Disruptive Technology Roadmapping for Artificial Intelligence's impact on Program Management

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Abstract

Artificial Intelligence (AI) is rapidly being adopted in program management, however, the users of AI tools in program management have limited understanding of its capabilities and risks. If that is so there is cause for concern. We focus on developing a strategic understanding of the capabilities and risks associated with the use of Artificial Intelligence associated with Program management. We provide for the initiation of the most elemental tool designed to put any technology into the strategy process - roadmaps and pre-roadmaps that focus on AI. However, how can you provide a roadmap or a pre-roadmap structure for Artificial Intelligence? AI is an extreme form of a Schumpeterian wave of creative destruction. We decided to first segment the Artificial Intelligence discussion into a subsegment: How it affects the future of Program management. We further embodied the massive move toward a remote and hybrid workspace and how Artificial Intelligence will be relied on in this employment trend. We asked nascent program managers with technological savvy to provide scenarios on how they forsee the adoption of AI in program management during a time of radical change toward remote and hybrid working environment. The results are a series of scenarios and frameworks where they discuss the risks inherent in the use of AI. All authors emphasized ethical and leadership issues which require

Human direction and control. These are exceptional initial material for a pre-roadmap for the future of AI use in Program Management.

Key words

Creative Destruction, Artificial Intelligence, Program Management, Ethics, Remote work, Hybrid work, and Leadership.

Introduction

One definition of technology roadmapping is:

> Technology roadmapping is a need-driven technology planning process to help identify, select, and develop technology alternatives to satisfy a set of product needs. It brings together a team of experts to develop a framework for organizing and presenting critical technology-planning information to make the appropriate technology investment decisions and to leverage those investments. Given a set of needs, the technology roadmapping process provides a way to develop, organize, and present information about the critical system requirements and performance targets that must be satisfied in certain time periods. Finally, it provides the information needed to make trade-offs among different technology alternatives. (Garcia and Bray, 2000)

Technology Roadmapping is a strategic tool designed to embody technology into product or product platform forms and accelerate AI's acceptance in an industry or marketplace. Technology roadmapping is most famously utilized in the semiconductor arena where "Moore's Law" accelerated the semiconductor revolution by tacking an established semiconductor surface microfabrication technology and driving the resultant products like semiconductor power and memory devices to commercial acceptance (Hoefflinger 2011). The semiconductor roadmapping efforts accelerated the commercial acceptance and diffusion of the semiconductor and for the first time in the late 1960's and early 1970's the commercial semiconductor market outperformed the government market (Walsh et al. 2005).

Artificial Intelligence (AI) and machine learning technologies and products are disruptive technologies where in 2021 there where over one hundred choices in radiology applications alone (Van Leeuwen et al. 2021) and now well over five hundred competing and or co-existing technology product paradigms according to web sources (Kale 2026). A professional needs a primer (Carlo 2017) and constant reading to keep up with the technologies progress the most famous is ChatGPT which answers questions and provides text. Others like Grammarly are designed to review your grammar, punctuation, and style. Still others focus on creating marketing, graphics, and presentations. Still others act like companions. For the project management world there are dozens of AI tools available already such as Zoho projects, Jira, Monday.com, Asana, Adobe Workfront, Resource Guru, and others. What seems to be true is Project Management represents an industry where professionals must master the onslaught of AI tools or AI project management tools will become their masters.

A first step in that strategic journey is to devise a technology pre-roadmapping (Islam et al. 2020) and eventually a roadmapping activity not just for a single firm but for the emergent AI industry or at least Industry sub sectors. To that end there are disruptive technology roadmapping techniques that understand the difference between high tech traditional technologies and disruptive technologies and reflect the disruptive workplace. The first of these was an industrial effort focused on Microsystems and top down NanoSystems technologies (Walsh 2004). Others include the pharmaceutical landscape (Tierney et al. 2013). A more recent effort (Curry et al. 2025) focused on pulsed power pre-roadmapping, a technology that supports a plethora of industry subsectors which is akin to Artificial Intelligence.

Any form of roadmapping must be based on the work or technology it is based on (Linton and Walsh 2004). The most popular roadmapping techniques are those found in the Semiconductor roadmapping efforts (Arden 2002, and Lidow et al. 2001). But how similar is AI technology to semiconductor microfabrication technology of the 1970's? Both are high technology-based industries. It is true that semiconductor manufacturing in the early 1970's was disrupting and creatively destroying markets formerly held by vacuum tube power devices and expanding the transistor and memory device technology with more advanced products that found new applications in the process (Walsh 2005). However, this is where the semiconductor industry similarity ends.

Artificial Intelligence technology and associated products do not have a dominant design, and there is a plethora of applications rather than the handful of products that drove the semiconductor driving semiconductor microfabrication's commercial and technology development. The technology roadmapping process that supports the strategic process of AI technology is disruptive technology roadmapping. Further it is an extreme form of a disruptive technology roadmap a Schumpeterian wave of creative destruction (Jung et al. 2024). The technology roadmapping and pre-roadmapping processes for disruptive technologies are much more complicated (Kirchhoff et al. 2007).

A new pre-roadmapping technique that we proposed here is to have authors that are emerging nascent professionals in a subsector being affected by the radical emerging disruptive technologies of Artificial Intelligence provide a thoughtful perspective on the future of Program Management will be affected by AI. We focus on the following authored efforts.

Literature Review and Results

Ybarra et al 2026 examined just how artificial intelligence and machine learning can support program managers in navigating complex environments. They used structured conceptual frameworks and literature reviews to analyze the capabilities of AI through Brown's *Chaos to Clarity* concept. These authors contributed to the program management literature by mapping AI-enabled tools to business, program, and project levels, demonstrating how predictive analytics and automation enhance visibility, coordination, and decision-making while augmenting rather than replacing human leadership. They viewed AI as part of the evolution in program management in the past decade (Martinsuo and Hoverfält 2018). They stated that as programs expand in terms of teams, technology and stakeholders' complexity has also increased, making it harder for program managers to maintain alignment, visibility, and control across the board (Carreño 2024). Traditional governance structures and reporting methods are often too slow and rigid to support timely, informed decision-making at the program level. They further postulate ` a future where Artificial Intelligence technologies power advanced decision-making dashboards and interactive scenario modeling. This will improve the program managers' ability to view current project Key Project Indicators (KPIs) alongside AI forecasts. These types of analyses could then be accomplished without any specialized expertise. This will transform static reporting tools into dynamic, predictive, and adaptive decision-support systems. Scenario modeling complements this by allowing users to simulate future outcomes under different conditions. AI program management tools are already ranking the simulated outcomes by probability and strategic impact, enabling executives to choose options not just based on feasibility but alignment with organizational goals (Ajibade 2025). AI enabled dashboards and scenario modeling will become tools that will be essential across sectors such as finance, healthcare, supply chain, and public administration.

Bingham et al 2026 examined whether bounded autonomous AI agents can function as co-program managers within contemporary program governance systems. They drew on program management theory, AI governance research, human–AI collaboration scholarship, and explainable AI literature. They see AI as developing a Hybrid Intelligence governance Model that allocates continuous sensing, forecasting, anomaly detection, and scenario analysis to AI agents while reserving strategic judgment, stakeholder alignment, ethical interpretation, and formal decision authority to human program leaders. The authors state that contemporary enterprise systems generate dense streams of performance, financial, operational, and risk data. They see future promise in Artificial intelligence ability to analyze those streams more quickly than manual governance processes typically allow, making earlier forecasting, anomaly detection, and scenario analysis possible as predicted by (Davenport & Ronanki, 2018; Dwivedi et al., 2021; Fridgeirsson et al., 2021). They disagree with others who treat AI as a useful tool rather than as a governance-embedded participant whose recommendations can materially shape program decisions.

Bingham et al 2026 make three contributions to the AI program management discussion. First, it defines the idea of the bounded co-program manager as an AI agent embedded within explicit governance thresholds rather than an unconstrained decision surrogate. Second, it specifies the division of labor, control architecture, and authority boundaries required for hybrid human–AI governance. Third, it develops a risk architecture for AI co-management centered on bias amplification, model drift, data-quality failure, over-automation, governance lag, and stakeholder trust erosion. Their analysis argues that AI strengthens program management only when autonomy is bounded, model behavior is auditable, escalation rights are explicit, and human accountability remains nondelegable. The article therefore shifts the discussion from AI adoption as a tooling question to AI deployment as a governance design problem.

Adkins et al. 2026 stated that AI-enabled programs are even now altering decision rights, workflows, stakeholder expectations, data governance, risk exposure, and the skills required of program managers.

Their analysis identifies four mutually reinforcing techniques: adaptive change management, structured communication planning, cross-functional collaboration, and active AI risk governance that are affecting program management. Change management addresses resistance and adoption readiness; communication planning builds trust and clarifies AI's purpose, limits, and expected effects; cross-functional collaboration aligns technical, operational, human resource, and leadership functions; and risk governance manages bias, cybersecurity, model reliability, compliance, accountability, and overreliance on automation. The authors further apply the framework to representative AI implementation scenarios and present a qualitative risk matrix and governance-aligned response table. The authors' central argument is that AI should be governed as an organizational transformation embedded within program structures, not treated as a stand-alone technology deployment. Programs that integrate people-side management with disciplined governance are more likely to achieve sustainable AI value than programs that focus on technical implementation alone. The authors depict that project and program management research increasingly describes AI as a force that reshapes work rather than merely digitizing existing practices (Hughes et al., 2025). Finally, Adkins et al 2026 discuss the established program management techniques that program managers must adapt to integrate AI successfully within organizations.

Badran et al. 2026 stated that Artificial Intelligence is increasingly entering program environments through predictive analytics, decision-support tools, automated reporting, and risk-monitoring systems. They investigate how AI can be integrated into program management without weakening human accountability, strategic alignment, or stakeholder trust. These authors used an integrative review of program management, AI governance, human–AI decision-making, and machine-learning to provide a Governed AI Integration Framework for Program Management.

Badran et al. 2026 use a framework to argue that successful adoption depends on four design principles: strategic fit, bounded augmentation, lifecycle assurance, and explicit architecture. Under this model, AI is most valuable in data-rich, repetitive, and reversible program activities such as forecasting, performance monitoring, dependency analysis, and routine reporting, while human leaders retain authority over strategic trade-offs, ethical judgment, stakeholder management, and high-impact decisions. They show that AI systems do not create value merely by existing; they create value when their outputs integrate into decision routines, authority structures, and monitoring processes in ways that managers can trust and govern (Birkstedt et al., 2023; NIST, 2023). These authors specifically state that AI tools do not stop being a governance concern upon deployment. They emphasize that Model performance depends on data quality, operational conditions, and ongoing maintenance. They state that without lifecycle assurance, a system can degrade into a source of false confidence. Finally, they emphasize that production AI therefore requires validation, performance monitoring, retraining discipline, and documented rollback procedures (Breck et al., 2017; Sculley et al., 2015).

Souza et al. 2026 states that hybrid work, global talent sourcing, and AI-enabled analytics are reshaping the conditions under which program managers govern. They focused on synthesizing literature on distributed work, global virtual teams, AI-enabled decision support, ethical monitoring, and mentorship to examine how program management must adapt in the next 30 years. Their analysis argues that future program managers will not always have co-located supervision and will be defined more by their ability to engineer communication routines across distance, interpret AI-generated signals without surrendering judgment, protect trust while using digital monitoring tools, and institutionalize reskilling and mentorship as governance mechanisms rather than optional benefits. They further argue that Artificial Intelligence does not eliminate the need for program leadership; but rather it increases the program managers premium on human interpretation, ethical oversight, cultural intelligence, and organizational learning.

These authors demonstrate that project and program environments will be increasingly shaped by Artificial Intelligence base digital transformation increasingly rely on such tools to surface patterns, predict risks, and support faster managerial response. They further the arguments made by (Gemino & Reich, 2023; Project Management Institute, 2024). They state that in practical terms, Artificial Intelligence strengthens visibility, but promotes rather than eliminates the need for human program management judgment.

Discussion and limitations

The use of future professionals steeped in digital technologies including Artificial intelligence provides exceptional information for pre roadmapping Artificial Intelligence impact on Program manager environment 5 years, ten years, or 30 years in the future. All major pre-roadmapping techniques strategically accelerate technology. Pre-roadmaps provide potential scenarios for roadmapping technology. All of the above efforts provide future scenarios for Artificial Intelligence adoption. There are limitations to this research including that we used only one program management cohort group.

Conclusions and Future Research

The effort on providing nascent program managers provided useful scenarios, frameworks, and models to those seeking to initiate a pre-roadmap or roadmapping process. All of the nascent program management author teams felt there were great ethical and leadership risks associated with the use of AI. Others stated that at times the AI answer was incorrect. These are important findings. However, this is just the initiation of the strategic effort to utilize AI in Program

Management. The future research effort is to embrace more cohort groups into first a pre-roadmapping process and a roadmapping process.

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