Low-Code Platforms Accelerate Business Value

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Takeaways

What you need to know

Takeaway #1
Digital threads and digital twins are well understood as keys to enabling an effective digital transformation. However, legacy integration approaches can't quickly (or economically) create true digital threads or digital twins of sufficient levels of fidelity and comprehensiveness.

Takeaway #2
Low-code platforms empower a wide spectrum of developers (including domain experts) to create personalized solutions that address business needs by providing them the tools and resources to do so.

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Takeaway #3
The Mendix™ platform is a modern, proven, industry leading all-in-one low-code development platform from Siemens. It connects Siemens Xcelerator portfolio codebase with existing enterprise IT landscapes; includes a multitude of templates and individualized, purpose-built applications; and provides organizations the ability to easily create new, scalable personalized solutions and modern extensions to legacy applications that can scale with the business and be available on any device.

Takeaway #4
Key to this capability is the Mendix platform's modern, microservices-based architecture that offers application composability and ensures multi-experience scalability and upgradability. This means efficient use and consistent governance of application development efforts.

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Introduction

Manufacturers face many challenges

Manufacturers are under continuous pressure to evolve, improve how they operate (develop, produce, and service their products), and deliver value to their customers and their stakeholders. They are developing increasingly complex products and systems of systems that require integrating specialized tools, expertise, and data repositories distributed across an extended value chain ecosystem. They rely on seamless, collaborative environments that encompass their internal organizations as well as their partners, suppliers, and customers. Addressing these challenges requires manufacturers to digitally transform themselves and their processes.

Such a digital transformation includes being able to create or evolve to next-generation business-specific solutions. Businesses need to create end-to-end digital threads and comprehensive digital twins at their own pace without requiring scarce or costly IT resources. The digital thread and digital twins must be able to leverage data quickly and easily from anywhere, in any format and deliver that data to the requiring user (or system) in proper context. They need to be able to integrate internal and external applications and information repositories that enable business flexibility and for-purpose productivity.

However, most IT organizations have a large backlog of requests for new capabilities and

corrections to current applications. They often have limited time and/or lack the skilled resources needed to respond quickly to the requests and needs of the business. This means that it takes too long to make the necessary changes to business and product development processes (including changes in the supply chain), resulting in continuing (and growing) inefficiency, lost market opportunity, and reduced customer/brand loyalty.

A primary reason for the typical backlog of IT requests is that traditional methods of application development tend to be lengthy and expensive and don't provide the flexibility and capabilities needed to enable companies to respond to market changes.

Using agile development methodologies powered by a low-code application development and integration platform (that connects data sources and builds applications) is an excellent approach for creating the extended digital threads (or workflows) across a value chain ecosystem required for true digital transformation of a business.

Challenges facing modern manufacturers are myriad:

- Create and maintain *global* value chains and operations.
- Provide a *secure* environment.
- Develop and support complex *smart*, connected products and be smart about how they do that.
- Continually improve the *quality* of their products and services.
- Create and support *personalized* products for their customers and personalized, business-unique applications for their organization.
- Establish collaborative workflows across a globally *connected* value chain of customers, partners, and suppliers.
- Create *sustainable* products in a supportable manner.
- Be agile and *flexible* to rapidly respond to market and business changes.
- Become a more *digitally driven* Integrated extended enterprise.
- Digitally transform the business to be more *efficient*.
- Continually improve *cost effectiveness* as well as shareholder and customer value.

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What is Low-Code Development?

Modern technology that simplifies and accelerates application development and integration

Low-code is a modern approach to software development, using a graphical user interface with logic and an easy to use drag-and-drop paradigm instead of arcane coding languages. It requires little to no coding in order to build applications and processes thus streamlining the development process and enabling accelerated delivery of personalized business applications. These intuitive tools expand the range of who can participate in software development by enabling domain experts, without formal knowledge of coding or software development, to create cross-organization business applications.

Based on a microservices architecture with functional capabilities, advanced low-code development platforms provide building blocks that can be used to easily assemble applications and entire business processes. Businesses can create multi-experience (i.e., server, desktop, and mobile) applications and streamline workflows without having to rework and maintain separate code environments for each format, allowing domain experts more time to focus on business issues rather than software development and professional developers to tackle bigger areas in the development process.

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Benefits of Low-Code Development

Personalized solutions in a fraction of the time

A key benefit of low-code development is that it accelerates time to value. Business-specific applications can be created faster. These applications can integrate data and processes across functional domains and the enterprise value chain—creating the digital thread of information and collaboration required to accelerate business and individual performance.

Low-code applications can be accessed and used via multiple devices, e.g., handhelds, laptops, etc., by personnel at all levels of an organization delivered anywhere, anytime using cloud infrastructures. This significantly improves the business value of a low-code application as the information and processes supported by the application are available to any appropriate user, anywhere, anytime.

Because low-code applications can be personalized, they provide an enhanced end-user experience, which improves both individual and organizational productivity and enables faster adoption across the user community.

Enterprise low-code development makes it easier to incorporate the requisite governance to ensure conformance to IT standards, including security, thus enabling more effective risk management and enforcing safety protocols.

Additionally, leading low-code platform solution providers also offer pre-developed applications, via a developers' marketplace, that can be customized to a company's specific requirements. This further reduces the time and cost of creating new applications needed by a business.

Courtesy of Siemens

Benefits of using a low-code platform include:

- Staff at all levels and skills can easily create personalized, business-specific solutions.
- Disparate data and data sources can be linked to create an extended value chain digital thread.
- Provides the business with greater flexibility to address business and operational changes while optimizing productive use of limited IT resources.
- Low-code applications are composable, meaning their components can be re-used in other applications.
- Enables faster transformation of the business.
- Low-code solutions are easier to upgrade, are more sustainable, and can be maintained with lower costs.
- Improved agility—operating at digital speed means quickly creating app capabilities users require to function smoothly across multiple devices.

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Siemens Mendix Platform

Delivering capabilities needed by the competitive enterprise

Siemens' Mendix is a complete, all-in-one low-code application development platform. Mendix is designed to make it easy for domain experts (also known as citizen developers) to co-create personalized applications, processes, and integrate data across diverse, distributed information repositories alongside professional developers. Built on a modern microservices architecture, Mendix is consistently ranked as an industry-leading, modern low-code platform in Gartner's Magic Quadrants (MQ) for LCAP and Multi-experience Development Platforms (MXDP) and Forrester Wave reports.

Mendix is a foundational part the of Siemens Xcelerator portfolio. It is used to integrate and extend the components of the portfolio. It can extend the capability of the Xcelerator portfolio and can also be used as a standalone tool by any company that needs to develop tailored business applications and integrate data and processes across their extended value chain.

The Mendix platform provides development environments to support developers of all skill levels:
- No-Code: Mendix Studio for domain experts (aka citizen developers)
- Low-Code: Mendix Studio Pro for traditional developers (aka professional developers)
- Extend-Code: Platform extensions for expert developers

Mendix also provides a DevOps pipeline and the deployment tools needed to streamline an application's time to value.

Mendix integration capabilities enable companies to define and create the complete digital thread and comprehensive digital twins required as part of establishing a modern, digitally driven enterprise.

Mendix and MindSphere®, the industrial IoT solution as a service from Siemens, work together to enable businesses to create new and innovative applications that connect ecosystems across any machines or sensors, from any location, on any cloud and platform. Siemens also provides numerous pre-built connectors to common applications and data sources used by a business (e.g., SAP,

MindSphere, Teamcenter® portfolio). This enables a business to create and use business-unique applications regardless of whether those apps are deployed in the cloud, on premises, or on the edge as part of forming a complete digital thread.

For example, Mendix is used to integrate with and extend existing Teamcenter (as well as other existing applications) data and workflows, using a drag-and-drop paradigm to create business logic and information access that brings additional capabilities and value to a company's in-place solution environment.

Siemens Industrial IoT
A Comprehensive IIoT Solution—From Edge to Cloud—
Powering the Convergence of IT and OT.

Courtesy of Siemens

Siemens Mendix Platform

Mendix differentiators

The low-code market is fast growing and there are many participants, but Mendix has significant functional and technology differentiators that show why it is a leader within the industry. The following paragraphs highlight several Mendix differentiators.

Mendix enables development of multi-experience solutions using a common visual language and reusable components, without maintaining separate environments. It empowers professional developers to co-create personalized solutions alongside the domain experts that need them—bridging the gap between IT and business. Mendix technology ensures that these solutions are designed to support both individuals and teams that must work together.

Mendix provides easy-to-use design capabilities that enable the creation of high-quality, tailored solutions. Developers can leverage optimized functionality out-of-the-box (OOTB) for a broad range of touchpoints and modalities, including web, mobile, immersive, conversational UIs, and IoT, eliminating the need for a specialized technical skillset.

Mendix natively provides enterprise-class DevOps and governance capabilities, along with associated platform APIs for open connectivity to external solutions across the software development lifecycle (SDLC). Organizations with established practices can easily integrate with existing version control (e.g., Git) and continuous integration/continuous

deployment (CI/CD) pipelines (e.g., Azure DevOps) to align with corporate standards. Alternatively, teams can choose to use Mendix tools for enterprise-class capabilities like version control, quality checking, functional testing, and cloud deployment. Additionally, all applications created on Mendix are registered in Control Center where Mendix Administrators can monitor, report on, and even shut down apps.

Mendix tools automatically create cloud native solutions. Every application developed in Mendix is deployed as a containerized cloud native application, ensuring scalability, portability, and reliability. Whether organizations are committed to a cloud strategy that is public, private, on-prem, or hybrid, or haven't yet established a cloud strategy, the Mendix platform provides one-click automated cloud deployment for every application, to the Mendix Cloud or to the enterprise cloud provider of choice, including AWS, Azure, and GCP.

Mendix leverages artificial intelligence (AI) to help developers. Mendix AI Assist will suggest the next best action as the app is being developed, pre-populates parameters, and will make suggestions based on the current context. Siemens claims a 95% accuracy of this capability. The Mendix Assist Performance Bot analyzes apps and helps developers implement best practices by detecting issues, recommending solutions, and auto-fixing with user confirmation.

In addition to the numerous pre-built, OOTB connectors, Mendix Data Hub provides a foundation upon which to build and evolve applications and integrations by ensuring that users have access to the data they need regardless of its source.
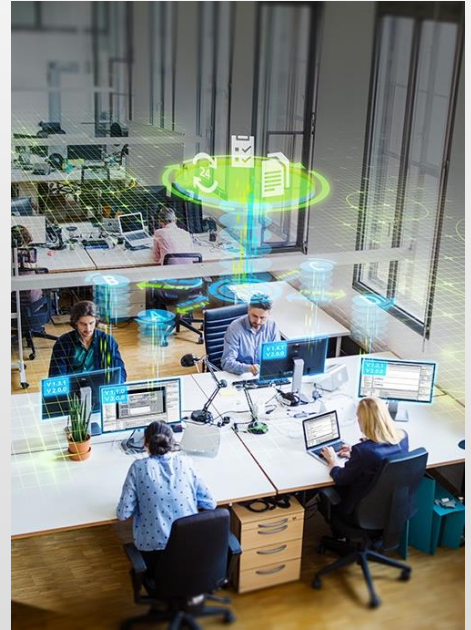
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Using the Siemens Mendix Platform

Example Successes

There are many Mendix case studies published on the Mendix website and in their app marketplace. Two that stand out are ERIKS and Philips. Of particular interest is how Mendix is used to provide the services to bring product feedback from the field back to both development and operations, enabling each company to improve their customers' experience and their products' performance.

ERIKS, a €2B industrial components wholesaler, needed to adapt to customers' desire to order products via eCommerce platforms. With almost 700,000 products and over 130,000 customers they needed to transform to support customers but did not have a seasoned development team.

So far, ERIKS has used Mendix to create two apps, Nanoflows, which enables field service engineers to enter digital data twice as fast as before, and an IoT product that monitors motion data from rotating equipment providing actionable intelligence about ERIKS' components.

Philips, a Fortune 500 electronics and medical equipment manufacturer, employs more than 100,000 people across 60 countries. To support innovation and emerging technologies Philips created an IT team to focus on three initiatives, mobile, an innovation lab, and a rapid application development process all using Mendix. It was chosen because of its ability integrate with the legacy environment, out-of-the-box mobile support, and the ability to create apps once and have them run across devices.

The team at Philips has developed more than a dozen apps to improve customer engagement and product development; each completed in four to eight weeks. Arguably, the most impressive app is MyUltrasound, that Philips uses to directly interact with over 2,000 equipment users to improve the customer experience.

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Mendix Case Study

How Avertra leveraged Mendix for competitive advantage

Avertra solves complex challenges many organizations—specifically in the utility, energy, and logistics industries—face through Smart Process Automation, AI, and Digital Experience. Using SaaS products to support digital transformation, Avertra has spent more than 5 years and $10M to build their product suite but realized that scaling with legacy technology would be difficult. After some research, Avertra chose Mendix for its microservices architecture to enable SaaS products, ease customer adoption, and minimize developer onboarding time.

Avertra built their MiCustomer™ platform (and integrated application suite) solely on Mendix. The MiCustomer Digital Experience Platform creates a seamless, immersive customer and Avertra employee experience unifying data and transactions from a multitude of systems like SAP and Oracle.

As an example, within the utilities space, MiCustomer streamlined the "meter to cash" process from meter reading to invoicing, to correspondence, to analytics from a single platform. Their customers get the Mendix platform with their solution and are able to continuously optimize and modernize the solution.

Using Mendix, Avertra is now able to transform any company into a proactive and customer-centric mindset with offerings like self-service customer portals, virtual agents, and automated back-office exception resolution management, in less than 12 weeks and onboard developers in four weeks rather than three to five months. According to Avertra CEO, Mr. Bashir Bseirani, "We realized that unless we did something differently, these problems wouldn't go away, and change would continually become harder and harder for us."

Avertra's Success Stories:

Aramex: Utilizing the MiCustomer platform, Aramex introduced a "Fleet and Spot" application. The crowdsourcing Uber-like app enlists, tracks, assigns work to, and pays over 10k drivers. The platform increases visibility in three core

areas: 1) Customer self-service e-commerce, 2) Demand for last mile delivery, and 3) Support for local communities where Aramex operates to provide residents the opportunity to earn extra income.

Halifax Water: Halifax implemented Avertra's MiCustomer portal solution delivering a premier customer service experience to their customers. With this initiative, Halifax was able to deliver personalized online information and services to each customer across multiple engagement channels with a proactive alert and notification model. Halifax's hundreds of thousands of customers can now have easy access to water consumption data, usage patterns, AI based usage and bill forecasting, and more.

Southwest Gas: Southwest Gas chose to engage Avertra with their MiCustomer Back Office solution and developed a sophisticated process mining and machine learning based decision system that analyzes and resolves exceptions without human intervention. Avertra's automation is able to (on a daily basis) resolve 10 thousand exceptions without involving human agents.

Fairfax Water: Fairfax Water implemented an omni-channel customer portal from Avertra's MiCustomer platform over an eight-month period utilizing a three-release deployment approach with the first release going live in under 12 weeks. Avertra delivered innovative solutions such as virtual agents, automated move in move out, enhanced mobile features, real-time payment, and billing history enhancing Fairfax's customer experience and streamlining their processes.

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Conclusions

What you should remember

The pressures on manufacturers are enormous. Globalization, competition, product complexity, and pricing are the main drivers of the pressures. Companies need to find ways to lower cost, improve quality, and shorten time to market. Product and process innovation are the most promising route to address these pressures. Digital transformation is the strategy that best supports such innovation. Many technologies address digital transformation but leveraging a low-code development platform has helped many companies adapt and extend their current applications and quickly create new ones, to help enable digital transformation more quickly.

Siemens acquired Mendix, an industry leading low-code application development and integration platform less than four years ago and has already leveraged it pervasively across its Xcelerator portfolio, including Teamcenter, Siemens' flagship PLM solution. Mendix already had a strong market presence across business applications, and with the Xcelerator integration, Mendix customers gained access to one of the broadest and deepest industrial software portfolios. Siemens' customers gained a low-code development platform and the ability to connect to the existing, and rapidly growing Mendix application ecosystem which should enable customers to readily integrate with business solutions such as SAP, and Salesforce.

Mendix addresses the breadth of business problem spaces by applying a low-code approach to areas of technology such as collaboration, data integration, workflow, multi-experience solutions, AI, and cloud. It enables domain experts

and professional developers to individually and collaboratively create enterprise-grade applications that address the needs of the business. CIMdata is looking forward to seeing what Siemens Digital Industries Software and industrial customers continue to create with this state-of-the-art platform.

CIMdata is impressed with Mendix and the results it can bring to companies. Manufacturers and commercial businesses should consider using Mendix to support their digital transformation, IT modernization and low-code development and integration needs.

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