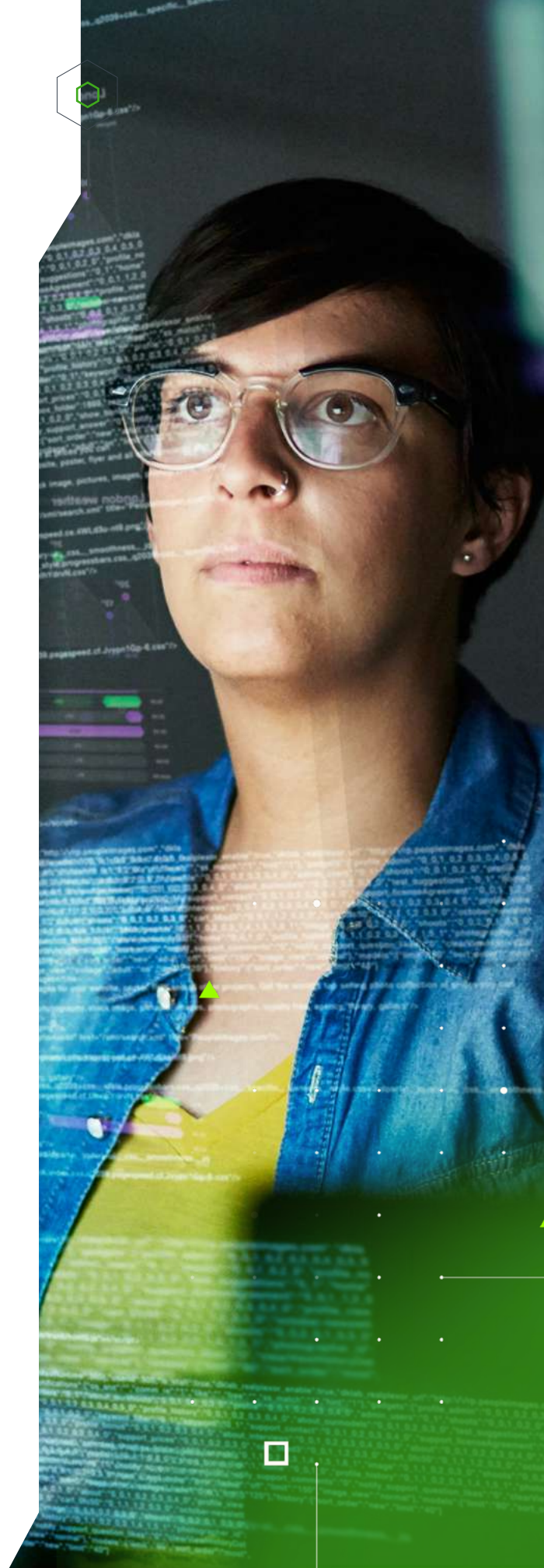
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