Five forces redefining the CTO mandate in software companies

Insights from 350 European software CTOs

2025

EY Parthenon

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Introduction: Five key forces that redefine the software CTO agenda

Chief Technology Officers (CTOs) at software companies[1] are under pressure. AI is moving from experimentation to execution, cyber threats are escalating, and boards are shifting priorities more quickly than ever before.

The pace of change is not easing, it is accelerating

In recent years, AI has moved from the periphery to the core of strategy, delivering measurable efficiency gains in both software products and R&D operations. As threats intensify, cyber-security has risen to the top of board agendas. At the same time, product modernization and talent remain essential foundations for competitiveness.

Drawing on client experience and survey responses from more than 350 European software leaders, our analysis confirms a clear shift: the CTO role is no longer defined solely by technical stewardship. What was once a technology remit has become a business mandate. Today's CTOs must be fluent not only in technology, but also in product, operations, and growth strategy.

Five key forces redefine the CTO agenda

This report examines how five key forces are redefining the CTO agenda and the competencies needed for long-term success. The findings offer practical takeaways for software companies and investors aiming to turn technology into an engine of growth.

1 **The CTO is no longer confined to technical decision making:** 65% now prioritize responsibilities that stretch into product, resilience, and strategic growth.

2 **Cybersecurity maturity is overstated and underinvested:** 82% of CTOs believe they are ahead of the curve, yet ~40% still lack basic security practices, such as risk assessments.

3 **AI in products is now the baseline:** Half of CTOs see artificial intelligence (AI) as a competitive differentiator, but most rely on off-the-shelf solutions. The real advantage lies in defining high-impact use cases and building tailored models.

4 **Developer AI tools unlock real efficiency gains, but adoption is nascent:** Almost all software companies use developer AI tools, with leaders reporting efficiency gains of 35–40%. However, almost two-thirds deploy them to fewer than 40% of developers.

5 **R&D organization and talent are blind spots:** Although they underpin the successful delivery of the broader agenda, 62% of CTOs see them as the lowest priority today.

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1 Organizations that develop, maintain and distribute software applications and provide related services to consumers or enterprises, differentiating by product type, customer focus, and industry.

1. The CTO is no longer confined to technical decision making

Software CTOs are no longer just technical stewards. While architecture, roadmaps, and operational integrity remain foundational, the role has expanded. Today, CTOs are expected to combine technical excellence with direct influence on business strategy.

From technical stewardship to business leadership

Survey data clearly demonstrates a shift in the expected roles and responsibilities of a CTO. For instance, over 31% now play a leading role in overall business strategy, while another 65% share this responsibility with other executives. In parallel, 65% prioritize corporate strategy, product innovation, and risk management over purely technical decision making.
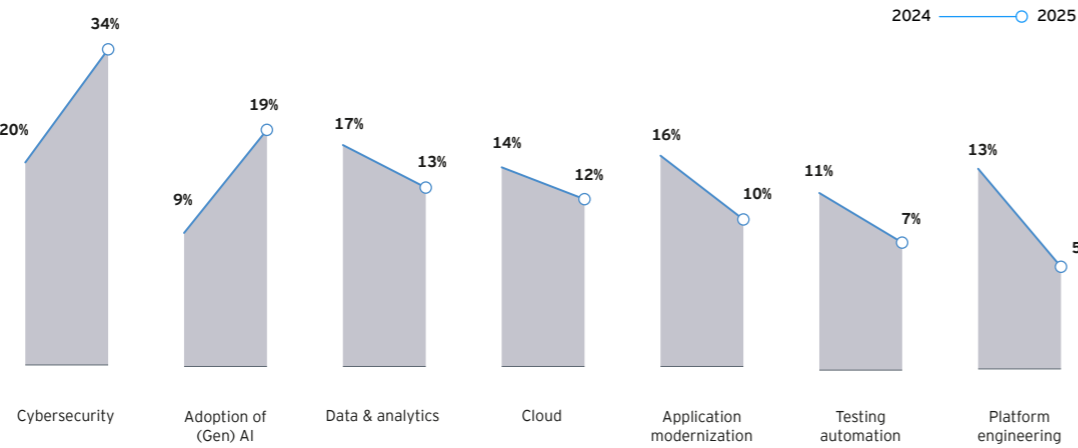
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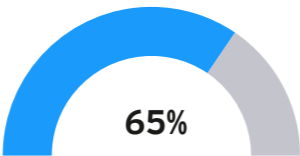
Of CTOs do not see technical decision-making as top priority

Source: CTO survey by EY-Parthenon and Potloc

The reason is simple: Technology now defines business outcomes. Technological capabilities are inseparable from competitive advantage. This places the CTO squarely at the intersection of product innovation, operational resilience, and strategic growth.
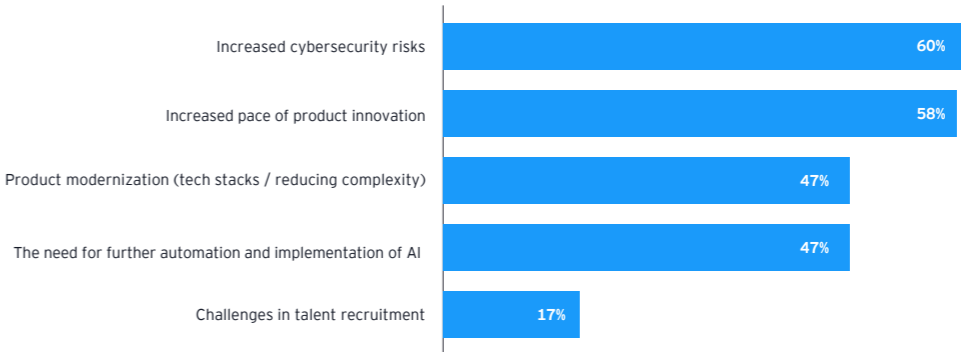
Shifting priorities further underscore how the mandate has expanded since last year's survey. Cybersecurity and AI have surged to the top of the agenda, while data, cloud, and modernization remain essential to sustaining core business health.

CTO views of the most important roadmap items, % of respondents

2024 ——○ 2025

	2024	2025
Cybersecurity	20%	34%
Adoption of (Gen) AI	9%	19%
Data & analytics	17%	13%
Cloud	14%	12%
Application modernization	16%	10%
Testing automation	11%	7%
Platform engineering	13%	5%

Source: CTO survey by EY-Parthenon and Potloc

Key forces behind the transition of the CTO agenda, % of respondents

Increased cybersecurity risks	60%
Increased pace of product innovation	58%
Product modernization (tech stacks / reducing complexity)	47%
The need for further automation and implementation of AI	47%
Challenges in talent recruitment	17%

Source: CTO survey by EY-Parthenon and Potloc

Surveyed CTOs point to five key forces that are reshaping their priorities:

- **Increased cybersecurity risks:** Escalating geopolitical tensions, increased attack volumes, more sophisticated threat vectors, and regulatory drivers have elevated cyber resilience to a board-level concern. CTOs are now responsible for implementing controls and framing cyber risk in business terms. They must link resilience to revenue continuity, brand trust, and regulatory compliance.

- **Increased pace of product innovation:** Shorter time-to-market expectations and the proliferation of emerging technologies are compressing product lifecycles. CTOs must assemble and manage cross-functional teams that can swiftly translate technology opportunities into business value.

- **Product modernization:** Competitive differentiation increasingly relies on replacing legacy systems with modern, scalable architectures. Modernization is no longer a periodic upgrade; it is a continuous process intertwined with security, data integration, and the enablement of advanced analytics and AI.

- **Further automation and the implementation of AI:** The rapid maturation of AI is reshaping both the customer proposition and the software development lifecycle (SDLC). CTOs must balance the pressure to incorporate generative AI (GenAI) into products with the need to manage operational risks, changes in skillsets, and governance frameworks.

- **Challenges in talent recruitment:** The demands of scaling AI-enabled development require rethinking team structures, governance, and talent strategies. CTOs are being called upon to design organizations that blend human and AI capabilities in a consistent way, protect institutional knowledge, and attract scarce engineering talent.

Point of view

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In practice, the responsibilities of the CTO increasingly stretch beyond sustainable limits. Leading software companies solve this by introducing a dedicated CPO, CISO, and head of engineering. This allows CTOs to focus on what matters most: turning technology into strategic growth, strengthening operational resilience, and building a defensible technology moat.

SANDER VAN WEELE
Partner

What defines today's CTO?

The traditional CTO was defined by technical stewardship. They were responsible for architecture choices, maintaining reliable infrastructure, and ensuring that systems ran smoothly. These responsibilities remain essential, but they are no longer enough.

The technology leaders who will succeed are those who can translate technical depth into business impact and guide their organizations through technological transformation.

The most effective software CTOs share three characteristics. They are:

1. **Translator of strategy,** turning technology trends into clear business strategy and provide boards with evidence-based perspectives on how choices impact growth, risk, and customer value.

2. **Stewards of resilience,** integrating cybersecurity, compliance, and risk management into the core of the business. They do this not as afterthoughts, but as enablers of trust and continuity.

3. **Architects of adaptability,** designing organizations that can innovate quickly by aligning culture, talent, and processes to absorb change without sacrificing the quality or maintainability of the code base.

Tomorrow's CTOs will be measured not only by the strength of their technology stacks, but also by their ability to deliver lasting business impact through them.

2. Cybersecurity maturity is overstated and underinvested

Surveyed CTOs identify cybersecurity as the top priority for European software companies. The reasons are clear:

■ The war in Ukraine has triggered state-sponsored cyber activity that is spilling into commercial domains, including energy grids and financial institutions.

■ Ransomware groups have shifted their focus from large corporations and are now targeting more mid-sized software vendors, where defenses are weaker but customer data is equally valuable.

■ Phishing campaigns are now AI driven, localized, and highly convincing.

■ Regulators are tightening requirements. The EU's NIS2 directive will require thousands of software firms to demonstrate their ability to withstand and recover from cyberattacks.
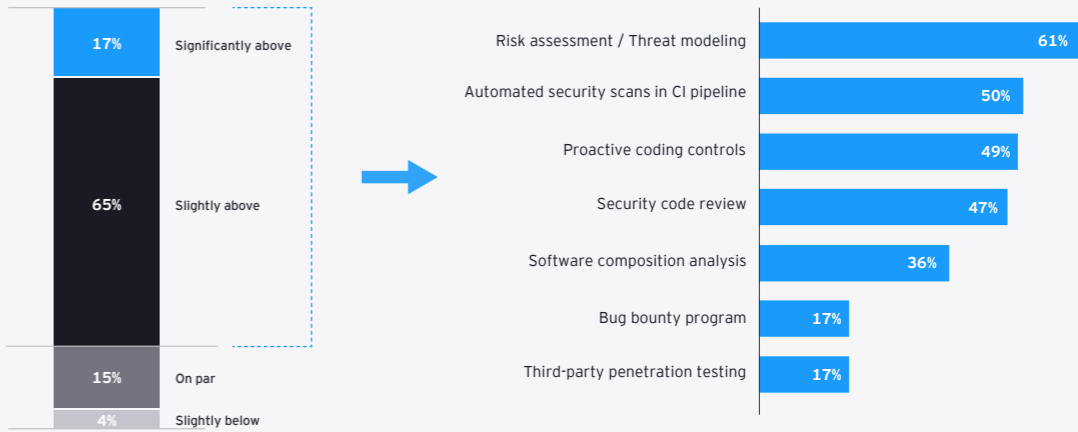
Because resilience is directly linked to revenue continuity and customer trust, the accountability of technology leaders is expanding. However, despite its prominence on board agendas, our survey reveals a persistent gap between perception and reality: while executives express confidence in their cybersecurity posture, operating maturity continues to lag.

The reality gap: Confidence without control

Our survey reveals a striking disconnect. Although 82% of CTOs rate their cyber capabilities above those of their peers, there is little evidence to support this confidence when we examine their actual practices.

Perceived cyber posture vs. peers,
% of respondents

17%	Significantly above
65%	Slightly above
15%	On par
4%	Slightly below

Adoption rate of security practices,
% of respondents

Risk assessment / Threat modeling	61%
Automated security scans in CI pipeline	50%
Proactive coding controls	49%
Security code review	47%
Software composition analysis	36%
Bug bounty program	17%
Third-party penetration testing	17%

Source: CTO survey by EY-Parthenon and Potloc

Some notable gaps in security practices reveal significant vulnerabilities across organizations:

- 39% of companies do not perform risk assessments or threat modeling. Without these assessments, vulnerabilities remain invisible until they are exploited.

- 50% of companies do not embed automated security scans in their continuous integration (CI) pipelines. This leaves them unaware of real-time vulnerabilities introduced in every release cycle.

- 53% of companies lack security code reviews. Developers form the first line of defense. However, many operate without structured oversight to catch vulnerabilities or assess exposure to emerging threats. With the increase in AI-generated code, security code reviews are becoming ever more important.

- 83% do not conduct penetration testing or bug bounty programs. Without external validation, blind spots persist in live environments.

This is not an outlier effect. Based on experience, these patterns hold true regardless of company size or industry, signaling a systemic maturity gap caused by underinvestment in cybersecurity fundamentals and misaligned priorities.

Risk assessments remain underutilized — even in regulated industries

Regular risk assessment and threat modeling are the cornerstones of a mature cybersecurity program. However, adoption of these practices varies widely by customer market. Vendors that build vertical applications are the least likely to implement these assessments, with nearly half (48%) skipping this foundational practice. These vendors often rely on smaller user populations, contractual controls, or limited deployments. This can create blind spots and underestimated exposure.

Adoption of risk assessment / threat modeling practices by primary industry,
% of reported organizations

Industry	Percentage
Consumer applications	82%
Healthcare IT	75%
Infrastructure software	67%
Enterprise applications	61%
Vertical applications	52%
Overall	61%

Source: CTO survey by EY-Parthenon and Potloc

Even in the field of healthcare IT, where the NIS2 directive requires essential entities to conduct regular risk assessments, one in four providers still fails to implement them. By contrast, consumer application vendors report the highest adoption rate (82%), reflecting their higher exposure of broad user bases and direct regulatory pressure.

The key takeaway: Reliance on industry context or contractual measures is no substitute for structured, threat-informed assessments. Without them, organizations will remain reactive rather than resilient.

Why perception does not match reality

CTOs often present themselves as "ahead of peers". A possible explanation is that admitting to system vulnerabilities carries risks, rather than their security being flawless. This creates a cycle:

- **Board optics:** It is challenging for CTOs to raise cybersecurity vulnerabilities with the board.

- **Process benchmarking:** Security is measured against industry norms and policies, which encourages "check-the-box" investments in dashboards or certifications rather than actual resilience.

- **Risk deflection:** If an incident occurs, being "better than average" provides political cover, even if customers experience the same level of disruption.

The result: Organizations overestimate their resilience, underinvest in controls, and remain exposed.

Closing the gap: How to build resilience

Although actual maturity appears lower than perceived, all surveyed CTOs are undertaking measures to improve their cyber posture. Nearly all CTOs (97%) anticipate increasing their cybersecurity budget in 2026, with most of that investment directed toward the following areas:

- 41% will invest in recovery and preventive controls, reflecting a focus on traditional perimeter defense security ("castle and moat").

- 30% will invest in detective controls to proactively uncover and address suspicious activities. This is in line with modern "assume breach" strategies, zero trust architecture, and proactive threat detection.

- Only 26% will invest in identifying critical assets and vulnerabilities, despite the lack of basic risk assessments, which are the foundational prerequisites for any security program.

As previously mentioned, the next frontier for CTOs is to begin turning investments into impact. To achieve this, CTOs are required to:

1. **Design controls as business enablers:** Security is often perceived as a compliance hurdle at the end of a release or sales cycle. The goal is to integrate security end-to-end across the product lifecycle to lower risk without slowing delivery. The next step is to move security upstream, embed security into the SDLC, automate scans, and track metrics like time to detect and time to contain.

2. **Make security a shared responsibility:** Transition from treating security as a siloed function to embedding security specialists within teams and establishing organization-wide accountability. This requires CTOs to incentivize developers, empower the security team to proactively stop the line, and integrate security into everyday business processes.

3. **Conduct independent risk assessments:** Establish a factual baseline that aligns with cyber-security frameworks such CIS and NIST CSF. Prioritize findings and vulnerable assets based on their criticality. Finally, develop threat-informed response plans and remediation targets.

4. **Educate the workforce:** Employees are targeted by phishing attempts and social engineering activities. Training must be provided to everyone in the organization, and should be backed by simulations, multi-factor authentication (MFA), and clear incident protocols. Executives should receive periodic reports and be incentivized to model secure behavior and enforce accountability across their teams.

The reality for CTOs
Cybersecurity can no longer be treated as just a compliance gate anymore. The organizations that will stand out are those that integrate security into their strategy, culture, and execution.

Point of view

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As cyber threats and regulatory pressures increase generally, perhaps the biggest risk most organizations still face is trying to run cyber security programs as side-of-desk activities out of other C-suite offices. The rapidly evolving threat environment, lack of foundational skills and competition with core delivery priorities all represent barriers for successful program execution and encourage a false sense of security, at least until disaster strikes. Today's cybersecurity challenges demand acute understanding, significant skillsets, explicit funding, and a singular focus, unencumbered by competing priorities or influences.
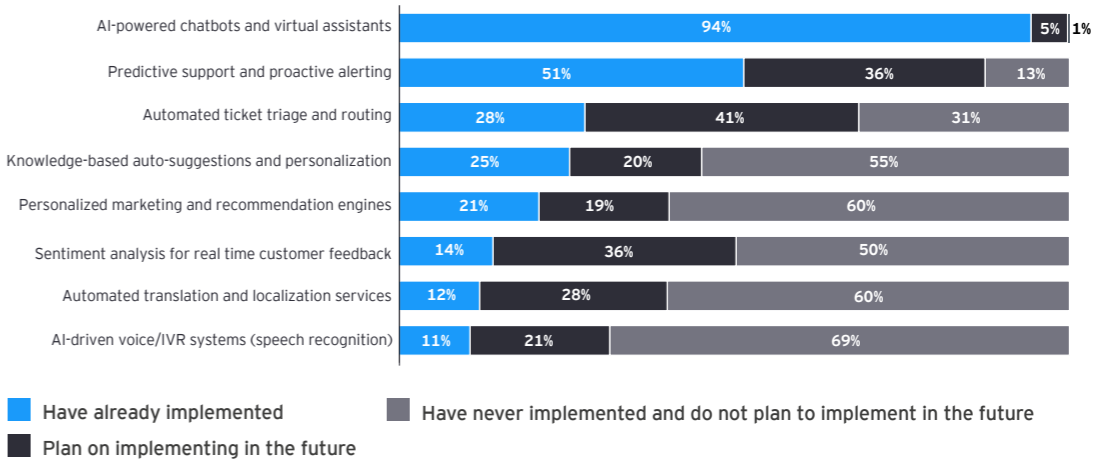
ADRIAN NEWBY
Partner

3. AI in products is now baseline

Almost every software company now embeds AI in its customer-facing products. Half of CTOs say that the need for faster product innovation is pulling them deeper into business strategy. Additionally, 40% describe their markets as highly competitive and fast paced. Yet most of today's "AI innovation" relies on chatbots and virtual assistants, which 94% of respondents have deployed.

**Customer-facing AI use cases by level of implementation,** % of respondents

Use case	Have already implemented	Plan on implementing in the future	Have never implemented and do not plan to implement in the future
AI-powered chatbots and virtual assistants	94%	5%	1%
Predictive support and proactive alerting	51%	36%	13%
Automated ticket triage and routing	28%	41%	31%
Knowledge-based auto-suggestions and personalization	25%	20%	55%
Personalized marketing and recommendation engines	21%	19%	60%
Sentiment analysis for real time customer feedback	14%	36%	50%
Automated translation and localization services	12%	28%	60%
AI-driven voice/IVR systems (speech recognition)	11%	21%	69%

■ Have already implemented
■ Plan on implementing in the future
■ Have never implemented and do not plan to implement in the future

Source: CTO survey by EY-Parthenon and Potloc

AI has shifted from novelty to necessity, but adoption does not equal advantage
Despite the widespread deployment of these technologies and the positive impact on customer satisfaction, most organizations report only incremental returns. Among CTOs who expected a positive impact, 86% report "somewhat positive" customer impact, while only 14% see a significant improvement. The reason is that adoption is still dominated by off-the-shelf solutions such as chatbots, which are fast to implement but easy to replicate. The result is parity, not differentiation.

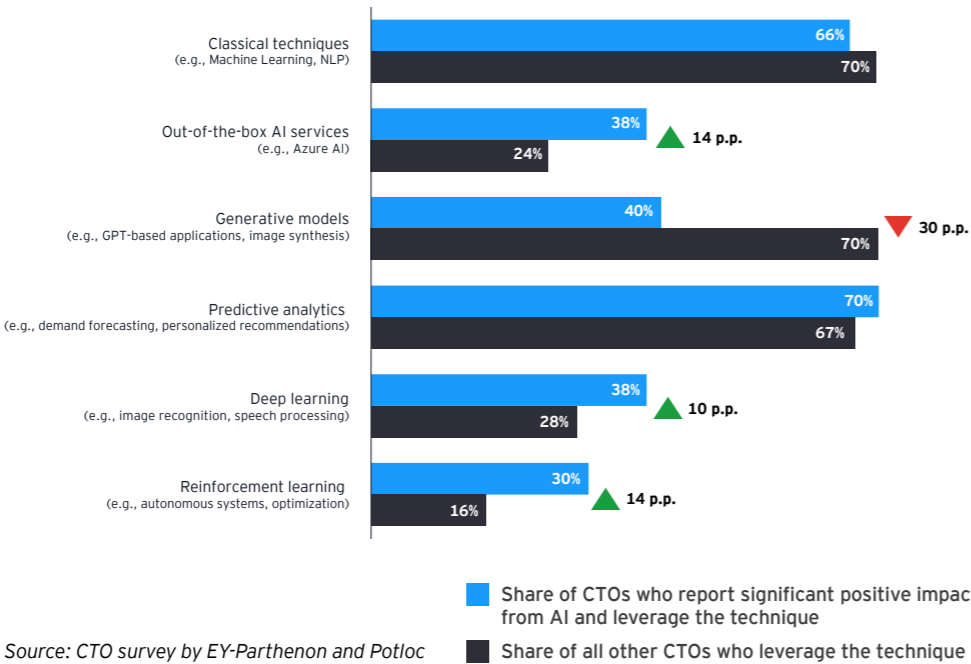**Actual impact of AI on customer satisfaction,** % of respondents

96% of CTOs have seen a positive impact of AI on customer satisfaction and engagement

14% Significant positive impact
86% Somewhat positive impact
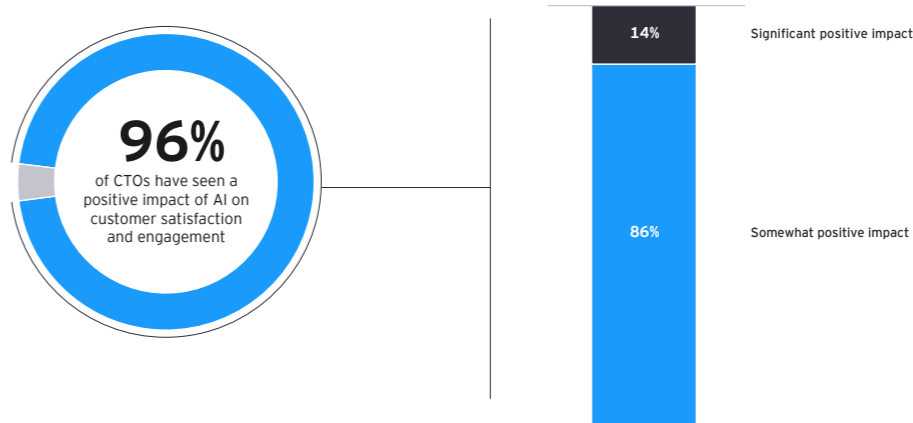
Source: CTO survey by EY-Parthenon and Potloc

The companies that are breaking through are building tailored AI solutions

A small group of firms that report a significant positive impact show a different pattern. Rather than relying on generic, pre-trained models, they are more likely to invest in:

■ Predictive analytics models (adopted by ~70%) to personalize experiences and forecast demand.

■ Deep learning and reinforcement learning, where adoption is rising sharply among high-impact companies (from 28% to 38% and 16% to 30%, respectively).

■ Proprietary in-house models tailored to customer needs, rather than off-the-shelf GenAI models, where reliance declined from 70% to 40%.

Adoption of AI methodologies and usage patterns by level of realized impact,
% of respondents

Classical techniques (e.g., Machine Learning, NLP): 66% / 70%
Out-of-the-box AI services (e.g., Azure AI): 38% / 24% ▲ 14 p.p.
Generative models (e.g., GPT-based applications, image synthesis): 40% / 70% ▼ 30 p.p.
Predictive analytics (e.g., demand forecasting, personalized recommendations): 70% / 67%
Deep learning (e.g., image recognition, speech processing): 38% / 28% ▲ 10 p.p.
Reinforcement learning (e.g., autonomous systems, optimization): 30% / 16% ▲ 14 p.p.

■ Share of CTOs who report significant positive impact from AI and leverage the technique
■ Share of all other CTOs who leverage the technique

Source: CTO survey by EY-Parthenon and Potloc

This shift is significant because, while off-the-shelf GenAI and chatbots allow for quick implementation, they seldom result in a lasting competitive advantage. Proprietary models require more data, talent, and cost, but they enable tailored solutions and meaningful differentiation beyond generic tools. This investment is worthwhile for companies seeking a lasting advantage.
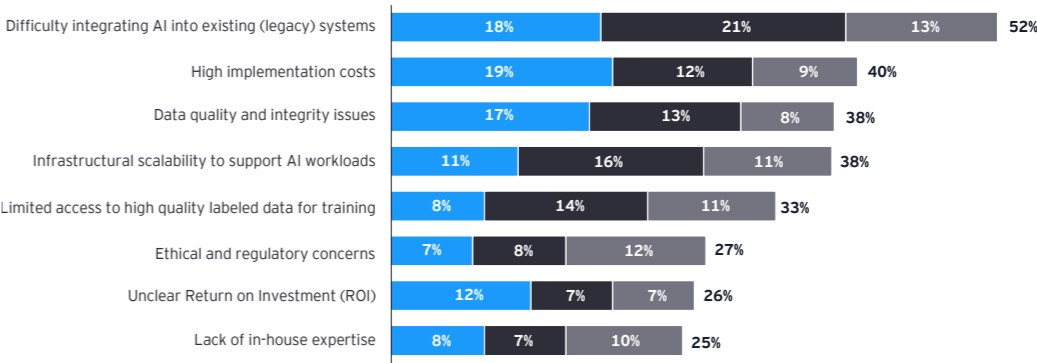
The barriers that hold most companies back

If tailored, in-house AI has the greatest impact, why don't more companies pursue it? The survey highlights several barriers to execution:

■ **Integration into existing systems:** 52% of respondents report difficulty with integrating AI into legacy architectures weighed down by technical debt. Even strong models stall when pipelines and platforms cannot support them.

■ **High implementation costs:** Four in ten companies struggle to justify the initial investment, particularly when AI requires re-platforming or the modernization of legacy systems.

■ **Data quality and integrity:** 38% of CTOs cite unreliable or fragmented data as their top barrier. Without high-quality data, advanced AI cannot scale beyond pilots.

■ **Infrastructure scalability:** Software companies face limitations in scaling infrastructure to support AI workloads. Even well-designed models struggle to perform without sufficient computing capacity and flexible architecture.

Although ethical and regulatory concerns and talent constraints are acknowledged, they rank lower. The hurdles to near-term execution that prevent companies from moving beyond generic AI adoption are the most significant concern.

Barriers to the adoption of AI, % of respondents

Difficulty integrating AI into existing (legacy) systems: 18% / 21% / 13% — 52%
High implementation costs: 19% / 12% / 9% — 40%
Data quality and integrity issues: 17% / 13% / 8% — 38%
Infrastructural scalability to support AI workloads: 11% / 16% / 11% — 38%
Limited access to high quality labeled data for training: 8% / 14% / 11% — 33%
Ethical and regulatory concerns: 7% / 8% / 12% — 27%
Unclear Return on Investment (ROI): 12% / 7% / 7% — 26%
Lack of in-house expertise: 8% / 7% / 10% — 25%

Source: CTO survey by EY-Parthenon and Potloc Priority: ■ 1 ■ 2 ■ 3

Overcoming these barriers is what differentiates leading organizations from ones that struggle to keep pace. Those that invest can build a defensible advantage, while those that do not remain stuck with parity solutions.

The risk of standing still

Software vendors who rely solely on generic tools face two main risks:

1. **Falling behind AI-native startups** that can out-innovate incumbents weighed down by legacy systems and technical debt.

2. **Losing defensibility** as off-the-shelf models become widely available and commoditized, eroding differentiation.

What should CTOs do next?

In order to turn AI into a driver of competitive advantage, CTOs must:

1. **Modernize the foundation:** Upgrade data architectures and cloud stacks to reduce friction for AI deployment.

2. **Embed governance and machine learning operations (MLOps):** Ensure reliability, explainability, and bias mitigation while enabling rapid iteration.

3. **Invest selectively in proprietary AI:** Build or train models that can meaningfully enhance customer experience or create intellectual property (IP) that competitors cannot copy due to data access.

4. **Balance ambition with pragmatism:** Deliver incremental ROI through automation now, while laying the groundwork for bold, tailored implementations in the future.

Point of view

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Software companies often struggle to move beyond isolated AI pilots and experiments. The real challenge is not creating proofs of concept; it is integrating AI into the core product in a way that truly drives innovation. This goes beyond adding a chatbot; it requires rethinking user experiences, strengthening data and infrastructure layers, and ensuring robust model performance and governance. Companies that succeed in these areas achieve genuine product innovation rather than incremental improvements.

ERIK OLTMANS
Partner

4. Developer AI tools unlock real efficiency gains, but adoption is nascent

AI has evolved from an experimental tool to a fundamental driver of R&D productivity. More than half of CTOs (55%) report that improving operational efficiency has become a priority alongside driving growth, and that AI is at the heart of this transition.
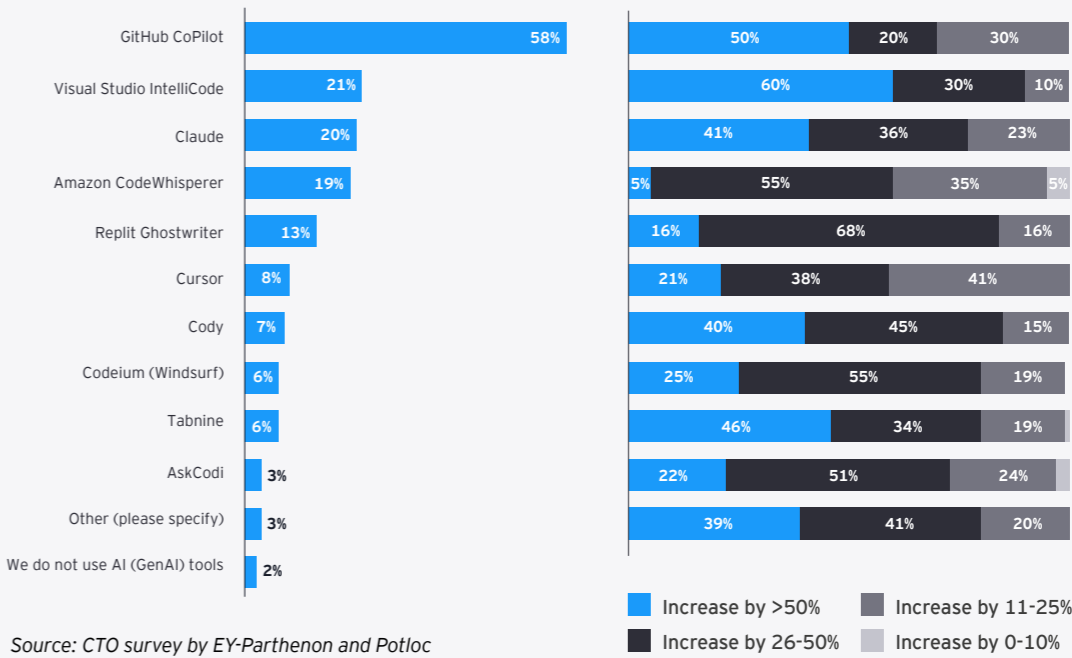
AI is reshaping the software development life cycle (SDLC) by automating repetitive tasks and accelerating workflows. However, capturing its benefits requires more than just adopting it. Without guardrails, the same tools that boost productivity can compound technical debt and erode engineering depth.

Developer efficiency gains of 35-40% are real but adoption remains shallow
Nearly all software companies use AI in their development processes. In fact, 98% of companies use at least one AI tool, and most rely on several tools that support different languages and frameworks. Yet in almost two-thirds of these companies, fewer than 40% of developers regularly use AI, demonstrating the significant potential that remains untapped.

When AI is well integrated into a company's operations, the payoff is significant. CTOs report average efficiency gains of 35–40%, particularly from coding assistants like GitHub Copilot and IntelliCode. These tools excel at high-frequency, low-risk tasks, such as boilerplate generation, code completion, and inline documentation. Their seamless integration into developer workflows explains their widespread adoption. For example, GitHub Copilot alone is used by 58% of teams.

Adoption of AI tools and related developer efficiency gains, % of organizations adopting specific AI tooling and reported efficiency improvements

	Adoption	Increase by >50%	Increase by 26-50%	Increase by 11-25%	Increase by 0-10%
GitHub CoPilot	58%	50%		20%	30%
Visual Studio IntelliCode	21%	60%		30%	10%
Claude	20%	41%		36%	23%
Amazon CodeWhisperer	19%	5%	55%	35%	5%
Replit Ghostwriter	13%	16%	68%		16%
Cursor	8%	21%	38%		41%
Cody	7%	40%	45%		15%
Codeium (Windsurf)	6%	25%	55%		19%
Tabnine	6%	46%	34%	19%	1%
AskCodi	3%	22%	51%	24%	3%
Other (please specify)	3%	39%	41%		20%
We do not use AI (GenAI) tools	2%				

Source: CTO survey by EY-Parthenon and Potloc

The benefits of adopting AI tools extend beyond speed. 79% of CTOs measure the quality impact of coding assistants, and all of them report improvements. To be precise, 70% cite moderate gains and 10% cite significant gains. Overall, AI is beginning to provide two main benefits: faster output and higher code quality.

Measured impact of AI coding assistants on code quality, % of respondents


79%
of CTOs measures the impact of coding assistants on code quality

- 10% Significant increase
- 70% Moderate increase
- 20% Slight increase
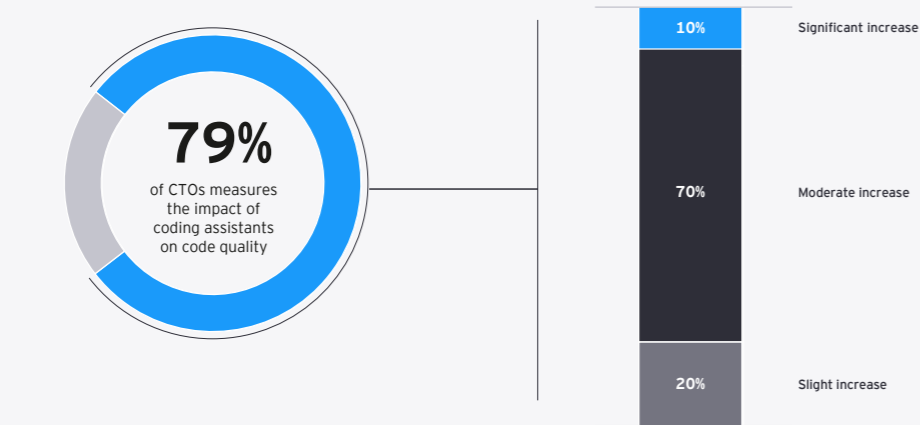
Source: CTO survey by EY-Parthenon and Potloc

Developer AI tools are already reshaping coding workflows

The most widely adopted use cases for developer AI include code generation (79%), coding assistance (64%), and documentation (53%). These use cases directly address the biggest time-consuming challenges developers face. By translating natural language requirements into working code, AI bridges the gap between product ideation and execution.

Most popular use cases for developer AI tools, % of respondents

79%	64%	53%
Code generation	Code assistance	Documentation assistance

37%	35%	24%
Debugging	Code refactoring	Testing
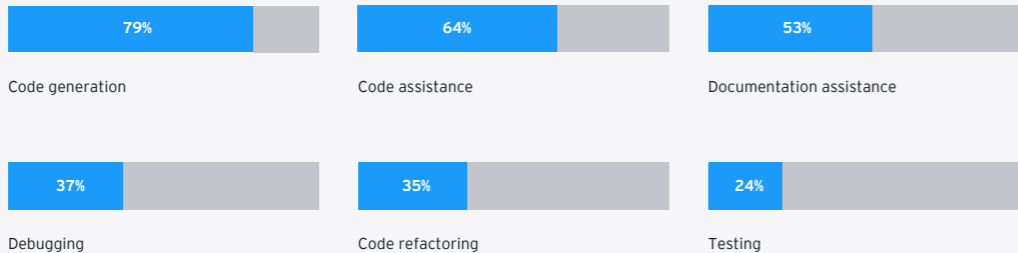
Source: CTO survey by EY-Parthenon and Potloc

The next area of opportunity for AI tools lies in **modernization and resilience**. At the moment, only **35% of companies use AI for code refactoring** and just **24% use it for testing**. This represents a missed opportunity, as nearly all organizations (99%) still operate legacy systems that limit scalability. However, only one in three CTOs actively prioritizes modernization. AI can serve as a force multiplier by helping to restructure APIs, automate code cleanup, and accelerate the migration away from technical debt.

The risks of unchecked AI adoption in R&D operations

In our experience, adopting AI tools without clear guardrails can create as many problems as it solves. What begins as a productivity boost can quickly backfire, leading to several risks.

- **Increase of technical debt:** Without human oversight, AI tends to produce repetitive code, or even exact duplicates, rather than proposing abstractions that can be instantiated multiple times. A recent analysis found that AI-driven code generation fueled an **8x increase in large copy-paste blocks**, which undermines key software design principles, such as "Don't Repeat Yourself" (DRY). This signals a decline in refactoring and module reuse, resulting in "spaghetti code" and increasing technical debt.

- **Erosion of expertise:** Heavy reliance on AI weakens problem-solving and architectural skills. Machine-generated code reduces the collective understanding of the codebase. Together, these factors make teams less capable of scaling systems or troubleshooting hidden bugs.

- **Tool fragmentation:** Uncoordinated adoption of AI tools by different teams can lead to duplicated effort, inconsistent coding standards, and integration issues. Without governance, the proliferation of AI tools risks undermining efficiency and security.

- **Data exposure from AI use:** Without proper controls, external AI services can leak IP or sensitive customer data. Shadow AI exacerbates this issue by allowing employees to unintentionally expose customer data or proprietary code by pasting it into unsecured tools.

- **New vulnerabilities from AI-generated code:** Code produced without peer review often contains vulnerabilities. As the volume of AI-generated code rises, so does the attack surface, which includes more injection paths, insecure APIs, and critical features shipped without oversight.

- **Attackers using AI as leverage:** Adversaries now use large language models (LLMs) to identify exploits, automate multilingual spear-phishing, and script attacks on a large scale. For example, one tactic is known as "slopsquatting," where attackers register software packages that developer tools are likely to hallucinate, allowing them to inject malicious code. The same tools that enhance developer productivity also accelerate attacker sophistication.

Given all of these risks, strong governance is essential to ensure AI becomes a durable advantage rather than a hidden liability.

Point of view

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AI in software development is not all upside. Without strong governance, AI solutions can backfire. Yet there is clear opportunity: developer AI tools can support modernization efforts, helping reduce technical debt and improve resilience when deployed with care and oversight.

PROF. DR. IR. JOOST VISSER
Prof. large scale software & data science at Leiden University
External expert EY-Parthenon

Ensuring AI becomes a durable advantage

The companies that will thrive most in the age of developer AI will be those that combine **broad adoption with disciplined execution**. That requires:

- **Governance first:** Clear rules on how AI tools are used, with oversight on data security, code quality, and IP.

- **Tool rationalization:** Rather than encouraging uncontrolled experimentation, streamline to a vetted set of AI assistants.

- **Value metrics:** Track both speed (throughput and cycle time) and quality (bug rates and code review findings) to validate returns.

- **Developer enablement:** Upskill teams to use AI effectively while maintaining their critical problem-solving skills.

The takeaway: AI is already delivering real productivity gains in software development, but the biggest breakthroughs are yet to come. Organizations that use AI for more than just coding assistance (e.g., to modernize legacy systems, refactor code, and build maintainable architectures) will capture the next wave of efficiency and differentiation.
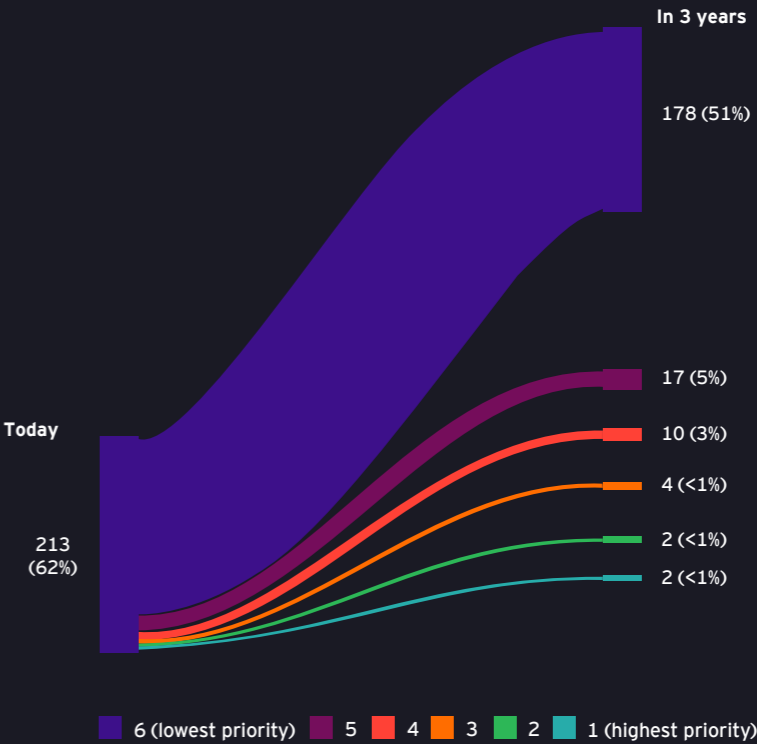
However, companies that scale up their use of AI tools without sufficient governance risk capturing the opposite: compounding technical debt and a loss of their competitive edge.

5. R&D organization and talent are a blind spot

When it comes to a CTO's agenda, R&D organization and talent remain consistently overlooked. Today, 62% of CTOs rank it as their lowest priority today, and the majority (51%) expect it to remain bottom of their lists over the next three years. This trend is consistent across company sizes and customer verticals.

Yet the execution of the CTO agenda – whether in cybersecurity, scaling AI, or modernization – depends on the strength of the operating model. When organizational foundations are weak, even well-funded initiatives underdeliver. However, when foundations are strong, budgets translate faster into business outcomes.

Prioritization of organization and talent on the CTO agenda, number of respondents (% of total)

In 3 years
178 (51%)
17 (5%)
10 (3%)
4 (<1%)
2 (<1%)
2 (<1%)

Today
213 (62%)

- 6 (lowest priority)
- 5
- 4
- 3
- 2
- 1 (highest priority)

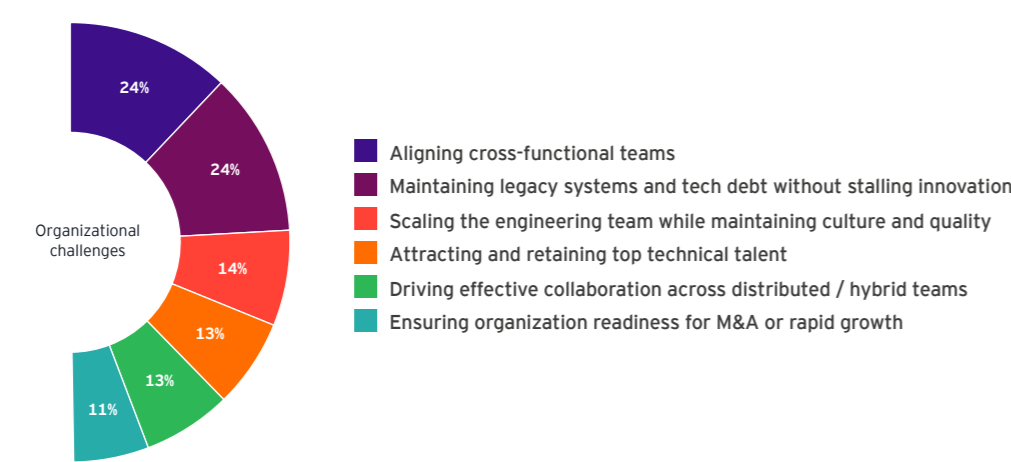*Source: CTO survey by EY-Parthenon and Potloc*

The persistent challenges

Survey data confirms the most common structural pain points that European software organizations face. Three stand out in particular:

1. Aligning cross-functional teams
2. Balancing innovation and modernization
3. Retaining talent and scaling engineering capacity

The latter of these pain points combines two recurring challenges – attrition and slow onboarding – both of which point to the same issue: organizations struggle to build and maintain the teams needed to deliver at scale.

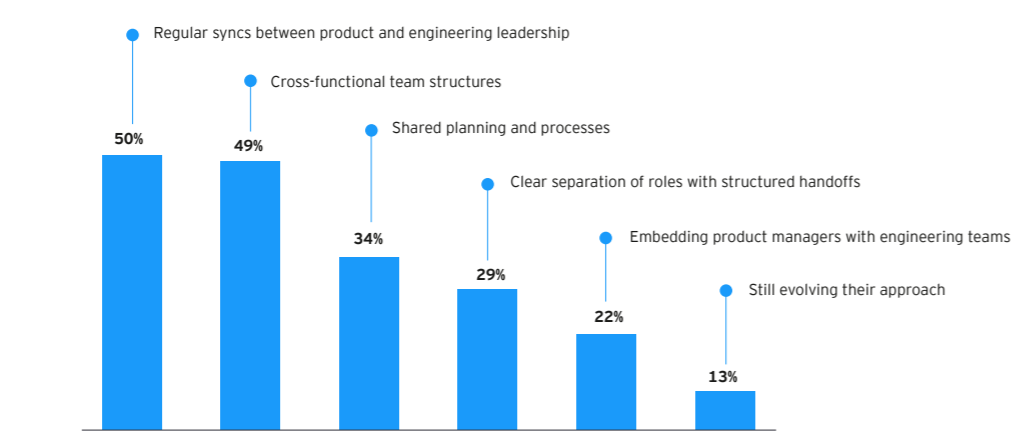**Reported organizational challenges,** % of respondents

Organizational challenges

- 24% | Aligning cross-functional teams
- 24% | Maintaining legacy systems and tech debt without stalling innovation
- 14% | Scaling the engineering team while maintaining culture and quality
- 13% | Attracting and retaining top technical talent
- 13% | Driving effective collaboration across distributed / hybrid teams
- 11% | Ensuring organization readiness for M&A or rapid growth

Source: CTO survey by EY-Parthenon and Potloc

1. Aligning cross-functional teams is challenging
According to a quarter of CTOs, getting product and engineering teams to work smoothly together is a top challenge. Most companies try to solve this issue by holding more leadership meetings (50%) and forming cross-functional teams (49%). However, only 22% actually embed product managers within engineering teams, which tends to create real, day-to-day ownership. In other words, many organizations add coordination meetings instead of redesigning team structures, causing alignment problems to persist.

Implemented practices to align product and technology teams, % of respondents

- 50% — Regular syncs between product and engineering leadership
- 49% — Cross-functional team structures
- 34% — Shared planning and processes
- 29% — Clear separation of roles with structured handoffs
- 22% — Embedding product managers with engineering teams
- 13% — Still evolving their approach

Source: CTO survey by EY-Parthenon and Potloc

2. Without guardrails, innovation overwhelms modernization
Another quarter of CTOs are struggling to develop new AI features and product bets while also tackling technical debt, reliability issues, and platform upgrades. Without explicit guardrails on how to allocate investment, feature requests always win out. The long-term result is a "hidden technology tax," which means slower delivery, more incidents, and increasing operational instability.

3. Retaining talent and scaling engineering teams is harder than it looks.
Many software organizations struggle with slow onboarding, heavy reliance on contractors, and frequent reorganizations. Unfilled vacancies and high turnover rates amplify this problem, leaving teams either understaffed or constantly in flux. The result is execution drag: initiatives take longer to ramp up, knowledge is lost, and delivery speed suffers despite adequate funding.

Point of view

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As AI transforms software development, the role of the developer is shifting from line-by-line coding to high-level oversight and architectural design. Supporting strategic growth through this change has emerged as a key CTO priority. This involves updating R&D organizational structures to facilitate new roles and team dynamics, taking on a new approach to talent management, and measuring productivity gains. We believe that software companies whose CTOs prioritize updating the R&D organization and optimizing talent to capture the impact of AI on productivity will have a clear advantage over their peers in the coming years.

PER FLAATA
Partner

How to fix the three persistent challenges

1. **Adding more scheduled meetings to help align teams does not create ownership. Implementing the right structure does.**

   - **Embed project managers (PMs) in squads:** The fastest way to kill the "throw over the wall" mentality is to put PMs inside engineering teams. This creates daily shared accountability instead of just leadership handshakes.
   - **One roadmap, one backlog:** Eliminate the dual backlog problem by ensuring that the product and engineering teams use the same stack-ranked priorities and the same definition of "done."
   - **Fewer handoffs:** Every handoff creates friction and drag. Flatten your team's structure so that PMs, designers, and engineers can ship without too much need for coordination.

   Key takeaway: Alignment does not require more meetings, it means creating fewer barriers.

2. **In the short term, innovation always beats technical debt unless you set hard guardrails.**

   - **Budget the split:** Decide on a ratio (e.g., 60% new features, 20% modernization, and 20% maintenance) and enforce it at the portfolio level. Then, track it at the team level. Otherwise, feature requests will consume all available resources.
   - **Bake modernization into features:** Every new build is an opportunity to reduce technical debt. Enforce the "boy scout rule": no feature ships without cleaning up what it touches.
   - **Track the hidden tax:** Measure lead times, incident load, and operational variance. When these metrics rise, it's proof that your "innovation" is slowing you down. Show this information on the executive dashboard to protect modernization time. If you don't have executive dashboards, then the hidden tax is guaranteed.

   Key takeaway: If you don't achieve balance, technical debt will force it later – and with interest.

3. **Reorganizations, contractors, and churn are not just HR problems. They're execution killers.**

   - **Accelerate onboarding:** It takes most organizations 6-12 months to make their engineers productive. Use coding playbooks and pair programming to help new hires ship effectively within 60-90 days.
   - **Stop the reorganization carousel:** Constant organizational redesign erodes trust and slows delivery. Instead, anchor teams around stable product lines or domains and only evolve when the strategy changes.
   - **Cut dependence on contractors:** Contractors should only be responsible for covering spikes, not core knowledge. If more than 20% of your critical systems were built by contractors, you're compounding fragility.
   - **Create pull, not perks:** Engineers stay where they can solve hard problems, grow their skills, see their impact, and feel rewarded. Make that clear every sprint.

   Key takeaway: Talent isn't just "supporting infrastructure"; it is the execution engine. Without talent, no budget will save you.

Final words

The CTO agenda is clear. Technology leaders are now expected to do two jobs at once: fuel growth while protecting the business from risk. This dual mandate comes with both leverage and exposure. A misstep – whether in AI adoption, organizational design, or the balance between innovation and modernization – can stall a company for years.
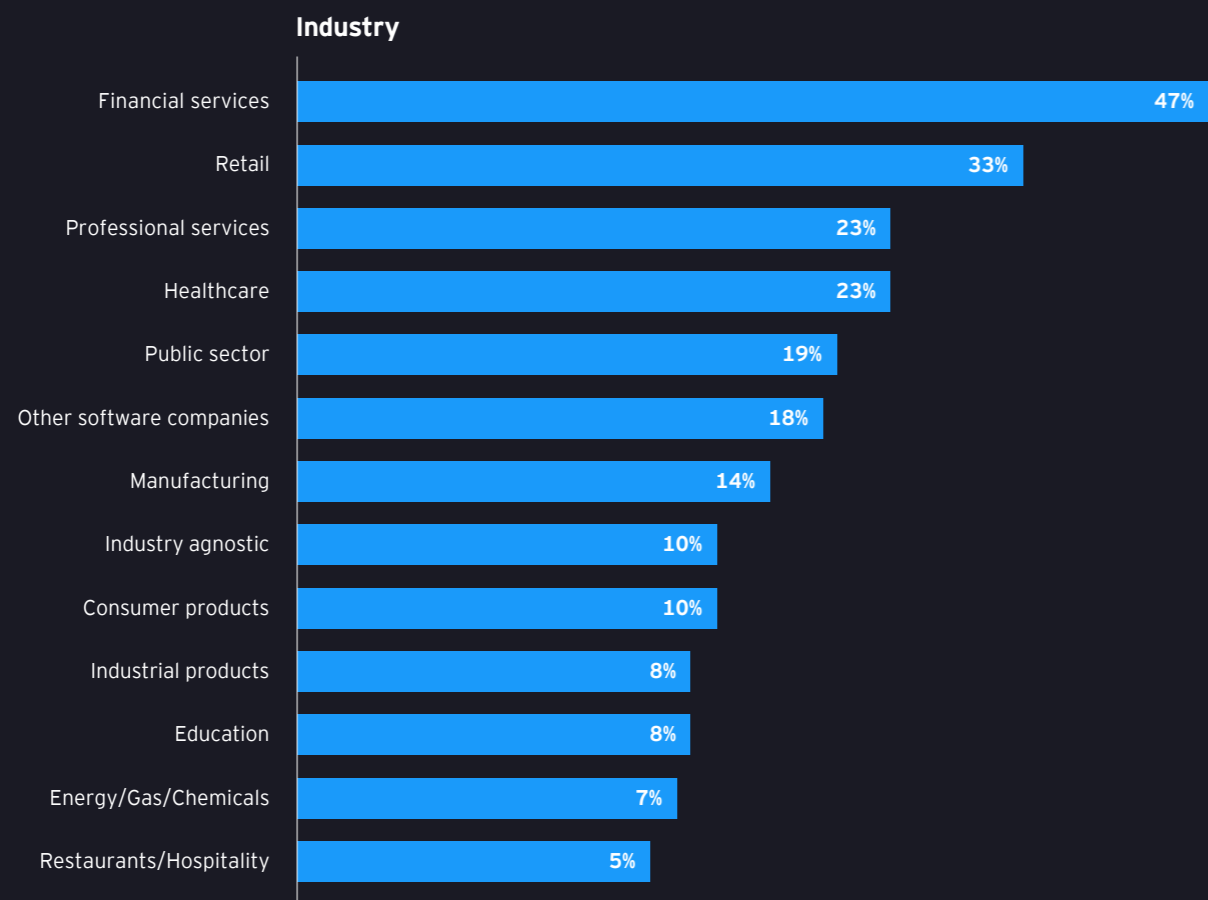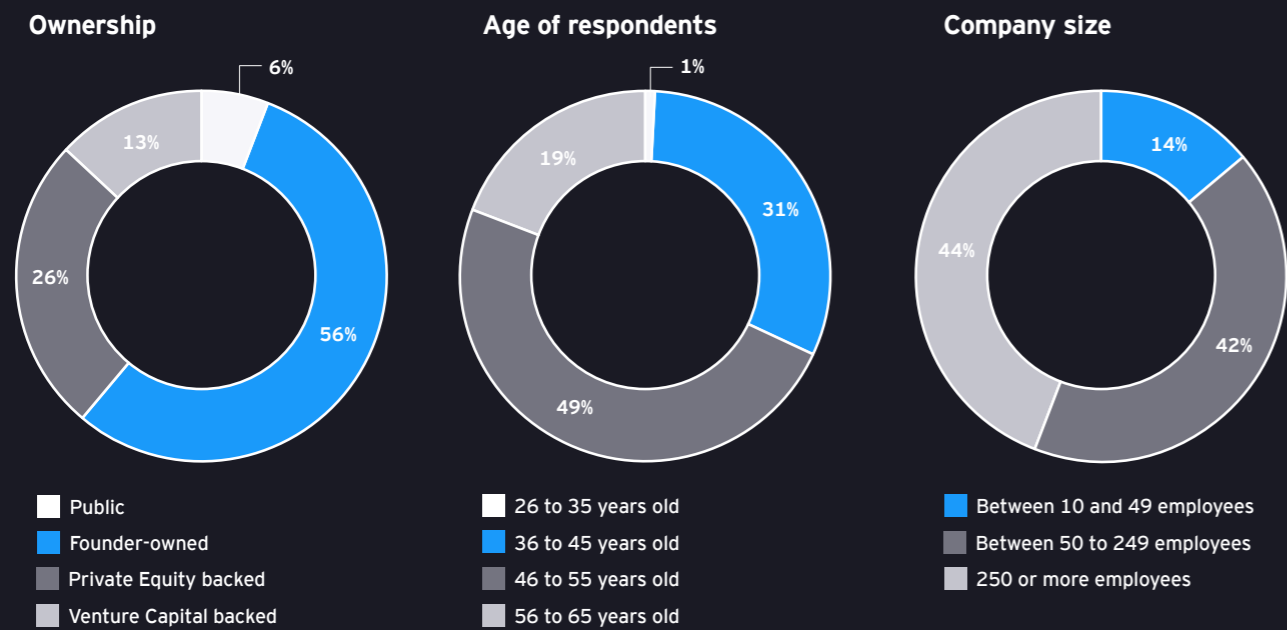
The upside is equally significant. The CTOs who translate technology into business strategy, secure their foundations, and build organizations that adapt without losing control are the ones converting budgets into market share. They don't try to do everything. Instead, they focus on a few non-negotiables – innovation, modernization, alignment, and talent – and execute them with discipline.

However, our survey shows that most companies are still stuck in the middle with shallow AI adoption, growing technical debt, and operating models that depend more on meetings than on ownership. In the meantime, there is a wide-open opportunity for those willing to push further.

If you are facing these tensions and want to exchange perspectives, we welcome the conversation.
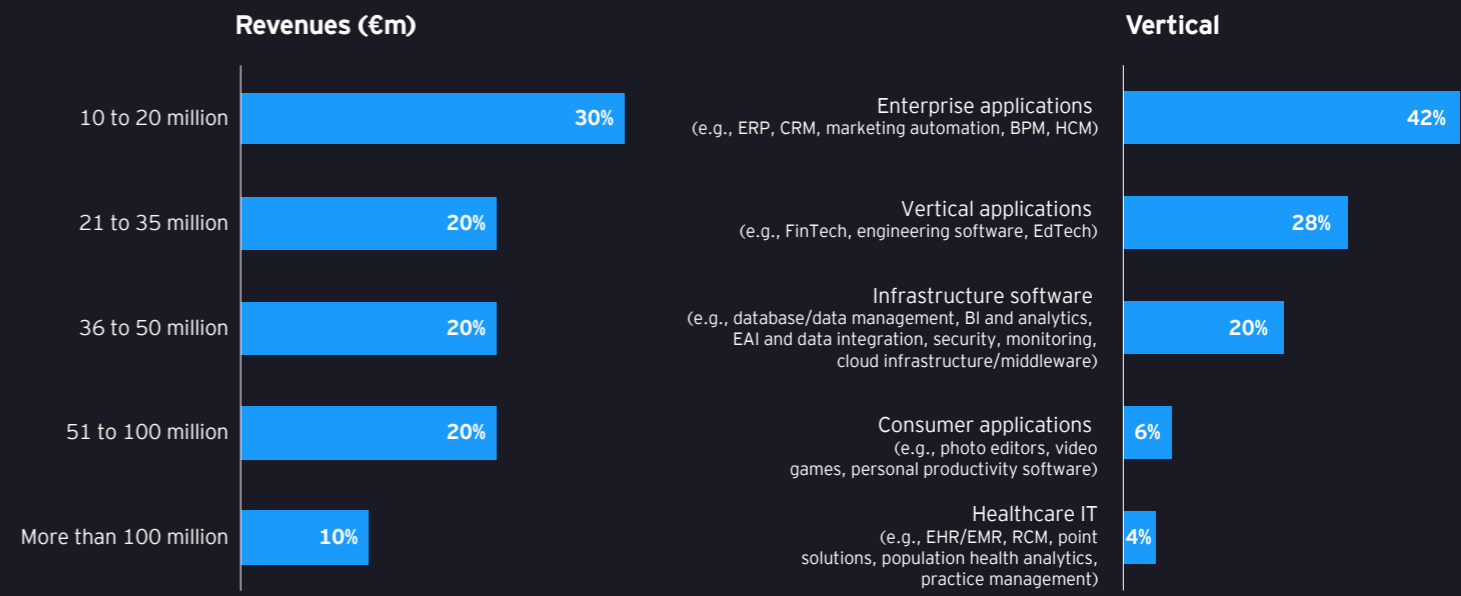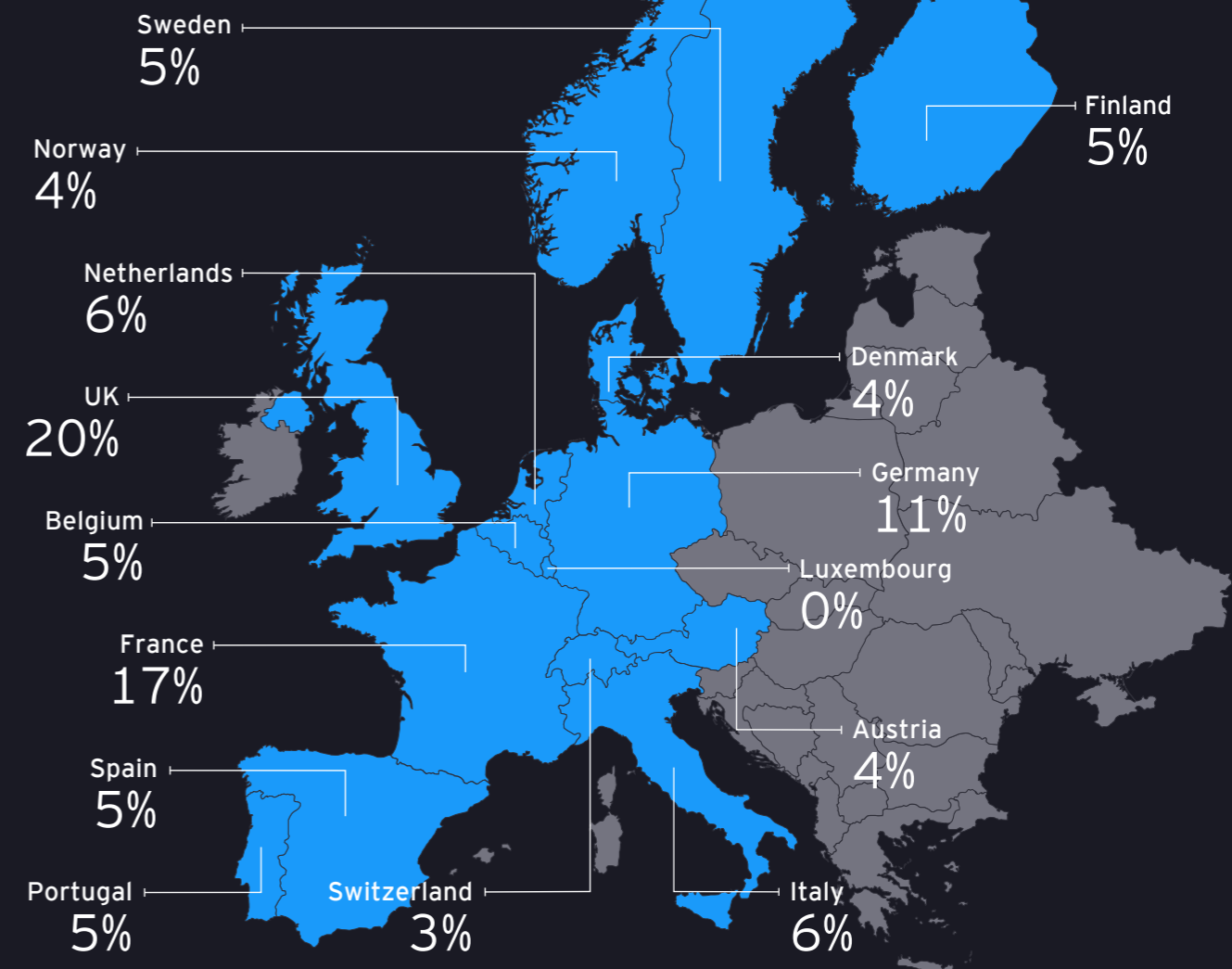
Survey demographics (n=350)

Ownership

- Public — 6%
- Founder-owned — 56%
- Private Equity backed — 26%
- Venture Capital backed — 13%

Age of respondents

- 26 to 35 years old — 1%
- 36 to 45 years old — 31%
- 46 to 55 years old — 49%
- 56 to 65 years old — 19%

Company size

- Between 10 and 49 employees — 14%
- Between 50 to 249 employees — 42%
- 250 or more employees — 44%

Industry

Industry	%
Financial services	47%
Retail	33%
Professional services	23%
Healthcare	23%
Public sector	19%
Other software companies	18%
Manufacturing	14%
Industry agnostic	10%
Consumer products	10%
Industrial products	8%
Education	8%
Energy/Gas/Chemicals	7%
Restaurants/Hospitality	5%

Multiple options could be selected

Country of respondents

- Sweden 5%
- Finland 5%
- Norway 4%
- Netherlands 6%
- Denmark 4%
- UK 20%
- Germany 11%
- Belgium 5%
- Luxembourg 0%
- France 17%
- Austria 4%
- Spain 5%
- Portugal 5%
- Switzerland 3%
- Italy 6%

Revenues (€m)

Revenues (€m)	%
10 to 20 million	30%
21 to 35 million	20%
36 to 50 million	20%
51 to 100 million	20%
More than 100 million	10%

Vertical

Vertical	%
Enterprise applications (e.g., ERP, CRM, marketing automation, BPM, HCM)	42%
Vertical applications (e.g., FinTech, engineering software, EdTech)	28%
Infrastructure software (e.g., database/data management, BI and analytics, EAI and data integration, security, monitoring, cloud infrastructure/middleware)	20%
Consumer applications (e.g., photo editors, video games, personal productivity software)	6%
Healthcare IT (e.g., EHR/EMR, RCM, point solutions, population health analytics, practice management)	4%

About EY-Parthenon Software Strategy Group

EY-Parthenon Software Strategy Group (SSG) is a specialized advisory practice that provides guidance to companies and investors on growth strategies, operational improvements, product and technology performance optimization, and M&A within the software industry. Software-driven and software-enabled companies and investors look to us for guidance on how to help drive value across commercial, product, technology, and R&D strategy.

Making the right decisions about software strategy and investments has never been more important. Many companies, both technology-native and historically non-technology, are now part of the software economy, where software drives most – if not all – of a company's differentiation and value proposition.

SSG serves, among others:
- Investors, including private equity firms
- Publicly listed software companies and software-enabled services businesses
- Non-tech companies that are transforming into software companies

We help companies and investors solve their toughest challenges, including identifying investment opportunities and assessing risks across commercial, product, technology, and R&D lenses through due diligence and value creation services. From developing growth strategies to helping to execute major technology changes and helping to improve R&D organizational effectiveness, SSG provides services that help companies to expand market share and enhance their core offering.

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Survey methodology

Potloc conducted a comprehensive survey targeting Chief Technology Officers (CTOs) from May 21 to June 12, using computer-assisted telephone interviewing (CATI). The study engaged 350 from the software industry, across seven regions in the UK, Europe, and the Nordics. Quotas were applied to ensure representation by company size and annual turnover, providing balanced insights across different organizational profiles. The average completion time stood at 30 minutes, demonstrating Potloc's commitment to engaging hard-to-reach targets and fostering meaningful interactions.

About Potloc
Potloc is a survey platform used by leading consulting and private equity firms to collect primary insights, backup decisions, and boost expertise. With its end-to-end, AI-powered tools and guidance from market research experts, Potloc streamlines the process of creating surveys, selecting samples, analyzing data, and visualizing results.

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All in to shape the future with confidence.

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