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eBook

Guide to Low-Code and AI

A practical framework for adopting AI-powered low-code development at enterprise scale while avoiding AI sprawl, maintaining governance, and delivering measurable ROI in regulated industries

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Context

Artificial intelligence has transformed software development. But the speed of adoption has created a new challenge: AI sprawl—dozens of disconnected tools, fragile governance, and teams experimenting without a framework.

As an OutSystems partner and a consultant with 30+ years in digital transformation, Noesis has implemented hundreds of low-code projects in Portugal and internationally, particularly in highly regulated sectors such as banking, insurance, healthcare, and industry.

This guide reflects what we've learned in the field: what works, what fails, and how to successfully adopt AI and low-code without compromising security, compliance, or control.

From AI adoption to AI sprawl

Artificial intelligence has transformed nearly every aspect of building and delivering software. From AI assisted code generation to automated testing, AI is embedded across almost every stage of the software development lifecycle.

In fact, several organizations have already integrated AI into their development processes, and nearly all plan to increase that investment in the year ahead. But AI adoption hasn't come without complications.

The rapid rise of point solutions and niche tools has created a new layer of complexity. Many enterprises now face "AI sprawl. Modern development requires more than adding AI on top of existing processes. It demands a framework that unites technology, skills, and process. In this guide, we'll show how the right framework enables a smarter, faster way to build without compromising quality, security, or control.

The 5 pillars of a modern development framework

To move from experimentation to sustainable success, organizations need a framework that enables AI-driven development without adding risk or technical debt. Based on hundreds of implementations across regulated industries, we've identified five interconnected pillars:

1

Unified platform

Modern delivery depends on integration between the people and processes building them. A unified platform consolidates tools across the SDLC so teams can design, build, test, and deploy in one environment. Embedded AI accelerates coding, testing, and deployment, while central governance eliminates "shadow IT" and ensures visibility and consistency. In our experience, fragmented tool chains create more problems than they solve. The goal isn't assembling "best of breed" tools but minimizing handoffs and maximizing visibility across the entire lifecycle.

2

Governance and security

As AI grows more capable, it also introduces risks. Governance ensures every automation, app, and agent meets enterprise standards through permissions, compliance checks, and version control. Built-in governance allows even regulated industries to innovate confidently within frameworks. We've seen organizations struggle when governance is enforced through policies rather than built into platforms. Developers bypass manual approval processes, leading to ungoverned AI tools in production. Especially for European enterprises where GDPR compliance is mandatory, governance can't be an afterthought.

3

Empowered teams

Demand for software keeps rising while hiring remains constrained. AI-powered low-code empowers existing teams to build faster by combining automation with visual, collaborative tools. Developers focus on architecture and innovation, while AI handles repetitive coding and testing. The result: faster delivery, better collaboration, and greater efficiency. Competing for talent on salary alone is challenging. We've found that upskilling existing teams delivers results faster than waiting to hire. Senior developers focus on architecture and complex problems, while AI handles boilerplate code, and visual tools enable broader team participation.

4

Continuous measurement and optimization

Without visibility into performance and workload, sustaining quality and speed is difficult. Modern frameworks rely on measurable outcomes as the foundation for improvement. The DevOps Research and Assessment (DORA) framework defines four key metrics—deployment frequency, lead time for changes, change failure rate, and mean time to recover (MTTR). AI enhances these by surfacing insights and recommending optimizations, allowing teams to continually refine processes for agility and impact. Many teams track activity metrics but miss what truly matters: how long it takes to move from idea to production, and how reliable those deployments are. DORA metrics provide this visibility. In practice, measuring lead time for changes often reveals that bottlenecks aren't in coding—they're in testing, approvals, or deployment processes.

5

Scalability and extensibility

A scalable low-code platform integrates seamlessly with enterprise systems while futureproofing for emerging AI capabilities. Portfolio awareness prevents redundancy and ensures consistent customer experience across the enterprise. Every enterprise we work with has legacy systems that can't easily be replaced—mainframes, decades-old ERP customizations, proprietary databases. True scalability means integrating with these realities, not ignoring them.

Choosing the right platform

A modern development framework requires a solid technological foundation that unifies AI, low-code, and governance into a single ecosystem. Based on hundreds of implementations across European regulated sectors, we've identified the capabilities that distinguish truly modern platforms from those that simply add AI features on top of existing tools.

AI-native capabilities

Built-in AI that accelerates every stage of development, from code generation and testing to deployment and optimization. AI must be embedded across the platform's core, not bolted on through third-party integrations that create governance gaps.

Governance and Design

For organizations operating under GDPR, PCI DSS, or sector-specific regulations, governance built into the platform's core is the only approach that scales without becoming a bottleneck.

Unified SDLC

A single environment connecting design, development, testing, deployment, and lifecycle management with full traceability. Fragmented toolchains add friction at each handoff; unified SDLC eliminates the integration tax that slows delivery.

AI agent orchestration

Support for designing and managing AI agents that integrate with existing systems through secure data access and permissioned workflows. The platform must provide guardrails preventing agents from accessing data or executing actions outside defined boundaries.

Rapid agent iteration

Advanced platforms allow teams to refine or retrain AI agents as business needs change without starting from scratch. This flexibility prevents the common pattern of teams abandoning agents that can't adapt.

Open integration

Seamless connectivity with enterprise systems, APIs, and data sources, whether legacy or modern. Open architecture supports new technologies including the ability to bring and manage your own LLMs.

Portfolio awareness

Holistic view of all applications and agents across the enterprise promoting reuse and preventing redundancy. Without portfolio visibility, organizations build the same components multiple times, wasting effort and creating maintenance burden.

The ROI of modern development

For modern development, ROI extends beyond cost savings to include agility, quality, and business responsiveness. According to DORA, four metrics offer a proven foundation for assessing performance: deployment frequency, lead time for changes, change failure rate, and mean time to recover. AI-powered low-code directly improves these metrics by automating tasks to increase release frequency, using generative AI to shorten lead time, embedding testing to reduce change failure rates, and providing integrated observability tools to accelerate recovery.

In our implementations across several enterprises, we've observed that the biggest gains come not from coding faster, but from eliminating wait times in testing, approvals, and deployment processes. Qualitative benefits compound that value: faster innovation cycles, improved developer experience, and tighter business-IT alignment. Together, these outcomes transform modern development from a cost center into a competitive advantage.



Modern development in highly regulated industries

Sectors like banking, healthcare, and government face strict compliance requirements, data sensitivity, and legacy systems that can't easily be replaced. In our experience working with financial institutions and healthcare providers, low-code and AI change this equation when governance is built in rather than bolted on.

Platforms with embedded security, version control, and auditability enable enterprises to modernize confidently while maintaining compliance with GDPR, PCI DSS, and sector-specific regulations. The challenge isn't choosing between speed and compliance; it's choosing platforms where compliance enables speed rather than blocking it.

Mitigating the risks of AI-assisted development

AI delivers major productivity gains, but it also raises challenges around governance, security, and transparency. As systems evolve from simple assistants to autonomous agents, the need for guardrails grows stronger. Nearly half of IT leaders cite AI sprawl and ungoverned tools as top risks.

In our work with European enterprises, particularly in regulated sectors, we've seen the pattern repeatedly: teams adopt AI tools for speed, then discover compliance gaps months later. A modern framework mitigates these risks through five essential capabilities:



Centralized governance

A single control plane for all AI components (models, data sources, and agents) ensures visibility into what's running, where, and why. Without this, organizations end up auditing AI usage reactively rather than governing it proactively.



Explainability

Documenting the logic and intent behind AI-generated code, decisions, or agent actions. In GDPR-regulated environments, explainability isn't optional. Regulators and auditors require traceability from decision back to data and model.



Human-in-the-loop oversight

Keeping people involved in reviewing and approving critical AI outputs and agent behaviors. We've implemented this in financial services where AI can recommend but humans must approve any changes affecting customer transactions or compliance processes.



Embedded security

Encryption, audit logging, and policy enforcement ensure that models and agents operate securely. Security bolted on after deployment creates gaps. It must be enforced at the platform level, not through policy documents developers bypass under deadline pressure.



Continuous monitoring

Tracking AI and agent performance to detect drift, bias, or unintended actions before they reach production. Model performance degrades over time as data patterns change. Monitoring must be automatic, with alerts triggering human review when thresholds are exceeded.

By combining AI and agentic capabilities within a governed low-code environment, organizations move from risky experimentation to responsible automation. This isn't about slowing down innovation, it's about scaling it sustainably with both speed and control.

How AI and low-code can deliver measurable impact

Enterprises across industries are already using AI-powered low-code to accelerate innovation. Based on our implementations across Portugal and Europe, these are the use cases delivering the most tangible value:

Agentic AI and IT automation

AI agents manage repetitive tasks like environment provisioning, monitoring, and incident response. Combined with low-code orchestration, they help IT teams operate proactively rather than reactively.



Legacy modernization

AI can analyze decades-old requirements documents, COBOL code, or AS/400 logic to extract business rules, then accelerate rebuilding for modern platforms. In Portuguese banking and insurance

Automated testing and QA

AI identifies anti-patterns and generates test cases, reducing manual QA work while improving coverage. We've seen testing become the bottleneck in many organizations attempting to accelerate delivery.

Intelligent documentation

Natural-language models transform code and workflows into searchable, maintainable documentation. In enterprises where institutional knowledge walks out the door with retiring developers.

Rapid prototyping

AI-generated code and visual modeling tools let teams build functional prototypes in days instead of months. This is particularly valuable in regulated industries where business stakeholders need to validate requirements.

Successful Implementations of Low-Code

These implementations show the value of low-code solutions.

Results in action



Replacing Manual Processes with Intelligent Cost Forecasting



[Read full success story](#)



Innovation in IP Management with Scalable Low-Code Platform



[Read full success story](#)



Technical debt reduction with Low-Code Solutions



[Read full success story](#)

Why Noesis?

With over 15 years as a trusted OutSystems partner, Noesis helps companies accelerate their digital transformation through enterprise-grade, low-code solutions. With a team of over 600 certified developers and more than 150 successful projects, we combine the AI-powered OutSystems platform with agile methodologies to build complex applications in just 6 weeks, when it traditionally takes 6 months. From strategy to ongoing support, we offer end-to-end delivery focused on generating real value, rapid return on investment, and competitive advantage.

Why OutSystems?

The Noesis and OutSystems partnership dates back to the very first project developed with the low-code platform. Noesis is one of the first, and more experienced OutSystems partners worldwide, and counts with a dedicated team of more than 150 professionals, with over 230 certifications, to deliver custom made solutions in record-time, with the greatest business impact.



Talk with us and let's make the next success story

Recognized by OutSystems





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