

SOFTWARE REVOLUTION

HOW ARTIFICIAL INTELLIGENCE
IS RESHAPING THE FUTURE
OF SOFTWARE PRODUCTS
AND SERVICES



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One of the front-row candidates for disruption by artificial intelligence (AI) is software product and service development. AI is already leading to a paradigm shift in aspects such as coding, architecture, security, service management and ticketing, and personalization, providing new opportunities and risks. But the implications go well beyond new products and services and improved development approaches, into how software enterprises need to transform themselves across the board, from strategy and organization through to capabilities, resources, and ways of working.

This is not just an issue for the software services industry itself. As part of ongoing digitalization, enterprises across many sectors, such as financial services, manufacturing, energy, and healthcare, are bringing software development in-house as it becomes increasingly critical for maintaining competitive advantage. Most large companies today have also become, at least to some extent, “software companies!”

In this article we explore some key aspects of how companies should go about making the necessary transformation of their software products and services capabilities amid an AI revolution that has already started.

THE IMPACT OF AI ON SOFTWARE PRODUCTS AND SERVICES

The revolution that AI is bringing to software development has many dimensions. We refer to these conveniently here under the acronym CRASHED:

- **C - Continuous learning software:** AI enables software that evolves in real time, leveraging user feedback and continuously generating new updates and versions. For example, AI-driven customer service platforms can adapt their responses and strategies based on ongoing customer interactions and feedback.
- **R - Revolutionizing architectures:** Given its huge dependency on data, AI connects directly to databases, making traditional enterprise software architectures obsolete. For example, AI-enhanced database management systems can autonomously optimize queries and storage, reducing the need for manual database tuning.
- **A - AI-driven software development:** AI assumes the roles of coders and testers, with human oversight focusing on specification and teaching. For example, an AI system can automatically generate and test code for a new application feature based on high-level design inputs.
- **S - Security enhancement:** With AI, new cybersecurity threats emerge, necessitating advanced solutions such as zero-trust architectures and real identity verification to significantly enhance security. One example is implementation of zero-trust security models in corporate networks, in which AI monitors and authenticates every device and user continuously.
- **H - Hyper-personalization:** AI enables highly personalized user experiences, diminishing the relevance of generic, one-size-fits-all software solutions. For example, e-commerce platforms using AI can provide individualized shopping experiences, with product recommendations uniquely tailored to segments of one².
- **E - Exponential acceleration:** Development and adoption of AI is occurring at an exponentially accelerating pace, and showing no signs of plateauing at present. This means even more rapid development and deployment cycles for software companies, with new features being released and updated on a weekly or even daily basis.
- **D - Decentralized autonomous systems (DASs):** Combined with edge computing, AI is driving further developments of DASs. DASs operate independently and are capable of self-updating, self-repairing, and autonomous evolution, leading to new developments such as verifiable claims and smart contracts. For example, an autonomous, decentralized supply chain management system can self-adjust based on real-time data, without central oversight.

Although some of these new capabilities are still in development, many use cases are already here. For example, AI tools are already assisting developers and testers by automating routine tasks and optimizing DevOps workflows. A recent benchmarking exercise conducted by Fonds Finanz looked at the efficiency benefits of GPT4, GPT3.5, Code Llama, Llama Chat, and StarCoder for coding and testing. It concluded that time and cost savings of 50–60% had been achieved in code generation and conversion for tasks involving no significant shift in logic or functionality, as well as 30% savings for testing and 60% for documentation. Even where logic or functionality was changing, benefits of 10–30% were demonstrated.

Code conversion from one language to another, for example, from an old language such as COBOL to a modern language such as Python or Java, is another area where AI can reduce the time needed from weeks or months to minutes. This is valuable for preserving the functionality of legacy systems, one of the biggest challenges faced by large corporations especially. It is also the precursor to humans specifying the requirements and the

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AI generating the code and the tests itself, which will lead to entirely new programming paradigms and languages.

Perhaps the most futuristic aspect of AI in software development is the emergence of self-developing software, whereby systems can create, optimize, and even repair themselves without human intervention, leading to software that is perpetually up to date and optimally efficient. A recent example is the STOP system developed by Stanford in collaboration with Microsoft research. STOP stands for Self-Taught Optimizer, and is a method whereby a language model is applied to code to improve arbitrary solutions recursively.

THE RISKS FOR COMPANIES

Clearly, the transformative nature of AI poses risks as well as opportunities for companies developing software products, with companies that are slow to adapt losing ground rapidly to their competitors. Conversely, companies that move too fast with unproven technology risk getting themselves into trouble. Many specific risks must be dealt with, for example:

SYSTEMS AND ARCHITECTURE

- Substitution of current software system offers by new AI-driven architectures
- High costs of transitioning to new architectures
- New challenges in managing decentralized software systems
- Controlling the risks of AI-generated errors or biases being propagated at scale

SECURITY

- New cybersecurity vulnerabilities and attack surfaces requiring new responses
- New data security, privacy, and ethical issues to be managed

DATA

- High dependency on data quality from legacy systems
- Need for differentiated data sources, including beyond corporate borders

SKILLS AND CAPABILITIES

- Upskilling of teams to adapt to new technologies and workflows
- Loss of core software skills as AI takes over
- Lower development barriers to entry, leading to an influx of new competitors

Today's large software organizations could find their existing business models, platforms, and system offerings severely disrupted by these risks, with new, more agile competitors posing a significant threat. Companies whose core business is outsourced software services could find their very existence threatened by AI substitution. B2B customers of software products and services, and those customers that have already brought software development in-house, also face a steep learning curve to integrate and adapt to new systems.

INSIGHTS FOR THE EXECUTIVE — HOW COMPANIES SHOULD RESPOND

Companies in the software industry, or that run significant in-house digital factories or incubators in other industries, need to conduct a thorough strategic review and establish change plans to ensure that they continue to thrive and prosper as the AI-driven revolution gathers pace. Many aspects must be considered, as shown in Figure 1.



FIGURE 1: SHAPING UP FOR THE AI SOFTWARE INDUSTRY REVOLUTION

1. REVISIT STRATEGY AND ORGANIZATION

A good place to start is to revisit strategic aims and objectives to set the right direction for transformation. For large incumbent companies whose core strengths are being significantly impacted by AI, defensive tactics could be an important part of the strategy. In practice, this could mean strengthening core competencies that are not easily replicable by AI, such as exceptional customer service, specialized market knowledge, deep customer relationships, and investing in

GIVEN THAT AI IS FUELING RAPID ACCELERATION OF INNOVATION, COMPANIES NEED TO CONSIDER WHETHER THEIR EXISTING INNOVATION EFFORT IS STILL FIT FOR PURPOSE.

proprietary technology. This is, in a sense, the “Apple strategy”: locking in customers and fostering brand loyalty by developing a unique ecosystem of interconnected products and services, focusing on innovation, design excellence, and a high-quality user experience.

Given that AI is fueling rapid acceleration of innovation, companies need to consider whether their existing innovation efforts are still fit for purpose. Creating a separate division or subsidiary dedicated to AI innovation allows for agile exploration and development of AI opportunities without impacting the primary business, and helps to encourage breakthroughs. Alphabet’s formation of Google AI is one obvious example of a successful use of this approach.

In terms of organizational structures, exploiting AI effectively requires fluid, dynamic, and collaborative models. This could include more cross-cutting functional, matrix, and network structures to enable better multidisciplinary and cross-unit synergies. As AI automates routine tasks, we could expect flatter structures to be more suitable, with enhanced unit autonomy due to better real-time data and analytics.

Leadership roles will need greater emphasis on orchestration, facilitation, and continuous change. AI's predictive analytics and DAS's transparency could lead to more data-driven decision making processes, reducing reliance on hierarchical decision making.

2. REFRESH PROCESSES AND DEVELOP NEW SERVICE OFFERINGS

Clearly, identification and development of new AI-driven service offerings has to be a key aspect of transformation, requiring the usual dual pull/push focus on deep understanding of customer and market needs, together with new technology capabilities and opportunities.

In terms of processes, companies will need to cultivate data-centric decision making, leveraging AI insights and equipping leaders and teams with the latest tools and training. They will need to deploy advanced tools that support communication and collaboration, particularly for teams working with remote and decentralized systems (even sometimes between corporations).

3. EXTEND PARTNERSHIPS AND COLLABORATIONS

One key for success will be doubling up on efforts to engage in strategic partnerships with other companies, research institutions, or startups in the AI field. Increasingly, the philosophy should be evolved away from "This is our business, so who can we best partner with?" and toward "These are our competencies and strengths, so how can we best combine these in new ways with those of others to create new businesses?" This means fostering greater openness with data and developing partnerships on the basis of mutual trust rather than legal protection. For instance, depending on the use cases and expected response time, new and converging partnerships with telcos around infrastructure could come into the picture to optimize (near-) real-time interactions.

4. RESKILL AND UPSKILL CAPABILITIES AND RESOURCES

In some ways, this is the greatest challenge for companies in the AI-driven revolution. A major shift is needed from traditional software development to areas such as AI model training, data analysis, and ethical AI design. This necessitates reevaluation and disruption of current educational and training programs, reskilling of certain job functions (such as coding and testing), a new commitment to continuous learning, and fostering an adaptive culture. Investment in innovation and R&D resources to accelerate the innovation effort is also a key aspect.

Given the direct proportionality of the “intelligence” part of AI with the ingested data, we also expect a refocus on foundational data-related capabilities — data governance and data scouting to identify value-adding data sources that could lead to a differentiated outcome.

5. REVIEW ETHICS AND GOVERNANCE

Relying on AI for software development raises new ethical questions, such as bias in AI algorithms and the potential misuse of AI-developed software. Additionally, ensuring the security and reliability of AI-generated software could pose new challenges for the industry. New frameworks and policies will be required based on clear ethical principles. These will need to ensure adequate coverage and robust enough control of risks such as safety, security, confidentiality, and privacy.

The case example shows an example of a software and data services company in Germany that has successfully adopted a thorough approach in transforming itself for an AI-based future.

Case Example — Transitioning a Software/Data Services Company to an “AI First” Model

A company that provides standardized software to the majority of the German insurance industry is making the transition toward becoming AI-based. Previously, its software was powered by data that was manually extracted from very large numbers of documents provided by various players in the industry, which required ever-increasing manpower. Working with ADL, the company applied a structured transformation approach to begin the AI transition:

- **New “AI first” strategy:** The first step was to reshape the strategy toward AI, a key part of which was to recognize the new business opportunity in providing insights, namely, “insights are the new oil” (rather than, “data is the new oil”). The organization was reshaped around AI-based operations, training, and results verification, with newly freed-up resources able to start a new business unit around provision of insights.
- **Redesign of core processes:** Rather than attempting to force-fit introduction of AI into existing processes, processes were reassessed and redesigned around AI-based execution. This required new and modified process steps in which humans interacted with AI as drivers or pilots to guide, provide sense checks, monitor, and improve. Transitioning was done in multiple stages, beginning with low-hanging fruit around efficiencies and major cost pools. “Insights-as-a-service” was introduced as an entirely new offer.

- **Staff upskilling:** Staff members were upskilled to enable the transition, and some new staff were hired for the transition journey and new insights unit. Nearly every role was redesigned for augmentation by AI copilots, with substantial employee engagement in the changes.
- **New governance and ethics council:** A new council for AI was established to drive thought leadership, engagement, and ethical reflections and insights.

In developing the new AI-first strategy, selected customers, mainly large insurance companies, played a pivotal role. This was especially valuable in helping to identify the value pockets for the new insights business. A technology partnership with the AI strategy and implementation arm of a major consulting company was also key.

The efficiency gains from AI deployment allowed the company to self-fund its business expansion, which resulted in double-digit growth.

IN CONCLUSION

The advent of AI and accompanying drive toward decentralized systems is clearly a fundamental shift that is redefining not only the software services industry itself, but also the way enterprises across all sectors go about developing software products and services. From revolutionizing product development to reshaping organizational structures, the impact is profound and pervasive.

As they navigate this new wave, leaders need to have clear strategic foresight and adopt a structured transformation approach, rather than just integrating AI tools operationally. Success will require a blend of technological acumen, ethical considerations, and a deep commitment to continuous learning and adaptation. The path forward is clear: evolve, adapt, and innovate, or risk obsolescence.

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