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the machine that didn't change the world.

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The Machine That Didn’t Change the World.

Technology changes what is possible. The deeper revolution begins when markets move with it—and assumptions that once looked permanent become choices.

The future is easy to recognise afterwards. Factories were always going to electrify. Cars were always going to replace horses. Computing was always going to move from rooms to desks to pockets to the cloud. Renewable energy was always going to become cheaper. Machines were always going to learn.

Except history only makes technological change look inevitable once the uncertainty has been removed. We remember the destination and forget the competing technologies, failed businesses, stranded capital, regulatory battles, indifferent customers and perfectly intelligent people who looked at the same evidence and reached different conclusions.

This is why the machine can be such a distraction. A new technology makes possibility visible: an electric motor turns, a car moves without a horse, a solar panel generates electricity without combustion, a machine produces functioning software from a sentence. These moments matter because they show that a constraint has moved, but they tell us much less about what the world will eventually build around it.

The deeper transformation begins when technology and market change start reinforcing one another. Costs cross thresholds as infrastructure appears, behaviour shifts, regulation moves and new businesses form around different economics. Advantages that once looked structural begin to weaken. Eventually, an assumption on which an industry has been built stops being a fact and becomes a choice.

That is the inflection point, and recognising one while you are living through it is considerably harder than recognising one in a history book.

When the Old Logic Stops Making Sense

Electrification provides an unusually clear example because factories built around steam did not merely contain steam engines; their physical organisation reflected the technology. A central engine transmitted mechanical power through shafts, belts and pulleys, constraining where machinery could be placed and influencing how production flowed through the building.

Electric motors could initially be inserted into much of that existing logic. The source of power changed before the system around it did. Greater possibilities emerged as production was progressively reorganised around distributed electric power: machinery no longer had to obey the geometry imposed by a central driveshaft, allowing layouts and workflows to evolve with it. Electricity mattered enormously, but much of its eventual value came from redesigning what surrounded it.

The technology had moved faster than the assumptions built around it.

That pattern recurs because technologies arrive in worlds designed for their predecessors. Products, organisations, regulation, skills, infrastructure and customer habits embody yesterday's constraints, which is why the first version of the future so often resembles the past. Early websites borrowed from brochures and newspapers. Smartphones carried visual remnants of notebooks, buttons and cameras. Much of the first cloud migration moved existing applications onto different infrastructure before businesses began exploiting what computing on demand allowed them to design differently.

AI is following the same path. We are using astonishing new capability to perform recognisable work faster—to write, analyse, design, code and respond. There is substantial value in that; productivity should not be dismissed merely because it improves something that already exists. But eventually another question appears. If a report exists partly because information historically had to be assembled and periodically presented, or a form because software needed people to translate messy reality into fields a machine could process, what happens when those constraints move?

The answer is not that everything old disappears. Regulation, accountability, physical reality and human preference have formidable staying power. Institutions are not simply technological artefacts waiting to be automated away. But once an underlying constraint changes, the structures built around it deserve to be questioned again.

The difficult part is knowing when.

Seeing the Next Curve

I learned something about that at Ford around the turn of the millennium, when Jacques Nasser had become chief executive and was attempting to change something more fundamental than the product portfolio. He wanted to change what Ford believed the business was.

Ford was hardly a company searching for an identity. It had helped define the industrial corporation through engineering, mass production, global supply chains and the manufacture of one of the twentieth century's defining products. Its ability to make vehicles at enormous scale ran through its culture, systems and assets.

Nasser wanted to change the bloodstream.

In 1999, he told shareholders that manufacturing excellence, quality and productivity would no longer be enough. His ambition was to move Ford from an industrial company towards what he called a consumer-focused company providing automotive products and services. Rather than seeing the economics largely through manufacturing and selling the vehicle, he wanted Ford to understand the customer's entire period of ownership: purchase, finance, insurance, repair, servicing, residual value, recycling and eventually the next vehicle. He called it the customer's “total transportation experience”.

Ford put capital behind the idea. It already had Ford Credit and Hertz, and in 1999 agreed to acquire Kwik-Fit for about £1 billion, gaining almost 2,000 service centres across Europe. It moved into vehicle recycling and other consumer services and took a majority interest in the Norwegian company producing the TH!NK electric car. The ambition extended beyond selling more cars towards participating in more of the economic life surrounding mobility.

I was working in technology at Ford during that period, across engineering, manufacturing and product development. From inside the company, the tension was more interesting than the familiar story of a visionary chief executive battling an organisation incapable of understanding him.

Nasser had recognised something important. The economic territory around the vehicle could become increasingly valuable as the relationship between manufacturer, product and customer changed. A quarter of a century later, the automotive industry thinks naturally about connected vehicles, software, charging, digital services, direct customer relationships and lifetime value. Electrification is drawing automotive, technology, infrastructure and energy into one another in ways that were difficult to realise commercially at the end of the twentieth century.

Seeing the direction of travel, however, is different from knowing when the conditions exist to travel there.

Ford still had to excel at its existing business, and that business began encountering serious problems. The Firestone tyre crisis surrounding the Explorer inflicted enormous financial, operational and reputational damage. Quality problems added pressure, sales and market share deteriorated, losses followed, and some of the internet and adjacent-business investments increasingly looked like distractions from a core automotive operation requiring urgent attention. Nasser left in 2001 and Bill Ford took control.

Kwik-Fit provides a particularly unforgiving coda. Ford had paid about £1 billion for the business in 1999; three years later, it sold it for £330 million.

With hindsight, it is tempting to choose between two cleaner stories: Nasser was the visionary who saw mobility before everyone else, or the chief executive who forgot that Ford was supposed to make cars. Neither explains enough.

He had seen part of the next curve while Ford still had to survive the one it was already on.

Many of the conditions underpinning today's mobility landscape were immature or absent. Smartphones had not arrived. Mobile connectivity was primitive by today's standards. Cloud computing had not become commercial infrastructure. Modern battery economics had yet to emerge, charging networks were embryonic and the software-defined vehicle lay well beyond the industry's mainstream architecture. At the same time, Ford's problems in the existing business were real, and foresight made them no less consequential.

That is what makes the story useful now. You can recognise the direction of change and still be wrong about the moment. Timing, sequencing and capital allocation are not administrative details attached to strategy; they are part of strategy, as is the ability to keep today's economic engine working while building whatever may eventually replace it.

Move too late and somebody else can define the next market. Move too early and enormous amounts of capital can disappear into a bridge to a world that has not yet arrived. The harder judgement is knowing when technology, economics and behaviour have moved far enough together to justify the bet.

When the Curves Begin to Cross

Renewable energy makes that convergence unusually visible today. The global weighted-average cost of utility-scale solar photovoltaic electricity fell by around 90 per cent between 2010 and 2024, while battery costs also declined dramatically. By 2025, more than 90 per cent of newly commissioned utility-scale renewable projects produced electricity more cheaply than the cheapest new fossil-fuel alternative available in their market.

Yet cheaper generation does not redesign an energy system by itself.

As variable renewable generation expands, grids, storage, transmission, permitting, market design and demand flexibility become more consequential. Electrification pulls transport and heating towards the power system. Electric vehicles become significant electrical loads as well as mobility products, while software increasingly coordinates assets that once operated largely independently. The transformation is no longer contained inside the solar panel, turbine or battery; it moves into the architecture connecting them.

The friction is as revealing as the progress. A country can possess extraordinary renewable resources and struggle to build transmission. A commercially compelling project can remain trapped in permitting. Battery costs can fall while minerals, finance or grid connections become constraints. Technology can be globally available while regulation and market structure remain stubbornly local.

An inflection point therefore has no single clock. It emerges through convergence as capability, cost, infrastructure, customer behaviour, regulation and capital begin reinforcing one another. The creative act is recognising those relationships before they harden into consensus.

AI makes this particularly difficult because the technology is so theatrical. We can watch a machine produce an image, write software, reason through a problem or turn a few words into work that previously required hours of skilled effort. The demonstration is compelling because capability is crossing a threshold in front of us, but a technological threshold is not automatically an economic one.

A model can work brilliantly without producing a product customers need. A company can deploy AI across thousands of employees without changing the economics of its business. An incumbent can become dramatically more efficient while a new entrant uses the same underlying capability to question why part of the incumbent's proposition exists at all.

I saw versions of this through the transition from software to cloud and then AI at Microsoft. Working across industries and markets made it impossible to think of technology as something that simply gets deployed. Similar capabilities encountered profoundly different realities in healthcare, financial services, manufacturing, retail, telecommunications and government because regulation, risk, buying centres, customer behaviour and existing systems differed.

The technology travelled more easily than the business model around it.

Cloud became consequential for reasons extending far beyond where the server was located. Computing on demand changed product development, release cycles and infrastructure economics, while allowing businesses to emerge without technology estates that would once have demanded substantial capital and specialist operations. Eventually, whether a company “used cloud” became less revealing than what kind of company cloud allowed it to become.

AI is approaching the same test.

Suppose it allows a company to produce something 30 per cent more cheaply. Initially, the advantage can be substantial: capacity increases, costs fall and margins improve. Then competitors acquire similar capability, new entrants begin with the new economics rather than migrating towards them, and customers discover that something previously expensive is becoming easier to reproduce. What looked like proprietary productivity starts becoming the price of admission.

The technology creates value; the market determines where that value eventually settles.

Some may remain with producers as margin, some may pass to customers through lower prices or better products, and some may migrate towards whatever remains difficult: distribution, proprietary context, infrastructure, relationships, permission or judgement. Existing value can disappear altogether when customers stop paying a premium for something that is no longer difficult enough to deserve one.

For investors, that distinction matters enormously. Productivity inside a company is only the beginning of the analysis. The harder question is what happens to the company's economics when every credible competitor possesses similar capability.

Professional services makes the tension easy to see. If AI allows an adviser to produce analysis in a fraction of the time, there is an immediate productivity benefit. But if clients were paying partly for the scarcity of producing that analysis, the economics may eventually come under pressure. If the deeper value lies in judgement, accountability, context, relationships or implementation when the answer meets reality, those things may become more important as production becomes cheaper.

Established companies face the same paradox because an inefficiency can be more than a cost; sometimes it is part of the profit pool. Removing friction may remove a fee. Automating expertise can challenge an hourly pricing model. Making software easier to build can weaken differentiation based on the ability to build it. Technological transformation becomes politically difficult when the new capability begins questioning assumptions on which somebody's revenue, expertise, authority or valuation depends.

Organisations, meanwhile, remember the world that created them. Specialist functions accumulated because expertise was difficult to distribute; processes formed because consistency had to be created; management structures compensated partly for limits in information and coordination; systems grew around older systems, while measures and incentives reflected economics the company already understood. Some of this is accumulated wisdom and some of it is scar tissue. Distinguishing between them is the work.

AI can expose the difference. A system may understand a customer's problem while the organisation cannot resolve it. Software can produce an answer in seconds while a decision waits days. A team can generate vastly more code, content and analysis while management becomes overwhelmed deciding what deserves attention. Making intelligence faster does not automatically make the institution better, just as producing more does not automatically create scale.

Nor does technology make businesses placeless. Working across 191 markets taught me that something can be technologically universal and commercially local. Regulation,

procurement, channels, culture and willingness to pay change across borders. Technology can compress distance remarkably well without abolishing difference.

What the Machine Leaves Behind

This is what connects electrification, Ford, renewable energy, cloud and AI without pretending they are versions of the same revolution. Technologies diffuse differently. Infrastructure has different replacement cycles. Regulation exerts different pressures. Physical systems move differently from software, and customer behaviour can accelerate one transition while stalling another.

What recurs is the moment when capability changes faster than the assumptions surrounding it.

For a while, the world remains recognisable. Then enough adjacent forces begin moving that yesterday's constraints stop providing a convincing explanation for why the system still has today's shape. Recognising that moment requires imagination because the next system remains incomplete, but also scepticism because most things that become technically possible never become economically important. It takes the founder's willingness to see something before consensus, the operator's understanding of what reality will tolerate and the investor's discipline to distinguish a genuine change in economics from a fashionable change in vocabulary.

Above all, it requires timing.

That is what stays with me about Ford. Nasser could see that the economics surrounding the vehicle might become as strategically interesting as the vehicle itself, and elements of that thesis look remarkably contemporary today. Yet the technologies, infrastructure and customer behaviours needed to realise it had not converged, while problems in the existing business became too serious for any future vision to excuse.

Being early is therefore not the same as being right, just as waiting is not necessarily prudence. The judgement lies in recognising when enough has changed that continuing to organise around the old constraint has become the greater risk.

AI will eventually become less interesting in the same way electricity, computing and cloud became less interesting. Models will improve, interfaces will recede and capabilities that astonish us now will become expected. The consequential story will then be what happened around them: how products changed shape, which costs stopped supporting old prices, where value migrated, which businesses discovered new economics and which companies either protected yesterday for too long or spent tomorrow's money before tomorrow arrived.

Technological revolutions tempt us to stare at the machine because that is where change is easiest to see. The better place to look is at the assumptions around it.

When technology and markets begin moving together, those assumptions rarely disappear overnight. They become harder to defend, increasingly expensive to preserve and eventually strange enough that the next generation wonders why anybody thought they were permanent.

That is when the machine has done its work: not by changing the world on its own, but by changing what the old world can still justify.

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