THE AGE OF CRITERION

Designing when everything is possible

An essay on artificial intelligence and discernment

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Dedication

To my son who, without asking for it or wanting it, has been the trigger and will be the future heir of what this book tries to promote.

To my wife, my accomplice and inspiration in uncertain times.

To the rest of my family, for their unconditional support always, no matter what.

To all the people who have accompanied me, for your friendship, brotherhood and trust.

Introduction — Why we need a new language

'We are surrounded by design'

We breathe it, touch it, inhabit it.

It is inscribed in nature: in the growth fractals of plants, in the geometry of a honeycomb, in the way a forest regulates its temperature or a colony of ants optimises invisible routes. And, of course, we find it in the human discipline: the objects we use, the systems that

sustain modern life, the cities we walk through, the algorithms that mediate our relationship with the world.

Design defines environments, habits, relationships, expectations, culture — often without our noticing. It is popularly mistaken for a superficial layer of aesthetics, but it is, above all, an invisible infrastructure: the architecture that makes your experience of reality possible — and probable.

And yet, amid this saturation, something essential has been lost.

I must admit: more than once I have felt a void, like hitting a wall. Not a technical wall — tools are more sophisticated than ever and production chains more efficient — but a wall of meaning. The frameworks we design with seem inherited from another time. They don't resonate. They don't nourish. They don't correct what they should correct. The fundamental questions have gone decades without being updated: Why do we operate the way we do? Who defined our purpose? Is it worth running faster if we don't know where we're going?

I write from inside the system I am trying to describe. For years I worked in engineering applied to industrial design: defining objects, processes, protocols, experiences and algorithms. There I learned to understand design as a vast network of dependencies and trade-offs — not as the canons dictated.

Later, that learning pushed me toward another task: contributing to the logic of what comes next. At Deep Design Systems we research and define how artificial intelligence is reconfiguring the practice of design and industrial engineering. I have watched AI learn to create and to recommend; I have also seen how it renders the traditional designer insufficient when they lack operative criterion. That is the frontier between a discipline that optimises and a discipline that struggles to stay alive.

This book is born from that hybrid vantage point: it is an analysis from someone inside the change and a roadmap for those who feel the same discomfort — that thing telling you something doesn't add up — but who have long been unable to name it.

Your relationship with the world is mutating through forces beyond your will. This is not a lifestyle change; it is a tectonic shift. We inhabit the crack between a model that is exhausting itself and a world we do not yet know how to name. Politics, economics, technology, personal relationships: everything is being reconfigured.

And if these domains share one thing, it is that each requires a foundational architecture to function. That is to say, a design. When the forces governing the playing field change, the rules that governed that architecture cease to work. It is in these moments that systems collapse, and the need to rethink everything appears.

'Design,' as both word and practice, no longer means what it used to — if it ever meant anything at all. It began as craft; evolved into industry; became brand; fragmented into specialisations; adapted to the digital; and today, like almost everything, it finds itself in

no man's land. In the midst of an identity crisis at the intersection of human creativity, ecological crisis and technological disruption. Along the way, moreover, it has adopted a hypertrophied rhythm that makes it run faster than its own capacity for reflection.

Optimise, iterate, produce.

Repeat.

Without stopping to ask whether the destination it is heading toward still makes any sense.

Crossing a threshold

We are entering the age of criterion. Not because we are wiser, but because the abundance and ease of creating options — now available to anyone with internet access — has turned judgment into the only human resource that, for the moment, cannot be automated.

This is why we are not facing a change of style. We are facing a change of scale. Today we no longer design only objects, interfaces or services. We design conditions, contexts, experiences, architectures, intelligences. We configure processes that, in turn, configure other processes. We intervene in systems that affect scales ranging from the intimate to the planetary. We are crossing a threshold. And continuing to name this change with the old vocabulary is no longer enough.

And in the midst of all this, artificial intelligence has erupted with a force that changes everything. Not as a tool that obeys, but as an independent agent that proposes, interprets, combines. This rethinks authorship, destabilises originality, and reconfigures what we call 'design.'

But this book is not about AI as technology; it is about criterion in the age of generative abundance.

AI is the catalyst that forces us to look deeper, to question what it means to design with purpose at a moment when abundance is no longer accidental but designed; at a moment when the scarcity that justified the value of the discipline has shifted without the discipline itself yet knowing where.

When almost everything is possible, the question that matters stops being *'can we?'* and becomes *'should this exist?'*

If that question is not part of the process, the world becomes a catalogue: brilliant, infinite, and increasingly meaningless.

We need a new language to talk about design: one that integrates the technical and the ethical, the aesthetic and the systemic, the human, the environmental and the computational. It is no small task. But it is urgent.

What is unseen decides what is seen. And what design has left invisible for decades — the aftermath, the residue, the cost of captured attention — is precisely what the world can no longer afford to ignore.

The question that opens this book should also open any project, before the first idea, before the first sketch:

What truly deserves to exist?

Chapter 1 — The crisis

'That diffuse, persistent unease. Hard to name.'

The perfect showcase

The room is bathed in flawless white light, almost surgical.

Endless rows of stands display perfect objects: surfaces that reflect not a single fingerprint, colours calibrated for the most demanding retina, ergonomics that would pass any laboratory test. You walk down the central aisle of a technology fair and the scene is a three-dimensional catalogue that breathes on its own. Everything gleams, everything seduces, everything is calculated to the millimetre so it will last barely a few seconds in your memory… before being replaced by the next novelty.

At first, you let yourself be swept along by the beauty. The eye is a curious animal, and here there is enough stimulus to keep it entertained for hours: shapes that seduce, colours that invite, slogans polished until they resemble physical laws.

But soon, a discomfort begins to settle in. It is subtle, like a barely perceptible hum. It does not come from a design error — everything fits, everything works — but from something deeper: the feeling that everything is carefully designed, yet very little is truly thought through.

After twenty minutes, the objects begin to blur in your mind. The robot you thought was unique reappears two stands further along with a slightly different function and a more pretentious name. The device that promises to 'revolutionise your life' is nothing more than a slightly modified version of one you saw last year. The car you thought you saw minutes ago appears again: they changed the mascara on its headlights. Chairs that look like twin sisters even though they come from different companies; appliances that differ only by a thinner bezel or a repositioned button; packages that change the colour of their label to convince you that 'this time it's different.'

On the surface, the narrative is one of innovation. Underneath, the reality is a constant echo of what has already been seen. It is a déjà vu with better lighting.

And then the uncomfortable question appears: what are we actually designing for?

I am not speaking from cynicism — I respect design too much for that — but from the frustration of watching a discipline that should be an engine of change trapped in a loop of accelerated production, questionable interests and diminishing meaning.

A craft that, at its best, knew how to connect ethics, culture and technique, reduced to a machine that manufactures, regurgitates and manufactures again, hoping the next iteration will justify the cycle.

And it is not that talent is lacking. Talent, if anything, abounds. Tools are more sophisticated than ever; production chains more efficient; the ability to imagine forms and prototype rapidly has reached levels that would have seemed science fiction twenty years ago.

The problem is something else: what is missing is direction, purpose, the courage to decide what deserves to exist… and what does not.

What has become invisible is not the aesthetics — those have never been more refined — nor the novelty — that is produced by inertia. What is invisible is the intention. And a design without intention is like a map without coordinates: it can be beautiful, even inspiring, but it takes you nowhere.

This is the first symptom of the crisis, and where the paradox turns cruel: when the pace rises, difference becomes superficial.

The more we refine the form, the more we empty the meaning.

Acceleration without control

We live in a paradigm where speed is not a variable: it is the dogma.

Change is no longer measured in decades or years, not even months. Today, development cycles are counted in weeks, sometimes days. Coding copilots allow solutions to be prototyped in minutes. Modelling software lets you go from idea to prototype in a matter of hours. Digital fabrication has reduced the barriers between concept and object until they are almost invisible. Global supply chains can move a product from screen to the other side of the world in record time.

All of this could be great news. Could.

But acceleration does not always mean progress. Having the latest novelty at your doorstep is, too often, merely a race to arrive before the rest — regardless of whether what you launch into the world makes any sense, whether anyone actually needs it, or whether the damage left behind can be repaired.

Speed has replaced reflection. The time that used to be dedicated to understanding the context and impact of what we create is now spent producing iterations, variants and derivatives to feed a market that never sleeps. No pause, no digestion, no learning. Only production.

I have delivered projects like this. Premature prototypes that were born before they were ready because the calendar would not negotiate. You know something is wrong; you sign off anyway.

The problem is that design, at this pace, becomes reactive.

It runs behind an agenda dictated not by the designer, nor the user, nor even the context: it is dictated by the commercial calendar. And that calendar has a constant hunger for ‘novelty’ that generates ‘return,’ even if the novelty is made of cardboard.

And the faster we spin, the less we remember why we started spinning.

This is where the craft begins to crumble: when haste becomes identity and the cadence of the market replaces the intention of the creator. Design ceases to be a conscious practice and becomes an automatic reflex of the system’s hunger.

Someone might say this is nostalgia for a slower rhythm. It is not. This is not about slowing down out of romanticism. It is about recognising that, without a filter of criterion — beyond the perpetual, and tedious, commercial rhetoric — speed turns the world into residue.

It was not always like this

There was a time when designing something took months, sometimes years. Not out of inefficiency, but because the process included understanding, making mistakes, correcting, understanding again. The scarcity of resources — of time, of materials, of production capacity — educated criterion. You could not propose just anything because launching just anything was expensive and carried risk; you had to be completely convinced.

That friction, which today seems like an obstacle, was in reality a filter. It forced you to ask: does this solve a real problem? Does it contribute something that wasn’t there before? Who benefits and how? What is the price to pay for this object to ‘live’?

Today those questions remain valid. But the system no longer demands them. The ease of production has made asking them optional. And what is optional, in an environment of constant pressure, tends to disappear.

The result is a landscape saturated with objects that are born old.

Products that reach the market without having solved anything, without having thought about their life after the sale, without having considered what happens when, a few months later, they are no longer ‘new.’ Sealed devices that cannot be repaired. Interfaces that accumulate functions without asking whether anyone will use them. Collections launched to generate headlines and forgotten before the next quarter.

Speed, when it has no direction, is just noise with a budget. And noise, however much it gleams, leaves nothing behind.

Except residue.

Fragmentation of the discipline

Industrial design is no longer a cohesive territory. It is a scattered mosaic of specialisations that rarely speak to one another: designers obsessed with surface aesthetics; engineers focused solely on technical performance; strategists who treat design as a marketing accessory; executives whose only objective is quarterly profits.

The result is objects that are technically impeccable but culturally irrelevant, or pieces that are visually attractive but unsustainable and fragile. The bridge between form and function — the historical essence of design — has weakened to the point of near collapse.

This fragmentation is not accidental: it is the direct product of decades of optimising efficiency above coherence.

Companies grew, departments specialised, processes were divided into sequential stages where each team does its work and passes the baton to the next: research hands off to concept; concept to development; development to manufacturing; manufacturing to logistics… and so on until the product reaches the world, without anyone having had a complete vision of what they were creating, where it came from, or what it will leave behind.

It is a cognitive assembly line: it works for producing volume, not for producing meaning. Everything seems reasonable in isolation. Then the product moves on, and in time, the whole fails as a relationship.

The problem worsens when we add the temporal dimension.

In the traditional model, a product ‘ends’ when it leaves the factory. The designer signs, the engineer validates, time to celebrate. Everyone is happy because the product is ‘presented’ to the client or at the fair: ‘congratulations, good work.’ Toasts, a pat on the back. End of project.

But that is not the truth — if it ever was.

A product does not end when it is manufactured. It begins.

It begins its life in the hands of someone who will use it in ways you did not foresee. It begins its relationship with technical service, with spare parts, with updates. It begins its journey toward the end of its useful life, where it will become residue or — if someone thought about it — material that returns to the cycle.

When we fragment the design process into islands that do not speak to one another, we lose the ability to see that complete life. Each island optimises its stretch without considering the others. And the consequences of that abandonment are paid by the system: the user who cannot repair, the planet that receives the waste, the trust that erodes with every broken promise.

What is missing is not another department. What is missing is conversation. And that conversation needs structure — a map that makes visible the consequences that each design decision has on the rest of the system. Otherwise, each island will continue optimising its own metric, satisfied, while the system degrades.

Every abundance creates its scarcities

When we multiply supply without criterion, we do not merely fill the world with absurd noise: we drain other things we did not know were finite.

The user's attention, for example: their 'yes' becomes automatic or cynical when each new object competes with thousands of others in the same visual field.

The time of teams, busy launching instead of learning, without space for reflection, to observe real-world use, or to correct with care.

Trust, which erodes when promises expire faster than the products themselves and the inflation of novelty drains the word 'innovation' until it becomes noise.

And material resources: the digital accelerates the imagination, but the physical world pays the bill. One more variant on screen seems not to pollute; one more variant in the world demands matter, energy, transport, space. Mining does not render.

Abundance does not eliminate scarcity. It displaces it.

The wrong dashboard

Here we arrive at the heart of the diagnosis.

It is not that the people who design, manufacture and sell are evil or incompetent. Most are committed professionals, working with the best intentions inside a system that measures what it measures.

And what that system measures is: novelty, speed, volume.

These are the three metrics the system has elevated to dogma, and corporate liturgy repeats like a mantra: they appear in every planning meeting, in every quarterly presentation, in every team objective: how many new products did we launch? How quickly did we reach the market? How many units did we sell?

If those metrics rise, the system celebrates. If they fall, someone has a problem. But the problem is that those metrics do not measure what matters.

They measure the outflow and the 'health' of the company's finances, but not the real impact. They count what leaves the factory, but not what comes back — neither in materials, nor in learning, nor in trust. It is like judging the health of a river only by the amount of water passing a single point, without asking where it comes from, where it goes, what it carries with it and what it leaves behind.

These questions do not appear on the usual dashboard. Not because they are impossible to measure, but because the system does not consider them relevant. They simply do not add up in the balance sheet: they are ‘externalities,’ costs we transfer to others — to the user, to the planet, to the future — while we celebrate our internal numbers.

Accelerating without direction is not modernity: it is waste with glamour.

The current dashboard is the system that converts that waste into business strategy. It is like the dashboard of a car that shows speed, but not the fuel level, nor the engine temperature, nor whether the brakes work. You can go very fast for a while.

Until you can’t.

And here is the trap: this frame of reference does not merely measure — it directs. What you choose to measure is what your organisation will optimise: if you measure speed to market, you will have teams that launch fast — even if they launch badly. If you measure number of variants, you will have infinite catalogues — even if no one needs that many options. If you measure quarterly growth, you will have constant pressure for ‘more’ — even though more is exactly what the world does not need.

It is not a neutral tool of observation; it is an incentive system disguised as objective information that governs everything: technology fairs, the algorithms that decide what you see, the platforms that mediate your relationships, the policies that structure markets, the priorities that guide scientific research.

Design is everywhere, and in most places it optimises the wrong thing.

Closing

The dashboard did not appear from nowhere. It was the result of decisions accumulated over decades, inherited from a way of understanding design that no longer serves — and that we continue to drag along out of inertia. To change it, we must first understand its origins.

Where does this mental map that governs us without our having chosen it come from?

Chapter 2 — The roots

‘You cannot chart a new course with an old map.’

Before Control+Z

Before the screens, before the renders, before a file could become an object on the other side of the world, there was a place where design happened differently.

I am not speaking with nostalgia: I am speaking of the material conditions that educated criterion and made consequences visible.

When was the last time something forced you to truly think before acting? Not out of discipline, but because mistakes had a price.

Think of an injection mould. Each mould cost a fortune — months of design, precision machining, hardened steel. There was no margin for 'we'll fix it in the next version.' You had to get it right. That investment forced you to think fifty times before committing to a form. To ask: is this the right curve? Will this wall thickness hold? Will this injection point leave visible marks?

Or think of the clay models in the automotive industry. Every centimetre sculpted by hand. Every correction meant hours of physical work. There was no Control+Z. The friction of the process was not a flaw of the system: it was the system.

Material cost. Time cost. Mistakes cost. You could not launch a hundred variants to see which one worked; you had to think before making. Its very nature — the resistance of the material, the limitation of the tools, the slowness of fabrication — imposed a discipline that today is already part of the past.

That system produced something that is scarce today: criterion.

Friction was not an obstacle to overcome. It was the filter that separated what deserved to exist from what did not. Losing it was not merely losing slowness: it was losing the mechanism that educated that criterion. And, without educated criterion, abundance is not freedom: it is noise perfectly executed.

Richard Sennett calls this '*tacit knowledge*': knowing that cannot be codified, that lives in the body and is transmitted through practice.

I do not idealise the past. The workshop was also a place of exploitation, of rigid hierarchies, of knowledge guarded as guild secrets accessible only to a chosen few. I am not proposing a return to it.

But I do propose recovering something we lost along the way: the idea that limitation can be generative.

Today we have access to almost any material, almost any process, almost any form. The abundance of options is vertiginous. And yet — or precisely because of it — criterion has weakened.

When everything is possible, nothing is necessary. The question 'does this deserve to exist?' becomes optional.

And what is optional, as we have seen, under pressure, disappears.

The industrial promise

Industrial design was born with a promise: to democratise beauty and utility.

The first mass-produced objects carried with them an aura of progress. They were more accessible, more precise, more consistent than anything a craftsman could produce alone. The world was entering an era where ‘well made’ could be reproduced at scale.

The Bauhaus, Ulm, Scandinavian design: the great movements of the twentieth century attempted to balance art and industry, form and function. ‘Form follows function’ became mantra. Mass production, an inevitable condition.

It was an optimistic vision. Design as a civilising force, capable of bringing quality to every home, of improving daily life through objects conceived with rigour and sensitivity.

But also, from the very beginning, that promise was incomplete.

Born in parallel with the Industrial Revolution, it was a child of its paradigm: mechanistic, linear, oriented toward efficiency. The flow was always the same: research the market, define the concept, execute the engineering, produce. A straight line from brief to factory.

This linear model — extract, produce, discard — did not only configure how we manufacture objects. It configured how we design systems, institutions, technologies. The logic of the assembly line extended to software (waterfall development), to education (students as products), to healthcare (patients as cases). Taylorism was not merely a way of organising factories; it was a way of thinking that colonised almost everything.

Leaving the linear model means leaving it in all its manifestations, not only the material ones. A system optimised for scale is not optimised for reflection or for long-term impact. Thus, aesthetics were domesticated by production processes; engineering was subordinated to deadlines; time-to-market became the supreme metric.

And something fundamental was left out of the equation: what happens afterwards? After the sale. After the first use. After the object ceases to be ‘new.’

The linear model has no answer for those questions because it does not consider them relevant. The product ‘ends’ when it leaves the factory. Whatever comes next is someone else’s problem.

The great masters of modern design were not naïve. Many of them — Dieter Rams, Victor Papanek, Enzo Mari — had already warned about the dangers of design in the exclusive service of the market.

Papanek, in 1971, opened Design for the Real World with an incendiary sentence: ‘There are professions more harmful than industrial design, but only a very few.’ He was denouncing a craft that had forgotten its social responsibility, that designed for obsolescence, that created artificial needs instead of solving real problems.

Half a century later, the diagnosis remains valid. Perhaps more alive than ever.

The warnings were there. But the system had too much momentum, too many incentives pointing the other way. Critical voices were assimilated as ‘ethical design’ — which capital

would soon exploit as a niche, just another specialisation — while the bulk of the industry continued operating with the same map.

Wicked problems, tame solutions

The design discipline is, by definition, the capacity to intervene in problems within a given environment. But there is a distinction that illuminates everything above: the difference between *tame problems* and *wicked problems*.

A tame problem is one that can be clearly defined. It has measurable objectives, known constraints, verifiable success criteria. You can formulate it, solve it, and know whether you solved it well. Science and engineering operate predominantly in this territory: calculating the strength of a beam, optimising an error function, reducing the loading time of a web page — tame problems.

A wicked problem is something else entirely.

It cannot be fully defined before you start solving it. Its boundaries are fuzzy, its stakeholders hold conflicting values, its consequences branch in unpredictable ways. There is no 'correct' solution that can be verified; there are interventions that generate new situations, new problems, new questions. Urban planning, public health, the climate crisis, inequality: wicked problems.

Design, at its best, has always operated in the *swampy lowlands* of wicked problems. Donald Schön called them that: the 'swampy lowlands' of human concerns, where ambiguity is the norm and context is everything.

But something has happened.

The system — the calendar, the metrics, the pressure for quantifiable results — has been domesticating problems. Turning them tame so they can be managed. The user isn't satisfied? We measure NPS, optimise the metric. The product isn't selling? A/B testing, rapid iteration, adjust the variables. Sustainability matters? We add a percentage of recycled material to the BOM and declare it 'eco-friendly.'

Every wicked problem is sliced into tame problems we can solve with the tools we have. And we celebrate each improved metric as if it were progress. But the wicked problem is still there. Intact. Sometimes worse, because the 'solutions' to the sub-problems generate side effects that no one anticipated.

The fragmentation of the discipline is a direct consequence of this domestication. Each island optimises its tame problem. Engineering solves strength. Marketing solves conversion. Sustainability solves certification.

No one looks at the complete wicked problem: what does this object displace? What relationships does it establish? What world does it build? Those questions do not fit in a KPI. And what does not fit in a KPI tends to disappear.

The designer, in this context, has a specific responsibility: to refuse to domesticate. To insist that the problem is wicked even when the system demands tame solutions. To keep complexity visible even when it is uncomfortable. To ask the questions that have no metric because they are precisely the ones that matter.

It is not a popular role, I know. The system prefers quick answers, measurable, presentable on a slide… and people who keep their heads down. But someone has to hold the difficult question.

And that someone, historically, has been the designer. The question is whether we will continue to do so. Or whether we will let the system domesticate us all alike.

That difficulty was not born with late capitalism or digital acceleration. It is inscribed in the very heritage of the discipline — in who drew the map, from where, and for whom.

The colonial inheritance

There is another layer to this story that we usually ignore: alongside the linear paradigm, industrial design also inherited a worldview.

The industrial centres of Europe and North America did not merely produce objects: they exported forms, aesthetics and ways of life. They imposed an idea of 'good design' that ignored or marginalised the material and cultural traditions of other places.

Value was measured by Western standards. Colonised economies became suppliers of cheap raw materials and labour, not co-authors of the design narrative. What came from outside was 'craftsmanship' or 'folklore'; what came from the centres was 'innovation.'

This invisible hierarchy continues to operate.

The global aesthetic homogenisation — those bland, interchangeable Airbnb interiors, identical in Tokyo, Mexico City and Stockholm, those products that could come from anywhere and nowhere — is not an accident. It is the result of decades of imposing a canon as though it were universal.

The 'international' is, often, the Western disguised as neutrality. Because an object is never just an object. We do not design artefacts: we design ways of existing.

When we say 'design,' most people think of objects. Chairs, lamps, telephones, bicycles, cars, boats, houses. Things that can be touched, bought, possessed. Design as the production of artefacts.

But that is only the surface.

A chair is not merely a place to sit. It is a declaration about how space should be organised, which postures are correct, how long you are expected to remain, what type of activity is appropriate. An office chair says: 'here you work, for hours, looking at a screen.' A dining chair says: 'here you eat, in company, with a degree of formality.' A stackable plastic chair says: 'this is temporary, mass-produced, disposable.'

The object configures behaviour. And behaviour, repeated, configures life.

A smartphone is not merely a communication device. It is an architecture of attention. It determines how you wake up (with its alarm), how you get informed (with its notifications), how you relate to others (with its apps), how you entertain yourself (with its infinite screen), how you fall asleep (with its blue light). You do not use the phone; the phone uses you.

The design of the object is the design of the subject.

Every time an object is globalised, it also globalises its implicit way of life. And local ways of life — the other ways of sitting, cooking, moving, inhabiting — are relegated to second place.

Yuk Hui proposed the concept of '*cosmotechnics*' to think about this differently: the idea that there is no universal technology, no single way of relating to technique. Each culture articulates its own relationship between the cosmos, morality, and the objects it builds. There is not one cosmotechnics; there are many.

What the West exported as 'the' modern design was, in reality, 'a' modern design: its own. With its assumptions, its biases, its blind spots.

Recognising this inheritance is not a gesture of retrospective guilt. It is an opportunity to broaden the repertoire. To understand that there are other possible relationships between form, material and purpose. And that this diversity is not an obstacle to efficiency: it is a reserve of possibilities that the monoculture of globalised design has impoverished.

Arturo Escobar calls it '*ontological colonialism*': imposing a way of being in the world as though it were the only one possible — so that other ontologies (ways of living, of knowing, of relating to the earth, to non-human beings and to spiritual entities) are rendered invisible, delegitimised or treated as mere 'beliefs' or as culture.

Design has been a vehicle of this colonialism, and the structure itself consolidated it: it was born in centres of power, canonised its solutions as universal, and exported them through the same channels that exported goods.

The problem is not that Scandinavian chairs or Californian smartphones exist. The problem is that they are presented as neutral solutions, as though they did not carry an embedded particular way of understanding life.

The 'ergonomic' chair is designed for an average body that does not exist, for a work posture that is historical (not natural), for a working day of a length that is political (not inevitable). Presenting it as 'the best chair' is to render invisible all the other ways of sitting that humanity has developed, and that perhaps solve other problems better.

The alternative is not to renounce design. It is to practise what Escobar calls '*design for the pluriverse*': to recognise that multiple worlds exist, multiple legitimate ways of life, and that design can serve that diversity instead of flattening it.

This means making visible what current design renders invisible: what way of life is implicit in this object? What forms of existence does it enable and which does it exclude? For whom is this solution 'universal'?

It means incorporating other voices into the process. Not as 'users' to be consulted, but as co-designers with their own knowledge about their contexts, their needs, their ways of life.

If design configures ways of life, then to design is an ontological responsibility. We are not merely deciding what form an object will take. We are producing conditions of reality. And by default, we are deciding what form the existence of those who use it will take.

Design was never just aesthetics. It was always politics. It was always ethics. It was always, in the deepest sense, the design of worlds.

Capital that destroys

We have seen where the linear map comes from. We have seen who drew it. Now let us see what feeds it.

If you look closely, there is a pattern that repeats with unsettling regularity.

Capital discovers something that works — a community, a practice, a resource, a form of relationship — and absorbs it. For a time, it amplifies it: more visibility, more resources, more scale. It seems like mutual benefit.

Then, it destroys it.

Not out of malice. By structure. The logic of capital is the extraction of value. And extraction, taken to its conclusion, exhausts what it exploits. Its sequence is predictable.

First, discovery. Something emerges organically — a music scene in a city, an artisanal practice in a region, a form of online community, a local production technique — and it works because it responds to real needs, because it has roots, because the people involved give it meaning.

Then, capture. Capital detects it. It sees 'growth potential,' 'market opportunity.' It invests, professionalises, scales. The original actors receive resources they never had. It seems like everyone wins.

Next, extraction. Capital's metrics take over: it no longer matters whether the practice makes sense, what matters is whether it generates return. Timelines accelerate. Quality standardises — downward. The original actors are replaced by more 'efficient' operators. The soul of the thing — what made it valuable — evaporates.

Finally, abandonment. When the resource is exhausted — when the scene is no longer ‘cool,’ when the community has dispersed, when the practice has become generic — capital withdraws. It seeks the ‘exit.’ It seeks the next discovery. It leaves behind an empty shell: infrastructure without life, brands without meaning, people discarded.

This has happened with neighbourhoods (gentrification), with music (co-optation), with social movements (cause capitalism), with digital platforms (enshittification), with spiritual practices (wellness industry), with food (from artisanal to industrial), with work itself (the gig economy).

And it is happening with design.

What was born, in part, as mediation between need, material and use, was progressively captured by another logic: that of competitive differentiation, administered obsolescence and the constant expansion of the market. The craft did not disappear; the system that told it what it was for changed.

Design captured

Design was born as a craft with purpose: to solve real problems, to improve daily life, to connect form with function. It had an implicit ethics.

Capital discovered it. Professionalised it. Scaled it. Gave it resources, visibility, status. Designers went from artisans to ‘creatives’ or ‘visionary leaders,’ from workshops to ‘studios,’ from clients to ‘accounts.’

And then, it extracted.

Today, the majority of professional design does not solve real problems. It generates variants to fill catalogues. It disguises obsolescence as innovation. It manufactures desire to sustain consumption. The original purpose — improving life — remained as portfolio rhetoric while actual practice serves objectives of another order: market share, inventory turnover, engagement, stock valuation.

Designers feel the contradiction. That is why there is so much fatigue, so much cynicism, so much searching for ‘meaningful projects’ to compensate for the emptiness of daily work. But the structure traps them: bills must be paid, clients must be satisfied, the system must be fed.

Design has been captured. And capture produces what it always produces: extraction of value until exhaustion.

The specific destruction

What exactly does capital destroy when it captures design?

The first thing it destroys is time. Conscious design requires pause, reflection, slow iteration. Capital seeks return: it demands speed, deadlines, deliverables. What is not

thought through is thought badly. And what is thought badly, as we know, produces residue.

It destroys relationship. Healthy design is conversation: with users, with materials, with contexts. Capital turns that conversation into transaction. The user becomes ‘target.’ The material becomes ‘input.’ The context becomes ‘market.’

It destroys criterion. Design needs the power to say ‘no’ — to ridiculous requirements, to projects that do not deserve to exist, to clients who ask for harm, to rhythms that prevent quality. Capital does not tolerate ‘no.’ ‘No’ is friction. Friction reduces return.

It destroys meaning. When purpose is replaced by metrics, when ‘why’ is replaced by ‘how much,’ work becomes hollow. Designers keep producing, but they no longer know for what or why. Form is perfected; meaning evaporates.

And it destroys the environment. Every material comes from somewhere. Classical economics, since Jean-Baptiste Say, treated certain natural goods as free and, in practice, inexhaustible. That accounting fiction remains active: species displaced, ecosystems destroyed, cycles broken that appear on no balance sheet.

And there is something more: the most subtle destruction of all. Not of what we have, but of what we are. If you suddenly felt complete in every dimension of your life, the market would collapse.

The current economic system cannot allow satisfaction. It needs scarcity — real or fabricated — to keep functioning. It needs you to desire what you don’t have, to feel insufficient with what you are, to seek in consumption what consumption cannot give.

The system uses designers for a purpose that contradicts the original purpose of the discipline. And the system does not need anyone to have bad intentions in order to function.

Design has been chosen for that function: to manufacture lack.

The difficult question

Can design exist outside capital?

Probably not entirely. We live in a concrete economic system; ignoring it is fantasy. But it can exist in tension with capital. It can resist total capture. It can preserve spaces of practice that do not obey exclusively the logic of extraction.

This requires awareness — knowing what is happening. It requires limits — knowing how to say no. It requires community — not facing the pressure alone. And it requires alternatives — economic models that allow another practice.

Design cooperatives. Decentralised initiatives. Pro-bono projects with real impact. Clients selected by criterion, not only by budget. Slow, well-paid work instead of fast, poorly-paid work. Refusing to participate in projects of deliberate obsolescence.

None of these is a complete solution. But together, they sketch a space of resistance.

There is a simple way to check whether that pattern has already taken hold of an activity: momentarily remove the promise of return. What remains when the logic of extraction is switched off? If what remains is silence, the diagnosis is made: it was not a practice, it was a container of profitability. If, instead, a purpose appears — a human need, a social or material function that deserves to exist even without an 'exit' — then we know there is something worth continuing.

Capital destroys almost everything it touches. 'Almost' is the key word.

And in that 'almost' there is margin. And in that margin, there is the possibility of practice with meaning. Capital well directed — with real barriers, with incentives that penalise the extractive and reward what serves everyone — can be a tool.

The fundamental problem is not capital in the abstract. It is the absence of criterion about what deserves to be financed and whom it benefits.

Software as operating system

Until now we have spoken of the inherited map: linear, extractive, universalist. That map was not only expressed in factories, supply chains and markets. It also embedded itself in the tools. And when a worldview becomes software, it stops looking like ideology and starts looking like common sense.

The digital tools we use to design are not neutral. Every programme, every platform, every agent, every workflow carries an embedded model of what it means to design. And that model, in most cases, is the inherited one: linear, sequential, output-oriented.

When you open a CAD programme, the first thing you see is an empty space waiting to be filled. The tools are organised for adding: shapes, layers, functions. Rarely for removing, for simplifying, for asking whether something should exist at all. The typical flow is: brief → concept → modelling → render → delivery. A straight line. The software facilitates every step of that line. What it does not facilitate is stepping outside it.

The software was designed by people who operated within the dominant paradigm, and it crystallised their assumptions in code. But the cumulative effect is profound. Generations of designers have been trained on these tools. They have internalised their workflows as 'the way things are done.' The software became the operating system of design: it ceased to be a tool and became the climate. It is not questioned; it is breathed.

From line to loop

The challenge is not to uproot the roots. It is to recognise which ones nourish and which ones constrain. Much of the heritage of industrial design is contaminated by inertias that prioritise growth over relevance and immediate benefit over the common good. But elsewhere, valuable principles persist: respect for material, empathy with the user, the

pursuit of simplicity, the integration of form and function. Those principles have not expired. What has expired is the framework that contained them.

The necessary change is not one of tools. It is one of epistemology. And it can be described in three linked movements.

From line to loop: the linear model says that launch is the end. The circular model inverts that order: launch is the beginning. The product goes out and begins its life — to be used in ways you did not foresee, to need maintenance and repair, to arrive at the end of its useful life where it will become residue or resource. In the linear model, feedback is an extra. In the circular model, feedback is the nervous system.

From object to system: what we deliver is not an isolated thing but a node in a network of connections — with materials that come from somewhere and go somewhere, with people who manufacture, transport, use and discard, with energy consumed at each step, with attention that is captured or respected. Seeing the object as a system does not complicate design: it clarifies it, because it makes visible the connections that were always there, even if we ignored them.

And from control to metabolism. A healthy organism is not the one that eats the most. It is the one that metabolises best: it converts inputs into usable energy, distributes nutrients where they are needed, eliminates residues before they accumulate, regenerates what is damaged. The linear model is an incomplete digestive system: it swallows materials, energy and attention, but does not process them. The circular model is complete metabolism — what enters is transformed; what exits returns; the residues of one process are inputs for another.

McDonough and Braungart formalised this in the *Cradle to Cradle* framework: designing so that every material has a return cycle, whether biological — returning to the earth — or technical — returning to industry without loss of quality. Every mixture that prevents that separation is a sentence: neither the earth can absorb it nor industry recover it. Designing in loops means designing for separation and disassembly.

If metabolism is the measure of an organism's health, perhaps it is also the measure of the health of a design system. Perhaps progress is not about producing more, but metabolising better.

This shift in framework — from line to loop, from object to system, from control to metabolism — is not a philosophical abstraction. It has concrete consequences. It changes the questions you ask at the beginning of a project. It changes what you measure at the end.

But above all, it changes what you consider 'success.'

Closing

Looking back is not retreating. It is recognising that, beneath the layers of repetition and noise, ideas persist that made design something transformative. Recovering them, reinterpreting them and adapting them to the contemporary context is the work that lies ahead.

But recovering the roots is not enough. If the map is linear and the territory is circular, we are missing something essential: knowing what it means to advance in that territory.

How do we measure progress when movement does not equal advancement?

Chapter 3 — The illusion of progress

'We call progress what is often merely movement.'

The choreography of applause

We grew accustomed to celebrating movement.

A launch, an update with a grandiose name, a promise in the form of a render. The calendar sets the rhythm and hands clap almost by reflex. Sometimes the music hasn't even started and the applause is already ringing.

I have seen presentations where the product doesn't quite work yet, where the prototypes are held together with tape on the back, where promises run faster than engineering… but it doesn't matter. The event is scheduled, the media are summoned, the visibility metrics need feeding. The show goes on.

We call that 'progress,' as if moving forward were synonymous with moving.

Mark Fisher had a name for this feeling: the *cancellation of the future*. The impression that time advances but nothing truly changes; that we are trapped in a perpetual present where the 'new' is merely recombination of the already known, where novelty is aesthetic, rarely substantive. From another angle, Simon Reynolds called it *retromania*: a culture addicted to its own past, incapable of generating genuinely new forms.

Fisher and Reynolds diagnosed the same thing from different angles: nostalgia as the only horizon, the infinite recycling of styles, a cultural industry that had lost the capacity to imagine futures that were not remastered versions of yesterday.

It is not that the future is impossible. It has been hijacked.

Capital recycles what already worked because old formulas have already shown traction. And when you cannot imagine something different, you can only repeat the same thing again and again under another name. Fisher called it *hauntology*: the future haunted by its own absence.

But movement, without direction, exhausts. And direction is the one thing that cannot be delegated.

The cycle of the industry repeats with the regularity of the seasons. It is like an implicit choreography, but — unlike the seasons — it does not respond to any natural necessity. It is not the planet that asks for a new colour every year. It is not the user who demands a 'pro' version every quarter. It is the logic of the market that imposes its rhythm, and design that obeys.

The choreography has its own aesthetic: that of the perpetual premiere.

Every launch needs its narrative of novelty: 'Revolutionary.' 'Unprecedented.' 'The future, today.' The words wear out from overuse. They become background noise that no one listens to anymore but everyone repeats. And meanwhile, the question that matters most goes unasked:

What has actually improved?

Not what has changed. Changing is easy; all you have to do is move something around. The question is different: what works better than before? What problem has been solved? What friction has disappeared? What life is a little easier, a little more dignified, a little more liveable?

Those questions do not fit in the press release. They are too slow, too modest, too difficult to measure in a quarter.

Overproduction as symptom

Let us call it by its name: we produce too much.

Not because the world asks for it, but because the calendar demands it: façades of smoke that hide minimal redesigns sold as great novelties. A kind of productive histrionics elevated to business model: design turned into a spectacle of empty variations that seeks only the brief applause of an amnesiac market, which in two months will ask for another novelty. And another. And another.

This overproduction is not an aesthetic accident: it is a cultural, economic and political decision. We decided to fill shelves, timelines and containers with minimal variations because the machine needs movement. Noise sustains the cycle; silence would expose it.

And the planet, in the background, pays the price: resources extracted without measure; processes dependent on polluting energy; logistics chains that multiply the carbon footprint to place on the market objects that, in many cases, do not solve real problems; objects that become obsolete through version incompatibilities, anticipated material decay, or simply because they are no longer fashionable.

Overproduction is not only an environmental problem. It is a problem of honesty.

And if that weren't enough, something even deeper is happening. We no longer live merely in the economy of 'more': we live in the era of *designed abundance*.

Globalisation drew the map: design in one place, manufacturing in another, impact everywhere. At first it was efficiency. Then, abundance. Adding a variant, a SKU, a 'premium' range stopped being a bet and became a reflex. Platforms that integrate suppliers, warehouses that promise immediate availability, algorithms that push the 'similar' because similar is a safe bet.

And now, with generative artificial intelligence, we are not only accelerating production: we are democratising it without filter. Unlimited creative access at the click of a button, options that would previously have taken weeks. What was expensive becomes cheap. What was slow becomes instantaneous. What required criterion becomes optional.

What is happening to the discipline is that it has become a victim of market commoditisation. Five years ago, a neural network that 'understood' the shape of a car was an oracle; today, it is just another Instagram filter. Design, once democratised, has lost its value as a signal of technological status. If anyone can generate a spectacular render with a three-word prompt, the render no longer demonstrates intelligence or talent — merely access to a generative infrastructure.

That is why abundance no longer happens: it is designed.

It was not 'there is a lot'; it was 'we can manufacture a lot.' And when producing is so easy that the marginal cost seems zero, the temptation to confuse possibility with merit is immense and becomes automatic authorisation. What enters the world without passing through that filter is not design — it is noise with a budget.

Abundance produces options; criterion produces direction.

The invisible residue

We confuse scale with achievement because we measure what goes out and barely look at what comes back. What falls outside those metrics is no less real. It is only less comfortable — you know, it is residue.

There are three types of residue that design generates and that we rarely account for.

The first is **material residue** — the most visible. Products that end up in landfills before their time. Mixed materials that cannot be recycled. Packaging designed for transport but not for what comes after. Parts that fail and turn entire objects into rubbish. We know this. We document it. We deplore it… and we keep doing it.

The second is **attentional residue**, less visible but equally real. Every product that demands attention subtracts it from somewhere else. Every notification, every update, every 'new feature' imposes a cognitive load on the user. Attention is finite. When we colonise it without returning equivalent value, we generate debt: an attention debt that

accumulates as background noise, as fatigue, as that saturation we have come to accept as normal.

Herbert Simon anticipated it in 1971: ‘a wealth of information creates a poverty of attention.’ It was not a metaphor; it was the description of an economic mechanism. When something abounds, what becomes scarce is whatever that something consumes. Information consumes attention; therefore, an abundance of information produces a scarcity of attention.

Half a century later, that scarcity has become epidemic.

Digital platforms measure success in ‘screen time,’ ‘engagement,’ ‘retention.’ These are metrics of capture: how much attention we manage to extract from the user. But they do not measure the cost of that extraction. They do not measure accumulated cognitive fatigue, the fragmentation of thought, the diffuse anxiety of someone who lives amid constant interruptions. We float eternally on the surface.

You notice it in the gesture: you open your phone ‘for a second’ and emerge twenty minutes later with the feeling of having done absolutely nothing productive. It is not a lack of willpower: it is capture by design.

The dashboard of the digital economy optimises this capture and externalises the cost, just as the dashboard of industrial design optimises the launch and externalises the residue. It is the same problem in two domains.

The third — and perhaps the most harmful — is **cultural residue**. The most invisible of all.

Franco Berardi calls this *semiotic exhaustion*: the saturation of signs that no longer mean anything. When everything is ‘revolutionary,’ nothing changes. When everything is ‘sustainable,’ the word loses its edge. When everything is ‘intelligent,’ true intention is diluted; and when everything is ‘design,’ the concept empties itself.

The exhaustion is not only linguistic: it is nervous. The saturation of stimuli and promises produces fatigue as an inevitable by-product. We have passed from physical exhaustion to psychic exhaustion: an external overseer is no longer needed when the pressure to be perpetually updated becomes internal.

It is no coincidence that the burnout epidemic coincides with the era of designed abundance: there is a direct connection between the saturation of artefacts and the saturation of minds.

This is where design plays a role it rarely acknowledges: the manufacture of insufficiency. I am not speaking of planned obsolescence — the deliberate engineering of a product’s death — but of something more insidious: *emotional obsolescence*.

Making what works feel old. Making what is sufficient feel insufficient. Making what yesterday solved with elegance feel outdated. The product is still alive; the desire has been assassinated.

It is a cultural residue, invisible but heavy. And that residue does not appear in any sustainability report.

The cost of this operation is enormous, even if it features on no balance sheet. It is not only economic — unnecessary purchases, premature landfills. It is psychological: the diffuse sensation that you never have enough, that you are always one step behind, that satisfaction is a provisional state the next launch will cancel.

There is an antidote, and it is not new. There are traditions — like *kintsugi* — that find beauty in the imperfect, in the transient, in the incomplete; that do not conceal a fracture but celebrate and incorporate it. They are not aesthetic curiosities: they are ethical frameworks for a different relationship with objects. A relationship where duration is value, where the mark of use is a sign of life, where repair is an act of care and not an admission of defeat.

From this derives an operative filter before every launch: does this product make something that works feel insufficient? If the answer is yes, the design is not solving a problem. It is creating one.

These three residues — material, attentional, cultural — do not appear on the usual dashboard. But they exist. They accumulate. And someone pays for them; usually not whoever generates them.

The reputational cost

The cost of all this is not only environmental or social. It is also reputational. When design becomes synonymous with planned obsolescence, with products that last less than they should, with inflated promises, it loses something difficult to recover: credibility as a discipline.

A product is rewarded for integrating AI as a virtue in itself, as though technical deployment were sufficient merit. The ‘how’ is applauded to avoid confronting the void of the ‘why.’ This is no coincidence: the recognition system of the discipline always lags a generation behind the moment it is trying to recognise. Institutional frameworks are the last to change — which, in the case of design, a discipline that should represent innovation and the avant-garde, is, to say the least, curious. And by default, the designer who works well within the new paradigm becomes invisible to a system that does not yet know how to name them.

All of this is an enormous loss.

Because design, at its best, has a real power: to shape the conditions of life. To make things work better, last longer, generate less friction. To create objects, relationships and systems that respect those who use them and the world that sustains them.

That power is there. It has not disappeared. But it is buried under layers of noise, of haste, of the wrong metrics.

Naming what is missing is not enough. The invisible residue, emotional obsolescence, acceleration without tempo — all are symptoms of the same problem: we are measuring the wrong things.

If we change what we measure, we change what we build.

Building the new dashboard

If the current dashboard measures novelty, speed and volume, what should the new one measure? I propose five metrics. They are not the only ones possible, but they form a starting point.

Coherence asks whether what something is, what it does and what it leaves behind point in the same direction. Does the promise match the reality? Does the product live as it was conceived?

Cycle asks what comes back. Not only materials — though those too — but learning, feedback, relationship. Do we have a system for what goes out to return? Materials that re-enter the productive chain? Lessons incorporated into the next project?

Material health asks whether materials can return to the cycle without alchemy: are they separable? Identifiable? Do we know where they come from and where they can go?

Jane Bennett, from philosophy, proposes recognising the *vitality of matter*: the plastic that does not degrade is doing something in the world for centuries. Designing with material health means recognising that agency and negotiating with materials that have their own logics and their own time.

Attentional health asks how much cognitive load we impose on the user. Does the product rest the mind or colonise it? In a world saturated with stimuli, designing something that does not shout, that does not notify, that does not demand constant presence, is today a countercultural decision — and a form of respect. A simple question: if this disappeared tomorrow, would the user miss it or feel relief?

Trust is the slowest metric of all. It is not built in a single launch; it is built in years of keeping promises. And it is destroyed in an instant. Does the relationship with the user improve over time or degrade? Are promises kept? Does after-sales service actually exist?

Progress = Health

If we take these five metrics — coherence, cycle, material health, attentional health, trust — and look at them together, a unifying concept emerges: **Health.**

Not health as the absence of disease, but health as a system's capacity to sustain itself, regenerate, adapt.

A healthy body is not the one that eats the most, but the one that metabolises best. A healthy company is not the one that launches the most, but the one that best sustains

what it launches. A healthy product is not the one that sells the most, but the one that lives best.

Progress is an increase in system health.

Material health: when materials return without alchemy, when what we extract regenerates, when the cycle closes.

Energy health: when we measure consumption per function, not per hour; when we power production, use and return with renewables; when we save by design, not by guilt-tripping the user.

Social health: when we know who manufactures and under what conditions; when repair is possible and accessible; when the warranty accompanies the product's actual useful life.

Cognitive health: when we reduce the attention footprint; when a service rests the mind instead of colonising it; when trust rises over months instead of wearing out with notifications.

This is the kind of progress that deserves the word.

It is a modest definition, yes. It does not have the sheen of 'revolutionising industries' or 'disrupting markets.' It does not lend itself to headlines or spectacular keynotes. It does not want them. Nor does it need them.

Because it is ambitious in a different way. It demands daily, constant discipline; it demands looking where it is uncomfortable to look; it demands accepting that success is slow, cumulative, difficult to photograph. And it demands, above all, ceasing to measure what we have always measured; beginning to measure what matters.

This definition has an uncomfortable kinship with a word that frightens: degrowth.

Degrowth does not mean recession, nor poverty, nor a return to caves. It means questioning the automatic equivalence between 'more' and 'better.' It means asking: more of what? For whom? At whose cost?

Kohei Saito, recovering Marx from the climate crisis, argues that capitalism has a metabolic problem: it extracts more than it returns, accumulates more than it can offer, grows more than the planet can process. The solution is not to optimise growth; it is to question growth as an objective.

Applied to design: perhaps we do not need more products. Perhaps we need better products. Fewer launches, more duration. Fewer variants, more coherence. Less noise, more signal.

It is not a popular message. The system is built to grow; proposing anything else sounds like heresy. But today's heresy may be tomorrow's common sense if we accept something simple but basic: the wellbeing and survival of those who come after is the axis around which everything else should orbit.

Serge Latouche uses a useful image: the snail. The snail builds its shell in a spiral, adding chambers as it grows, but there comes a moment when it stops adding. Not because it cannot, but because it knows that more chambers do not mean a better life. It has matured: it has reached sufficiency.

Sufficiency is not resignation. It is intelligence taken to the extreme. It is recognising that there is a point where more becomes less; where the next iteration does not add value, only complexity; where the next launch resolves nothing, only gives the wheel more momentum.

Conscious design learns from the snail. It knows when to stop. It knows that true progress is not growing indefinitely, but reaching a state that can be sustained.

It knows when to stop.

Closing

We have talked about what to measure; we have not talked about who decides. When designing becomes cheap, deciding becomes expensive. And if we do not design the criterion, the market will automatically design it for us.

If intelligence can now design at infinite scale, who decides what deserves to exist?

Chapter 4 — Intelligence, ethically

'Not artificial intelligence. Artificial responsibility.'

Forty-eight hours

I remember a Thursday a few years ago. A managing director (one of those who arrive at the post by divine appointment) showed up at the studio in a foul mood and decided, with the same arbitrariness as someone ordering a coffee, that two months of work were worthless. Gone. We start from zero. Forty-eight hours to present the same volume of options.

After the silence of disbelief, I did not ask what for. I did not question the criterion — if there was one. I connected a homemade generative adversarial network pipeline and bombarded it. Variant after variant, at the speed of the machine, without a gram of coherence between them. The system produced; I delivered. The director chose. No one asked what problem any of those options solved, nor whether any of them deserved to exist.

That was not design. It was accelerationism with a creative interface.

And the most revealing part: it worked. No one questioned it. The system rewarded speed and silently punished justification. Criterion was friction. Friction was the problem.

When intelligence is distributed

It took me some time to understand what had really happened that day.

For centuries, design operated under a clear assumption: the intelligence of the process was localised in people. The designer observed, interpreted, decided and gave form. Tools expanded their capacity, but did not displace the centre of gravity of the decision.

That is no longer necessarily true.

Today the intelligence of the process is distributed among multiple actors: algorithms that explore formal spaces, models that recombine existing patterns, systems that optimise invisible parameters, human teams that interpret results.

The designer is no longer alone in the process. But neither has the designer disappeared. What has changed is the nature of their responsibility.

From artificial intelligence to artificial responsibility

This is why the problem we face is not exactly the one that usually appears in debates about artificial intelligence.

The emergence of generative systems has changed the equation. The capacity to produce ideas, variants and solutions is no longer a scarce resource. The central question now is not whether machines can create. Machines already create. Nor is the question whether machines will replace designers. In many cases they are already radically transforming the process.

The more relevant question is another: who is accountable for the decisions when intelligence is distributed? When a machine proposes a form, when a system optimises a structure, when a pipeline generates thousands of variants — where exactly does the creator's responsibility lie?

Between the capacity to generate solutions and the capacity to decide which ones should exist, a gap opens. That gap is new. We can produce more. But that expansion of possibilities does not automatically come accompanied by an equivalent criterion.

This is where the central problem of design in this new era appears. And it is not a problem of creativity.

It is a problem of the governance of criterion.

From tool to co-agent

What happened that Thursday was not an anecdote. It was a change of relationship.

What has changed is not merely the power of machines, but the relationship we establish with them: they no longer follow orders; they interpret, propose, combine and even, at

times, surprise. Systems that have their own tendencies and emergent capabilities that not even their creators anticipated.

The relationship between designer and tool has a genealogy of four moments worth naming.

The first is the one we already know: the Industrial Revolution generates industrial design. The machine, serial production, the promise of democratising beauty. The designer as formal configurator of reproducible objects.

The second moment arrives in the nineteen-eighties and nineties with the irruption of CAD and CAE. The manual sketch remains the entry point, but validation is digitalised. Form remains the designer's decision; what changes is the speed and precision with which it is tested. It is the same process, faster.

The third moment is *computational design*. Here there is genuine mutation: the designer stops drawing forms and starts defining systems — rules, parameters, constraints, objectives — and form emerges as the result of a solution space. It is what John Frazer called 'the evolution of form' as early as the nineties, and what became commonplace in architecture, aerospace and advanced manufacturing. The leap is not merely technical: it is epistemological.

The fourth moment is the generative regime: when that computational epistemology accelerates and overflows because models enter that internalise priors, detect patterns, compress styles and propose plausible variants without the designer having to specify everything as an explicit rule. This new regime renders computational design ubiquitous, conversational and dangerously easy to scale. The interface shifts: from parameters to intention; from geometry to language; from 'tell me how' to 'tell me what for.'

That shift — from tool to companion, from executor to co-agent — forces a revision of the very pillars of the discipline. A pencil has no opinion about what you build. An intelligence does.

Not 'opinion' in the human sense, but tendencies, biases and implicit inclinations. When you ask it to design a chair, it does not start from zero. It starts from the millions of chairs it has 'seen,' from the patterns it has extracted, from the correlations it has learned. Its response is not neutral. It is charged with history, with culture, with decisions others made before you.

If you do not intervene, the system will do what comes easiest: reproduce what already exists with variations. More of the same, now at machine speed.

Design is not neutral. An intelligence is not either.

And its intention — if we can call it that — is statistical probability: the most probable outcome according to what it has learned; what most resembles what worked before. That can be useful or disastrous, depending on what you want to achieve.

What you do not govern, governs you.

The dark mirror

Nick Land is not easy to read. Nor is he easy to ignore.

A British philosopher turned dark prophet of accelerationism, Land articulates with disturbing clarity what many practise without admitting: blind faith in acceleration as the only vector of value. His thesis, stripped of the feverish prose that clothes it, is simple: capitalism is a self-improving intelligence machine. Humans do not control it — they are its medium of propagation. Trying to slow it down is futile, even cowardly. The only coherent stance is to accelerate until the system reaches its logical conclusion, whatever that may be.

There is no humanism here. No promise of wellbeing, no narrative of progress. Only the machine feeding back into itself.

For a long time, this idea belonged to the territory of cultural theory. Today it has become infrastructure.

Land functions as a dark mirror of the dominant technological discourse. What is uncomfortable is not what he says — it is what he reflects. When Silicon Valley talks of 'disrupting,' of 'moving fast and breaking things,' of 'innovation without permission,' it is operating with a sugar-coated version of exactly this. The difference is that it wraps acceleration in humanist rhetoric. Land removes the wrapping and gives it to you raw: he says what practice does without admitting.

And industrial design, in its dominant version, does not escape the reflection either. We practise low-intensity accelerationism. We call it 'competitiveness,' 'being agile.' But the logic is the same: faster, newer, more, without asking where or for whom.

This is what we have. Is this what we want?

Land would say there is no other option — that the machine optimises what it optimises and humans are merely the medium. But there is a difference between describing the logic and surrendering to it.

What the machine inherits

Your conversation with an agent begins before the connection. It begins when you decide what you are going to ask, what criteria you will establish, what limits you will set, what values will govern the process.

You ask it for a chair. It returns a Scandinavian chair.

You ask for another. Scandinavian. And another. Scandinavian with nuances. Light wood, soft lines, proportions that remind you of something you have already seen a thousand

times. It is not bad. It is beautiful. But it is not yours and it is always the same. It is the statistical average of what the system considers ‘chair.’

Why?

Because the system does not start from zero. It starts from everything it ‘saw’ during training. And what it saw, in its vast majority, are the dominant aesthetics of the culture that fed it. If that culture is predominantly European, male, urban, upper-middle class, the system’s proposals will reflect that norm. It is not intentionality. It is pure statistics.

Those default values are neither explicit nor declared, but they are operative. They reside in the quantity and quality of the training data, in the model’s architecture, in the optimisation functions that no one questions because they ‘work.’ If you do not question them, they are taken as valid and you inherit them. They are the machine’s diet. And like any diet, it determines the health of the outcome.

Nick Bostrom, in his work on superintelligence, posed the alignment problem: how do we ensure that an intelligent system pursues the objectives we actually want, not a distorted version of them? The classic example is the ‘paperclip maximiser’: an AI you ask to manufacture paperclips and which, taking the objective to its extreme, converts the entire planet into paperclips. Pure literality. It did exactly what you asked; the problem is that you asked badly.

In design, the equivalent is subtler but equally real. If you ask the system to generate ‘attractive variants,’ it will generate what has historically been considered attractive. But attractive for whom? From what culture, what body, what aesthetic? It is the same gap we described in Chapter 2: what Escobar called ontological colonialism. Generative models, trained predominantly on Western data, reproduce a particular cosmotechnics as though it were universal — now on steroids.

The machine’s diet

Research confirms it: generative image models reduce the world to stereotypes when their diet is not plural. A ‘Nigerian woman,’ a ‘Mexican woman,’ a ‘Chinese woman’ are caricatures of what the model learned to consider normal — a mirror of our society, not representations of global reality.

The diet also has a cost dimension we rarely name. The ImageNet data — the visual dataset that accelerated the deep learning revolution — were labelled by tens of thousands of workers from more than one hundred and sixty countries through microtask platforms; behind each label was a person with their biases, their working conditions, their cultural context. Current models train on the Internet — the same problem at larger scale. Audits document biases of representation and rights-protected material without verification.

Generative abundance is not virtual. It has a diet, it has bias, it has a bill. If we train it on the canon that brought us here, we are not innovating: we are automating the past.

Broadening the diet is not a gesture of political correctness. It is a question of capability. A system trained only on European chairs does not know how to solve the problem of sitting in other contexts. A system that has only seen normative bodies does not know how to design for real diversity. The restriction is not ideological; it is functional.

What you include is as important as what you exclude.

When intention is formulated with clarity — do not mix materials to the point of condemning them, do not seal critical organs, do not add functions no one asked for — the landscape of options changes completely. Reversible joints appear, traceable materials, interfaces that confess their limits. Restriction, when well chosen, does not suffocate. On the contrary, it sharpens.

But the diet is not only semantic. It also has a physical cost dimension that design rarely names. Every training run and inference consumes energy, water, raw materials. Projections indicate that by 2027 the water consumption of AI systems will reach between 4,200 and 6,600 million cubic metres globally. To this we must add environmental justice: the communities affected by resource extraction and electronic waste are rarely those that benefit from the technology.

Every time we generate an image to ‘put a Christmas hat’ on an avatar; every time we iterate without criterion; every time abundance invites us to keep generating because the marginal cost seems zero, we are externalising a real cost to a planet and to communities that have no voice in the decision and do not appear in any results presentation. The global atlas of environmental conflicts documents this asymmetry with devastating precision.

Formulate the question well. Choose a tempo. And when there is no need, do not generate. The environmental cost of generative AI is not a footnote: it is part of the dashboard.

Intelligence as an object of design

Artificial intelligence is not merely a tool for designing. It is, itself, an object of design.

Someone decides what problems it will solve, with what diet (curated, filtered, labelled datasets), what objective function governs it (what it maximises and what it penalises) and how it is deployed (API, limits, guardrails, access). Those decisions — more than any demo — determine what the system produces, what it renders invisible and whom it favours. Configuring, by extension, the world that technology produces.

Why do we invest hundreds of billions in generative intelligence engines? Who benefits? Why so much effort developing image generators that will eliminate thousands of human jobs? Why is all that talent not employed in solving problems that truly matter — orphan diseases, the climate crisis, food systems, education — instead of generating images faster?

The question is not rhetorical. It is structural: it decides what gets built and what gets abandoned.

And the answer is not technical. It is market-driven. The big tech companies do not invest out of philanthropy or scientific curiosity: they do so because every dollar in AI infrastructure reinforces an ecosystem in which they control the infrastructure, the data, the platforms and the access points. AI is not the product; it is the mechanism for everything to pass through their servers.

In practice, the product is the channel: whoever controls the model in production controls latency, price per use, policies and dependency. When a design studio adopts a synthetic generation service or a copilot is integrated into its stack, it is not buying a tool: it is entering a chain of dependency designed so that leaving is more costly than staying.

The designer who adopts without questioning is not a user. Is a tenant.

That dependency is not only contractual or interface-based. It is semantic: when a studio converts its archive into vector embeddings to feed copilots and RAG systems, it externalises its operative memory to a mathematical space defined by a model and a platform. Migrating ceases to be 'exporting data': it means rebuilding the semantic index (re-embedding, recalibrating, revalidating), with drift and cost. The tenant no longer rents only compute: they rent search criterion.

Speaking about design and artificial intelligence is not merely speaking about how we use AI. It is speaking about a new paradigm, a new condition — about how intelligence was designed, by whom and for what purpose.

The epistemological gap

AI, in its current state, is designed to solve tame problems: clear objectives, defined metrics, functions to optimise. Give it a well-formulated problem — 'minimise the weight of this structure while maintaining strength' — and it will solve it with an efficiency no human can match.

But give it a problem that cannot be domesticated — 'design a mobility system that is fair, sustainable and acceptable to communities with conflicting values' — and it will not know where to begin. Not because it lacks power, but because it lacks the kind of intelligence that problem requires: judgment, negotiation between values, tolerance for ambiguity, the capacity to hold contradictions without resolving them prematurely.

Billingsley calls this the *epistemological gap*: the mismatch between the type of knowledge AI produces and the type of knowledge design requires. AI operates through the exploration of large datasets and pragmatic optimisation. Design, when confronting problems that matter, involves contextual research, negotiation between values and subjectivity.

When we confuse both epistemologies, the blindness does not disappear — it merely becomes more sophisticated. We believe we are solving a problem when in reality we are reformulating it to fit what the tool knows how to do.

This does not mean AI is useless for wicked problems. It can optimise within each territory — it does so better than anyone. What it cannot do, for now, is decide which territory to explore.

AI does not come to improve the wrong dashboard. It comes to make visible that the current one is wrong.

Agent teams

One of the most promising responses to the epistemological gap comes from research in multi-agent systems. Instead of a single model that tries to solve everything: teams of specialised agents that dialogue with one another. What is interesting is not that it works better than a single model — it does. What is interesting is that it models creativity as a dialogue, not as optimisation.

Applied to design: imagine a team where each agent holds a different perspective. None has the complete answer. But their dialogue — their tensions, their disagreements, their encounters — makes visible the complexity that a single model flattens.

The designer's role, in this scenario, is not to operate an agent. It is to orchestrate the team. To decide which agents participate. To define what values each one defends. To establish the rules of dialogue. And, in the end, to make the decision that no agent can make on its own: what to do with all of this.

Design does not emerge from consensus among agents. It emerges from the sparks that fly in their disagreements.

Governing abundance

Governing abundance means deciding rhythm and volume. Not everything that can be generated deserves to exist. Not everything possible is desirable. The capacity to produce infinite variants seems like opportunity. But it is neither a mandate nor an excuse to do so.

There are projects that ask for broad exploration at the beginning and great restraint afterwards. Others benefit from a sustained trickle, with long pauses to listen to real-world use. Time, too, is a material of design.

There is a test of maturity that applies to people and systems alike: knowing when to be silent. An intelligence that detects its own repetitions, that stops when it stumbles over the same error again, that asks for new examples before continuing to propose, is a better-trained intelligence than one that produces without pause. Not everything needs to be running all the time.

Yes, we are running late. But running without direction only wears you down.

From use to agreement

You close the programme but the system does not close. What you decided alongside the system — the materials chosen, the forms discarded, the criteria that governed each proposal — will live in the product for years. Perhaps decades. The work session lasted an afternoon. Its consequences will not.

That is why we need to move from use to agreement.

An agreement implies clear terms: what the system can do and what it cannot, what criteria govern its proposals, what trail it leaves for reconstructing decisions, and who is accountable when something goes wrong.

Because the session closes, but responsibility should not dissolve.

Without that agreement, what looks like collaboration is in reality blind delegation. And blind delegation has a known consequence: 'There comes a moment when you have delegated so many decisions that you no longer know why you chose what you chose. Amplification has become dependency.'

Agreeing is not braking. It is exactly the opposite: it is the condition for the tool to amplify without colonising.

Limits

There is a word that technological discourse — and, above all, economic discourse — avoids: limit.

It sounds like a brake, like repression, like a lack of ambition. In a world that celebrates the unlimited, proposing limits seems retrograde.

But let us not be mistaken: limits are not the opposite of freedom. They are its condition.

The progress of technology is the history of displaced limits. Each leap resolves one limit and creates another. Design has always organised itself around the limit of the moment. Recognising it is the first step to defining it.

Ivan Illich, half a century ago, proposed the concept that contemporary design would do well to recover: the *threshold of counterproductivity*.

The idea is simple: every tool has two phases. In the first, it amplifies human capacity. It solves problems. It frees time, energy, possibilities. It serves. But past a certain point, it crosses a threshold and then inverts. It ceases to serve and begins to dominate. It creates dependency. It generates the problems it claimed to solve.

The car, said Illich, liberates at first: it allows you to go further, faster. But when everyone has a car, the city is redesigned for the car. Distances lengthen. Public transport degrades. And suddenly, you need a car to do what you used to do on foot — the tool that promised freedom has become a cage.

Generative artificial intelligence follows this same pattern. In its first phase, it amplifies: it lets you explore more options, faster; it frees you from repetitive tasks; it shows you possibilities you would not have imagined alone. But the threshold is there, waiting. When the abundance of options exceeds your capacity to choose, the tool ceases to help. When the system proposes faster than you can evaluate, speed transforms into paralysis.

When generating is so easy that friction disappears, so too does the effort that produces learning.

Setting limits is recognising that the threshold exists.

There are four types of limit we can define before opening the tool.

Limits of scope determine which decisions the system can make on its own and which require human approval: generating colour variants is not the same as deciding which materials to use. Defining scope beforehand is designing the relationship.

Limits of volume ask how many proposals are enough — when to stop generating and start choosing.

Limits of speed regulate the pace of iteration and the pauses for evaluation before continuing. The machine has its own rhythm. It is not the human scale.

Limits of territory mark the zones the system does not enter: decisions that remain human on principle, not because of technical incapacity.

Illich called '*convivial tools*' those that respect these thresholds. A convivial tool amplifies without dominating. It serves without creating dependency. It allows intense use but also non-use.

The bicycle was, for Illich, the perfect example: it amplifies human mobility without requiring massive infrastructure, without creating fuel dependency, without preventing you from walking when you choose. It is a tool that serves without colonising.

Can generative AI be a convivial tool? It depends on how we use it. On what limits we set. On whether we respect the threshold or cross it without looking.

Designing limits is designing the conditions for the tool to remain a tool and for us to remain human in relation to what we have created. So that it amplifies without dominating. So that it serves without colonising.

Ethics as structure

Historically, ethics in design has been treated as something added at the end. Impact reviews when the product is almost finished. Certifications sought to meet requirements. Declarations of good intentions in the sustainability report. A layer of moral varnish over decisions already made.

In the case of intelligent systems, this is not sufficient. Ethics is not ‘a phase’: it is a design condition, as structural as the code that makes the system function. It is not added at the end; it is established before the first parameter.

This means designing not only for the best case, but for the worst. Anticipating how a system might fail. Whom it might harm. How it might be manipulated.

The challenge is not ‘can we make artificial intelligence responsible?’ but ‘what is our level of responsibility in designing it?’

Because if AI is an extension of our intentions, its ethics will ultimately be ours. We cannot externalise responsibility to the machine. The machine does what we teach it to do, optimises what we ask it to optimise, samples the patterns we gave it as examples. If we teach it badly, the responsibility is ours.

Artificial responsibility begins with human responsibility. There is no shortcut.

Ethics must enter early, as a discrete layer. This translates into thresholds that protect against hurried epic. Into rules the system cannot break even when some metric is ‘optimised.’ Into habits that teach the machine to orient itself toward coherence, not only toward novelty.

Creativity does not shrink within this framework.

It breathes better.

Closing

If the designer is no longer the sole author,

What does it mean to be a designer when intelligence is distributed?

Chapter 5 — The new designer

‘You don’t sign. You host.’

The liminal designer

Today’s designer possesses something predecessors did not: threshold consciousness.

The pioneers of industrial design — the Eameses, Rams, Papanek — worked with conviction but without the urgency of the planetary limit. Designing was about improving life, not averting collapse. The luxury of thinking in decades existed because decades seemed infinite. Progress was an arrow pointing upward; the only question was how to accelerate its trajectory.

Today that luxury does not exist.

Now we know that resources are finite in ways that were once abstract. We know the climate responds to what we manufacture. We know human attention has limits that the digital economy systematically ignores. We know that every object is a decision that reverberates through systems we do not fully control.

And we also know that artificial intelligence is changing the rules of the game at a speed that renders inherited frameworks obsolete.

What is at stake

What we do in the coming years will determine whether design contributes to changing the system or continues feeding it out of inertia. There is no neutral position. Every project that enters the world takes a side, even if no one declares it.

If we continue optimising the current board, nothing will change except the scale of the damage.

But if we change the questions we ask, the answers we find change. And if the answers change, the world we build changes.

Today's designer is not an executor of commissions. Consciously or unconsciously, the designer has been transformed into a guardian of the threshold: the one who decides what passes to the other side. What enters the world and what is discarded before the first sketch. What deserves the resources it will consume — and what does not.

It is an enormous responsibility. It is also a privilege.

The privilege of responsibility

Those who worked in times of stability applied rules that others wrote.

Those of us who work now can write them.

This is not common: most professionals inherit an already configured discipline and operate within a framework they did not choose. But when the framework fails — when the metrics produce results that contradict their supposed purpose — a crack appears. And in that crack there is a real opportunity.

We are in that crack. The current framework of design is failing. But there is not yet another to replace it.

We see it in overproduction celebrated as success while the planet accumulates residue. We see it in the fragmentation of disciplines that do not speak to one another. We see it in planned obsolescence that turns functional objects into cultural waste. We see it in the exhaustion of those who work inside the system: the feeling of running very fast without arriving anywhere meaningful. And we see it in the early AI models, which multiply design options without the slightest criterion.

It might seem like a burden. More responsibility, more weight, more guilt. Personally, I do not see it that way.

I see it as the strangest and most fertile moment the craft has ever known: the possibility of using tools not to accelerate the cycle of the same, but to change it at the root. Of connecting form with consequence, aesthetics with ethics, creativity with criterion. While the old structures crumble under crushing logic, this is the opportunity to write new rules: that measure what matters, that reward what works, that care for what sustains, that penalise what harms.

The question is not whether we have permission. The question is whether we have the lucidity to see what is at stake and the courage to act accordingly.

From author to host

For a long time, the designer was an author. The designer signed. The designer's name appeared alongside the object — sometimes larger than the object itself: the Eames chair, the Castiglioni lamp, the Giugiaro car, the Starck juicer, the Ive smartphone. The designer was that aspirational, almost mystical figure; the creative genius, the visionary, the one who saw what others could not and turned it into form.

This model had its logic. In a world where designing was difficult, where tools were limited and access to production was restricted, designing consisted of administering those constraints with intelligence. The designer became a scarce specialist. And what is scarce is valued.

But that world no longer exists.

Today, the capacity to generate forms is distributed. Anyone with access to the right tools can produce variants, explore options, visualise ideas. Artificial intelligence has dispersed what was once the exclusive territory of the designer. Generation is no longer the bottleneck. What matters now is the situated intelligence necessary to read a concrete context, weigh consequences and judge what deserves to exist — something that cannot be delegated or automated. Value no longer lies in producing possibilities: it lies in governing them.

This does not render the designer irrelevant. It means the designer's relevance is no longer where it was. If the capacity to generate has been distributed, what is scarce is no longer the capacity to produce or imagine possible solutions. It is something else. Scarcity has not disappeared. It has shifted.

What is scarce is **criterion**: deciding what deserves to exist among a thousand possible options; distinguishing what contributes from what merely adds noise and repetition; seeing not only the form, but its consequences.

What is scarce is **coherence**: maintaining a direction when everything invites dispersal; connecting form, function and consequence; ensuring that what something is, what it does and what it leaves behind point in the same direction.

What is scarce is **responsibility**: taking ownership of what is put into the world. Not delegating consequences. Answering for decisions made, informing oneself before executing them, and anticipating their systemic consequences.

What is scarce is **purpose**: knowing that what we are about to design will resolve something, not merely fatten quarterly results. Purpose is the capacity to answer an uncomfortable question: what disappears from the world if this exists?

In this environment, the new designer ceases to be the sole author of an object. No longer signing as author of a closed work but hosting as steward of an open process.

The difference is fundamental. The author says: 'this is mine; I made it.' The host says: 'this happened here; I created the conditions for it to happen.' The author claims the merit of the result; the host assumes the responsibility of the process.

The usual debate about design and AI tends to concentrate on two questions: how the tools change and how the professional adapts. They are legitimate questions, but second-order ones. The first-order question comes before: whether what we design with these tools deserves to exist. If it does not, it matters little how sophisticated the process or how brilliant the career.

Making space

If the designer is a host, the designer's principal work is making space.

Making space for the right ideas to emerge. For collaborators — human and non-human — to contribute what they can contribute. For the object to find its form without being forced toward a preconceived vision.

Making space is the opposite of imposing.

It is not passivity. The host is not a spectator: the host creates the conditions for the right things to happen. A good dinner host does not cook every dish or monopolise the conversations. But chooses the guests, arranges the space, selects the music, sets the tone. The result — a good evening — is not 'the host's' in the sense of authorship. But neither would it have happened without the host.

The designer as host operates in a similar way. The host chooses which tools enter the process and which do not. Defines the criteria that will govern decisions. Establishes the limits the system cannot cross. Observes what emerges and decides what stays and what is discarded. Intervenes when the process deviates. Withdraws when the intervention gets in the way.

Richard Sennett, in his study of craftsmanship, distinguishes two ways of working with materials. One is impositive: the craftsman has a clear idea and forces the material to conform to it. The other is dialogical: the craftsman has an intention, but listens; attends to the grain, to the flexibility, to the natural tendencies. The result emerges from the conversation between intention and reality. The second mode is not weaker. It is more intelligent. It produces objects that respect their own nature, that are not at war with themselves, that last longer because they were not forced to be what they could not be.

When the collaborators are intelligent systems, ‘making space’ acquires another dimension. I experienced this recently in an internal exploration exercise for a predictive inference prototype. An architecture of four agents: the first generated proposals from the product’s structural logic; the second filtered them through environmental criteria; the third set economic limits. The three negotiated, proposed, conceded. A fourth agent evaluated the inputs of the others and presented two consensual final options.

The final decision was mine.

I did not design the final object. I designed the conditions: who participated, under what criteria, within what constraints. The host was not in the room generating forms. The host was there beforehand — deciding who was invited and with what mandate — and at the end — choosing what deserved to stay among what the system had been able to produce within those limits.

Making space also means knowing what not to do: which decisions to leave open; which variations to permit; what margin to leave for unforeseen use, for appropriation, for the life the object will have beyond your intentions.

Over-controlled design is fragile: it breaks when the context changes. Design that makes space is resilient: it has enough structure to function and enough flexibility to adapt.

Navigating between islands

The designer as host inherits a fragmented landscape: islands of specialisation that do not speak to each other. Not because people do not want to collaborate, but because each discipline has its own language, its own metrics, its own time horizon. The designer’s role is not to be the greatest expert in each territory — that is neither possible nor necessary. It is to occupy the peculiar position of someone who can see the complete object, from conception to end of life. To see connections that specialists, concentrated on their stretch, cannot.

The stylist understands how light runs across a surface; they may be unaware of the energy and residual impact of manufacturing it. The materials engineer masters resistance and fatigue; they may not think about what happens when that material reaches the end of its useful life. The interface designer masters usability; they may not measure the accumulated cognitive load over months. Production masters costs and efficiency; they may not anticipate how an assembly decision destroys repairability.

The designer as connector does not replace any of these experts. The connector puts them in conversation. Translates between languages. Makes visible the connections that would otherwise remain hidden.

These questions are not answered by a single discipline. They require conversation. And the designer, as connector, is the one who enables that conversation to happen.

It is not a glamorous role. It does not win awards. But it is the role that makes possible the most important thing: coherence.

Connecting islands in space is not enough if they are not also connected in time. That is why there is another function we must remember: leaving a trail. Not a bureaucratic trail of forms, but operative memory: ensuring that the decisions made — and the reasons behind them — do not disappear when the team changes or the project ends.

Why did we set the limits of generation where we set them? What alternatives did we consider? What problems did we anticipate? Why did we choose this material and not another? What did we learn when the product reached the market and we saw how it was actually used?

Without a trail, every project starts from zero. It repeats mistakes already made. It ignores lessons already learned.

The designer as host documents the 'why,' not only the 'what.' In the era of collaboration with intelligent systems, documentation becomes even more critical. Without it, collaboration with AI will continue to be a black box: we know what came out, but not how we got there.

The designer who steps aside

There is a final trait that seems paradoxical: knowing how to disappear. The author wants to be seen. The author's signature is part of the object's value. The host works so that others shine. The host's success is that the dinner works, not that the guests talk about how well the host cooks. If at the end of the evening no one mentions the host, perhaps that is a sign of a job well done.

The age of criterion demands something similar: design that does not shout, that does not exhibit itself, that does not need to call attention to itself in order to function. It is not effortless design; on the contrary. It requires more effort to make something that works without ostentation than to make something that proclaims its own importance.

It is design that solves problems without creating new ones. That endures without demanding constant attention. That ages with dignity. That, when it fails, can be repaired. That knows how to leave without leaving debt.

Inhabiting complexity

Donna Haraway proposes something that runs counter to the modern instinct: staying with the trouble. Not resolving it prematurely. Not fleeing toward the techno-optimism that projects the solution into the future and exempts us from acting today, nor toward the apocalypticism that projects failure and exempts us from trying. Both are forms of not being present. Staying with the trouble is accepting that there is no clean solution, that the future is neither guaranteed nor lost, that what we do now matters even without a guarantee of success.

Haraway proposes '*tentacular thinking*': a way of knowing that does not seek dominion from above, but connection from within. The octopus — a creature that fascinates her — does not have a centralised brain. Its intelligence is distributed across its tentacles. It does not control the world: it touches it, feels it, entangles with it. It knows through contact, not through distance.

The connector of islands needs a warning: connecting is not the same as directing. The risk is that the facilitator ends up occupying the centre they claim to vacate. That 'creating the conditions for conversation' becomes, unintentionally, modelling the conversation from above. The antidote is contact: connecting from within the problem, not from outside it.

Haraway also proposes '*making kin*' — an expanded kinship that includes those who are not 'like us.' With materials, which have history and destiny. With users, not as targets but as collaborators. With future generations, who will inherit consequences without having chosen them. With ecosystems and other species that will sustain or suffer what we design.

This kinship changes the question. It is no longer just 'does it work for the user?' It is 'does it work for the system of which the user is a part?'

Designing systems, not objects

Imagine a studio with a materials expert, a structural engineer, a reverse logistics manager and a screen with two agents evaluating the life cycle. None of them is 'designing an object' in the classical sense. They are designing a system.

A product designer at a mobility company does not design a vehicle; they design the relationship between vehicle, user, charging infrastructure, ownership model, predictive maintenance and the experience over years. The object still exists, but it is no longer the centre: it is a node in a network of relationships.

Dieter Rams could design a radio seated at his drawing table. He controlled the form, the material, the interface, the finish. The world of the object fitted on his table. Today, the world of the object fits on no table. It extends through global supply chains, through business models that change every quarter, through algorithms that personalise the experience, through regulations that did not exist when the project began.

One day you realise you have spent months without touching a pencil. And you do not miss it. Not because you have lost the ability to express yourself graphically, but because the need has shifted: now you spend your time negotiating between constraints that no render resolves — material against weight, weight against cost, cost against CO_2. Each negotiation touches someone who speaks a different language, answers to different metrics, defends a different priority.

Systems design is not a speciality; it is the syntax of complexity. It is the underlying capacity that allows us to design absolutely everything — from the precision of a medical device to the thermal architecture of a data centre. That is the place design deserves.

The object is still there, somewhere in the process. But it has ceased to be the centre. It is the physical result of a network of decisions that precede it and outlast it. And if that network governs the outcome, then the real work is no longer 'drawing a thing' but designing the negotiation that makes it possible: which variables enter, what is considered acceptable, what is penalised, what is left out. Systems intelligence — the capacity to understand and balance the trade-offs before committing the first gram of matter — is what shifts value: from execution to interpretation, from form to criterion.

Whoever does not see that fabric designs technically correct objects that fail systemically.

The problems that matter today — mobility, health, energy, food, information — are not solved with isolated objects. They are solved with systems: sets of interconnected elements where value emerges from the relationships, not from the parts.

The new competencies

The designer as architect of systems needs competencies that traditional education rarely provides:

The first is **thinking in loops**: intervening without seeing feedback is designing blind. What you produce affects the context, and the context affects what you produce. Causality is not linear, and whoever treats it as if it were will end up surprised by consequences that were predictable.

The second is **tolerating uncertainty** without becoming paralysed. Designing systems is designing for learning, not for total control. You cannot predict how a complex system will behave when it comes into contact with reality; you can, however, design it so that it fails in a recoverable way and improves with use.

The third is **mapping relationships** before touching anything: dependencies, bottlenecks, leverage points. The temptation is to start solving. The mistake is to do so before understanding how the pieces are connected.

The fourth — and perhaps the most difficult to cultivate — is **epistemic humility**: assuming unforeseen consequences as a constitutive part of the craft. Not as failure, but

as information. Accepting that you do not know everything is not a weakness; it is the starting point for learning something real.

None of these competencies is acquired in a two-day workshop. They grow slowly, with patience and through friction with real problems.

And there is one more, perhaps the least obvious: accepting that the systems designer has an additional client, often invisible — the system itself. Is it healthy? Does it sustain itself over time? Does it regenerate the resources or exhaust them? When the interests of the immediate client and those of the system that contains them come into conflict — and they will — the decisions cease to be technical: they become ethical.

The system as legacy

There is something more the systems designer must accept: the systems designer will not see the final result of the work. Systems evolve. What is designed today will be modified, adapted, subverted by others. Every intervention is a moment in a long story that began before and will continue after.

Timothy Morton speaks of *hyperobjects*: entities so vast and distributed that we cannot see them complete. Climate change is a hyperobject. The global economy is a hyperobject. The system of industrial design we are describing in this book is one too.

We cannot see the complete system. We cannot calculate all the consequences of every decision. This may sound disheartening. But it is also liberating, because it changes the focus: if you do not control the final result, your responsibility is not to produce the perfect solution. It is to produce conditions for the system to be improved. To design for adaptability, not for permanence.

The legacy of the systems architect is not an object that remains unalterable. It is a direction that others can continue.

Closing

Everything said up to here may sound fine in the abstract. But tomorrow you have to sit down and work. There are briefs to answer, deadlines to meet, systems to configure, decisions to make.

How does all of this translate into concrete and operative decisions?

Chapter 6 — Towards a conscious design

'Not everything possible deserves to exist.'

The method of sufficiency

We have arrived at the point where diagnosis must become method. The previous chapters have drawn a map. But a map without a compass leads nowhere; and a compass without tools does not allow you to build anything.

The compass has a name that may sound austere but that conceals enormous power: the intelligence of sufficiency.

Sufficiency is not a style of innovation. It is a threshold of publication to the world: the criterion that decides what enters and what does not. That distinction changes everything.

Sufficiency is not poverty. It is not settling for less because there is no more. It is not 'cheap' design that sacrifices quality for price. Sufficiency is the criterion that distinguishes the essential from the superfluous.

There is a genealogy of this thinking worth tracing.

Buckminster Fuller called it '*ephemeralization*': the tendency of technological progress to achieve more function with less matter. E.F. Schumacher added the human dimension: the appropriate technology is not the most powerful, but the one that is at the user's scale — the one that can be maintained, repaired, understood. Victor Papanek closed the circle with the moral dimension: every object that enters the world is an ethical decision. Navi Radjou operationalised it under the term '*frugal innovation*': doing more with less for more people.

Filtering the unnecessary not by limitation, but by criterion. Turning constraint into creative method.

These thinkers did not work together or use the same terminology. But they converge on something fundamental: good design does not add. It justifies itself by what it achieves with what it has.

The three pillars of conscious design

This philosophy can be translated into three simultaneous conditions. They are not optional; they are constitutive.

Nuclear functionality asks what is the essential function the object must fulfil. Not the complete list of specifications; the central function that justifies its existence. This pillar demands brutal honesty. Most products are overloaded with features no one asked for: details 'to evoke,' functions 'just in case,' variants 'for segmentation.' Every addition has a cost — in complexity, in materials, in user attention — that is rarely accounted for. Conscious design inverts the logic: instead of asking 'what more can we add?' it asks 'what can we eliminate without losing the essential?'

Optimised performance clarifies that sufficient does not mean low quality. It means quality adequate to the purpose, with neither excess nor deficit. It implies precise

engineering: not over-dimensioning when simulation can calculate exactly what is needed; not using ‘premium’ materials when standard ones fulfil the same function; not adding finishing layers that contribute neither durability nor meaning. It also includes durability and repairability: an object that lasts is usually more efficient than one that is replaced, even if the first costs more at the point of purchase.

Substantial reduction does not speak of marginal tweaks, but of order-of-magnitude reductions: solutions that cost a fraction of their conventional equivalents without sacrificing nuclear functionality. The Pareto principle reminds us that the last 20% of refinement consumes 80% of the effort. The closer you get to technical perfection, the more disproportionate the cost becomes. Designing for sufficiency — not for superfluous excellence — is a decision of efficiency and honesty, not conformism.

Forced constraint unlocks creativity that abundance of resources rarely activates.

Sufficiency and circularity: the double filter

This is where sufficiency meets another fundamental current: the circular economy. They are complementary, not competing. They answer different questions that need each other.

Sufficiency asks: does this deserve to exist? Is it essential? How much is necessary? Circularity asks: if it exists, how does it return? What happens afterwards? Where do its materials end up?

This double filter radically changes what is permissible in a design process. It is no longer enough for something to ‘work’ or ‘sell.’ It must justify its material existence and have a return path.

The aesthetics of sufficiency

There is a foreseeable objection: won’t conscious design inevitably be ugly? Utilitarian? Austere to the point of boredom?

The evidence suggests otherwise. Users value beauty even — especially — in austere products. This is not a contradiction. It is coherence.

The aesthetics of sufficiency is not ornament; it is the beauty that emerges when the superfluous and the banal disappear. It is the elegance of what neither exceeds nor lacks. It is what the Japanese call *shibui*: the subtle beauty that reveals itself over time, without shouting, without tiring.

Brands like Dacia, MUJI or Fairphone have demonstrated that austerity can be aspirational. Deliberate simplicity — when well executed — generates a type of attraction that excessive complexity cannot replicate.

The aesthetics of sufficiency is not a lack of ambition. It is the most difficult ambition: to achieve something that is exactly what it needs to be, nothing more and nothing less.

From philosophy to tool

The rest of this chapter translates this philosophy into concrete instruments: existence criteria, materials and decision passports, a Bill of Relations and publication thresholds. Every tool responds to the same logic: making visible what is invisible. Turning hidden consequences into conscious decisions.

An important note: these tools do not apply only to physical products. They apply to anything that is designed: a service, an interface, an algorithm, a policy, a research process. Because wherever there are decisions that configure what others experience, there is design.

The method of sufficiency is not a limitation. It is a lens that focuses creativity on what matters. In a world of finite resources and saturated attention, this capacity to 'do better with less' is not merely a competitive advantage: it is a historical responsibility.

There is also a tactical dimension worth noting. Sufficiency is not only a moral position. It is the only survival strategy that makes sense in a world of finite resources. Whoever closes the cycle does not depend on the geopolitics of lithium. Whoever designs for repairability does not bleed when a supply chain is blocked. Operational resilience and material ethics are the same thing seen from different angles and from the long term.

The system that optimises the quarter sacrifices the decade. The one that optimises health survives.

Existence criteria

Does this deserve to exist?

This uncomfortable question has been appearing since the first chapter. That is not accidental. Every time we have formulated it, we have contextualised it differently: as a symptom of the crisis, as historical inheritance, as an absent metric, as a limit for AI, as the purpose of the new designer. Here we convert it into an operative tool: we break it down into three questions that must be answered before the first sketch.

They are not a bureaucratic checklist. They are a discipline of thought: a way of ensuring that what you are about to create has a reason to exist.

The first question: **what problem disappears if this exists?** Not what problem it 'addresses' or 'mitigates.' What problem disappears. The difference matters: addressing a problem is easy; all you have to do is mention it in the brief. Making it disappear demands that the design actually works. If you cannot name a concrete problem that will disappear, perhaps another artefact is not needed.

The second: **what gets worse if this exists?** Every design has costs: extracted materials, squeezed ecosystems, displaced communities, consumed energy, captured attention, occupied space. The question is not to avoid cost — there always is one — but to know which you are willing to assume and whether it is proportional to the benefit. An object

that solves a small problem but generates large ones does not deserve to exist, however elegant its form.

The third — and the most difficult: **what disappears from the world if this exists?** This is not about what the object does, but what it displaces. Every new object competes for attention, for resources, for space. What are you displacing? And does it deserve to be displaced?

Every new object introduces not only materials, energy and processes into the world. It also introduces decisions, maintenance, learning and attention.

An object does not exist only in physical space. It also exists in the minds of those who use it, maintain it, regulate it and interpret it.

In that sense, every object consumes intelligence from the system.

This is why sufficiency is not only a material ethics. It is also a cognitive discipline: a way of not saturating the world with more complexity than we can sustain with criterion.

Materials passport

If an object deserves to exist, the next question is: what is it made of? Not in the technical sense of material data sheets. In the sense of provenance and destination.

I am not speaking of the EU's regulatory Digital Product Passport; I am speaking of a criterion passport: origin, assembly and return as a design condition from the first sketch, not as after-the-fact compliance. The difference is not semantic; it is temporal. The regulatory one arrives at the end; the criterion one arrives before the material.

Origin asks where each material comes from: what was extracted, where, under what conditions; whether it is virgin or recycled. **Assembly** asks how materials were joined and whether they can be separated afterwards. **Traceability** asks whether each material can be identified when the time comes to dismantle it. **Return** asks where each material can go when the object ends its life.

Many products boast of using recycled materials while creating objects that cannot be recycled: they laminate layers that cannot be separated, use permanent adhesives where a snap-fit would suffice, mix incompatible plastics that condemn the whole. The material came from a cycle, yes; but it will not return to one.

That is not circular economy. It is greenwashing with extra steps.

The materials passport forces you to think about return from the beginning. Not as a virtuous add-on, but as a condition of the design.

Decision passport

In the era of collaboration with intelligent systems, there is another necessary passport: the one for decisions. What did a human decide and what did an agent decide? With what criteria? Based on what data?

Training data documents what the system 'saw' and what known biases it carries. **Optimisation criteria** record what it was asked to maximise. **Corrected biases** document how detected problems were treated. **Established limits** record which territories were excluded. **Human decisions** document at which moments agent proposals were discarded and why.

This passport is not for surveilling the agent. It is for understanding the process. Decision traceability is the condition for continuous improvement.

Bill of Relations

Alongside the Bill of Materials — the list of physical components — we propose a Bill of Relations: the list of relationships the object establishes. It is not a technical document. It is a document of consequences.

The **relationship with service** asks how the object is maintained: who can repair it, whether spare parts are available, whether the design facilitates or hinders intervention. Sealing a compartment saves production costs but multiplies repair costs; using standard screws allows any workshop to intervene.

The **relationship with energy** asks how much it consumes across its life — not only in manufacturing, which is what we usually measure, but in use, in transport, at end of life. Is it proportional to the service it provides?

The **relationship with attention** asks how much cognitive load it imposes on the user and how much cognitive return it offers. Does it demand constant attention or does it allow forgetting? An object that colonises more attention than it returns in value is an extractive object.

The **relationship with trust** asks whether promises are kept, whether the warranty accompanies the actual useful life, whether the relationship with the user improves over time or degrades. Trust is built in years and destroyed in minutes.

The **relationship with the end** asks what happens when the object finishes its useful life: whether there is a designed return path, or whether the end is someone else's problem.

The Bill of Relations does not replace the Bill of Materials. It complements it. One says what the object is made of. The other says what relationships it establishes. Both are necessary to understand what we are putting into the world.

An honest warning: applying the Bill of Relations with rigour creates real frictions. A decision that reduces the cost of production may increase the cost of repair. The

document’s value is not in giving you the answer; it is in forcing you to formulate the question before it is too late.

The Bill of Relations reveals something design has concealed for too long: that every object expands not only the world’s inventory, but also the network of relationships necessary to inhabit it.

Every new thing adds dependencies, learning, maintenance, expectations and cognitive load.

When the number of objects grows faster than the collective intelligence capable of sustaining them, the system does not become richer. It becomes more fragile.

Publication thresholds

This simple phrase contains a radical shift in mentality.

In the traditional model, the question was: can we make it? If the answer was yes, it was made. In the model we propose, there is an intermediate step: publication thresholds. They are not project phase-gates; they are thresholds of existential merit — questions about whether something deserves to be in the world, not about whether it is ready on time and within budget.

The **threshold of necessity** asks whether it solves a real problem: whether someone needs it — not wants it, not would buy it — but needs it.

The **threshold of proportionality** asks whether what it contributes justifies what it consumes: whether the benefit is proportional to the material, energy and attentional cost.

Because not all cost is measured in matter. There are also objects that demand too much learning, too much management, too much sustained attention for the real value they return.

The **threshold of coherence** asks whether what it is, what it does and what it leaves behind point in the same direction: whether there is a contradiction between the promise and the reality.

The **threshold of return** asks whether it can come back: whether the materials have a return path, whether the knowledge generated is documented, whether feedback has a channel.

The **threshold of humility** asks whether we know what we do not know: whether failure modes have been anticipated and whether there is a plan for when things do not go as expected.

Not everything has to go out. Not everything has to exist. Knowing what to hold back is as important as knowing what to launch.

The aesthetics of what endures

We arrive at the end of the operative journey. And it may be surprising that we finish by talking about aesthetics. But aesthetics is not decoration: it is the visible expression of everything that came before.

An object designed to last has a different aesthetic from one designed to be replaced. The former can afford sobriety. It does not need to shout to attract attention, because it is not competing for an impulse purchase. It can age, because its value lies not in novelty but in permanence.

There is a specific beauty in what endures.

It is not the beauty of the showcase, designed to capture in seconds. It is the beauty of prolonged use: the patina that appears with time, the wear that tells a story, the familiarity that becomes affection.

This beauty does not photograph well. It does not win awards at fairs. It does not generate headlines. But it is the beauty that accompanies real life: the one that is there when you are not looking; the one that keeps working when the gleam of the new has faded.

Coherence is the deepest form of beauty.

A coherent object does not lie. Its form does not promise what its function does not deliver. Its material does not boast virtues that its end of life contradicts. This is the conscious design we propose.

It is not a design of deprivations. It is not a sad, austere design that renounces pleasure or form. On the contrary: it is an adult and intelligent design that knows what it wants, that has a reason to exist, that chooses carefully and takes responsibility for its consequences.

It is, in the end, a design that deserves to exist.

Closing

Conscious design begins precisely there: where it understands that every new thing consumes not only matter, but also intelligence from the system.

The epilogue is not a summary. It is the final threshold.

Epilogue — The beginning of another question

'There is no ending here. Only a better criterion.'

There is no closing

This book does not end.

Not because it is incomplete, but because its subject does not admit closure.

Design is not a problem that is solved; it is a practice that is exercised. There is no point where you can say ‘that’s it, we did it.’ There are, at best, better questions than the ones you had before.

All of this can remain on paper. Or it can become practice. The difference between a book that is filed away and one that transforms does not lie in the diagnosis: it lies in the threshold where you decide whether to apply it when it hurts, or not.

If anything deserves to remain from this book, it is this: progress is not measured in launches. It is measured in health.

And if anything deserves to remain about the designer’s role, it is this: you don’t sign. You host.

It is a less visible role. Less photogenic. Less awardable. But it is the role that the moment — and the future — need.

The invitation

I do not write this book to convince, but to connect.

To convince is to impose a vision: to expect the other to abandon a position and adopt yours. It is a game of winners and losers.

To connect is something else. It is to find the point where your question and the other person’s touch. Where your discomfort and that of the other turn out to be the same. Where what you seek and what the other seeks, though it comes from different places, points in the same direction.

This book does not have definitive answers. It has questions that seem to us better than the previous ones. If those questions connect with yours, then it will have served.

The invitation is simple: **criterion** as a historical position, not as a personal virtue. We are at the moment when human judgment about what deserves to exist is what defines the difference between design and noise.

Do not let the system decide for you.

Ask the difficult questions before you begin. Subject your projects to thresholds. Conscious design is an act of public courage that begins by breaking the silence of consensus. Human **tempo**. Not speed for speed’s sake. Not the rhythm imposed by your synthetic agent or the commercial calendar. A rhythm that allows thinking, observing, correcting. And **care**. For the materials you use and where they will go. For the people who manufacture and under what conditions. For the attention you capture and whether you return equivalent value. For the ecosystems that will sustain or suffer what you design. For the generations that will inherit it without having chosen it.

None of this is easy, I know. The system has inertia. The incentives push in another direction. The deadlines press. The absurd briefs arrive with the ‘what’ already decided. The pressure to launch is constant.

You will not always win. Sometimes you will have to concede. Sometimes you will do things that contradict what you believe. Having contradictions makes you human.

But there is a difference between conceding knowing that you concede and conceding without realising. Between compromising with open eyes and being an accomplice asleep.

Lucidity does not guarantee victory. But it is the minimum condition for trying.

The question that remains

We arrive at the end. Or at the beginning, depending on how you look at it.

We have proposed tools, roles, metrics, thresholds. We have cited thinkers who preceded us and illuminate us. We have diagnosed a crisis and sketched a way out.

Everything reduces, in the end, to a single question.

It is the question that should be asked before every project. Before every decision. Before every artefact launched into the world. It is a simple question. And it is the most difficult question to answer with honesty.

What disappears from the world if this exists?

Not what is added. That is easy to see. The new gleams, is presented, is celebrated.

Everything that exists displaces something. The question is whether what you displace deserved to be displaced.

We cannot know with certainty what will disappear from the world if what you propose exists. But we can ask. We can try to see.

We can, at least, not ignore the question.

There is no universally correct answer. It depends on the context, the project, the moment. But the question is stable: if you do not ask it, the system will answer it by default — with its metrics, not with your values.

Ask it before the first sketch — whether it is a product, a service, an interface, a policy, an algorithm or a piece of research; before the first line of code; before the first render.

In the next kick-off meeting, before adding anything, ask what problem disappears if this exists. If no one can answer, it is not design: it is mere production.

Design is everywhere. Precisely because of that, in an era obsessed with generating more, your criterion matters — it is what makes you singular, not flatlined.

Deliberate ignorance is the worst form of complicity.

It is not spectacular design. It does not win covers. It does not dazzle at fairs.

But it endures. It serves. It respects. And when it ends, it returns.

Glossary — Glossary of terms

Terms coined in the book and concepts adopted from other authors.

This glossary collects the book's own terms, those redefined for its specific use, and concepts from other authors that the book adopts and adapts. The references column indicates in which chapters each term is developed in greater depth.

Foundational concepts

Threshold

The historical moment when abundance shifts from accidental to designed. The point where the central question ceases to be 'Can we produce this?' and becomes 'Should this exist?' This is the context in which the book is situated: an era where the capacity to generate surpasses any filtering criterion.

→ *Appears in: Introduction, Ch. 1 (All abundance creates its own scarcities), Ch. 5*

Dashboard

The set of metrics that govern design decisions. The current dashboard measures novelty, speed, and volume—and what doesn't appear on the panel tends to disappear. The book proposes an alternative dashboard that measures coherence, cycle, material health, attentional health, and trust.

→ *Appears in: Ch. 1 (The wrong dashboard), Ch. 3 (Building the new dashboard), Epilogue*

Computational design

The disciplinary evolution of industrial design under technological pressure. Unlike classical industrial design, where the designer defines the form, in computational design the designer defines rules, constraints, and objectives, and the system explores the solution space. Form emerges as a result of multi-objective optimization, not as represented intention. The shift is not merely technical: it is epistemological. The designer ceases to be a formal configurator and becomes an architect of conditions. The book's central question—what deserves to exist?—acquires its utmost urgency here: if no one defines the right criteria, the system will optimize the wrong ones with perfect precision.

→ *Appears in: Ch. 2 (Software as operating system), Ch. 5 (The designer as systems architect)*

Existence criterion

The question that must be answered before the first sketch: does this deserve to exist? It is not a rhetorical question but an operational tool that breaks down into three concrete questions: What problem disappears if this exists? What gets worse? What disappears from the world so that this can be here?

→ *Appears in: Ch. 1, Ch. 5 (What is scarce is purpose), Ch. 6 (Existence criteria)*

Designed abundance

The capacity to generate variants, outputs, and decisions at an unprecedented scale—first through the globalization of supply chains and then through generative artificial intelligence. Unlike accidental abundance, this kind is produced deliberately. The problem is not abundance itself but the absence of criteria to govern it.

→ *Appears in: Introduction, Ch. 3 (Overproduction as symptom), Ch. 4*

Generative regime

The fourth moment in the genealogy of the relationship between designer and tool, after classical industrial design, CAD/CAE and computational design. In the generative regime, generative artificial intelligence enables models that internalise priors, detect patterns, compress styles and propose plausible variants without the designer having to specify everything as an explicit rule. It renders computational design ubiquitous, conversational and dangerously easy to scale. The interface shifts: from parameters to intention; from geometry to language; from 'tell me how' to 'tell me what for.'

→ Appears in: Ch. 4 (From tool to co-agent)

The designer's role

Host

The designer's new role, as opposed to the historical role of author. The author signs and claims authorship of the result. The host creates the conditions for what deserves to emerge to emerge, and assumes responsibility for the process rather than credit for the product. The host does not receive passively: they choose the participants, define criteria, intervene when the process goes off course, and step back when they are in the way.

→ *Appears in: Ch. 5 (From author to host, Making room), Epilogue (Hosting, not signing)*

Making room

The designer-as-host's central action: creating the conditions for the right ideas to emerge, for collaborators (human and machine) to contribute what they can contribute, for the object to find its form without being forced toward a preconceived vision. Making room is the opposite of imposing.

→ *Appears in: Ch. 5 (Making room section)*

Orchestration

The designer's mode of work when collaborating with teams of intelligent agents. The designer neither generates alone nor delegates blindly: they coordinate specialized perspectives, define which values each agent defends, and make the decision that no single agent can make on its own.

→ *Appears in: Ch. 4 (Agent teams)*, *Ch. 5 (Making room)*

Conscious design

Design that works without drawing attention to itself. Not 'effortless' design—on the contrary, it demands more rigor to make something that works without ostentation. It solves problems without creating new ones. It endures without requiring constant attention. It ages with dignity. When it fails, it can be repaired. It does not seek a large signature next to the object; it seeks things that work well.

→ *Appears in: Ch. 5 (The designer who steps aside)*, *Ch. 6 (The aesthetics of what endures)*, *Epilogue*

Metrics and tools

System health

The real metric of progress proposed as an alternative to quantitative growth. A healthy system is not the one that produces the most but the one that metabolizes best: it maintains closed cycles, regenerates the resources it consumes, and does not accumulate waste that others will have to pay for. It breaks down into: material, energy, environmental, social, and cognitive health.

→ *Appears in: Ch. 3 (Progress = Health)*, *Ch. 6*, *Epilogue*

Bill of Relations

A proposed document complementary to the Bill of Materials (list of physical components). Where the BOM states what an object is made of, the Bill of Relations makes explicit the relationships that object establishes: with technical service, with energy, with the user's attention, with trust, with end of life. It makes visible the consequences that are usually externalized. Note: the term exists in manufacturing engineering and PLM with a different meaning—process relationships between data. Here it is used in a displaced sense: not process relationships, but consequence relationships.

→ *Appears in: Ch. 1 (Fragmentation of the discipline)*, *Ch. 5 (The designer as connector of islands)*, *Ch. 6*

Materials passport

A traceability tool that documents the origin, assembly, identifiability, and return path of every material in a product. It goes beyond the technical data sheet: it requires knowing where each component came from and where it can go when the object reaches end of life. A necessary condition for the circular economy to be real rather than greenwashing. Distinct from the EU's regulatory Digital Product Passport: this is a criteria passport that arrives before the material, not after the design.

→ *Appears in: Ch. 6 (Materials passport)*

Decision passport

A traceability tool for the age of collaboration with intelligent systems. It documents what a human decided and what a machine proposed, under which criteria, based on which data. Without this trail, collaboration with AI is a black box: we know what came out but not how we got there, and we cannot improve a process we cannot reconstruct.

→ *Appears in: Ch. 6 (Decision passport)*

Publication thresholds

Criteria a design must meet before it goes out into the world. These are not technical quality filters (which are taken for granted) but existential merit filters: threshold of necessity, of proportionality, of coherence, of return, and of humility. They operationalize the question 'Does this deserve to exist?' at the concrete moment of launch.

→ *Appears in: Ch. 6 (Publication thresholds)*

Compass

The conscious rhythm the designer chooses for their practice, as opposed to speed as a dogma imposed by the commercial calendar. Compass does not deny speed; it subordinates speed to direction. 'Choose your compass' is one of the Epilogue's three invitations.

→ *Appears in: Ch. 1*, *Ch. 4 (Governing abundance)*, *Epilogue*

Diagnosis

Commoditization

The process by which a previously exclusive, differentiating capability becomes accessible to everyone, losing its value as a signal of distinction. In the book it applies to design: what once required training and judgment—producing a spectacular render, exploring formal variants—is now within reach of anyone with access to generative tools. Commoditization does not invalidate design; it shifts where its value resides: from generation to the criteria of selection and governance.

→ *Appears in: Ch. 1 (Overproduction as symptom)*

Emotional obsolescence

Making something that works perfectly feel old, insufficient, or inadequate. Unlike planned obsolescence (which engineers the product's physical death), emotional obsolescence operates on desire: the object is still alive, but the desire for it has been killed. It is invisible cultural waste that appears in no sustainability report.

→ *Appears in: Ch. 3 (Overproduction as symptom, The invisible residue)*

Metabolic rift

A term coined by John Bellamy Foster (Marx's Ecology, 2000) in the tradition of Marxist political ecology. It describes the disconnect between what we extract from the world and what we return. Linear design widens the rift with every product: it extracts materials, energy, and attention without closing the return cycles. Circular design attempts to close it. It connects with the concept of metabolism as a measure of system health.

→ *Appears in: Ch. 2 (From line to loop)*

Wicked problems / tame problems

A distinction by Horst Rittel and Melvin Webber (1973). A tame problem has measurable objectives, known constraints, and a verifiable criterion of solution. A wicked problem cannot be fully defined before you start solving it: its boundaries are blurry, its success criteria depend on who is asking, and every intervention generates new situations. Design operates in wicked-problem territory, but the system pressures designers to domesticate them and turn them tame.

→ *Appears in: Ch. 2 (Wicked problems, tame solutions), Ch. 4 (The epistemological gap)*

Hyperobject

A term coined by Timothy Morton to describe entities so vast and distributed in time and space that we cannot see them whole: climate change, the global economy, nuclear radiation. In the book it applies to the industrial design system: the designer can never see the totality of the system they configure, which changes the nature of their responsibility. It is not about calculating every consequence, but about not ignoring the question.

→ *Appears in: Ch. 5 (The system as legacy)*

Artificial responsibility

A central concept of Chapter 4: we do not design intelligence in the abstract—we design the conditions under which a system learns, proposes, and acts. If the system fails, responsibility cannot be externalized onto the machine—the machine does what we taught it to do. Artificial responsibility begins with human responsibility.

→ Appears in: Ch. 4 (epigraph, Ethics as structure section)

References that appear in more than one chapter are developed at their first occurrence and cross-referenced thereafter. Authors marked with [→ see Ch. X] have an annotated entry in the Annotated Bibliography.

Notes — Notes and references

Footnotes · References by chapter · Cross-reference map.

Footnotes from the text

Numbered footnotes that appear in the body of the manuscript.

FN-1 (Ch. 2).

Jean-Baptiste Say, Traité d'économie politique (1803). Say distinguishes 'richesses naturelles' (air, water, sunlight) as goods that nature provides 'freely' and without exchange value, and considers the action of the sun and the wind as 'inexhaustible.'

FN-2 (Ch. 3).

The term attention residue was introduced by Sophie Leroy to describe the cognitive cost that persists when we switch tasks before completing them (Leroy, S., 'Why Is It So Hard to Do My Work?', Organizational Behavior and Human Decision Processes, 109, 2009). In this book it is used in an expanded sense: the residue accumulated by objects and platforms that capture attention without returning equivalent value.

FN-3 (Ch. 5).

The figure of the designer as host appears in fashion and sustainability research—especially in the work of Dilys Williams—as a framework for thinking about the designer who facilitates conversations rather than imposing artifacts. Here the concept is displaced: the host does not only facilitate human conversations; they govern generative systems, establish criteria, define boundaries. The scale and the type of co-authors—intelligent agents—change the nature of the role without invalidating its core.

FN-4 (Ch. 4).

ImageNet (2009) was annotated by Mechanical Turk workers, predominantly from low-wage countries, classifying millions of images for cents per task. The invisible infrastructure of modern visual recognition. Jia Deng et al., 'ImageNet: A large-scale hierarchical image database', CVPR 2009.

FN-5 (Ch. 4).

LAION-5B is the dataset of 5.8 billion image-text pairs used to train Stable Diffusion and other generative models. Independent audits documented unverified copyrighted material, child abuse imagery, and systematic representation biases. It was partially withdrawn and cleaned in 2023.

FN-6 (Ch. 4).

The Environmental Justice Atlas (EJAtlas), developed by the Institute of Environmental Science and Technology at UAB, documents more than 3,000 active socio-environmental conflicts worldwide linked to resource extraction, mining, energy, and waste. ejatlas.org

FN-7 (Ch. 4).

Vector embeddings: mathematical representations of a studio's knowledge. *RAG systems*: combine search over proprietary archives with language generation. *Re-embedding*: recalculating those representations for a new platform. Technical reference: Gao, Yunfan et al., 'Retrieval-Augmented Generation for Large Language Models: A Survey', arXiv:2312.10997 (2024).

FN-8 (Ch. 6).

The Relative Importance Index (RII), a methodological tool developed in the field of frugal innovation, ranks the attributes a product must have. Aesthetics appears as an essential attribute, on the same level as functionality and affordability. Navi Radjou and Jaideep Prabhu, *Frugal Innovation* (Profile Books, 2015).

FN-9 (Ch. 4).

Generative adversarial network (GAN): a deep learning architecture in which two neural networks compete — one generates candidates and the other evaluates them. The opening anecdote of Chapter 4 describes its use in a homemade variant-generation pipeline. Ian J. Goodfellow et al., 'Generative Adversarial Nets', NIPS 2014.

Introduction — Why we need a new language

The introduction carries no explicit notes. The concepts it introduces (threshold, designed abundance, dashboard, existence criteria) are developed with full references in the corresponding chapters.

Chapter 1 — The crisis

Chapter 1 carries no explicit notes. The concepts it introduces (wrong dashboard, designed abundance, displaced scarcity) are developed with full references in the following chapters.

Chapter 2 — The roots

1.

Richard Sennett, *The Craftsman* (Yale UP, 2008). The concept of 'tacit knowledge'—knowing that cannot be codified, that lives in the body and is transmitted through practice—and the distinction between imposing work and dialogic work with materials. Central reference in Ch. 2 (Before Control+Z) and revisited in Ch. 5 (Making room).

2.

Victor Papanek, *Design for the Real World*: Human Ecology and Social Change (Pantheon Books, 1971). 'There are professions more harmful than industrial design, but only very few.' First appearance of Papanek: the historical context of critique from within the profession. Also appears in Ch. 5 and Ch. 6.

3.

Yuk Hui, Recursivity and Contingency (Rowman & Littlefield, 2019) and On the Existence of Digital Objects (Minnesota UP, 2016). The concept of 'cosmotechnics': there is no universal technology—each culture develops its own way of articulating the relationship between cosmos, morality, and technique. First appearance. Revisited in Ch. 4. [→ Full development in Ch. 4, note 2]

4.

Arturo Escobar, *Designs for the Pluriverse*: Radical Interdependence, Autonomy, and the Making of Worlds (Duke UP, 2018). 'Ontological colonialism' as a framework for understanding global aesthetic homogenization. 'Design for the pluriverse' as an alternative: recognizing and serving multiple worlds instead of imposing one.

5.

William McDonough and Michael Braungart, *Cradle to Cradle*: Remaking the Way We Make Things (North Point Press, 2002). The two-cycle framework—biological and technical—as an operational response to the 'cradle to grave' paradigm. [→ Cross-reference in Ch. 6, note 1]

5b.

John Bellamy Foster, Marx's Ecology: Materialism and Nature (Monthly Review Press, 2000). Origin of the concept of 'metabolic rift': the structural disconnect between what capitalism extracts from nature and what it returns. In the manuscript it is applied to linear design as an extension of the same mechanism.

6.

Emad Mostaque, The Last Economy (2025). Structural reference: provides a narrative architecture (threshold → dashboard → criteria) useful for sustaining the manuscript's progression, but is not used as an original source for pre-existing concepts (e.g., the metabolic rift).

7.

Horst Rittel and Melvin Webber, 'Dilemmas in a General Theory of Planning', Policy Sciences, 4, 155–169 (1973). The original formulation of the distinction between wicked problems and tame problems. Structures the section 'Wicked problems, tame solutions.' Returns as a central reference in Ch. 4.

8.

Donald Schön, The Reflective Practitioner: How Professionals Think in Action (Basic Books, 1983). The 'swampy lowlands' where the problems that truly matter reside. Professional excellence requires operating in swampy territory, not fleeing from it. **Chapter 3 — The illusion of progress**

Chapter 3 — The illusion of progress

1.

Herbert A. Simon, 'Designing Organizations for an Information-Rich World', in M. Greenberger (ed.), Computers, Communications, and the Public Interest (Johns Hopkins UP, 1971). The full quote: 'In an information-rich world, the wealth of information means a dearth of something else: a scarcity of whatever it is that information consumes. What information consumes is rather obvious: it consumes the attention of its recipients.' Fifty years before the attention economy, Simon was already describing its mechanism.

1b.

Sophie Leroy, 'Why Is It So Hard to Do My Work? The Challenge of Attention Residue when Switching Between Work Tasks', Organizational Behavior and Human Decision Processes, 109, 168–181 (2009). Leroy coined the term 'attention residue' to describe the attention that remains anchored in a previous task when moving to the next. In the manuscript it is used in an expanded sense: the attentional residue that a product leaves accumulated in the user as a sustained burden, not merely as a momentary distraction.

2.

Mark Fisher, Ghosts of My Life: Writings on Depression, Hauntology and Lost Futures (Zero Books, 2014). Hauntology as a cultural condition: the future haunted by its own absence. And Simon Reynolds, Retromania: Pop Culture's Addiction to Its Own Past (Faber

& Faber, 2011). Complementary diagnoses of the inability to generate genuinely new forms.

3.

Franco Berardi ('Bifo'), The Soul at Work: From Alienation to Autonomy (Semiotext(e), 2009). Semiotic exhaustion and the economy that has colonized the soul. The saturation of signs emptied of meaning as a nervous phenomenon, not merely a linguistic one.

4.

Byung-Chul Han, The Burnout Society (Herder, 2012). The shift from physical fatigue to psychic fatigue. [→ Revisited in Ch. 5, note 4]

6.

Jane Bennett, Vibrant Matter: A Political Ecology of Things (Duke UP, 2010). The 'vitality of matter': materials are not passive—they have their own tendencies and ways of acting. Philosophical foundation for the concept of material health.

6b.

Kintsugi (金継ぎ): a Japanese repair technique using urushi lacquer and metallic powder (often gold) that highlights the fracture as part of the object's history. Associated with wabi-sabi aesthetics: Leonard Koren, Wabi-Sabi for Artists, Designers, Poets & Philosophers (Stone Bridge Press, 1994).

7.

Kohei Saito, Marx in the Anthropocene (Cambridge UP, 2022). Capitalism's metabolic problem: it extracts more than it returns. Degrowth as a questioning of growth as an objective, not as a proposal for regression.

8.

Serge Latouche, Farewell to Growth (Polity, 2009). The image of the snail that reaches sufficiency and stops growing. Degrowth as intelligent maturity, not deprivation.

9.

Harry Brignull coined the concept of 'dark patterns' in 2010 to describe interfaces deliberately designed to deceive or manipulate users. The reference to 'capture metrics' connects with this concept.

10.

Mark Fisher, *Capitalist Realism*: Is There No Alternative? (Zero Books, 2009). 'It is easier to imagine the end of the world than the end of capitalism.' Central reference for 'The

choreography of applause' and the concept of hauntology. See also: Ghosts of My Life (Zero Books, 2014).

Chapter 4 — Intelligence, ethically

1.

Nick Bostrom, Superintelligence: Paths, Dangers, Strategies (Oxford UP, 2014). The alignment problem and the 'paperclip maximizer': a system that optimizes exactly what you ask for, even when you asked wrong. First appearance of the alignment problem as a conceptual framework.

2.

Yuk Hui, cosmotechnics. [→ First appearance in Ch. 2, note 3. Here applied directly to the biases of generative models.]

3.

W. Billingsley, 'The Practical Epistemologies of Design and Artificial Intelligence', Science & Education, 34, 807–824 (2024). DOI: 10.1007/s11191-024-00517-z. The epistemological mismatch between the type of knowledge AI produces and the type design requires. Central reference of the chapter.

4.

Venkatesh, K., Dunlop, C. and Yanardag, P., 'CREA: A collaborative multi-agent framework for creative content generation with diffusion models', arXiv:2504.05306 (2025). The multi-agent system as a model of creativity as dialogue, not optimization. [→ Cross-reference in Ch. 5, note 8]

5.

Ivan Illich, *Tools for Conviviality* (Harper & Row, 1973). The threshold of counterproductivity and convivial tools. First and most extensive appearance. [→ Cross-reference in Ch. 5, note 5; Ch. 6, note 6]

5b.

On the externalization of a studio's operational memory through *vector embeddings* and *RAG* (Retrieval-Augmented Generation) systems: when a studio converts its archive into embeddings to feed copilots, migrating platforms means recalculating the entire semantic index, with drift and cost. The dependency is not only contractual: it is semantic. Background technical reference: Gao, Yunfan et al., 'Retrieval-Augmented Generation for Large Language Models: A Survey', *arXiv:2312.10997* (2024).

6.

Lennart Meincke, Gideon Nave and Christian Terwiesch, ‘ChatGPT decreases idea diversity in brainstorming’, Nature Human Behaviour, 9, 1107–1109 (2025). DOI: 10.1038/s41562-025-02173-x.

7.

Nataliya Kosmyna et al., ‘Your Brain on ChatGPT: Accumulation of cognitive debt when using an AI assistant for essay writing task’, arXiv:2506.08872 (2025). DOI: 10.48550/arXiv.2506.08872.

8.

Gerlich, M., ‘AI Tools in Society: Impacts on Cognitive Offloading and the Future of Critical Thinking’. Societies, 15, 6 (2025). DOI: 10.3390/soc15010006.

9.

Li, Pengfei; Yang, Jianyi; Islam, M. A.; Ren, Shaolei, ‘Making AI Less ’Thirsty’: Uncovering and Addressing the Secret Water Footprint of AI Models’, arXiv:2304.03271 (2023). Projection: global AI water consumption between 4,200 and 6,600 Mm^3 by 2027.

10.

Alexandra Sasha Luccioni et al., ‘Power Hungry Processing: Watts driving the cost of AI deployment?’, ACM FAccT 2024. DOI: 10.1145/3630106.3658542 (preprint arXiv:2311.16863). Energy cost of generative vs. discriminative tasks.

11.

Jia Deng et al., ‘ImageNet: A large-scale hierarchical image database’, Proceedings of CVPR 2009. The dataset accelerated computer vision and depends on large-scale annotation work (crowdwork) as the material condition of the system’s ‘intelligence.’

12.

Sophie J. Nightingale et al., ‘AI-synthesized faces are indistinguishable from real faces and more trustworthy’, PNAS 119, e2120481119 (2022). DOI: 10.1073/pnas.2120481119. Bias toward the mean and reduction of the world to stereotypes in generative models.

13.

Environmental Justice Atlas (EJAtlas). Environmental conflicts linked to resource extraction for technology. ejatlas.org.

14.

LAION-5B dataset (Large-scale Artificial Intelligence Open Network, 2022). Foundation for major generative image models. Subsequent audits documented representation biases and unverified copyrighted material.

15.

Nick Land, Fanged Noumena (Urbanomic/Sequence, 2011) and The Dark Enlightenment (online essay, 2012). Accelerationism as the extreme articulation of the dominant logic. Reference for 'The dark mirror' section. For the critical analysis: Benjamin Noys, Malign Velocities: Accelerationism and Capitalism (Zero Books, 2014). For the left-wing variant: Nick Srnicek and Alex Williams, Inventing the Future: Postcapitalism and a World Without Work (Verso, 2015).

Chapter 5 — The new designer

1.

Victor Turner, The Ritual Process: Structure and Anti-Structure (Aldine, 1969). The concept of liminality: the threshold state, neither inside nor outside, where habitual categories dissolve and something new becomes possible. Foundation for the concept of the 'liminal designer.'

2.

Peter Berger and Thomas Luckmann, The Social Construction of Reality: A Treatise in the Sociology of Knowledge (Doubleday, 1966). The sociology of knowledge as a framework for understanding how conceptual frames are constructed and naturalized.

3.

Richard Sennett, *The Craftsman*. [→ First appearance in Ch. 2, note 1. Here the distinction between imposing and dialogic work is revisited, applied to the designer as host.]

4.

Byung-Chul Han, The Burnout Society. [→ First appearance in Ch. 3, note 4. Here applied to the concept of 'new desire' and the society of positivity.]

5.

Ivan Illich, Tools for Conviviality (1973). 'Freedom does not consist in possessing more, but in needing less.' [→ First full appearance in Ch. 4, note 5. Here applied to the concept of sufficiency as a form of desire.]

6.

Donna Haraway, *Staying with the Trouble*: Making Kin in the Chthulucene (Duke UP, 2016). ‘Staying with the trouble,’ tentacular thinking, odd kinship. See also: Simians, Cyborgs, and Women (Routledge, 1991) and The Companion Species Manifesto (Prickly Paradigm, 2003).

7.

Donella Meadows, Thinking in Systems: A Primer (Chelsea Green, 2008). ‘Leverage Points: Places to Intervene in a System’ (Whole Earth, 1999). Systems thinking and leverage points.

8.

Venkatesh et al., CREA system. [→ First appearance in Ch. 4, note 4.]

9.

On the reconfiguration of the professional role in the face of AI, see Javier Rico Sesé, El Diseño en la Era de la Inteligencia Artificial (Experimenta, 2024), focused on authorship and algorithmic co-creation, and Eugenia Martínez Barbazza, Diseñando al Diseñador (Experimenta, 2025), on the contemporary designer’s professional trajectory. Both works address how tools and the professional are changing; this chapter is concerned with what for.

10.

Timothy Morton, *Hyperobjects: Philosophy and Ecology after the End of the World* (Minnesota UP, 2013). Hyperobjects: entities so vast and distributed in time and space that we cannot see them whole. In ‘The system as legacy’ the concept is applied to the industrial design system as a hyperobject: the designer can never see the totality of the system they configure. [→ Cross-reference in Epilogue, note 1]

Chapter 6 — Toward conscious design

1.

William McDonough and Michael Braungart, *Cradle to Cradle*. [→ First appearance and main development in Ch. 2, note 5. Here the sufficiency/circularity dual filter is revisited.]

2.

Navi Radjou and Jaideep Prabhu, Frugal Innovation: How to Do More with Less (Profile Books, 2015). Frugal innovation as a system: doing more with less for more people. The Relative Importance Index (RII).

3.

R. Buckminster Fuller, Operating Manual for Spaceship Earth (Southern Illinois UP, 1969). ‘Ephemeralization’: achieving more function with less matter.

4.

E.F. Schumacher, Small Is Beautiful: Economics as if People Mattered (Blond & Briggs, 1973). Appropriate technology: at the user’s scale, maintainable, repairable.

5.

Victor Papanek, *Design for the Real World*. [→ First appearance in Ch. 2, note 2. Here Papanek’s test is revisited: ‘Does the world really need this object?’]

6.

Ivan Illich, *Tools for Conviviality*. [→ First appearance in Ch. 4, note 5. Here applied to publication thresholds and the principle of non-use.]

7.

Pareto principle: Vilfredo Pareto (1906), applied to management by Joseph M. Juran (1940s). The last 20% of refinement consumes 80% of the effort.

8.

Shibui (渋い): a Japanese aesthetic concept of austere and subtle beauty, revealed over time and through use, without ostentation.

9.

On the ‘criteria passport’ vs. the EU’s regulatory Digital Product Passport. The regulatory DPP is conceived as a traceability and compliance instrument: a standardized medium for reporting product information (composition, origin, repairability, recyclability, impacts) for verification purposes throughout the life cycle. It usually arrives at the end of the process—when the design is already finalized—to document what has already been done. In this book, ‘materials passport’ designates a criteria passport: a design entry condition, not a retrospective report. The difference is not semantic; it is temporal and causal. The regulatory passport describes; the criteria passport governs. The former asks ‘What is this made of?’; the latter requires deciding ‘What must be able to happen to this at end of life?’ before choosing material, architecture, or process.

9b.

The question ‘What disappears from the world if this exists?’ appears at six points in the manuscript, serving a different function each time: Ch. 1 (The wrong dashboard), Ch. 2

(Before Control+Z), Ch. 4 (What the machine inherits), Ch. 5 (What is scarce is purpose), Ch. 6 (Existence criteria), Epilogue (The question that remains).

10.

Epilogue — The beginning of another question

1.

Timothy Morton, *Hyperobjects* (2013). [→ First appearance and main development in Ch. 5, note 10. In the Epilogue, the concept frames the final question: we cannot see all the consequences of every decision, but we can choose not to ignore the question.]

Cross-reference map by author

Authors appearing in more than one chapter.

McDonough & Braungart (*Cradle to Cradle*)

Main development → Ch. 2, note 5 | Cross-reference → Ch. 6, note 1

Illich (*Tools for Conviviality*)

Main development → Ch. 4, note 5 | Cross-references → Ch. 5, note 5 | Ch. 6, note 6

Papanek (*Design for the Real World*)

First appearance → Ch. 2, note 2 | Cross-references → Ch. 5 | Ch. 6, note 5

Sennett (*The Craftsman*)

First appearance → Ch. 2, note 1 | Cross-reference → Ch. 5, note 3

Han (The Burnout Society)

First appearance → Ch. 3, note 4 | Cross-reference → Ch. 5, note 4

Hui (cosmotechnics)

First appearance → Ch. 2, note 3 | Cross-reference → Ch. 4, note 2

Venkatesh et al. (CREA system)

First appearance → Ch. 4, note 4 | Cross-reference → Ch. 5, note 8

Leroy (attention residue)

First appearance as footnote (FN-2) | Development in Ch. 3, note 1b | Reference in Annotated Bibliography

Bibliography — Annotated bibliography

The works that have nourished this book's argument.

This bibliography does not aim to be exhaustive. It collects the works that have nourished this book's argument: its diagnosis, its tools, its frames of reference. The annotations explain why each work matters in this specific context and not in the abstract. References marked with ✦ are those the author considers essential reading for anyone wishing to go deeper.

Cultural criticism and capitalist realism

✦ **Fisher, Mark** — *Capitalist Realism: Is There No Alternative?* (Zero Books, 2009)

The book that names the background condition: the difficulty of imagining alternatives to the capitalist system, even when its consequences are evident. The famous line — *'it is easier to imagine the end of the world than the end of capitalism'—summarizes the paralysis that design experiences when trying to break free of the commercial calendar without an alternative framework. Brief, dense, urgent.*

→ Cited in Ch. 3 (The choreography of applause, note 10)

Fisher, Mark — *Ghosts of My Life: Writings on Depression, Hauntology and Lost Futures* (Zero Books, 2014)

Hauntology as a framework for understanding why design produces 'novelty' that is, in truth, repetition of what has already been seen: futures haunted by their own absence. Necessary cultural context for the critique of superficial innovation.

→ Cited in Ch. 3 (The choreography of applause)

Reynolds, Simon — *Retromania: Pop Culture's Addiction to Its Own Past* (Faber & Faber, 2011)

A diagnosis parallel to Fisher's, from the perspective of music criticism: a culture addicted to its own past, unable to generate genuinely new forms. Useful for its empiricism: it documents the phenomenon with concrete examples before abstracting it.

→ Cited in Ch. 3 (The choreography of applause)

Han, Byung-Chul — *The Burnout Society* (Herder, 2012)

The most precise analysis of contemporary psychic exhaustion: we are no longer exploited by an external overseer — *we exploit ourselves. The 'society of positivity'—everything is possible, everything invites more—does not produce satisfaction but disorientation and fatigue. Essential for understanding attentional health as a metric.*

→ Cited in Ch. 3 (The invisible residue), Ch. 5 (The new desire)

Berardi, Franco 'Bifo' — *The Soul at Work: From Alienation to Autonomy (Semiotext(e), 2009)*

Semiotic exhaustion: the saturation of signs that no longer mean anything. An economy that has colonized the soul and produces fatigue as an inevitable byproduct. Connects directly with the concept of cultural residue and the burnout epidemic in creative disciplines.

→ Cited in Ch. 3 (The invisible residue)

Land, Nick — *Fanged Noumena* (Urbanomic/Sequence, 2011) / The Dark Enlightenment (online essay, 2012)

Included as a dark mirror: the most honest articulation of what many practice without admitting. Accelerationism without the humanist wrapping. Useful for naming the underlying logic of 'move fast and break things.' See also: Benjamin Noys, Malign Velocities (Zero Books, 2014), for the critical analysis of accelerationism.

→ Cited in Ch. 4 (The dark mirror)

Philosophy of technology

✦ **Illich, Ivan** — *Tools for Conviviality* (Harper & Row, 1973)

The concept of the threshold of counterproductivity — *the point where a tool stops amplifying and begins to dominate—is one of the most useful ideas for thinking about the relationship with generative AI. Illich's 'convivial tools' (which amplify without creating dependency, which allow for non-use) are the normative model this book adopts.*

→ Cited in Ch. 4 (From use to agreement), Ch. 6 (Publication thresholds)

Illich, Ivan — *Medical Nemesis* (Barral, 1975)

The same threshold argument applied to medicine: when the entirety of life is medicalized, medicine stops curing and starts creating patients. Useful as a complementary analogy.

→ Contextual reference, Ch. 4

✦ **Hui, Yuk** — *Recursivity and Contingency* (Rowman & Littlefield, 2019) / On the Existence of Digital Objects (University of Minnesota Press, 2016)

The concept of 'cosmotechnics' — *each culture develops its own relationship with technology; there is no universal technology—is a fundamental conceptual tool for understanding the biases of AI systems trained on Western diets. Hui offers a rigorous philosophical framework for the critique of ontological colonialism.*

→ Cited in Ch. 2 (The colonial inheritance), Ch. 4 (What the machine inherits)

Bostrom, Nick — *Superintelligence: Paths, Dangers, Strategies* (Oxford UP, 2014)

The alignment problem and the ‘paperclip maximizer’ as an illustration of dangerous literalism: a system that optimizes exactly what you ask for, even when you asked wrong. Useful as a starting point for the discussion on default values.

→ Cited in Ch. 4 (What the machine inherits)

Critical design and material ethics

✦ **Papanek, Victor** — *Design for the Real World* (Pantheon Books, 1971)

The book that opened the ethical breach. Papanek denounced design in the service of obsolescence and the manufacture of artificial needs. It cost him marginalization; time has proven him right. Required reading for sustaining the existence criteria.

→ Cited in Ch. 2 (The industrial promise), Ch. 5 (The liminal designer), Ch. 6 (Existence criteria)

Rams, Dieter — *Less and More* (Die Gestalten, 2011)

The ten principles of good design — *especially honesty, durability, and ‘as little design as possible’—as a direct antecedent of sufficiency and the existence criteria. Austerity as the highest ambition.*

→ Contextual reference, Ch. 2 and Ch. 5

Sennett, Richard — *The Craftsman* (Yale UP, 2008)

‘Tacit knowledge’ and the distinction between imposing work (forcing the material) and dialogic work (listening to the material). Friction as a generative filter; craftsmanship as ethics.

→ Cited in Ch. 2 (Before Control+Z), Ch. 5 (Making room)

✦ **Escobar, Arturo** — *Designs for the Pluriverse* (Duke UP, 2018)

‘Ontological colonialism’ — *the imposition of one way of being and dwelling in the world as if it were the only one possible—and ‘design for the pluriverse’ as an alternative. Escobar proposes a design that recognizes multiple worlds rather than flattening them. An essential framework for understanding the colonial inheritance of industrial design.*

→ Cited in Ch. 2 (The colonial inheritance)

Bennett, Jane — *Vibrant Matter: A Political Ecology of Things* (Duke UP, 2010)

The ‘vitality of matter’: materials are not passive; they have their own tendencies, resistances, and ways of acting in the world. This framework changes the relationship with materials and reinforces the concept of material health.

→ Cited in Ch. 3 (Building the new dashboard)

✦ **McDonough, William and Braungart, Michael** — *Cradle to Cradle: Remaking the Way We Make Things* (North Point Press, 2002)

The two-cycle framework — *biological and technical—is the operational basis of the circularity concept used in this book. The clearest formulation of the linear design problem: 'cradle to grave' versus 'cradle to cradle.' Practical and foundational.*

→ Main development in Ch. 2 (From line to loop). Cross-reference

in Ch. 6 (Sufficiency and circularity)

Foster, John Bellamy — *Marx's Ecology: Materialism and Nature* (Monthly Review Press, 2000)

Origin of the concept of 'metabolic rift': the structural disconnect between what the capitalist system extracts from nature and what it returns. In the manuscript it is applied to linear design as an extension of the same mechanism: every product that fails to close its cycle widens the rift.

→ Cited in Ch. 2 (From line to loop)

Radjou, Navi and Prabhu, Jaideep — *Frugal Innovation: How to Do More with Less* (Profile Books, 2015)

Frugal innovation as a system: doing more with less for more people. The Relative Importance Index (RII) ranks the attributes a product must have; it is the empirical tool that supports the idea that sufficiency and beauty are not incompatible.

→ Cited in Ch. 6 (The method of sufficiency, The aesthetics of sufficiency)

Fuller, R. Buckminster — *Operating Manual for Spaceship Earth* (Southern Illinois UP, 1969)

'Ephemeralization' — *achieving more function with less matter—as a form of evolution of material intelligence. Fuller precedes the entire tradition of frugal and circular design. His optimism is rooted in design as a discipline of sufficiency, not of abundance.*

→ Cited in Ch. 6 (The method of sufficiency)

Schumacher, E.F. — *Small Is Beautiful: Economics as if People Mattered* (Blond & Briggs, 1973)

Appropriate technology: not the most powerful, but the one that is at the user's scale. The one that can be maintained, repaired, understood. A direct antecedent of Illich's convivial tools and Radjou's sufficiency.

→ Cited in Ch. 6 (The method of sufficiency)

Frazer, John — *An Evolutionary Architecture* (Architectural Association, 1995)

The foundational work that anticipated what we now call computational design: form as the result of evolutionary processes, not as the designer's imposition. Frazer developed generative systems in the 1990s when the concept had neither name nor market. A necessary historical reference for understanding that the 'epistemological leap' of computational design has been decades in the making.

→ Cited in Ch. 2 (Software as operating system)

Schumacher, Patrick — *'Parametricism: A New Global Style for Architecture and Urban Design' / The Autopoiesis of Architecture (Vol. 1–2)* (Architectural Design, 2009 / Wiley, 2010–2012)

Included as a positional reference, not an endorsement. Schumacher articulated something real: that computation is not a tool for design but its new ontological paradigm. His mistake was confusing formal complexity with systemic complexity. His insight was seeing, before almost anyone else, that the designer no longer draws: they define conditions. For a critical reading: Daniel Davis, 'Patrik Schumacher — *Parametricism' (danieldavis.com, 2010).*

→ Cited in Ch. 2 (Software as operating system)

Political ecology and the Anthropocene

✦ **Saito, Kohei** — *Marx in the Anthropocene* (Cambridge UP, 2022)

The ecological reading of Marx: capitalism has a structural metabolic problem — *it extracts more than it returns. The solution is not to optimize growth but to question it as an objective. Saito provides the political-economic framework for the 'progress = health' proposal.*

→ Cited in Ch. 3 (Progress = Health)

Latouche, Serge — *Farewell to Growth* (Polity, 2009)

The image of the snail — *which knows when to stop growing because it has reached sufficiency—is one of the most useful images in the book. Latouche does not propose regression but intelligence: questioning the automatic equivalence between 'more' and 'better.' Degrowth as maturity, not deprivation.*

→ Cited in Ch. 3 (Progress = Health)

✦ **Haraway, Donna** — *Staying with the Trouble: Making Kin in the Chthulucene* (Duke UP, 2016)

'Staying with the trouble': the most radical proposal against the two easy escapes (techno-optimism and apocalypticism). Tentacular thinking — *knowing through contact, not through domination—and expanded 'making kin' (with materials, with users, with future generations, with the non-human) are frameworks that transform the designer's role. Difficult but necessary.*

→ Cited in Ch. 5 (The designer who does not flee from complexity)

✦ **Morton, Timothy** — *Hyperobjects: Philosophy and Ecology after the End of the World* (Minnesota UP, 2013)

Hyperobjects — *entities so vast and distributed that we cannot see them whole. A framework for understanding the impossibility of calculating all the consequences of every decision. We cannot see the complete system, but we can ask the question.*

→ Cited in Epilogue (The question that remains)

Future, AI, and design governance

✦ **Billingsley, W.** — *'The Practical Epistemologies of Design and Artificial Intelligence'* (Science & Education, 34, 807–824, 2024. DOI: 10.1007/s11191-024-00517-z)

Articulates with precision the epistemological gap between the type of knowledge AI produces (optimization over data) and the type design requires (judgment, negotiation between values, tolerance for ambiguity). It is not an anti-AI argument; it is a map of its current limits.

→ Cited in Ch. 4 (The epistemological gap)

Venkatesh, K., Dunlop, C. and Yanardag, P. — *'CREA: A collaborative multi-agent framework for creative content generation with diffusion models' (arXiv:2504.05306, 2025)*

The research underpinning the concept of 'agent teams': multiple specialized agents in dialogue generate ideas that none would produce alone. It models creativity as dialogue, not optimization. The technical foundation for the concept of conscious orchestration.

→ Cited in Ch. 4 (Agent teams), cross-reference Ch. 5

Meincke, L., Nave, G. and Terwiesch, C. — *'ChatGPT decreases idea diversity in brainstorming'* (Nature Human Behaviour, 9, 1107–1109, 2025. DOI: 10.1038/s41562-025-02173-x)

Empirical evidence of collective diversity collapse when AI is used in brainstorming: individual ideas may improve, but the variety of the set diminishes. A relevant finding for a discipline that needs to explore the unexpected.

→ Cited in Ch. 4 (The epistemological gap)

Kosmyna, N. et al. — *'Your Brain on ChatGPT: Accumulation of cognitive debt when using an AI assistant for essay writing task' (arXiv:2506.08872, 2025. DOI: 10.48550/arXiv.2506.08872)*

The concept of ‘cognitive debt’: the gradual erosion of capacities the brain stops exercising when it delegates complex processes to assistants. An important finding for evaluating the cognitive cost of uncritical adoption of generative tools.

→ Cited in Ch. 4 (The epistemological gap)

Gerlich, M. — *‘AI Tools in Society: Impacts on Cognitive Offloading and the Future of Critical Thinking’* (Societies, 15, 6, 2025. DOI: 10.3390/soc15010006)

A negative correlation between habitual use of AI assistants and independent critical thinking ability.

→ Cited in Ch. 4 (The epistemological gap)

Leroy, Sophie — *‘Why Is It So Hard to Do My Work? The Challenge of Attention Residue when Switching Between Work Tasks’* (Organizational Behavior and Human Decision Processes, 109, 168–181, 2009)

Origin of the concept of ‘attention residue’: the attention that remains anchored in a previous task when moving to the next. In the manuscript it is used in an expanded sense applied to product design: the attentional residue accumulated in the user as a sustained burden.

→ Cited in Ch. 3 (The invisible residue)

Luccioni, A. et al. — *‘Power Hungry Processing: Watts driving the cost of AI deployment?’* (ACM FAccT 2024. DOI: 10.1145/3630106.3658542 / preprint arXiv:2311.16863)

Data on the real energy cost of generative systems: the order-of-magnitude difference between discriminative and generative tasks. Empirical foundation for including AI’s environmental cost in the dashboard.

→ Cited in Ch. 4 (Intelligence as a design object)

Li, Pengfei; Yang, Jianyi; Islam, M. A.; Ren, Shaolei — *‘Making AI Less ’Thirsty’: Uncovering and Addressing the Secret Water Footprint of AI Models’ (arXiv:2304.03271, 2023)*

Projected water consumption associated with global AI demand by 2027 in the range of 4.2–6.6 billion m^3. Turns the water cost from something abstract into something concrete.

→ Cited in Ch. 4 (Intelligence as a design object)

Deng, J. et al. — *‘ImageNet: A large-scale hierarchical image database’* (CVPR 2009)

The dataset that revolutionized computer vision. Useful for visualizing the invisible labor (large-scale annotation) behind model performance.

→ Cited in Ch. 4 (What the machine inherits)

Nightingale, S. et al. — *'AI-synthesized faces are indistinguishable from real faces and more trustworthy'* (PNAS 119, e2120481119, 2022. DOI: 10.1073/pnas.2120481119)

Empirical evidence that generative models reduce the world to stereotypes when their diet is not plural. Reinforces the argument about inherited biases and the need to broaden the systems' diet.

→ Cited in Ch. 4 (What the machine inherits)

✦ **Meadows, Donella** — *Thinking in Systems: A Primer* (Chelsea Green, 2008)

The most accessible and comprehensive reference for systems thinking. 'Leverage points' — *the places where a small intervention can produce large changes—are the intuitive basis of the concept of the designer as systems architect.*

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Structural reference: helps sustain a clear progression (threshold → dashboard → criteria) and the use of driving questions. Cited as a formal and architectural influence on the manuscript, not as an original source for pre-existing concepts (e.g., the metabolic rift).

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