

Generative AI & The Management Consulting Industry

**Lessons from Previous
Major Technological
Revolutions**



Carlota Perez is a British-Venezuelan economist known for her work on technology and socio-economic development. In her book "Technological Revolutions and Financial Capital," Perez outlines a framework for understanding how new technologies lead to far-reaching societal and economic changes. The work was based on an analysis of five major technological revolutions that have occurred since the late 18th century:

The Industrial Revolution (1771-1820s)

This began in England with the invention of machinery for the textile industry, powered by water and then by steam. It marked the transition from an agrarian economy to one dominated by industry and machine manufacturing.

The Age of Steam and Railways (1829-1870s)

This was driven by the development of the steam engine and the expansion of railways, which revolutionized transportation and communication, and led to the development of large-scale industry and the growth of cities.



The Age of Steel and Heavy Engineering (1875-1905)

The third revolution involved the widespread use of steel, the growth of heavy engineering, and the invention of the telegraph and the telephone. This period saw the rise of large industrial corporations and the expansion of global trade.

The Age of Oil and Mass Production (1908-1940s)

The fourth revolution was characterized by the development of the internal combustion engine, the automobile, and techniques for mass production. This led to the growth of the consumer society and marked the beginning of the dominance of the United States in the global economy.

The Age of Information (1971-2000s)

This is the current revolution driven by the development of digital technology, computers, the internet, and telecommunications. It has led to the globalization of the economy and the growth of the knowledge-based economy.

Characteristics of Major Technological Revolutions

Wide Scope of Impact

The technology has the potential to be applied across a variety of sectors and industries. This broad applicability allows the technology to permeate society and the economy, transforming how businesses operate and people live.

A New Infrastructure

The technological revolution often brings a new or significantly transformed infrastructure that makes the widespread use of the latest technology possible. This could include physical infrastructure (like roads and railways for the automobile) or digital infrastructure (like the internet for the information technology revolution).

Significant Reduction in Costs

The technological revolution often significantly reduces the cost of key inputs or processes. This reduction in cost makes the technology accessible to a larger number of users and applications, driving its widespread adoption.



Increases in Productivity

The new technology often leads to significant increases in productivity. This productivity gain can drive economic growth and further incentivize the adoption of the new technology.

Potential for Profits and Capital Investment

The potential for high profits and the opportunity for capital investment are key drivers for the development and spread of the technology. These financial incentives attract the capital necessary for the technological revolution to unfold.

New Techno-Economic Paradigm

Each technological revolution brings a new techno-economic paradigm – a new common-sense logic for how to best organize and apply the new technology for economic growth. This includes new best practices, organizational forms, skills, and capabilities.

Every major technological revolution in the last 250 years was associated with a breakthrough that led to far-reaching economic and societal changes.





We are in the early stages of a new major technological revolution.

Generative AI possesses each of these characteristics:

- It has a wide scope of impact and will be applied across virtually all industries.
- Resources such as ChatGPT represent a new infrastructure for building apps, services, and business processes. It will continue to drive the development of new infrastructure (like data centers and cloud computing services).
- It dramatically reduces the cost of many repetitive tasks, from administration to data gathering, computation, analysis, and writing.
- Significant productivity improvements are projected across a wide range of occupations, particularly traditionally white-collar occupations.
- It is already attracting significant investment and contributing to the development of new techno-economic paradigms.

While the ultimate impacts of generative AI will depend on factors such as technological developments, societal responses, and policy decisions, it appears clear to me that it will have a greater impact on the management consulting industry than any of the technological advancements that have occurred to date in my lifetime.



What does Perez's framework predict will happen as this revolution rolls out? Her framework outlines the five phases of a technological revolution:

Irruption: This is the phase where the new technology first appears. It usually starts with a significant innovation that leads to a flurry of investment and speculation. This phase is characterized by high financial volatility and an "irruption" of the new technology into the marketplace.

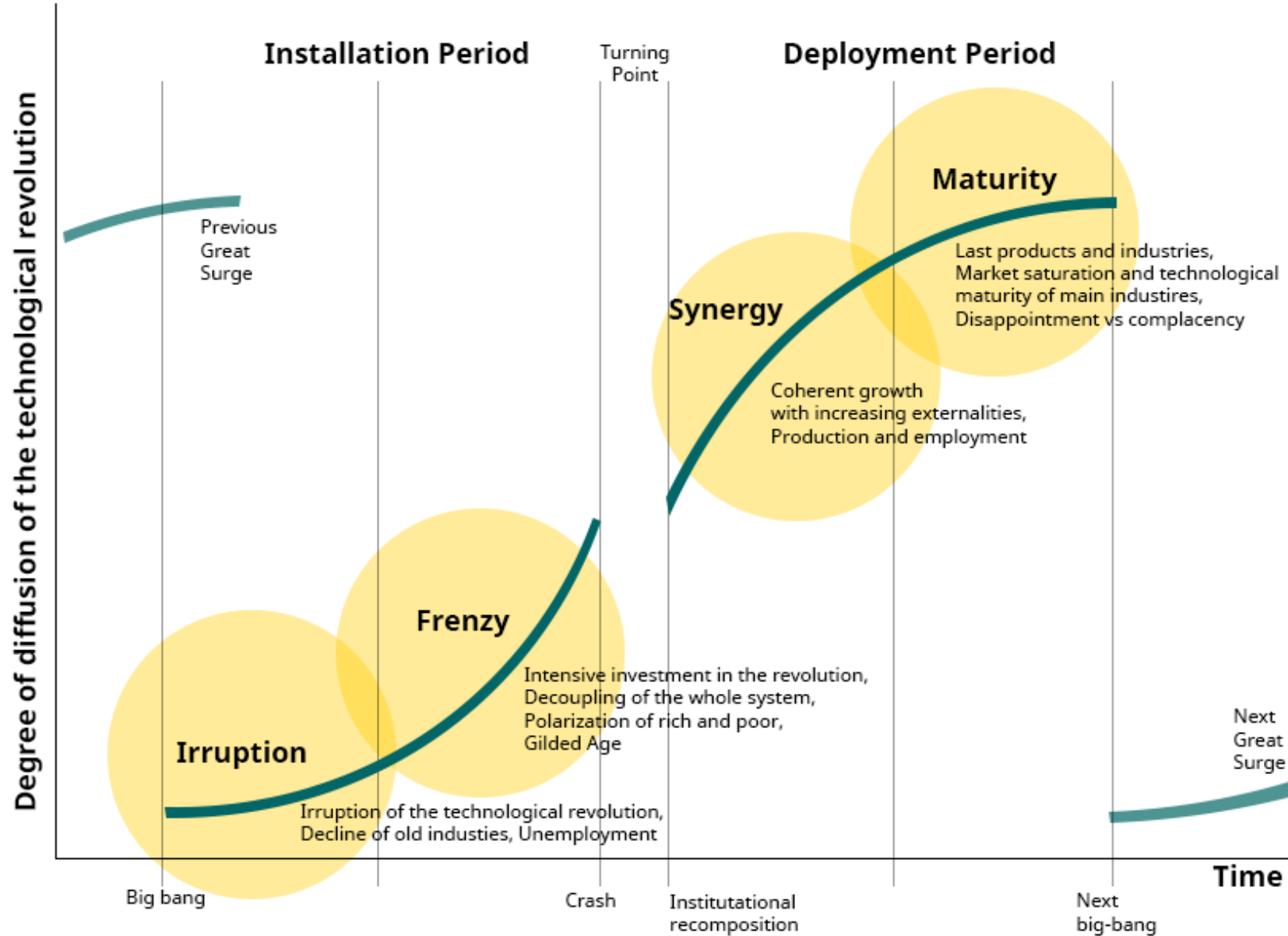
Frenzy: The new technology begins to spread and create new wealth, leading to a speculative frenzy. This phase is characterized by financial excess, as investors seek to capitalize on the new technology, often leading to a financial bubble.

Crash: The speculative bubble bursts, leading to a period of financial and economic crisis. This phase is often accompanied by social and political unrest.

Synergy: After the crash, society begins to learn how to effectively use the new technology, leading to a period of growth and consolidation. This phase is characterized by the widespread adoption of the new technology and the transformation of industries and social institutions.

Maturity: In this final phase, the technology becomes fully integrated into society and the economy. However, the rate of growth slows down and the technology may start to become a limiting factor, setting the stage for the next technological revolution.

Recurring phases of each great surge



We are currently in the irruption phase.

Generative AI is attracting massive public attention and investment.

ChatGPT and other generative AI technologies have given people firsthand experience with the power of advanced AI and greatly raised interest in AI among the general public, business leaders, and investors.

Launched in November 2022, ChatGPT surpassed one million users in just five days and 100 million users in two months, the fastest a company has reached these levels.

ChatGPT and other applications have surprised users with their generalized capabilities, ability to generate novel, human-like output, and ability to interact using natural language, images, audio, and video.



According to Pitchbook, the level of venture capital investment in early-stage generative AI businesses increased from \$408 million in 2018 to \$4.8 billion in 2021 before declining slightly to \$4.5 billion in 2022, while the value of angel and seed investment increased from \$103 million in 2018 to \$354 million in 2022.¹ While significant, these figures represent only a small percentage of the overall investment in AI; the 2023 State of AI Report estimated that private investment in startups and scale-ups using AI totalled \$111 billion in 2021, including major investments by key players such as Google, Meta, Microsoft, Amazon, Nvidia, and many others. The US accounts for more than half of the AI investment worldwide (53% in 2022 and 57% in 2021).²

At the same time, the capabilities of generative AI models are advancing rapidly, as reflected in the tremendous improvements between ChatGPT 3.5 and 4. This rapid progress could accelerate the movement through the irruption phase and into the frenzy phase. The model suggests that this will lead to a frenzy of activity, peak levels of investment and new business startups. History suggests that this can lead to a crisis period, where the economic returns on the investment are lower than anticipated, business failures are rising, and increasing attention is paid to the negative consequences of the technology (e.g., worker displacement), leading to social and political pushback.

¹ Pitchbook, *2023 Vertical Snapshot: Generative AI* March 21, 2023

² Nathan Benaich and Ian Hogarth, *State of AI Report*, October 11, 2022





Early Thoughts on the Potential Life Cycle for Generative AI

The AI revolution may play out faster than previous technological revolutions.

The five reviewed in the development of the Framework commonly took 40 to 60 years to move from irruption to maturity. Given the high levels of awareness, business interest, and investment, generative AI may advance much more quickly.

The rate of adoption may be slower than currently anticipated by many.

Products such as Microsoft Copilot will facilitate early adoption of generative AI in some functions and business processes. However, major constraints to implementation can include challenges in identifying how and where to use it, technical expertise, difficulties in bringing employees up to speed, resistance from management and staff, the cost of the software and processing time, and concerns about trust, reliability, data security, ethics, and liability.



There will be substantial productivity gains and efficiency improvements.

For instance, the advent of electricity improved industrial processes, and the rise of the internet improved information access and communication. AI has the potential to substantially improve the efficiency of the management consulting industry by automating routine tasks, improving decision-making with predictive analytics, and enabling more data-driven strategies.

New services and new business models will be developed.

Technological revolutions often lead to the emergence of entirely new services and business models. For example, the rise of the internet enabled e-commerce, digital marketing, and online consulting.



There will be significant business and labour market disruption.

Just as companies like Amazon and Google disrupted retail and advertising with internet technology, AI could enable startups to disrupt established consulting firms with AI-powered services. The Industrial Revolution displaced many manual labour jobs but created demand for machine operators and mechanics. Similarly, AI may displace some roles in management consulting, such as data analysts, but could also create demand for new roles, such as AI specialists or data scientists.

There are already new regulatory and ethical challenges.

Just as the rise of the automobile led to the need for traffic laws and the internet raised issues around data privacy, AI brings ethical challenges such as bias in decision-making algorithms, the privacy of AI-derived insights, and the responsibility for AI-driven decisions.