THE DIGITAL ECONOMIST

ARTIFICIAL INTELLIGENCE | AUTOMATION | GOVERNANCE

Expert Insights

Aurélie Jean, PhD and Mark Esposito, PhD

Playing to Win at the High-Stakes AI Table

Introducing a New AI R&D Planning Framework and Matrix

The ongoing maturing of the era of digital transformation is being superseded by a new wave of AI transformation. Today's rapid emergence of AI for R&D opens up a myriad of use cases across all sectors. Every company, organization, or individual in any field stands to gain the benefits of AI, in general, and, with the right level of project planning, can deliver high business performance improvement.

Every day's media news seems to carry another story of unprecedented successes, pretty much equally matched by other articles of concern over threats of unintended consequences. So it has been for every new stage and level of the very human continuous striving to make better tools to make a better life and to protect us from the bad things.

In this short paper, we suggest that in these still early days of artificial intelligence (AI) and machine learning (ML) capabilities, both questions are worthy of addressing: How do we build better tools to live better lives, and how do we use our tools to prevent life's catastrophes? In the modern world, the very best time to do that is in the research and development (R&D) planning process by creating frameworks that guide our innovative thinking and planning.

A lesson from digital transformation

A key learning from the first two decades of this century is that digital (data) transformation in business often leads to an inversion in business models in many companies, such that clients and customers become collaborators and products become services (Bernardi, et al., 2016).

AI holds the promise of both accelerating and improving upon such transformational process inversion. Whenever the recursive algorithms of machine learning (ML) are applied to business and production processes, the ready possibility of continuous, autonomous, and real-time process improvement comes alive.

However, to ensure that new algorithmic models are most effectively designed and built requires senior (to the models themselves) R&D planning frameworks to help the endeavor succeed in its transformational performance improvement and risk mitigation.

Introducing: The Recursive 3P AI Transformation Framework

The definition of a recursive algorithm is one that continuously seeks to break down the problem that the software is being asked to solve into smaller instances of the same problem. The 3P AI Framework is not the solution to the problem, but rather provides a comprehensive, disciplined approach to solution development.

We suggest there are three dimensional realms for consideration in the R&D guidance. These are Prediction, Personalization, and Precision.

Prediction: Predictive data analytics help ensure that organizations can, in near-real-time, forecast conditions, trends, outcomes, and behaviors more accurately, thereby allowing for informed proactive planning and decision-making. For example, for farmers, "predictive data models can provide insights into weather patterns, forecasts, and potential risks, which can help farmers make better decisions and take proactive measures to protect their crops, reduce costs, and improve their yields" (Times of India, 2023).

When thinking through how to apply AI in any given field, predictive simulations come first to mind. Indeed, by capturing the signals and patterns within the underlying mechanisms and logic of past events or a given phenomenon, algorithms can anticipate (or predict) a similar event in the near or long-term future (Louridas, 2020).

The accuracy and efficiency of such simulations relate to the level of advancement and precision of the algorithmic models. Over the past decades, significant efforts and progress have been made in such deep-learning models, in particular, which have markedly improved the quality of predictive AI simulations (Le Cun, 2019).

Of note, one could pay attention to the capability of the model, either autonomously or with human subject matter experts (SMEs) oversight in the given field or industry sector, to predict some unique, singular, or new events resulting from the simulations.

Such "predictives" can also help identify threat risk potential hidden within the opacity of the algorithms driving the simulations, again with SME human oversight. Among the threats that one could mention are issues such as technology discrimination (O'Neil, 2016; Bowlamnini, 2024), or environmental impact (Crawford, 2021).

Personalization, on the other hand, indicates a potential for customization of services, products, and experiences that are tailored to individual users (consumers, customers, clients, and/or value-chain partners) based on demographics, preferences, and behavioral data for the purpose of enhancing product or service provision, satisfaction, and loyalty.

In past decades, the progress made in both high-performance computing (HPC) capabilities and IoT-edge sensing, monitoring, data collection, and analysis has enabled real-time gathering and automated curation of datasets that can then be used to train machine-learning (ML) algorithms. Additionally, advances in ML models make possible highly personalized recommendations or actual modification of the delivery of products and services in general. Such increased capacity for personalization brings with it new business opportunities in the improved design, production, and delivery of more personalized products and services to customers.

Precision in AI implies that the insights gained and actions derived from the application of AI are optimized for high accuracy, high contextual relevance, high integrity, and high error avoidance.

Following the progress mentioned in the previous section on the advances in predictive analytics, the algorithmic models now being developed, based on large-scale datasets, are far more precise in their output. Such heightened precision plays a major role in both the prediction and personalization performance capacity.

Developing a recursive AI transformation framework based on improvement in each of these three dimensions ensures that the resultant recursive algorithm models will deliver continuously more predictive capability, more personalization opportunity, and more precision.

How to embrace the Recursive 3P AI Transformation Framework approach:

More Predictive, More Personalized, and More Precise business, work, or production processes can be both envisioned and detailed by employing formal design and systems thinking approaches which fully anticipate and consider the AI transformation opportunities.

A use-case-driven approach should be used when adopting the 3P Framework. What are the business transformation opportunities envisioned? What are the problems that can be anticipated? What are the threat risks?

We offer the 3P AI Transformation Matrix, as depicted in Figure 1, which presents a list of all tasks for each of the three P dimensions. The parameters for these tasks can vary. Here are the steps to building and using an AI Transformation planning matrix:

1. **List all the tasks** in which AI is already being, will be, or can be applied.
2. **For each task**, list how this task can become more precise, and/or more predictive, and/or more personalized.
3. **Identify tasks** that have substantially similar or common ways to achieve more of each P dimension.
4. **Identify tasks** that have the most influence on precision, prediction, and personalization, in order to identify the tasks that will bring the most to the business.
5. **Reiterate this matrix over time** while moving forward with the AI transformation of the target process.
6. **Tell the stories** of what went right, what went wrong, and what came next.

	Task #1	Task #2	(...)
More Precise			
More Predictive			
More Personalized			

Figure 1 – The More 3P Framework Matrix

During the framework matrix planning process, it's useful to keep in mind that this is simply an R&D guidance mechanism for model development. The simpler, the better. This enables development teams to actively and iteratively apply The More 3P Matrix to make ever-increasingly smarter, more effective planning decisions.

The Promise of Business-Transforming Performance and ROI

Because this is a simple framework and matrix, it means it can be more rigorously applied.

In its simplicity, its thoughtful detail, and rigor lies its power as an important planning tool. It should not be rigorously pursued if it is not.

"More" performance improvement within the context of The 3P Framework Matrix may also mean improvement in planning for abeyance and mitigation of downside risk instances, such as technology discrimination, e.g., techno-racism and algorithmic biases.

This is made possible by measuring the levels of the "more" quotient in each of the 3P realms and their evolutionary stages over time. Indeed, being more precise, more personalized, and more predictive over baseline measures enforces project conceptors, both as a matter of science and engineering.

Technology development teams need business leaders to be crucially engaged. Design, develop, test, and actualize/operationalize—every stage requires even non-technical business leaders to be closely engaged. The underlying machine learning operations (MLOps) and/or generative artificial intelligence operations (GenAIOps) as applied to the algorithmic models being developed require business leadership to help ensure that the aims of the model, in terms of "More 3P AI," meet all design criteria represented in the matrix.

If not, the systems may not run correctly, resulting in a drag on business performance and ROI for the company as a consequence. Poor governance may well result in the unintended consequences of imprecise (loose) AI model development. The More 3P AI Matrix, at its best application, prevents that.

Forward-leaning

The More 3P AI Framework Matrix is a proactive approach calling for continuous process improvement that voluntarily compels the full and willing participation of designers, developers (both data scientists and process engineers), as well as business-side leaders.

This matrix must be planned and implemented with no-option fidelity as a “mission-critical” matter for ensuring these software systems meet stringent performance guidelines, specifications, and necessary policy and governance guardrails, all geared towards achieving true AI-led business transformation.

The More 3P Framework Matrix should likely lead the business case development for the proposed AI/ML project models. This may apply particularly in mature corporate software development organizations. What makes it to the matrix and is fully listed and described will inform the criteria of the business case.

For the AI start-up or early-stage venture, the 3P Framework Matrix may actually form a clear, easy-to-understand way to introduce to all stakeholders what the business of the business is.

When pursuing AI Transformation within an organization, it’s useful to envision it through this Framework lens, as it demonstrates how the organization can empower itself to take the best advantage of AI. The faster this can be fully articulated and demonstrated to leadership, the faster competitive advantage can be realized.

Furthermore, delineating how the business can evolve to become a More 3P organization within the business case cum an applied Recursive 3P AI Framework during the AI transformation provides a clear narrative of AI's impact, a storyline that goes beyond just the expected growth, profitability, and efficiency performance gains. This narrative powerfully conveys the AI’s business value, resonating with all stakeholders—employees, customers, value chain partners, and investors alike—by showcasing tangible enhancements in business operations and outcomes.

Embedding Effective Governance

Demonstrating near bullet-proof effective algorithmic governance in the Recursive 3P AI Transformation Framework is crucial as it addresses various challenges, such as data privacy, sovereignty, ethical considerations and guardrails, and regulatory compliance.

By integrating algorithmic governance, the organization can mitigate risks associated with AI while optimizing its benefits. This governance should be dynamic, evolving with changing AI capabilities and societal norms to ensure that the transformation is not only innovative but also continuously responsible and sustainable.

Conclusion

A well-considered AI transformation course, viewed through the strategic "3P" lens, promises substantial advantages for organizations. By rigorously applying Recursive 3P AI Transformation Framework strategies, organizations can realize significantly enhanced operational effectiveness and efficiencies, business performance improvement, ROI, and competitive advantages—all governed by robust recursive algorithmic development and management practices that safeguard against any potential risks.

Contributor: Navroop K. Sahdev | **Editor:** Bruce Armstrong Taylor

About

The Digital Economist, based out of Washington D.C. is an ecosystem of 30,000+ executives and senior leaders dedicated to creating the future we want to see: where digital technologies serve humanity and life. We work closely with governments and multi-stakeholder organizations to change the game: how we create and measure value. With a clear focus on high-impact projects, we serve as partners of key global players in co-building the future through scientific research, strategic advisory and venture build out. We are industry-agnostic as most high-impact projects touch many different industries. Our portfolio ranges from energy transition to ethics in emerging technology.

CONTACT: INFO@THEDIGITALECONOMIST.COM