SIEMENS
Ingenuity for life
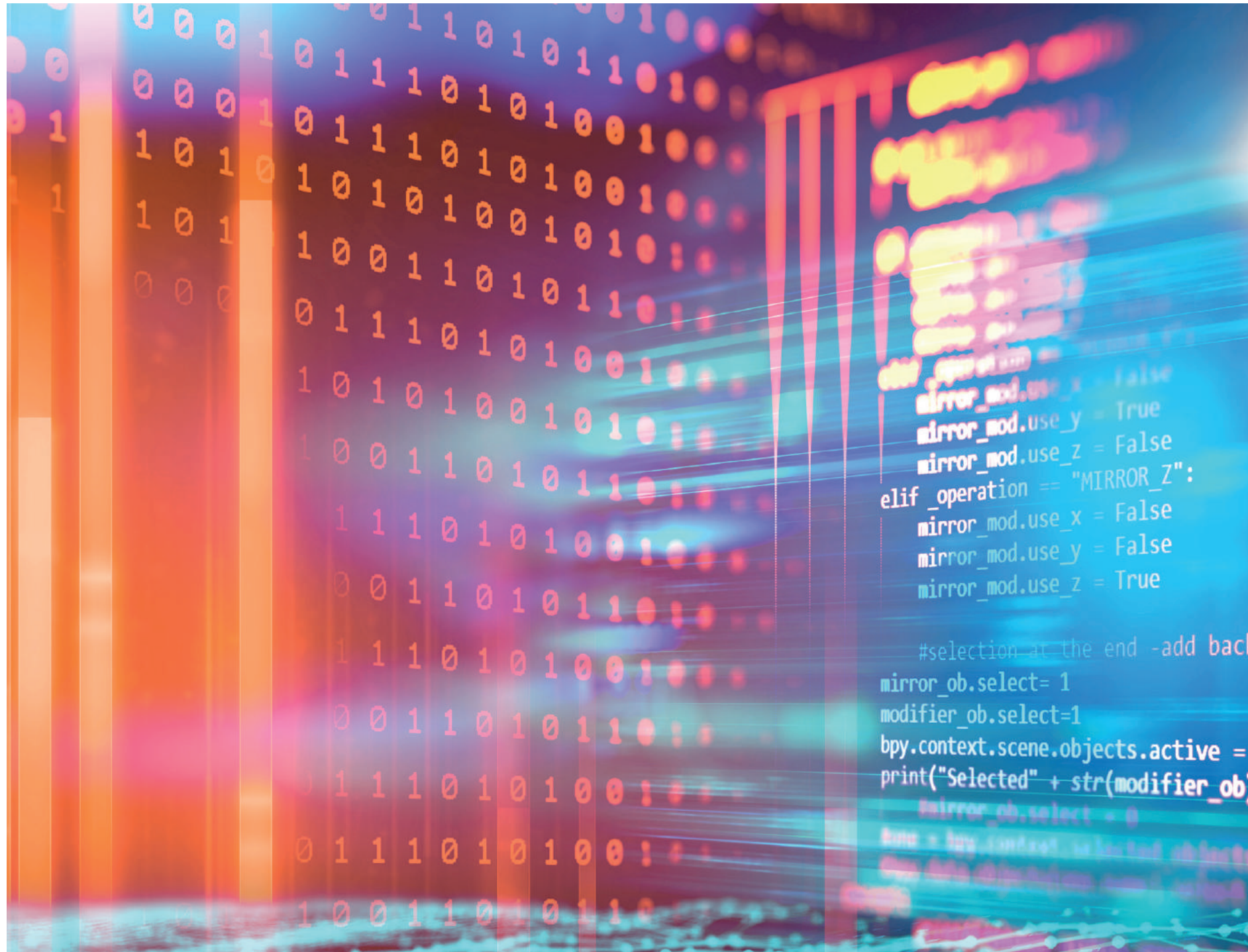
The low-code digital transformation guide

Providing a road map for using Mendix to launch a low-code initiative

siemens.com/software

Contents

A new world

The world is changing and the way you develop software needs to change with it. The key? Your entire organization. Start breaking down walls to clear space for your innovation factory. When we began our journey, we wanted to solve a problem that you and countless other businesses face every single day: delivering software with traditional tools and techniques. The problem, while easy to grasp, is massively complex. The success rate of an enterprise-scale digital project is very slim, with 70 percent of projects either facing serious challenges or failing altogether.[1]

It's all about collaboration. Or a lack thereof. Infrequent end user involvement often results in unclear requirements. And unclear requirements are harder to address and refine when development teams use processes that are rigid and siloed. The result? A perfect storm of inefficiencies causing delayed projects fraught with issues.

We have made it our mission to help you weather this storm. To do this, we needed to break down the walls between business and information technology (IT) to reform the way enterprises approach application development. We aimed to connect people with innovative ideas to the technology that would help them turn those ideas into a reality.

With low-code development, we've enabled and fostered business collaboration in over numerous organizations of all sizes across a range of industries and geographies. Harnessing years of research, development and a myriad of successful customers, we have become a leader in low-code application development, supporting a community in the tens of thousands.

We have taken this experience and transformed it into what you're reading now: the digital execution guide. With this, we guide you through executing your organization's digital transformation strategy and mending the rift between business and IT so you can get back to what you're good at: making.

What does it mean to make?

Making is delivering technology to enable and empower the makers and doers of today. You're a maker. You are leading your company through a digital transformation. You're implementing massive changes to digitalize your company and empower everyone in the organization to be able to make applications.

For your organization, you've been asking, "What's next?" That answer is digital transformation, in which application delivery is crucial. Long-cycle planning and lengthy application delivery cycles no longer support today's customers' needs and expectations.[2] Whether it's building or refining solutions that enhance engagement with your customers, resolving operational inefficiencies or driving new business, your applications are the key value delivery mechanisms for your organization.

For digital transformation to truly take hold, you need to start asking, "What if?" What if there was real collaboration between the business and IT that enables your makers to take their innovative ideas and deliver real, tangible results? What if there was a way to let your people experiment, explore, build, develop, question and answer in a structured, repeatable and scalable way? We have your answer to, "What IF?"
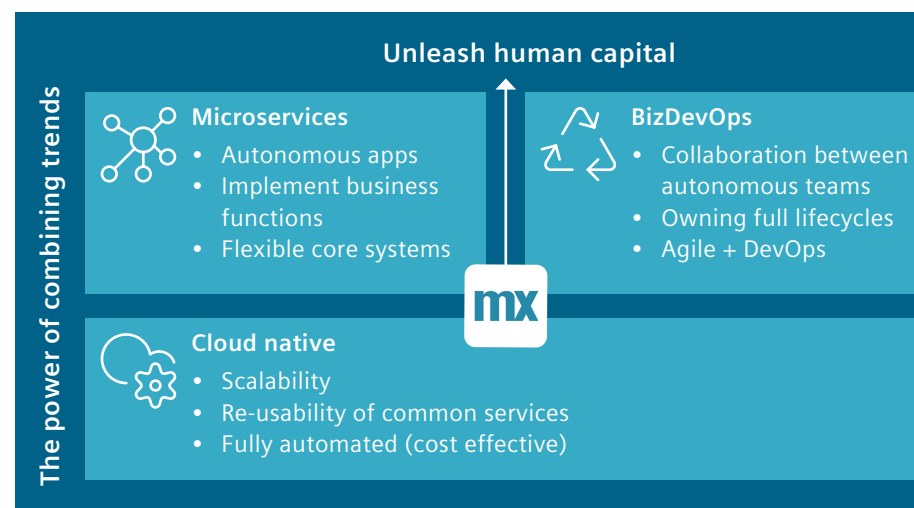
Welcome to the innovation factory

The innovation factory is the critical juncture where exploration meets real actionable results. It's a process that uses constant and choreographed collaboration to produce enterprise-grade applications in an efficient, predictable manner. It's a scalable, self-sustaining, organizational capability that enables you to manufacture that IF.

The innovation factory is a combination of our low-code technology and rapid application development methodology. Your innovation factory's foundation is built on a convergence of three trends. Microservices are providing new ways to architect applications and infrastructure. Developers are freer than ever to concentrate on the value an application offers rather than focus on the intricacies of a messy monolithic backend. Cloud-native deployment options provide opportunities for enterprises to be more scalable and agile because of its cost effectiveness and the re-usability of common services. BizDevOps is a new way of collaborating across the entire development lifecycle – including business users, developers and operations – to ensure an application is released quickly and accurately.

The innovation factory enables a BizDevOps approach and helps you establish a constructive and conscious common language centered around business needs, architecture and deployment to help you make applications at scale.

When you begin your journey of digitalizing your business, you need a vision and a strategy that gets you to the innovation factory so you can unleash the creativity and ingenuity of your enterprise and enable makers in IT and the business to rapidly ideate, create and deploy apps at scale.

The power of combining trends

Unleash human capital

Microservices
- Autonomous apps
- Implement business functions
- Flexible core systems

BizDevOps
- Collaboration between autonomous teams
- Owning full lifecycles
- Agile + DevOps

Cloud native
- Scalability
- Re-usability of common services
- Fully automated (cost effective)

mx

Start here

Let us guide you through this new world of digital transformation and arm you with the know-how to enhance collaboration. We'll take you through the elements of digital transformation, and the key players and pieces that enact change in your application delivery process. Once you're accustomed to the elements and goals of digital execution, we guide you step-by-step through building the foundation of your innovation factory. We also show you the Mendix tools that help you empower more people to create at scale, enable apps with smart technology and turn those ideas into reality.

The elements of digital execution

The innovation factory doesn't start out of the blue. You need to build it from the ground up. But before going into how you build your innovation factory, let's get acquainted with the different elements of your digital execution journey, the key drivers to unleashing your enterprise.

The 4 Ps

Mendix has identified the core tenants of digital execution. These are the 4 Ps. Throughout this guide you'll see that each P comes with its own set of milestones and objectives, all driving toward the goal of building your innovation factory.

People

The people you choose to fill out your Mendix team are absolutely crucial to the success of your digital execution program. You need more than just enterprise low-code developers on your team.

You want to find the right people with the right skills, no matter their job title. Success starts at the top, where senior executive buy-in is a must. You need a program owner to lead the program and mandate change. Architects are critical as well, because they will help establish a target architecture, infrastructure and governance. Product owners are key players in a successful program because they have in-depth knowledge of the business, the product and its users and will have insight into the value that it will create. Finally, an application development manager needs to spearhead the initiative and drive the program as well as the cross-functional teams that will deliver on those projects.
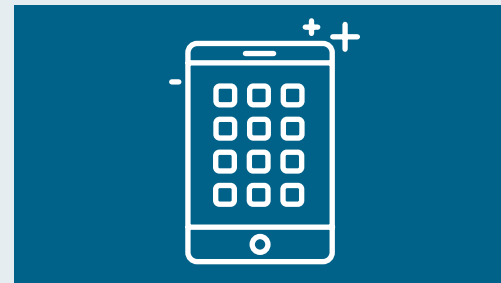
Portfolio

A successful rapid application development model is all about identifying the right projects and creating a project portfolio of quick wins and high-value initiatives. Quick wins allow you to realize immediate success and create a wow factor, while high-value initiatives justify broader organizational change, especially when the applications are tied to relevant strategic initiatives. Mixing use cases is important to increase your portfolio flexibility in the later stages of digital execution, so include new-market applications as well customer engagement and operational efficiency.
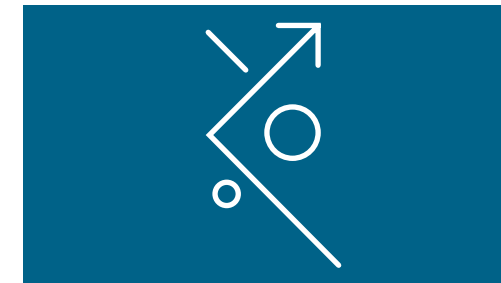
Process

Successful digital execution means changing the way you work and establishing rapid application development processes. Agile methodologies like Scrum are a good starting point, splitting the work into sprints and basing them on user stories, but you also need to change from a traditional way of development and operations into a BizDevOps approach, speed up release cycles from quarterly to bi-weekly (sometimes even daily), and learn how to develop minimal viable products (MVPs) with fast-paced, follow-up iterations.
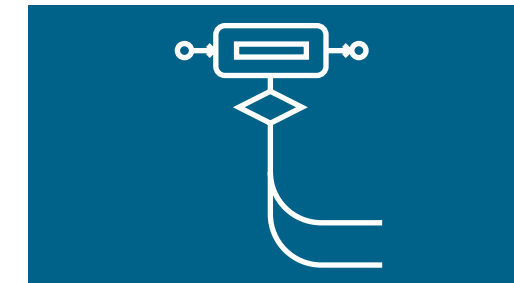
Platform

As you hurtle toward digital execution, the rapid application development platform you choose shouldn't just be about new technology trends like artificial intelligence (AI), big data or blockchain, or whatever comes down the line. You need a platform that also helps you improve operational efficiencies, reduce time-to-market and foster collaboration between business stakeholders and IT: Something that addresses the present and prepares you for the future.

Seek out a platform that helps you not only deliver faster, but more accurately, so you can produce robust applications in a matter of weeks. This is the fail-fast, learn-fast approach.

The innovation factory requires going through three major stages: start, structure and scale. Each stage has its own unique set of objectives, all with the aim of scaling up your application development program.

Start, structure and scale

Start
Innovation factory foundation

Establish first team, value and MVP

Structure
Formalized methodology and architecture

Get predictability and continuity

Scale
Scalable innovation factory

Continuously increase productivity and efficiency

Start
If you need to build a mode of transportation and you've never built such a thing before, would you start by building a car or a skateboard? For most people out there, you'd probably start with the skateboard. It's not the car you want, but a skateboard gets you from point A to point B (albeit a little slower), with minimal relative effort. You've developed an MVP. This is what the start stage is.

Start is about laying the foundations for your innovation factory. In start, you develop applications that realize value quickly. The reason for this is two-fold:

1. You'll be spending more time building a team and putting the necessary prerequisites in place in terms of infrastructure and process.

2. You want quick wins. Quick wins are important because you'll use these to prove the value of your new approach; you'll want to celebrate your first success and gain broader support around the company.

Structure
If the start stage is about establishing and proving the benefits of rapid application development, then structure is about building out predictability and continuity. Structure is about growing from your first set of apps to a portfolio with more apps addressing multiple use cases, expanding your first team into multiple teams and expanding your maker center. Structure is about taking the process of your first agile experience that you established in start to a process that institutes shorter release cycles under strict governance. In structure, you're ready to move from your first cloud deployment to a multi-cloud deployment.

Your objectives for the start phase:

1. Deliver first value.

2. Build and enable first team.

3. Develop and deliver first MVP.

4. UX design of the first app.

5. Begin architecture design.

Structure is where you start to formalize your rapid application development process – establishing an architecture, enabling continuous delivery and creating governance. By establishing predictability and stability, you're building the scaffolding for the maker center.

Your key objectives for the structure stage:

1. Formalizing your processes.

2. Building more apps and extending your portfolio use cases.

3. Architecture design.

4. Advanced level development team.

5. Governance documentation.

6. Automated testing.

Scale
From start to scale, learn how to use Mendix to speed up and scale out app development and start delivering real value for your business. Your talent has been trained and activated in such a way that you can shift them around the organization to work on projects where their skills are best put to use. You are applying greater automation to your processes to efficiently and rapidly deliver and manage hundreds of applications with strategic impact. This includes automating deployment and maintenance to support a large portfolio, automating quality assurance to proactively monitor the maintainability of your projects, and enabling greater re-usability by establishing a private app store. With these capabilities in place, you maximize value and productivity by creating distributed innovation capabilities throughout the enterprise. You have achieved continuous productivity and efficiency.

Your objectives during scale:

1. Talent portability.

2. Delivery velocity.

3. Team efficiency.

Influencing factors

We've identified key influencing factors that can impact the success of your digital journey, laid out across three levels of digital execution. Throughout this guide, we will highlight the influencing factors to consider at key points of building your innovation factory. The icons you see in the image below will let you know which key influencing factors to keep top of mind for that particular stage and milestone.

Strategic level

This level is about evaluating and proving a strategic impact, addressing transformation risk and identifying resources to ensure success. In other words, it's about putting into place the pieces for establishing and maturing a rapid application development vision. The key factors here are: the right executive with the right vision, a wider organizational footprint and expanding the portfolio to include more applications across the different use cases.
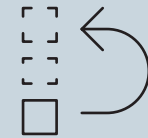
The vision   The organizational footprint   Use case focus and portfolio

Program level

The focus at the program level should be on achieving and proving return-on-investment (ROI), a realization of the benefits and communication. One of the key factors at this level is the program owner who owns the Mendix program and is leading change throughout the organization. Another factor is the architect who is critical in connecting the IT and business organizations and acts as what Gartner calls a vanguard architect,[3] one who establishes and communicates architectural guidelines and guardrails. The third influencing factor is proving ROI because seeing is believing. Without proving program value, it's difficult to expand your rapid application development capability that you're building.

The program owner   The architect   ROI and budget for change

Application level

The value focus at this level should be on time, cost and quality. To ensure the success of these application-level influencing factors, you need the right product owner from the business; a collaborative, trained and Mendix certified team; and to make sure that they're delivering the right application from both a technical- and business-value point of view.

The product owner   The team   The app(s) delivery
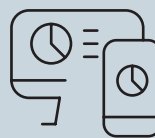
Let's get making

It's time to start laying down the foundation of your innovation factory. To do this, you'll need to create your first Mendix team, establish processes and celebrate the successes you'll achieve in the early parts of your digital execution program. It's all about firsts in the start stage: first value, first team, your first MVP.

We've aligned each objective to the 4 Ps and have listed out the milestones for each and the ways to achieve those milestones. At the end of each P, you'll also receive the structure milestones so you know how to not only lay the groundwork for sale but start building toward it.

Team position and organization

Before starting anything, you need the right people to make the first application and portfolio, and to help you prove the value. We've created the blueprint for building your first Mendix team, assessing that team and showing how it can grow and collaborate with the business and other departments within your organization.

Influencing factors

Program owner	Architect	Organizational footprint	Product owner	Team

Find problem solvers

Find team members who care about solving business problems (rather than people who prefer to build solutions based on detailed requirements). There will be many obstacles to overcome due to existing processes and the culture of the business, so seek out people who have a can-do attitude.

Look for the type of people who want to test their limits and have some technical proficiency, but also understand business challenges. A host of individuals that we've seen successfully make the transition come from business analysis, UX, front-end web design and business intelligence backgrounds.

In the end, selecting the right team is the cornerstone of success, not just for your first project but for your entire rapid application development program.
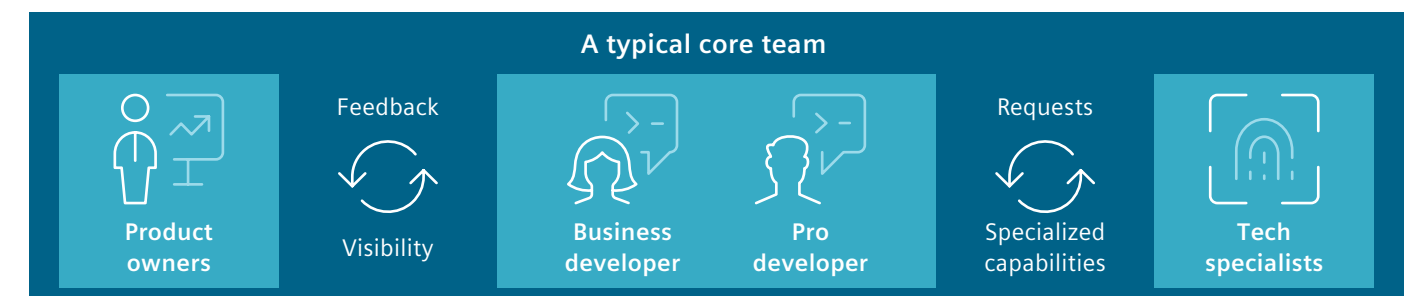
A who's who

It's important to keep your team small as you build your innovation factory. With a small team, you can deliver new applications quickly, avoiding much of the miscommunication and delays that often come with larger development teams. Smaller teams encourage productivity and creativity. Amazon chief executive officer (CEO) Jeff Bezos's "two-pizza rule" states that you should never have a meeting where two pizzas couldn't feed the entire group. The smaller the team, the more room for brainstorming and peer review (and an extra slice of pepperoni for all).

Bashir Bseirani, CEO of Avertra, saw his team become more collaborative when they started using Mendix because they could operate in a smaller team environment. "Our philosophy is, we should be able to build an app with a team big enough to eat one pizza. When Bezos decided to do his two-pizza model, he didn't know about Mendix and he didn't know about the power of it."

A strong first Mendix team is more than just the number of people in the room. Your first Mendix team should include a core development team comprised of a combination of a professional developer, someone with technical expertise, and a business developer, someone familiar with the platform that can act as a power user if needed. The key is to have developers who can collaborate closely together, bridging the gap between business needs and technical possibilities.

A typical core team

Product owners	Feedback / Visibility	Business developer	Pro developer	Requests / Specialized capabilities	Tech specialists

The right team means the right product owner. The product owner acts as a stakeholder, someone who understands the value of the user stories and makes sure the requirements are being met. Your product owners are critical components of your success as a team. The right product owner needs to have a vision of what you need to build, a solid understanding of the users and marketplace and a keen ability to prioritize backlog. Make sure they have the right authority to make decisions and engage with the team daily.

A Mendix certified developer is also highly recommended to help the team get trained on the Mendix platform.

Some other team members to consider in the start phase are what we call accelerators. As an example, the UI/UX person makes the app look good but also establishes a template ecosystem for future applications. There's also a need for an architect to establish guidelines and think of the future state of the IT ecosystem.

One pitfall to avoid is assigning a different team member for each project role. Each member can be responsible for multiple roles. Instead of a formal structure, team members take on work based on their areas of expertise. For example, you don't need a dedicated Scrum master for your first projects; the lead developer can fill this role on top of his or her existing development tasks.

Typical start stage

One product owner	One lead/ Scrum master	Trained engineers	Accelerator
			UX / Architect
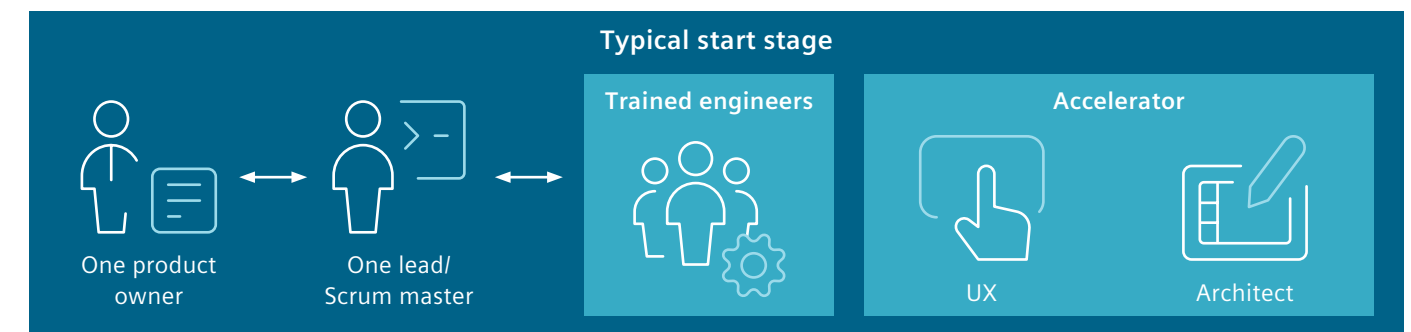
Mendix developers come with all types of skill sets

Developers come from all parts of the business, not just IT. From hardcore programmers and business-centric developers to tech-savvy business analysts, low-code platforms let you build teams of makers from all backgrounds.

| Citizen developer | Business developer | Rapid developer | Full stack developer |

← Business developers — IT developers →

Mendix Studio
Business developers

Mendix Studio Pro
Pro developers

Code extension
Expert developers
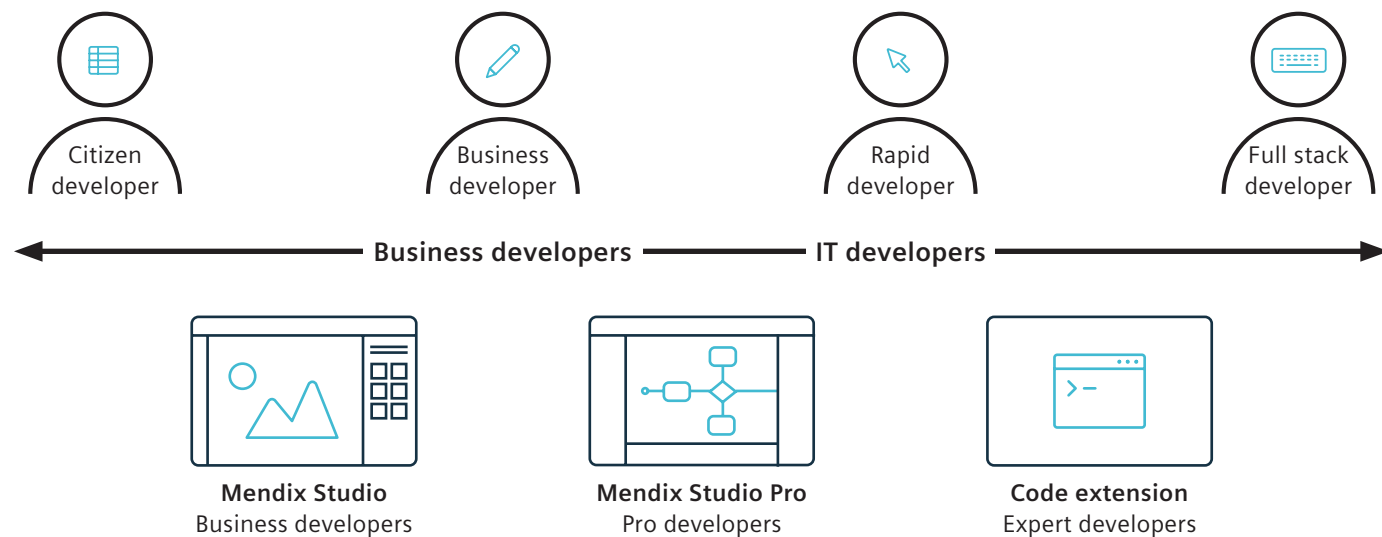
Activate your team

It's tempting to just focus on your new low-code platform at the start of your maker center. In reality, it's best to train your team on an agile development process, too, so they can collaborate effectively. This will make learning the Mendix platform easier because you'll understand how it works. By observing an experienced Mendix developer in action, your team learns how to effectively engage business stakeholders and deliver better solutions.

Another way of enabling your new Mendix team is with training and certification. The Mendix Academy offers three-day introductory courses and rapid developer certifications to help upskill employees on how to rapidly develop applications and use the Mendix platform.

The most effective rapid application development teams are onsite together, ideally located with the product owner, working through frequent iterations based on user feedback. Your innovation factory is all about enabling creativity to solve business challenges faster. By keeping your team close together, you can keep the group excited and motivated to continuously deliver and show results.

Giving your team the right tools will also take them far. The tools used by each person on your team will differ, depending on their technical acumen. A citizen developer, someone with limited or no programming experience, can easily pick up Mendix using Mendix Studio. Traditional developers will find themselves at home in Mendix Studio Pro.

"Because the product owner sits right next to us, we can quickly get feedback on what we're developing, which makes it so much faster."

Jennifer Taylor
Business Developer
Innovapost

"With Mendix, you have to think from the database model up and the relationships between entities and build upon that. When you can do that, you are thinking completely differently and understand the relationships. This has made me a better developer."

Evan Gagnier
Full Stack Developer
Granite Telecommunications

"People are always talking about solving problems with software, but I don't think it's always problem-solving. You can add value to an existing process. Sometimes, we can just make it better."

Yasmijn Joosten
Citizen Developer
Kuehne + Nagel

"We wanted to show how quickly a project can get done with little to no overhead using digital execution and really allowing developers to work with free reign without the process wrapped around it."

Russ Martin
*Rapid Developer*
Erie Insurance

Team growth strategy

When building your team, you also want to build a team growth strategy so you can expand your rapid application development program efficiently. There are a few options to do this.

Option A: the centralized model
In this model, there are multiple product owners who work with a Scrum master and directs multiple teams of developers who work on various types of apps.

You also want to start creating and fostering a talent pool from which you can quickly and easily pull from in case a developer leaves the team.
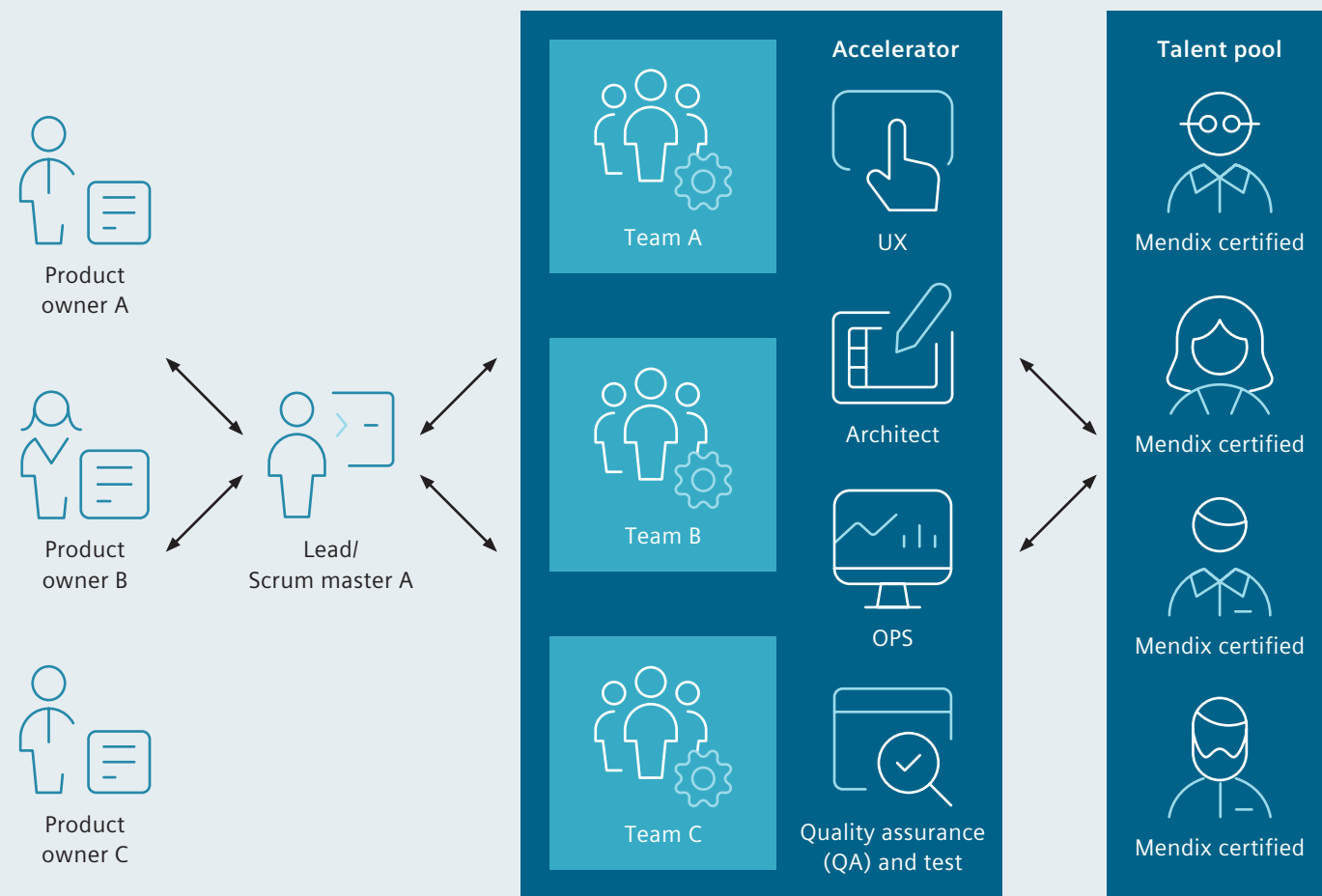
Option B: the decentralized model
This model requires you to have a core development team consisting of a Mendix engineer, an enterprise architect, designer, Scrum master and professional developers. This group trains and enables the talent pool while deploying them from different business units.

The core team owns the application portfolios, sets up architecture guidelines, establishes best practices and ensures agile awareness across the business while the other units build their own portfolios. This model also enables the business developers in your organization. Thinking about future state, this is where you start to scale out your innovation factory.

Product owner A

Product owner B

Product owner C

Lead/ Scrum master A

Accelerator

Team A

Team B

Team C

UX

Architect

OPS

Quality assurance (QA) and test

Talent pool

Mendix certified

Mendix certified

Mendix certified

Mendix certified

EA/lead architect

Designer expert

Scrum master

Test/Q&A manage

Pro developer

Team B

Own BU portfolio

Own BU portfolio

Own BU portfolio

Unit A (embedded in BU A)

Business stakeholder

Product owners

Business developer

Unit A (embedded in BU A)

Business stakeholder

Product owners

Business developer

Unit A (embedded in BU A)

Business stakeholder

Product owners

Business developer

Citizen developer

Own "flex" portfolio

Citizen developer

Own "flex" portfolio

Citizen developer

Own "flex" portfolio

Talent pool

Mendix certified

Mendix certified

Talent pool

Mendix certified

Mendix certified

BizDevOps vision

Much like a team growth strategy, we recommend also creating a BizDevOps vision for your team. Rapid application development can work only as fast as the operations allow. You could build and deliver apps at the speed of light, but they aren't realizing value until operations makes them go live. So, begin investigating what alignment between development and operations looks like in your business.

Structure

You want to take your team growth strategy and put it into action. Your objectives here are about expanding your original team and creating new ones.

Sourcing and enablement strategy:

Mendix Studio and Mendix Studio Pro cater to developers of all kinds. Because of this, you can recruit developers from atypical places. Go beyond your full-stack developers and try to find technically minded people from the business who are focused on solving problems and making great things.

To do that, you can use the resources from the talent pool that you began cultivating in the start stage. And you can pick a team growth option that's right for you and your business and start executing it.

Grow and split your teams

Your team in the start stage was purposefully small. As your apps become more complex and gain more exposure, your team needs to grow in proportion to that. Add an architect and an UI/UX designer if they're not already part of your team and add an operational engineer as well. Regardless of your team growth strategy, you'll be creating more teams as well, adding more business developers and product owners from across the business.

You've read about who needs to be on your first Mendix team. Take some time to consider people you work with that would be perfect for these roles. Consider people in and out of your business. When you invite them onto your team, give them a token to let them know they're going to be working on something very important and exciting.

Identify the first applications to develop

Part 3 | Portfolio

It's important that your first applications bring immediate value upon launch because rapid application development isn't about delivering rapidly, it's about realizing value quicker than you have before. Remember: build fast, build right.

One project does not equal one application. We recommend that you start with a portfolio of three applications. Although the first success is always important, to truly grasp the new rapid application development process and the Mendix platform, developing multiple apps and demonstrating repeated success is a best practice. You have a new team with a new way of working using new technology. Showing replicate success is important. Stick to application use cases that have low predefined requirements and a higher rate of change (innovation, customer engagement, operational efficiency).

We've developed a checklist of considerations to assist you in identifying the right applications for your first project. It's almost impossible to find projects that cover all eight considerations, so we've categorized them as must have, should have and nice to have.

Influencing factors	
Use case focus and portfolio	App(s) delivery

Must have

1. **Go live quickly**
   One of the main goals of your first application is to validate your ability to rapidly bring new ideas to market.

   It's important that you identify quick wins that can go live, typically in 30 days. Select applications that are limited in scope and can stand alone in production.

2. **Make them worthy**
   Your first applications should also be highly visible within the organization. They must have the right urgency and executive support, as well as deliver tangible business value. Select applications that you're sure the results will get noticed and your success will be shared by stakeholders.

You want word of your initial successes to spread like wildfire throughout the organization. Suddenly, you'll have colleagues banging at your door, saying things like, "I heard you delivered that application in 30 days. How did you do that? Will it work for my project?"

3. **Involve business stakeholders**
   Requirements are often unclear and need to be refined through collaboration with, and feedback from, business stakeholders. The goal is to illustrate the higher level of creativity and collaboration facilitated by this new rapid application development approach.

   The key to involving business stakeholders lies with the role of the product owner. The product owner knows what needs to be built. Applications are successful when the development team and product owner work together with a passion for making applications that deliver value. Limit business involvement to a single department with your first applications. Too many people can hamper your team's ability to make decisions quickly.

4. **Ensure a desire to take the applications into production**
   Another important consideration is that you can take the applications into production. Doing this gives you a clearer picture of the time-to-market advantage. As an aside, starting with a prototype might lead others to believe this approach is only suitable for prototyping, which is underselling the impact.

   For instance, a Mendix customer built a customer self-service portal in six weeks, only to discover a week before go-live their biggest competitor launched a mobile app. They pushed the application to production and within two weeks added mobile functionality while the initial version was delivering value. Rapid application delivery gives you the ability to pivot quickly and address changes in the market in a matter of weeks.

5. **Limit dependencies**
   To deliver applications in as little as 30 days, limit your applications' external dependencies. External factors over which you have little or no control can quickly diminish the productivity advantage offered by the Mendix platform. That's like using a permanent marker on a brand-new whiteboard.

Some dependencies to avoid:

- Integration with existing systems, particularly those where application programming interfaces (APIs) aren't defined

- Deployment infrastructure. It's not uncommon at large companies to wait two months for the required hardware. For this reason, deploy your first application in the Mendix Cloud. With one-click deployment, you're able to remove all friction from the deployment process

- Industry regulations. Often, external regulations can make for unclear requirements, which can lead to delays

6. **Don't get bogged down in requirements**
Digital innovation projects are often marked by unclear business requirements. Don't worry; this is a good thing because it is better to define a high-level goal or purpose versus having detailed requirements. The more requirements your first applications have upfront, the longer it's going to take to release. Make sure that you have at least two follow-up iterations planned so you can capture and refine requirements and build trust with the business stakeholders. This shows them that even if their requirements don't make it into the initial MVP, they will come in the next versions.

The process of getting from idea to production is traditionally a lot of work, so when the people across the business see an idea come to fruition in just 30 days, they will be amazed.

Matt Rogers, chief information officer (CIO) of Suez UK, a waste management company, looked for a way to quickly address gaps in his portfolio. Using Mendix, he and his department were able to do so: "Where we have gaps in our architecture, or gaps in our application portfolio, low-code enables us to build them very quickly and bring them to market."

7. **Make failures into wins**
It's ok to admit defeat. In this case, it's beneficial. It may sound contradictory, but good first applications are often ones that your organization previously failed to deliver.

For instance, a Mendix customer initially failed to build an application that calculates prices because the algorithm was so specific to the business, and the .NET developer couldn't grasp all the nuances. Using Mendix, business stakeholders and IT developers were able to take that failure and turn it into a winner, collaborate much more closely and successfully deliver a first version of the application in a few days.

8. **Make them smart**
To ensure that apps deliver the best possible experience to the user, they should be intelligent, contextual and proactive – for example, smart. Develop an app that could use AI to personalize a user's experience or uses geolocation to let you know the location for the cake you ordered for your big app launch party.
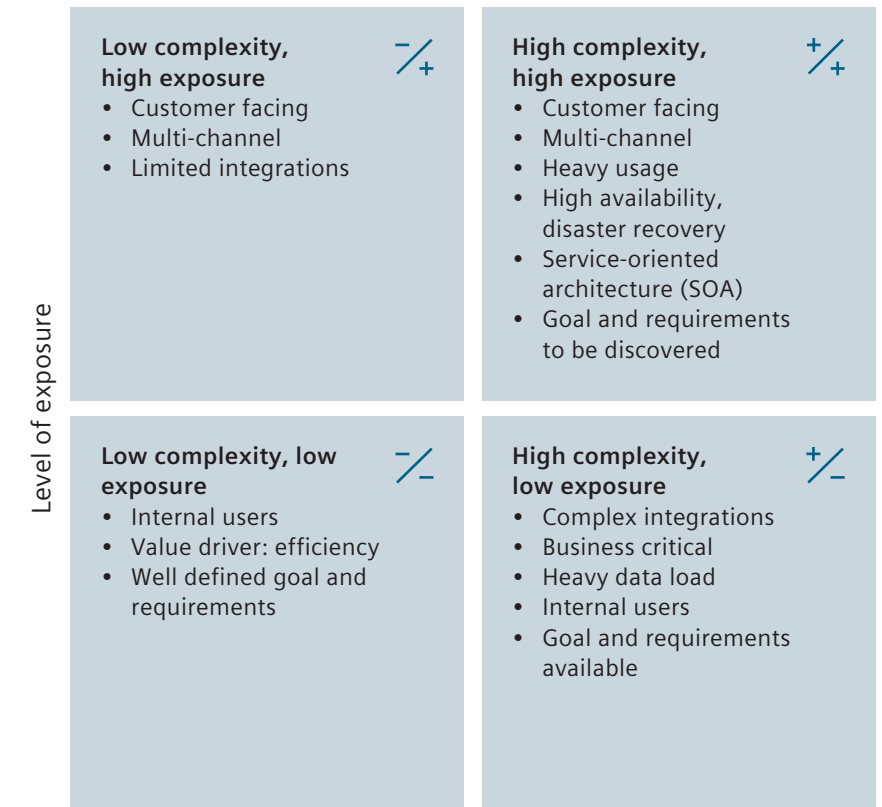
As you progress from the start to the structure phase, the looser these guidelines become. For example, you can select applications with multiple integration points, or start to work on applications that have more predefined requirements. By picking the right applications you will illustrate several important things:

1. You can release applications to market in an unprecedentedly short time.

2. Business and IT can effectively collaborate to deliver new innovations.

3. You can achieve results with fewer resources (small teams, low cost).

4. You are able to work with agile processes and feedback cycles.

5. Your new approach is a repeatable process, not a one-off success.

6. You will show continuous improvement using a fail-fast, learn-fast approach.

The complexity matrix
Using the complexity matrix is a great way to assess the right projects for your start stage portfolio. Exposure is the amount of usage or availability an application has. Complexity can be defined as how technically complex is the application; for example, how many integrations does the application require? You want to start on the left-hand side of the quadrant, which represents your team learning and feeling comfortable with the new way of working.

Level of complexity

Level of exposure

Low complexity, high exposure −/+	**High complexity, high exposure** +/+
• Customer facing • Multi-channel • Limited integrations	• Customer facing • Multi-channel • Heavy usage • High availability, disaster recovery • Service-oriented architecture (SOA) • Goal and requirements to be discovered
Low complexity, low exposure −/−	**High complexity, low exposure** +/−
• Internal users • Value driver: efficiency • Well defined goal and requirements	• Complex integrations • Business critical • Heavy data load • Internal users • Goal and requirements available

Take a minute to review the eight considerations and use the checklist below to start thinking about and writing down the first applications you're going to make with Mendix:

- Go live quickly
- Make the apps worthy
- Involve business stakeholders
- Ensure a desire to take the applications into production
- Limit dependencies
- Don't get bogged down in requirements
- Make failures into wins
- Make them smart

Deliver your first application

You've carefully selected your team and thoughtfully selected your projects. Now it's time to deliver. Agile methodologies like Scrum are a good starting point and a critical component of digital execution, but not all Scrum principles work for all organizations. Also, if the business is unwilling or unprepared, the effort is in vain. You need to prepare the business for rapid, iterative development, which is why the selection of a product owner is important.

At Zurich insurance, senior product underwriter, Alex Tong, was a critical player in Zurich's inaugural DevOps team's first application with Mendix. Tong gave the DevOps team a deep understanding of a data-capturing application that helped the underwriting process. Working together, Tong and the DevOps team were able to produce an underwriting app that's saving Zurich underwriters days' worth of time, allowing them more time for quoting and building business.

Agility is crucial to rapid application development because it brings an iterative, team-based approach to software development. Rapid application development teams deliver components of an application in sprints, time-boxed phases with defined durations and a finite list of deliverables planned at the start. Collaboration is key to an agile approach.

Here are some guidelines to ensure a successful delivery of your first application with rapid application development:

1. Intake workshop

   This workshop is where the real collaboration begins. The purpose of the intake workshop is to define the project business goal – not what you want to build, but what you want to achieve. The meeting should include the following people:

   - The project sponsor, or the leader of digital transformation initiative, who can articulate the strategic value of the new approach

   - The product owner, who can describe the problem the application should address

   - Mendix power users, a subset of end users, to enable the definition of requirements for the first sprint and who have a firsthand knowledge of the organization's challenges and needs

This type of interaction will help create a different attitude towards IT and set the stage with the rest of the organization. Although this workshop alone won't transform your organization, it gets the business to think, "This just might work." That is a victory upon which you can build.

2. Kickoff workshop

   You cover several topics in the kickoff workshop:

   - Assigning project roles and responsibilities

   - Formulating a high-level delivery plan

   - Creating agile awareness and a lean governance approach

   - Sharing strategic business goals

   - Defining clear rules of engagement

   Instead of assigning technical roles, give people full ownership of their user stories and divide the work based on those. Thanks to the Mendix Studio and Medix Studio Pro, business developers can do most of the work themselves. Then, when necessary, you can bring fly-in experts for specific technical issues like integration or performance tuning. Using project management tools like Jira or Sprintr can help manage the user story-based work.

   Once you have defined the new rules of engagement, work out the first 10 to 20 user stories as a team. Go through the exercise of having one person write a user story and someone else interpret it. This helps to create a shared vocabulary and understanding, including a definition of ready that indicates when the team collectively feels a user story is ready for development.

   As a last step, prioritize the user stories for the first development sprint. Mendix provides APIs that connect tools and services to the Mendix platform. We recommend that you try to do all the work in Mendix first before integrating with a third-party tool or service. When you start to include those, you start to increase dependencies, which is what you want to limit in the start phase.

3. Run short sprints

   Scrum typically calls for two-to-four week sprints. With longer sprints, there's always a threat of not going live. The faster you go live, the faster you can realize value.

   A traditional development approach suggests waiting for feedback at the end of the sprint. With longer sprints, assumptions made by developers can negatively affect the latter end of the sprint when you finally demo the application because developers are not eliciting feedback early and often enough. When mistakes build up and aren't addressed until the end of the sprint, this causes application development to slow down.

   An important aspect of collaboration is listening. Bringing in the business and asking for their feedback throughout the development process tells the business that not only are they being heard, but you're able to listen and incorporate feedback remarkably quickly. Make sure to allocate time to process user feedback.

   The Mendix visual modeling lets the business see what you're building; they don't need to look under the hood and at the code to understand. This is a huge factor in collaborating and engagement. Allocating time for feedback will help the business feel for the first time they are truly involved in the creation process.

4. First sprint review meeting

   In each sprint review meeting, but particularly the first, it is critical to show a good working demo.

   - Show how you solve business problems. Don't just demonstrate features; tie the demo back to the business objectives and challenges shared at the onset of the project

   - Make sure the user interface (UI) looks good. Users will judge the book by its cover, even early in the development process. Make sure they don't tune out because you have underinvested in the UI

   - Use good demo data. The data needs to be representative so the demo feels real to business users. They will start to get excited with the impact of the new solution.

   The Mendix Atlas UI is an open source and extensible design framework that brings good user experiences to your applications. Atlas UI gives your user interfaces a simplicity, consistency and responsiveness to allow you to brand your apps and make them usable across a range of devices.

Mendix Studio Pro enables you to adopt an agile approach based on Scrum. With capabilities like sprints, story management and integrated feedback management, you can easily get an agile shop up and running in a single environment. More importantly, you can start bridging business and IT and start developing apps that bring real value.

Holding shorter sprints helps a team that is learning not only how to collaborate with each other and across the organization, but also how to estimate the complexity of the user stories they need to build. As the app begins to take shape, you can move to two-week sprints.

Mendix Studio Pro provides several tools to enable real-time, business-IT collaboration:

- The developer portal – Includes stories page that lets you add and edit sprints, and a social tool called Buzz that enables stakeholders post updates, make comments and upload documents

- The feedback and collaboration widget easily elicits and receives feedback from all involved with the project. Beyond making comments, you can get feedback in real-time with the edit, view and share functions

- APIs – Connect Mendix with third-party tools and services

Demo each sprint

Systems design can be an abstract exercise. To make sure your developers are on the same page with your product owners and vice versa, your product owner needs to be sitting with your developers and establishing a common language among them. With Mendix Studio and Mendix Studio Pro, you can remove abstraction. Model-driven development and real-time collaboration allow you create a common, shared language among your Mendix team – developers and product owners alike. Rather than just talking about a function, a developer can easily show it in action and get immediate feedback on it.

Your applications should be doing a combination of three things for your company:

1. Creating new products and business models

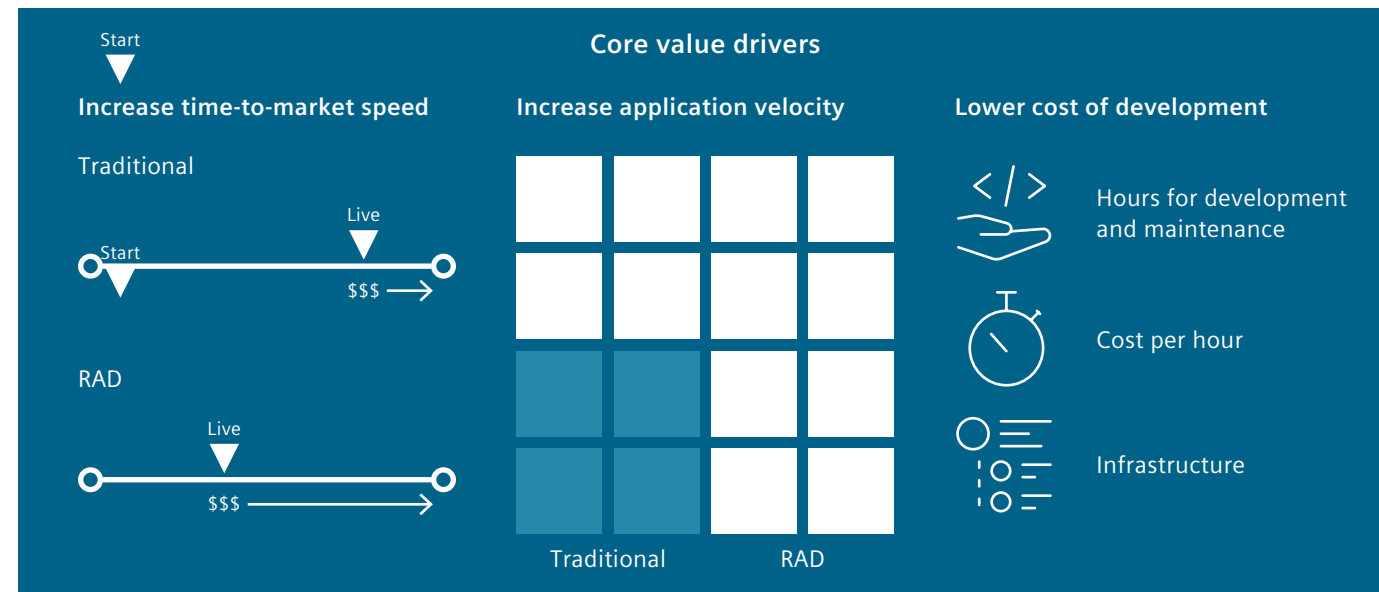   Apps can help you enable strategic programs that aid in reaching business objectives like launching new business models, entering new markets and staying ahead of your competition.

2. Enhancing customer engagement

   Apps that create new products or services that attract new customers or enhance an existing product to prevent churn. Keep them coming back for more.

3. Increasing operational efficiencies

   Apps that help you decrease operational and IT costs with process automation and infrastructure improvements.

Influencing factors

ROI and budget for change	Program owner	The vision
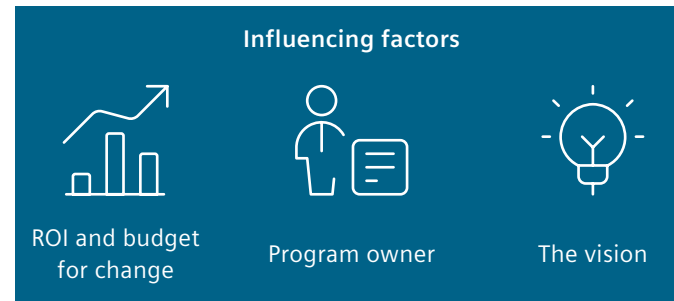
When you're assessing the value of your application portfolio, consider how fast you're bringing your applications to market (time-to-market), how fast you're building those applications (application velocity) and how much time and money you're saving in development (cost of development).

Core value drivers

Start

Increase time-to-market speed

Traditional

Live

$$$

Start

RAD

Live

$$$

Increase application velocity

Traditional   RAD

Lower cost of development

Hours for development and maintenance

Cost per hour

Infrastructure

The higher the potential value of your application, the greater the unpredictability. That is, an application designed to reduce costs has more predictable value than one that helps you enter a new market. You can use the previously mentioned complexity matrix to help you define the value of your products. Or you can create a use case with the program owner that describes the current state of affairs and offers a description of the application idea.

Use our digital use case template to start assessing the value of your project. The use case should talk about what the application is, what it's solving or creating and the key performance indicators (KPIs) to help assess its success.

Data capture application (B2B) ⊠

Current situation

Poor data quality ....

Too much time spent on manual data input ....

No splash ....

Description of the idea ("we believe")

....

We believe that this new app can improve data quality and automate data capture ....

....

What will it solve/create?	Affected KPIs?	Enabled by:
....	....	....
reduce time to capture data,	....	Mendix Studio, makers,..
increase data integrity, ...	....	ingenuity ....
a big splash	....	....
....	....	....

Celebrate success

Your initial applications will be a catalyst for change throughout the organization. To ensure the organization knows about the successes of the apps and understands their value, you need to celebrate success.

When you celebrate success, you create awareness for the value you've delivered and what it means for other individuals and departments across your organization. Celebration drives executive sponsorship, establishes broader support, and attracts new talent. According to McKinsey, involvement from company leaders is critical. "Companies with CEO sponsors are twice as likely to be high performers as companies whose CEOs are not directly engaged in digital."[4]

People like to be associated with success and when they see it, they will quickly want to be a part of it.

Here are some tips to maximize the impact of your internal celebration:

- Throw a party and invite as many people as possible, not just your development team. Host the party in a central location so other departments take notice.

- People love cake. To be more specific: people love free cake. Order a cake. One of our customers in the shipping industry made their cake look like a shipping container because their app increased the utilization of their containers. You could make your cake look like a volcano, because business is about to erupt.

- Make sure your most senior sponsor is in the room to reinforce the importance of low-code development.

- Captivate your audience by presenting the astonishing results of your project. Have the business show the demo.

Structure
Portfolio in the structure stage is about expanding the number of apps in your portfolio, their use cases and their complexity.

Move to high-complexity apps
In structure you want to move to the right in the complexity/exposure matrix. Only after you've established repeated success and consistent delivery velocity should you move to the upper right quadrant. This is a gradual approach.

Crawl, walk, then run
Make sure your team is ready to take on more complex apps. Train them and get them to be rapid and advanced

developers certified through the Mendix Academy. Take the governance strategy we discuss later and put it into action.

Portfolio/use case mix of rebuild, ideation and components
In start, you've selected your first projects, delivered them and received many accolades. In structure, you want to expand your use cases and start increasing your output. To do this, express an "application ambition." This is your statement of intent for growing your portfolio. List out how many apps you want to create, which use case they fall under and start to estimate their value.

Think about the key pieces of information you'd show off during your application launch celebration: Here are some starters:

1. Why you started making this app.

2. The app's key performance indicators (KPIs).

3. Your journey to building the app.

4. How the app has performed against those KPIs.

5. Key takeaways.

Put governance structure in place

A core element to success is repeating it. Repeated success leads to and informs your governance around rapid application development. You need to define and implement processes and rules around application development that help you coordinate and control your application portfolio.

Governance is creating a centralized hub where you establish best practices around agile and Scrum, UI/UX and guidelines around build, deployment and architecture. You're assigning the people on your team responsibilities around these best practices.

Influencing factors

Program owner	The vision	Architect	App(s) delivery

Establish a retrospective cadence

To achieve this milestone, it's first important to establish the goals of a retrospective. The retrospective should look back on the project and review successes and lessons learned.

1. Did the project achieve its business goal?

2. Did you have the right people on the team?

3. How well was the business engaged in the process?

Embrace all feedback, whether it's perception or reality. Again, let the business know they have a voice and their input is vital to improving future projects. Seek their advice on how to develop a more structured rapid application development approach that further enhances engagement and collaboration with other business units.

One of the most important questions to ask the business stakeholders in the retrospective is, "What would you tell your friends/colleagues about this project to make them enthusiastic?" This elevator pitch is great fodder for internal feedback, with the goal of implementing this approach more broadly across the organization. To effectively engage the business, you may have to reverse years of perception. The key is constant communication and proof. Once business users see that you have done what you said you would do – and they can have a significant impact on the project – they will quickly embrace this new approach.

Onboarding
We've talked about the people-focused milestones already, but onboarding is a people-centric milestone that falls squarely into the process aspect of start stage. You've selected your team, but you have to give them time to learn on the job. Making mistakes and experimenting with different tools and processes is going to help you learn what works and what doesn't work for your rapid application development process.

What you learn during onboarding can also help inform your governance strategy, so be sure to record not just your successes in the start stage, but your missteps as well.

Try framing your next retrospective around these questions:

1. What did you like?

2. What did you learn?

3. What did it lack?

4. What did you long for?

Structure
You've established that it works, now it's time to codify that success: The process milestones in structure center around standardizing best practices and creating governance around the technical aspects of rapid application development.

Standardize best practices and methodology

This is what we like to call functional governance. Here you are capturing the many different processes that you've used successfully to then share with others and refer back to. Capturing the milestones of the 4 Ps – your ideation process, release cycle, agile collaboration methods and how you ensure quality – are all processes that should have best practices set around them.

To gain a better understanding of your successes, make sure when you're closing your learning loops and going through the feedback process you and your team start to include lessons-learned with your retrospectives. This will help define and build your rapid application development playbook in the structure stage.

Establish a governance plan
If the above milestone is about functional governance, this milestone is about technical governance. The governance plan you were visualizing at the start stage should be up and running at this point. Set up guidelines and rules around architecture, testing/QA and deployment to ensure your process continues to run smoothly even with more people and more complex applications.

High-level positioning
High-level positioning is about knowing how and where Mendix fits in with the rest of your IT ecosystem. Use the start stage to experience the benefits of instant provisioning, not just of the application environment, but all the software needed to support the entire lifecycle, from project management to repositories. Learning more about how easy it should be to deploy and operate apps shows how developers can do this and help your innovation factory achieve continuous productivity and efficiency.

Influencing factors
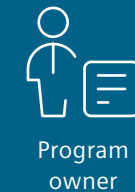
Program owner	Organizational footprint	Architect

Deployment strategy

The start stage is an excellent time to start exploring the cloud and use this knowledge as input for strategic choices in the future. You're most likely going to deploy your application on the Mendix cloud because it's the most optimized cloud to run Mendix built applications. Built on top of Cloud Foundry and AWS, the Mendix Cloud is the deployment solution in which Mendix provides hosting environments for you. It's available globally and comes standard with deep insights, alerting capabilities, high availability options and backups.

But as you expand your portfolio and move from start to structure, you will need to consider other deployment options and moving to a multi-cloud environment. Understanding the cloud environments to which you'll deploy – for example, the security features and how they fit into your existing security framework – will help inform how you move to structure.

Run in the cloud

Mendix applications run on the platform's cloud-native, stateless runtime architecture that conforms to the 12-Factor App principles with support for modern cloud platforms such as Docker, Kubernetes and Cloud Foundry. Mendix applications provide auto-scaling, auto-provisioning, auto-healing, low infrastructure overhead, continuous integration and continuous deployment and cloud interoperability, all out-of-the-box.

With the Mendix platform, you can package and deploy your applications to the cloud provider of your choice with one-click deployment. This feature automatically creates the appropriate deployment package (like Docker or Cloud Foundry) and supports the creation of build packs for on-premises or infrastructure-as-a-service deployments.

Data and integration strategy
Similar to your deployment strategy, you also want to begin considering what your data and integration strategy looks like with Mendix and the rest of your IT ecosystem. You need to consider your architecture strategy, too. This is an opportunity for that vanguard architect you elected to come in and understand what architecture works best for your development program.

Part of building a successful innovation factory is moving away from a monolithic architecture to a microservices setup. Your vanguard needs to investigate if microservices is right for your business and evaluate its benefits (hint: it is right for your business).

Microservices are a historical improvement in the way we design, build and manage IT assets. To us, there's no more productive combination than a microservices architecture and using a low-code platform.

Small, autonomous DevOps teams use microservices to produce deployable components that fulfill a business function autonomously. Use microservices to model your IT landscape closer to the way a business is run. This not only better bridges the gap between IT and business stakeholders, but also can drastically improve flexibility and time-to-market.[5]

Moving to the cloud and microservices in conjunction with using Mendix can help you realize application development velocity increase by five or 10 times.

Structure
You've established deployment and integration strategies, now it's time to execute. The structure objectives of the platform are about developing re-usable components and expanding out to a multi-cloud strategy.

Develop re-usable components
A successful move from start to structure means developing re-usable components to save time later in the development cycle. You need to first establish a re-usable component strategy and define how they are used, maintained and where they're stored. Assign a development team to solely work on re-usable components. This team will be in charge of not only creating but maintaining the components as well. This team should store the components in the enterprise app store.

Deployment strategy
In start, you used Mendix cloud to deploy your first set of projects. But as you grow your teams and expand into multiple business units, you need to start considering a multi-cloud strategy.

Although it was tempting to think about using Mendix Studio and Mendix Studio Pro in their entirety form the start, you chose to focus on the people and process. You've got some amazing first results and some great takeaways that prove your organization can adopt a new way of working.

You've successfully laid the foundation to your innovation factory. You've hit the milestones for each of the 4 Ps and have:

1. Delivered your first value.

2. Built and enabled your first team.

3. Developed and delivered your first MVP.

4. Designed UX for your first app.

5. Begun your architecture design.

Take a moment to admire your work and think about next steps. Remember, the key to moving from start to structure is not success but repeating it. Repeated success shows that you've ironed out any wrinkles in the process, smoothed out any kinks in your first team and showcased the value you've realized from your portfolio.

This is the beginning

The real work is just starting. Taking your company from being digitally disrupted to digitally innovative is not done in a day. Now you are armed with the know-how to go out and successfully digitize your organization. You're moving forward with a new, collaborative way of working. Soon you and your team will be building amazing things.

Use the steps we've laid out in this guide so you, your team, your business stakeholders – your entire organization – are empowered to answer, what if? You're ready build the impossible. You're ready to create the exceptional.

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