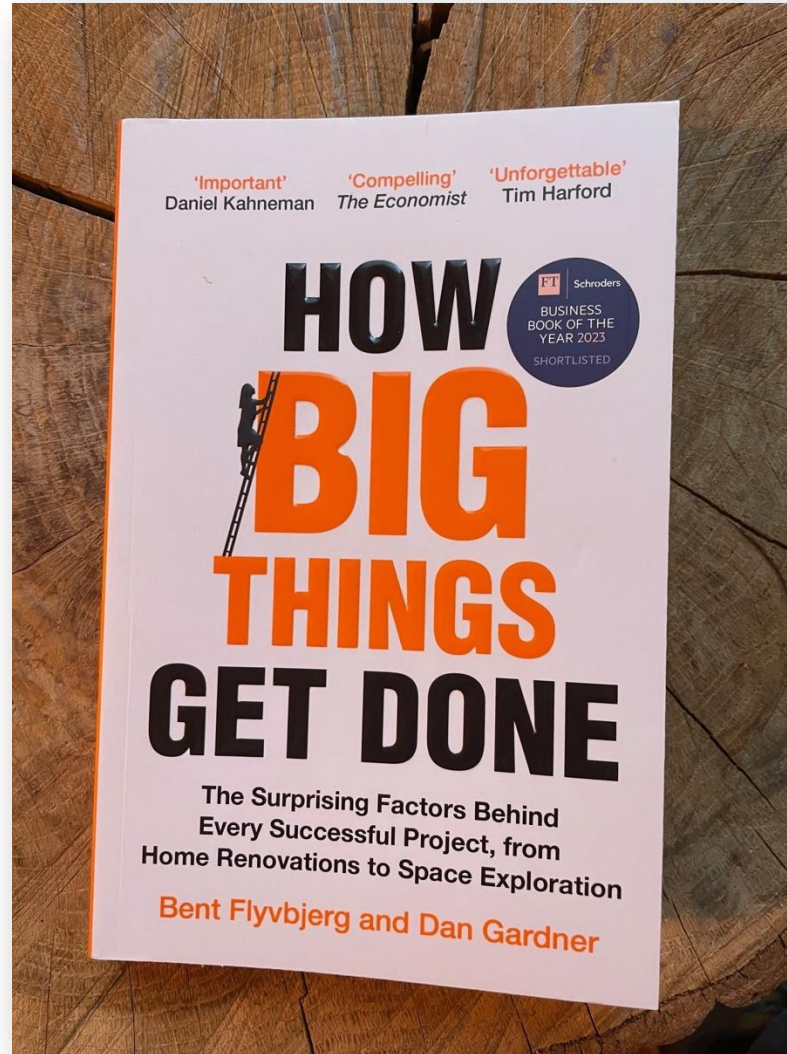


# Summary

Revision 1.0  
02 February 2025



A Conversation with  
**Professor Bent Flyvbjerg**,  
*the World's Leading  
Megaproject Expert on  
How Big Things Get Done.*

Interviewed by Vikas Shah MBE, @MrVikas  
<https://thoughteconomics.com>



- Focus on **Megaprojects** – very big projects – and lots of things about that category are special.
- What are the **drivers** for **project failure** and **drivers** for **project success** that are universal?
- The author of the book is specialized in big projects, which are big by anyone’s standards.
- Though, big is relative in this case! It’s about “a big thing” (a kitchen renovation in your house may also be a “big” project for you).
  - ✓ Meaning a project that is considered big, complex, ambitious and risky.
- Drivers (for projects in all scales):
  1. Psychology: involved people in projects think, make judgement and make decisions.
  2. Power: there are competition and jockeying in projects, so there is power.
- With universal drivers at work, we can expect there to be patterns in how projects of all types unfold. Two patterns recognized by the author:
  1. **Think fast, act slow**: a hallmark (“kenmerk”) of failed projects.
  2. **Think slow, act fast**: successful projects tend to follow this pattern.

# 1) Think slow, act fast

*The record of big projects is even worse than it seems.  
But there is a solution: speed up by slowing down.*



- Megaproject management: to find “honest numbers” is not as simple as it should be in theory to judge such projects. In practise it is everything but.
- On every big project, there are blizzards of numbers generated at different stages by different people. Finding the right ones – those that are valid and reliable – takes skills and work.
- And it doesn’t help that big projects involve money, reputations and politics.
- Those who have much to lose will spin the numbers, so you cannot trust the. That’s not fraud. Or rather, it is not usually fraud: it’s human nature.
- And with so many numbers to choose from, spinning is a lot easier than finding the truth.
- Projects are promised to be completed by a certain time, at a certain cost with certain benefits produced as a result – benefits being things as revenues, savings, passengers moved, megawatts of electricity generated, etc.
- How often do projects deliver as promised?

# 1) Think slow, act fast

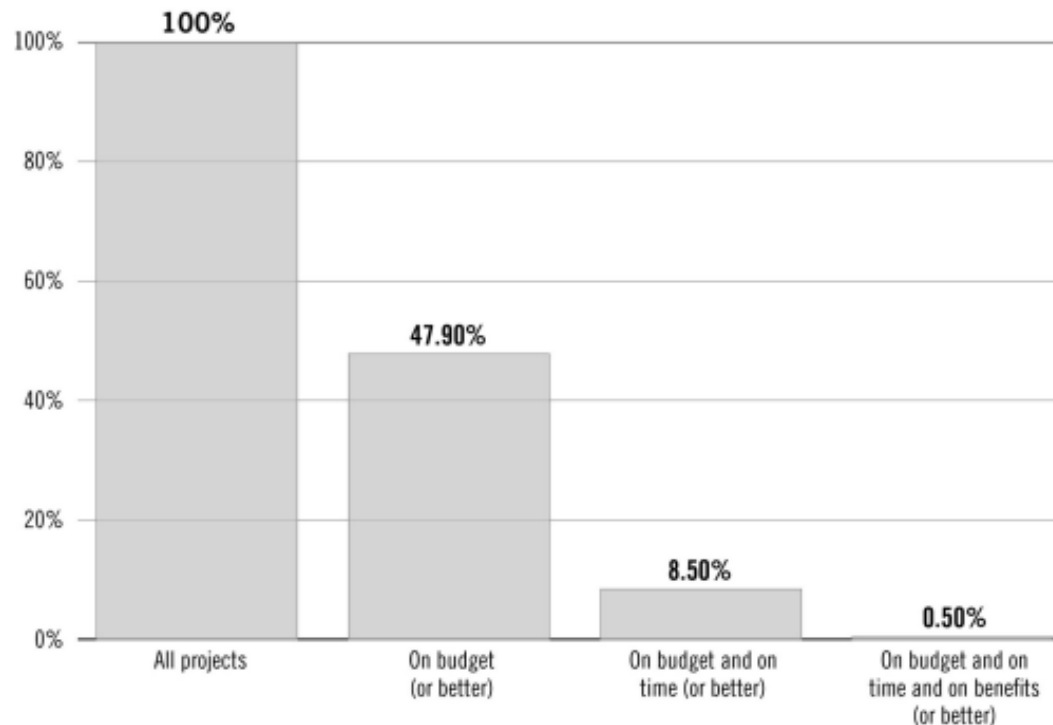
The record of big projects is even worse than it seems. But there is a solution: speed up by slowing down.



Graphically, the Iron Law looks like this:

THE IRON LAW OF PROJECT MANAGEMENT:

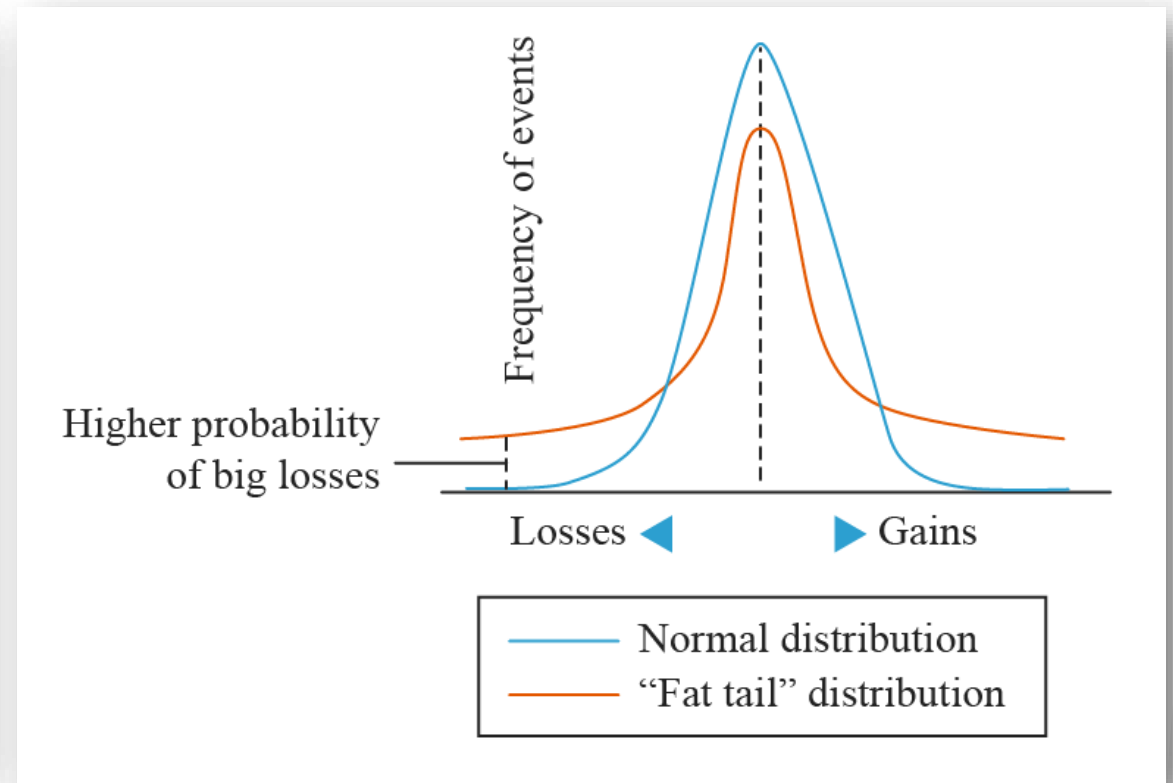
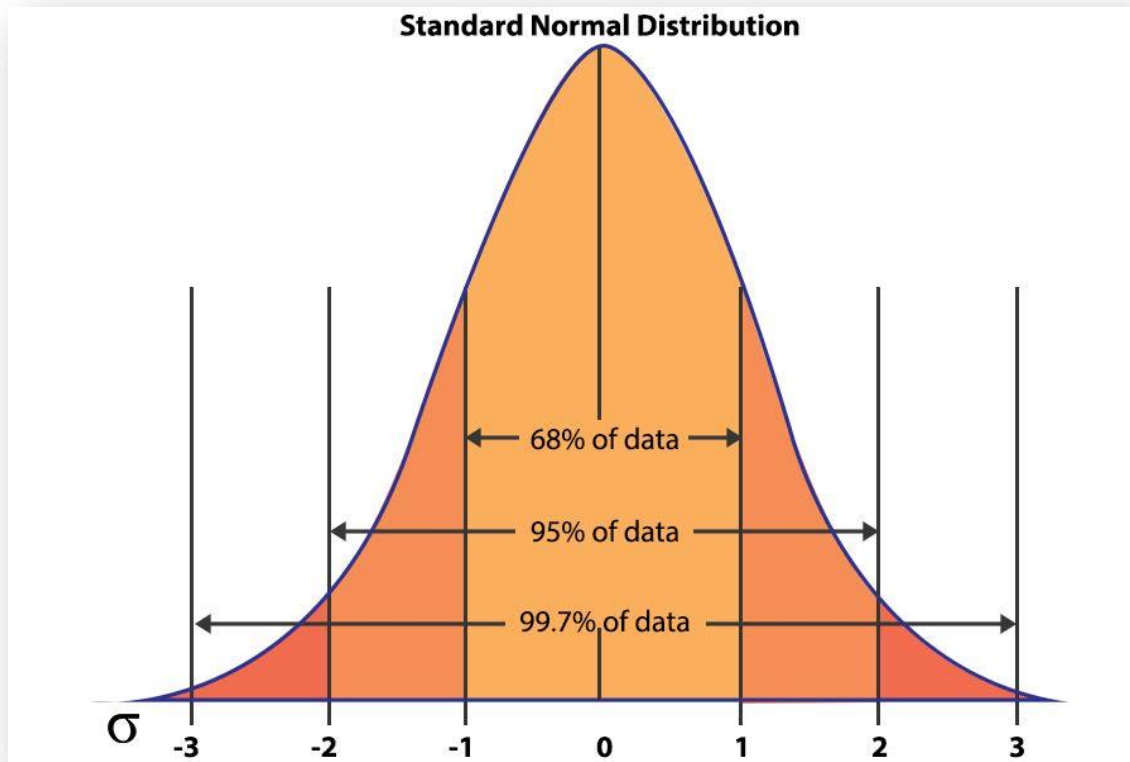
*"Over Budget, Over Time, Under Benefits, Over and Over Again"*



Results are not limited to any country or region; the same patterns are valid all over the world.

Based on database that contains more than 16,000 projects, from 20+ different fields in 136 countries!

- Are the project results distributed as “normal distribution”?
  - ✓ For example: IT Project results have truly “fat-tail” distribution: 18% of projects do have cost overruns of 50%, and for those projects the average overrun is 447 % (that is the average in the tail).
- Most project outcomes have **fat-tails**, see next slide (Appendix A of book).
- A few project types do **not** have fat tails. See last chapter: projects with **modular construction**.



- With normal distributions of project results, the change that project results become very bad is relatively low. The more predictable and reliable projects are, the more the outcome will be normal distributed.
- For example, building a standard kitchen for a company that has built already many comparable kitchens.
- When project results are very unpredictable and uncontrolled, the project outcomes are fat-tailed distributed and the change for very bad outcome is much higher than for normal distributed.
  
- We are deeply optimistic species. That makes us an overconfident species.
  - ✓ They are useful for us!
- But when we are in a plane, and we hear the pilot say “I’m optimistic about the fuel situation” get off immediately, because this is neither the place nor the time for optimism. You want a hard-nosed analysis from the pilot, that sees reality as clearly as possible.
- The same holds for optimism about budgets and schedules for big projects, what are their “fuel readings”
- Unchecked, optimism leads to unrealistic forecasts, poorly defined goals, better options ignored, problems not spotted and dealt with, and no contingencies to counteract the inevitable surprise. Optimism routinely displaces hard-nosed analysis in big projects, as in so much else people do.

## How Big Projects Performed

Source: Flyvbjerg Database

Project type	Mean cost overrun (%)	Projects (A) with $\geq 50\%$ overruns (%)	Mean overruns of A projects (%)
Nuclear storage	238	48	427
Olympic Games	157	76	200
Nuclear power	120	55	204
Hydroelectric dams	75	37	186
IT	73	18	447
Nonhydroelectric dams	71	33	202
Buildings	62	39	206
Aerospace	60	42	119
Defence	53	21	253
Bus rapid transit	40	43	69
Rail	39	28	116
Airports	39	43	88
Tunnels	37	28	103
Oil and gas	34	19	121
Ports	32	17	183
Hospitals, health	29	13	167
Mining	27	17	129
Bridges	26	21	107
Water	20	13	124
Fossil thermal power	16	14	109
Roads	16	11	102
Pipelines	14	9	110
Wind power	13	7	97
Energy transmission	8	4	166
Solar power	1	2	50

Only 8.5% of projects in the Oxford database met cost and schedule targets while just 0.5% satisfied benefit goals as well. Projects with modular construction performed best.

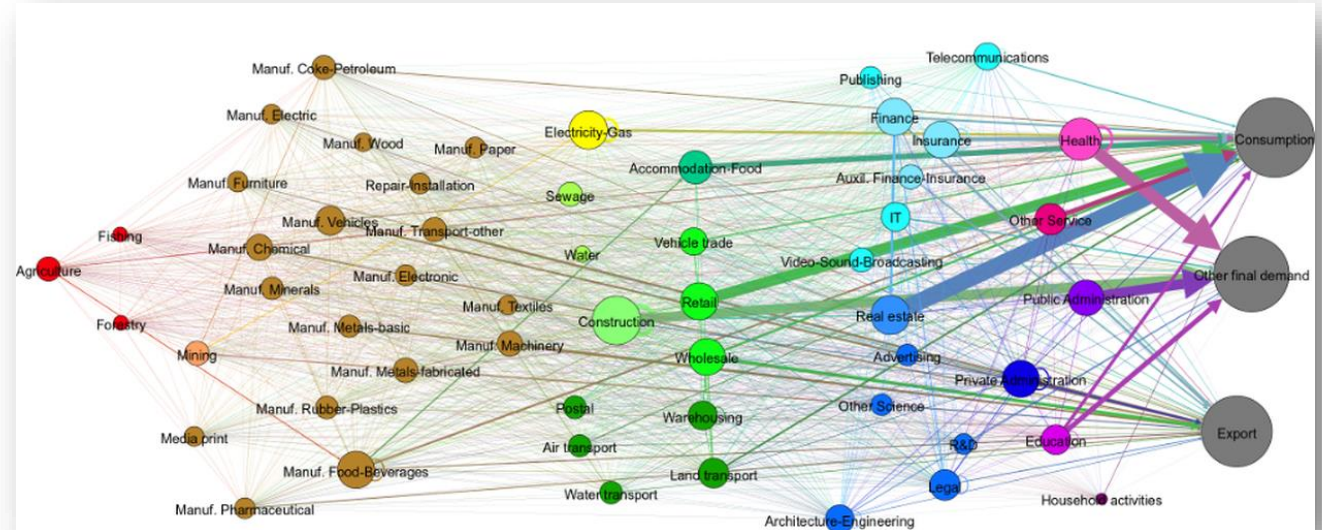


Conclusion: most big projects are not merely (“louter”) at risk not delivering as promised. Nor are they only at risk of going seriously wrong. They are at risk of going disastrously wrong because their risk is fat tailed.

**Fat tailed** does mean that for example outcome overruns of several hundred percentages do occur (budget or timing or...). Examples of budget overruns of nearby 1.000 % are even known of very big projects with enormous budgets,

Nassim Nicholas Taleb famously dubbed low-probability, high consequence events as “**black swans**”.  
Disastrous project outcomes such as these can end careers, sink companies, and inflict a variety of other carnage (“bloodbad”). They definitely qualify as “black swans.”

- Data shows that smaller projects outcomes are also fat-tailed.
- Moreover, fat tailed distributions are typical within complex systems!
- Complex systems are increasingly interdependent systems.
- If a project is ambitious and depends on other people and many parts, it is all but certain that your project is embedded in a complex system.



- The duration of a project: compare as an open window. The longer the duration, the more open the window, the more opportunity for something to crash through and cause trouble, including a big black swan.
- What could that black swan be? Almost anything with low probability but high consequence.
- The more time that passes from the decision to do a project to its delivery, the greater the probability it will happen.
- Growing complexity and interdependency – with possibility for non-linear response and amplifications – make such probability more likely.
- Solution? Close the window! It cannot be closed completely of course. Shorten the duration of a project! Speed it up and/or make the project smaller and reduce risk for “black swans”.
  - ✓ In sum, keep it short!
  - ✓ Drive and ambition are key to speed up.
  - ✓ Also, haste makes waste! (“haastige spoed, is zelden goed”).
- To get a project done as quickly as possible, think of a project as being divided in 2 phases: first planning (preparation), second delivery.
  - ✓ Think first, then do! (“’n goeie voorbereiding is het halve werk”). *Think slow, act fast!*
- Planning is relative cheap, delivery is relative expensive (serious money is spent and the project becomes more vulnerable as a consequence in that delivery phase).
- Projects don’t go wrong, they start wrong.

## 2) The commitment fallacy

*If "Think slow, act fast" is the wise approach to big projects, why do so many people do the exact opposite? Because they rush to commit. You do need to commit. But not in the way you think*



- Purposes and goals are not carefully considered. Alternatives are not explored. Difficulties and risks are not investigated. Solutions are not found. Instead, shallow analysis is followed by quick lock-in to a decision that sweeps aside all the other forms the project should take.
- That lock-in for decision may even occur, for most organisations and persons the case, at a point they even past the point where they put themselves at more cost or risk than they would have accepted at the start of the project. This is followed by action.
  - ✓ The author call such premature lock-in the "commitment fallacy" (fallacy means in Dutch: "dwaling, bedrog, bedrieglijkheid, misvatting").
  - ✓ It is a behavioural bias on par with the other biases identified by behavioural science.

What is commitment fallacy?

We have **an instinctual desire to remain consistent with our prior actions and beliefs.**

This can lead us to behave in irrational ways. Here's how the commitment and consistency fallacy can lead us to do things that aren't always in our best interest.

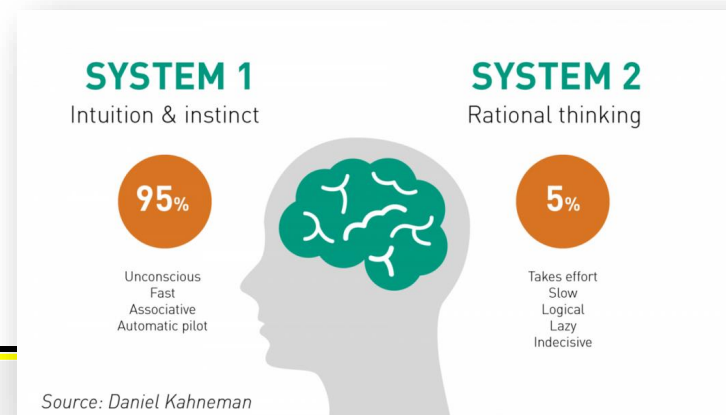
➤ Why do we often fail to carefully think through with big decisions or big projects:

1. The author calls it “strategic misrepresentation”, the tendency to deliberately (“met opzet”) and systematically distort or misstate information for strategic purposes.
  - ❖ Example: If you want to win a contract or get a project approved, superficial planning is handy because it glosses over major challenges, which keeps the estimated costs and time down, which wins contracts and gets projects approved. But as certain as the law of gravity, challenges ignored during planning will eventually boomerang back as delays and cost overruns during delivery. By then the project will be too far along to turn back. Getting to that point of no return is the real goal of “strategic misrepresentations”. It is politics, resulting in failure by design
  
2. Psychology: as projects get bigger and decisions more consequential, the influence of money and power grows. Powerful individuals and organizations make the decision, the number of stakeholders increases, they lobby of their specific interest, and the name of the game is politics. And the balance shifts from psychology to “strategic misrepresentations”.
  - ❖ That said, the common denominator of any projects is that people are making decisions about it.
  - ❖ And wherever there are people, there are psychology and power.

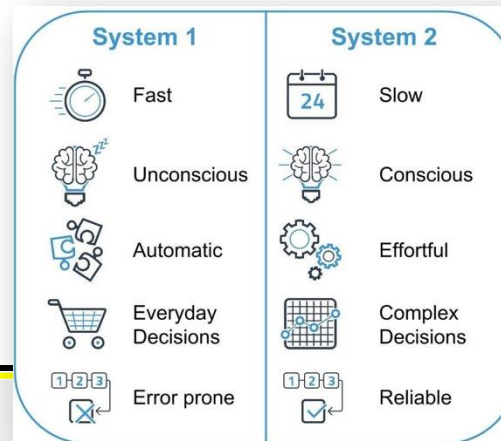
Strategic misrepresentation occurs when individuals or organizations intentionally exaggerate their abilities, achievements, or projections to appear more attractive to stakeholders. 6 jan 2025



- One of the basic insights in modern psychology is that quick and intuitive “snap judgments” are the default operating system of human decision making – “System one”. Conscious reasoning is a different system – “System two”.
- A key difference between “System One” and “System Two” is speed. System One is fast, System 2 is slow; it can get involved only after System One delivers. Both systems may be right or wrong.
  - ✓ To generate snap judgment, the brain can't be overly demanding about information.
  - ✓ Instead, it proceeds on the basis of “WYSIATI” (according Kahneman, What You See Is All There Is), meaning judgment, assumption that whatever information we have on hand is all the information available to make decisions.
  - ✓ After a quick and intuitive judgment is delivered by System One, we can think about the problem slowly and carefully, if we have time, using System Two, the conscious mind and adjust the snap judgment or entirely override it.
  - ✓ But another basic insight of psychology is that when we have a strong intuitive judgment, we seldom subject it to slow and careful critical scrutiny. We just go with it, spontaneously settling for whatever System One decided.
  - ✓ We all know at least when thinking coolly that strong emotions are not necessarily logical or supported by evidence and are therefore an unreliable basis for judgment.
  - ✓ But the intuitive judgments generated by System One are not experienced as emotions. They simply “feel” true. With the truth in hand, it seems perfectly reasonable to act on it.
  - ✓ System One is “a machine for jumping to conclusions” (according Kahneman).
  - ✓ This is what makes optimism bias so potent!



- Although decision making by Systems One can fail, it's important to recognize that quick, intuitive judgment often works remarkably well. That is why it is our default.
- People ordinarily take the first option that occurs to them and quickly run it through via a mental simulation. If it seems to work, they go with that option. If it doesn't, they search for another and repeat the process. This method tends to work well for familiar decisions, especially when there is little time to make them, and it can work brilliantly when done by an expert. But in the wrong circumstances, it's a mistake.
- Typical for planning for big projects, it's not suitable for the quick and intuitive decision making that comes naturally to us. But too often we apply it anyway- because it comes naturally to us.
- If we are routinely biased towards snap judgments and unrealistic optimism and these methods fail to deliver, we will suffer.
  - Shouldn't we learn from those painful experiences?
  - We should indeed. But to do that, we must pay attention to the experience, And unfortunately, too often we don't.



### **“Planning Fallacy” (fallacy in Dutch: bedrieglijk, bedrog, dwaling, misvatting):**

- People commonly underestimate the time required to complete complex tasks, even when there is information available that suggests that estimate is unreasonable.

### **Hofstadter’s law:**

- It always takes longer than you expect, even when you take in account “Hofstadter’s Law”

### **Not in the book, added here by myself:**

#### **Parkinson’s Law:**

- "work expands so as to fill the time available for its completion",
- The number of workers within public administration, bureaucracy or officialdom tends to grow, regardless of the amount of work to be done. This was attributed mainly to two factors:
  1. that officials want subordinates, not rivals,
  2. and that officials make work for each other.

### **In Dutch (see next slide as well):**

- De wet van Parkinson is een wet, die stelt dat het werk van een taak uitdijt naar de tijd die beschikbaar is om een taak te realiseren.

## Wet van Parkinson

De **wet van Parkinson** is een wet, die stelt dat het werk van een taak uitdijt naar de tijd die beschikbaar is om een taak te realiseren: *work expands to fill the time available for its completion*.

[Cyril Northcote Parkinson](#) formuleerde deze op waarneming gebaseerde wet in 1958 in zijn boek *Parkinson's Law: The Pursuit of Progress*. Parkinson stelde vast dat de omvang van het Britse imperium afnam terwijl het ambtelijk apparaat van het Britse imperium in omvang toenam. De oorzaak hiervan was volgens Parkinson tweeledig:

1. een manager wil, in plaats van meer rivalen, meer ondergeschikten,
2. een manager creëert werk, ze houden elkaar bezig.

Parkinson nam waar dat het aantal mensen in een bureaucratie, onafhankelijk van het werkaanbod, met 5-7% per jaar toeneemt zonder dat hiervoor een logische verklaring te vinden was.

De wet van Parkinson is in algemene bewoordingen als volgt te formuleren: de vraag naar iets zal zich altijd aanpassen aan de maximale beschikbaarheid ervan.

# Planning fallacy

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The **planning fallacy** is a phenomenon in which predictions about how much time will be needed to complete a future task display an [optimism bias](#) and underestimate the time needed. This phenomenon sometimes occurs regardless of the individual's knowledge that past tasks of a similar nature have taken longer to complete than generally planned.<sup>[1][2][3]</sup> The bias affects predictions only about one's own tasks. On the other hand, when outside observers predict task completion times, they tend to exhibit a pessimistic bias, overestimating the time needed.<sup>[4][5]</sup> The planning fallacy involves estimates of task completion times more optimistic than those encountered in similar projects in the past.

The planning fallacy was first proposed by [Daniel Kahneman](#) and [Amos Tversky](#) in 1979.<sup>[6][7]</sup> In 2003, [Lovallo](#) and Kahneman proposed an expanded definition as the tendency to underestimate the time, costs, and risks of future actions and at the same time overestimate the benefits of the same actions. According to this definition, the planning fallacy results in not only time overruns, but also [cost overruns](#) and [benefit shortfalls](#).<sup>[8]</sup>

## Empirical evidence [ edit ]

### For individual tasks [ edit ]

In a 1994 study, 37 [psychology](#) students were asked to estimate how long it would take to finish their [senior theses](#). The average estimate was 33.9 days. They also estimated how long it would take "if



[Daniel Kahneman](#) who, <sup>↗</sup> along with [Amos Tversky](#), proposed the fallacy

**Planningsfout** (planning fallacy): Het onderschatten van de tijd die nodig is om een toekomstige taak te voltooien, zelfs als je weet dat soortgelijke taken in het verleden langer hebben geduurd dan gepland.



scribbr.nl

<https://www.scribbr.nl> > veel-gestelde-vragen > wat-zijn... ⋮

## Wat zijn veelvoorkomende soorten drogredenen in onderzoek?

Over samenvattingen • Feedback



Eefficiënter

<https://www.eefficiënter.nl> > overzicht-plannen > weten... ⋮

## De planning fallacy: waarom je planning steeds misloopt

25 feb 2021 — De planning fallacy (simpel vertaald: de planning denkfout) zorgt ervoor dat we slecht in kunnen schatten hoe lang een taak zal duren.

## Meer om te vragen :

Wat veroorzaakt planning fallacy?

Planning fallacy ontstaat door een aantal cognitieve vooroordelen en psychologische factoren. De belangrijkste oorzaken zijn: **Vooroordeel richting optimisme** : Mensen overschatten de waarschijnlijkheid van positieve uitkomsten en onderschatten de mogelijkheid van negatieve gebeurtenissen. Ze geloven dat hun projecten beter zullen verlopen dan ze in werkelijkheid doen. 15 aug 2024

Wat is de planning fallacy en hoe kunt u voorkomen dat u deze ernstige fout maakt?

De planning fallacy ontstaat waarschijnlijk wanneer we alleen op de inside view vertrouwen, dat wil zeggen **wanneer we externe informatie over hoe waarschijnlijk het is dat we slagen negeren en in plaats daarvan vertrouwen op onze intuïtieve gissingen over hoe kostbaar een project zal zijn** . Helaas is dit precies wat velen van ons geneigd zijn te doen.



# Leren plannen en organiseren? “Je bent te optimistisch” zegt Nobelprijswinnaar

20-04-2020 9 min.



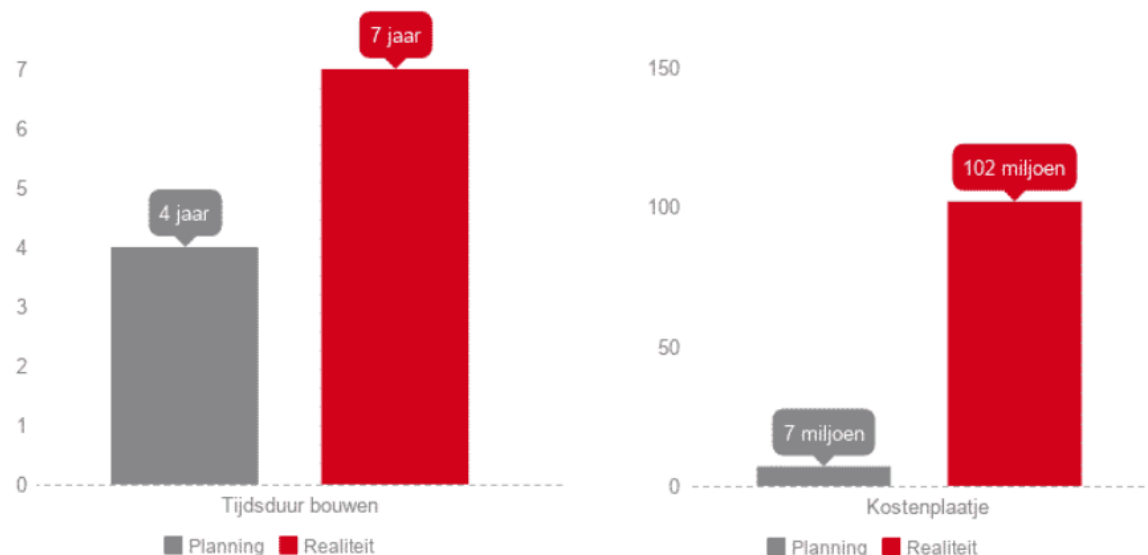
Door Björn

Jouw projecten lopen altijd uit – ongeacht wat voor planning je ook

<https://timemanagement.nl/leren-plannen-en-organiseren/>

Schokkende resultaten dus, waar volgens Kahneman niet alleen werknemers en studenten aan ten prooi vallen: ook overheidsprojecten of immense bouwplannen hebben ermee te maken.

Neem onder andere het Sydney Opera House; volgens de planning zou het in 1963 afgerond moeten zijn, kostenplaatje rond de 7 miljoen dollar. In werkelijkheid duurde het maar liefst 10 jaar *langer* dan wat men had gedacht, met een schamele 102 miljoen dollar als uiteindelijke som – toch aardig een verschil!



## ‘Planning Fallacy’ overkomen in 2 (*simpele*) stappen

We schatten onze eigen kennis en vaardigheden dus te hoog in, terwijl we tegelijkertijd geen rekening houden met onvoorziene tegenslagen of plotselinge ad hoc zaken.

Hoe voorkom je dit nu?

Je zal *realistisch* moeten zijn over je eigen vaardigheden en rekening moeten houden met onverwachte factoren, wil jij goed leren plannen en organiseren.

Volgens Kahneman doe je dit door jouw project of taak te koppelen aan twee invalshoeken: het ‘*binnenaanzicht*’ en het ‘*buitenaanzicht*’. Laten we jouw case als voorbeeld gebruiken:

### 1. Maak je referentiekader (voor het ‘*binnenaanzicht*’)

Waarschijnlijk heb je in het verleden aan een soortgelijk project gewerkt. Jij denkt te kunnen vaststellen dat dit huidige project net zo zal verlopen. Je schat daarom de tijd en uitkomsten vergelijkbaar – en vaak zelfs *beter* – in “*want deze taak is namelijk uniek en dit keer loopt het op rolletjes!*”.

30 uur uittrekken voor het project lijkt jou daarom ruimschoots voldoende.

Aangezien we volgens Kahneman kunnen aannemen dat deze voorspelling voortvloeit uit jouw optimisme, is het niet verstandig om dit als uitgangspunt te gebruiken.

Je gaat daarom jouw voorspelling baseren op een referentiekader – of zoals Kahneman de aanpak noemt: **‘Reference Class Forecasting’**.

Je kijkt hierbij naar specifieke omstandigheden en voorvallen in het *verleden*, naar werkelijke *statistieken* en legt de taak buiten jezelf: hoe lang heeft een *collega* over een soortgelijke taak gedaan?

### 2. Bedenk je **worst-case scenario** (voor het ‘*buitenaanzicht*’)

Vervolgens zul je nog rekening moeten houden met alle *onverwachte* zaken die jouw planning in de war kunnen schoppen. Aangezien jij geen glazen bol hebt waarmee je de toekomst kunt voorspellen, is dat lastig. Toch kun je een kleine poging doen:

Zodra jij een project of een grote taak plant, stel jij een lijst op. Daarop beschrijf je drie onverwachte zaken die jouw project compleet in de war zouden kunnen schoppen.

Je zou hiervoor een klein gedachtenexperiment kunnen houden:

Je bent in de toekomst. Jouw planning voor die ene taak ligt geheel aan diggelen – over het werkelijk eindresultaat wil je het niet eens hebben, zo’n gigantische flop was het. Wat is er mis gegaan?

Bijvoorbeeld:











*Jij nam het jaarrapport voor jouw rekening. Jouw intentie was om het binnen 7 dagen ‘signed, sealed and delivered’ bij jouw baas te krijgen. In werkelijkheid duurde het je langer dan 3 weken. Reden? De kostenanalyse bleek bij controle verkeerd aangeleverd, de desbetreffende contactpersoon had een week verlof en bovendien bleek er met de cijfers geen rekening gehouden met de vernieuwde aanpak.*

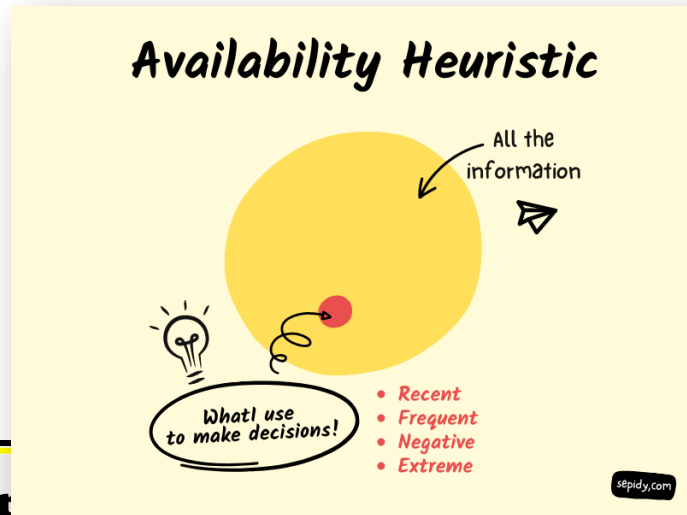
Dit is een zeer krachtige techniek omdat het zelfs de meest optimistische persoon aanzet om na te denken over een *worst-case scenario*. Het geeft ook de ruimte om je planning en je aanpak in twijfel te brengen, wat alleen maar goed is. Op die manier creëer je ruimte om na te denken over een slimmere en efficiëntere aanpak.

Zodra je deze 2 factoren hebt bepaald, je binnen- en buitenaanzicht, kun je een simpele 1+1 som maken:

Bias for action (also called action bias) is **the tendency to favor action over inaction**. Because of bias for action, we often feel compelled to act, even when we don't have all the information we need or are uncertain about the outcome. 10 mrt 2023

- In general, as people we have preference for doing over talking (“gaan doen in plaats van erover praten”).
  - ✓ “Bias for action” (bias in Dutch: neiging, vooroordeel, vooringenomenheid)
  - ✓ “To see work happening, to have tangible evidence of progress.”
  - ✓ “Speed matters in business”
- That makes us to want to start too fast: first think, then act (“think slow, act fast”).
- “Try something! If it does not work, reverse it and try something else”.
  - ✓ That is not always or easy applicable to many decisions in big projects, because they are difficult or expensive to reverse that they are effectively irreversible.
- Especially when under time pressure, managers and executives perceive planning to be wasted effort.
  - ✓ Then they prefer to go with the quick flow of availability bias, as opposed to the slow effort of planning.

SYSTEM 1	SYSTEM 2
FAST 	SLOW 
SUBCONSCIOUS 	CONSCIOUS 
AUTOMATIC 	EFFORTFUL 
EVERYDAY DECISIONS 	COMPLEX DECISIONS 
ERROR PRONE 	RELIABLE 



What is the availability bias?

In psychology, the availability bias is **the human tendency to rely on information that comes readily to mind when evaluating situations or making decisions**. Because of this bias, people believe that the readily available information is more representative of fact than is the case.



- “To see work happening, to have tangible evidence of progress.”
  - ✓ In principle good. Everyone involved should have that mindset.
  - ✓ It become a trouble or risky when we belittle (in Dutch: “kleineren”) planning as the annoying stuff we have to deal with, before we really get going on the project!
  - ✓ Planning is working on the project!
  - ✓ Progress in planning is progress on the project! Most often the most cost-effective progress you can achieve.

- In politics (example in book for France), there might be a theoretical budget given as the sum of that politically has been released to do something. In most cases that does not correspond to anything in technical terms.
  - ✓ Strategic misrepresentation
- “If people knew the real cost from start, nothing would ever be approved”.
- “If we gave the true expected outcome of costs, nothing would be built.”
- Why misrepresentation works?
  - ✓ “get shovels in the ground and start digging a hole so big, there is no alternative to coming up with the money to fill it in” (Willie Brown).
  - ✓ In theory Browns is not right. In practice he is.
  - ✓ “Lock-in” or “escalation of commitment”

- If “escalation of commitment” comes after “commitment fallacy”, there is over commitment to the **second degree**.
  - ✓ This typically spells disaster, or at least a result vastly inferior to what could have been achieved with a more thoughtful approach!!
- Why people spiral downward this way is immensely important question that psychologists, economists, political sciences and sociologists have studied for decades.
  - ✓ A 2012, meta-analysis of the literature included 120 citations even after excluding the many non-quantitative analysis.
  - ✓ Not surprisingly, there is no simple explanation.
  - ✓ But one element that is central to any account is the “sunk cost fallacy”
  - ✓ “Throwing away the budget already spent.”

Sunk cost fallacy is de neiging om vast te houden aan een beslissing of een plan, zelfs als het plan mislukt. Omdat we al waardevolle tijd, geld of energie hebben geïnvesteerd, voelt stoppen alsof deze middelen verspild zijn.

What is the sunk cost fallacy? The sunk cost fallacy is our tendency to continue with an endeavor we've invested money, effort, or time into —even if the current costs outweigh the benefits. And while the term sounds like technical jargon, it's a common decision-making pitfall in both life and business. 12 feb 2024

- Lesson Learned: Don't assume you know all there is to know!
  - ✓ If people in your (project) team, make this assumption – which is common – educate them or shift them out of your team.
  - ✓ Don't let yourself or them draw what appears to be obvious conclusions.
  - ✓ That sort of premature commitment puts you at a risk of missing not only glaring flaws (“gebreken”) but also opportunities (“kansen”) that could make your project much better than what you have in mind now.
- If you feel the urge to commit – and you probably will – commit to completing that process (exploring the flaws and opportunities) before you draw conclusions about your big project.
  - ✓ Commit to have an open mind; that is commit to not committing.

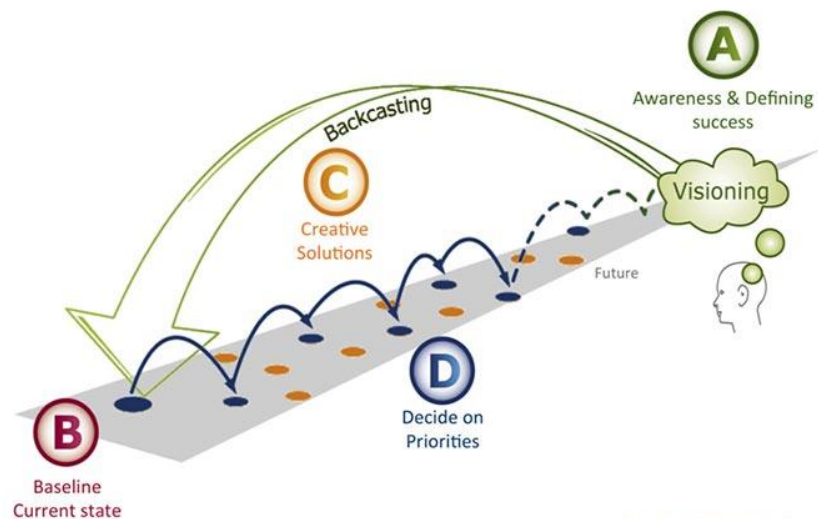
### 3) Think from right to left

*Projects are often started by jumping straight to a solution, even a specific technology. That is the wrong place to begin. You want to start by asking questions and considering alternatives. At the outset, always assume that there is more to learn. Start with the most basic question of all: Why?*



- “think slow” ⇒ slow isn’t good in itself.
  - ✓ If careful analysis is too narrowly focussed, it won’t reveal fundamental flaws in the plan or gaps, much less correct them.
  - ✓ And by its impressive detail, it might give the false idea that the overall plan is stronger than it is.
- Good planning explores, imagines, analyses, tests, simulates and iterates. That takes time.
  - ✓ Thus, slow is a consequence of doing planning right, not a cause.
  - ✓ The cause of good planning is the range and depth of the **questions** it asks and the imagination and the rigor of the **answers** it delivers.
  - ✓ Unfortunately, projects routinely start with **answers**, not **questions**.
  - ✓ The goal of the project seemed obvious, a given.
- Asking questions with open minded desire to learn. That is the opposite of natural inclination (“neiging”) to think that What You See Is All There Is (WYSIATI). The fallacy we saw in the previous chapter.
  - ✓ If you are open to learn and more open minded, you are avoiding the trap of the WYSIATI fallacy.
- At the beginning of a project, we need to disrupt the psychology driven dash to a premature conclusion by disentangle (“ontrafelen”) means and ends and thinking carefully about what exactly we want to accomplish.
  - ✓ Why are you doing the project?
  - ✓ In own words added: “the question behind the question” and “5 times why” etc.
  - ✓ Explore the Why!
- Developing a clear, informed understanding of what the goals is and why – and never losing sight of it from beginning to end – is the foundation of a successful project!

- The goal of the project in a planning is the box on the right.
  - ✓ That is where project planning must begin by asking questions and thoughtfully exploring what should go in that box.
  - ✓ Once that is settled, you can shift to considering what should go into the boxes on the left. – that means that will best get you to your goal.
- That is what the author calls “thinking from right to left”.
- “Backcasting” also commonly used.
- “Theory of Change” is a similar process (often used to seek social changes).
- “work backwards” is mantra in today’s Silicon Valley (inspired by success of Apple, Steve Jobs)



© 2011 The Natural Step

Wat betekent backcasting?

Backcasting is een planningsmethode die begint met het definiëren van een gewenste toekomst. Vervolgens wordt teruggewerkt om beleid en programma's te identificeren die de gespecificeerde toekomst verbinden met het heden .

What is Theory of Change?

Theory of Change is essentially a comprehensive description and illustration of how and why a desired change is expected to happen in a particular context.

- The most common way in which thinking from right to left fails is **losing sight of the right**, the goal
- “Work backwards” also fails when planners aren’t compelled (“gedwongen”) to nail down what is in the final flowchart box on the right and forced to think from right to left.
  - ✓ Without that, it’s easy to get consumed by the blizzard of details and difficulties that arise during the planning of any project, while the goal, which was only vaguely understood to begin with, fades from view. Then the project can veer off in unpredictable directions.
  - ✓ Amazon is successful with this approach: working backwards and iterative from short Press Release (PR), document that summarizes the new product or service and why it is valuable for customers, versus Frequently Asked Question (FAQ), document with more details about costs, functionality, and other concerns.
  - ✓ “Working backwards from the PR/FAQ” via multiple iterations as it is used in Amazon.
  - ✓ “Oprah-speak” ⇒ when Oprah had someone on her show who would say something, Oprah would turn to her audience and explain it in very simple way that anyone understood.
    - ❑ With language like that, flaws can’t be hidden behind jargons and slogans of technical terms.
    - ❑ Thinking is laid bare.
    - ❑ If a thought is fuzzy, ill considered, or illogical, or it is based on unsupported assumptions, a careful reader will see it
- Let it the project make happen instead of it happens to the project.
  - ✓ Then you are in control 😊

## 4) Pixar Planning

People are terrible at getting things the first time right. But we are great at tinkering (“sleutelen, prutsen, opknappen”). Wise planners make the most of this basic insights into human nature. They try, learn, and do it again. They plan like Pixar and Frank Gebry do.



- Latin word “**Experiri**” means “to try”, “to test”, or “to prove”.
  - ✓ It is the origin of two wonderful words in English: *experiment* and *experience*.
- Think of how people typically learn: We tinker. We try this. We try that. We see what works and what doesn’t. We iterate, We learn. This is experimentation creating experience. Or to use the phrase of theorists, it is “experimental learning”.
  - ✓ We are good at learning by tinkering – which is fortunate, because we are terrible at getting things the first-time-right.
  - ✓ Tinkering sometimes requires tenacity, and it always requires a willingness to learn from failure.
  - ✓ Edison about light bulb invention: “I have not failed ten thousand times. I have successfully found ten thousand times it will not work”.
- A **good plan** (planning) is one that meticulously (“zorgvuldig”) applies experiments or experience. A **great plan** is one that rigorously applies both. A **bad plan** is one that applies neither experimentation nor experience.
- Why iteration works?
  1. Iteration frees (“vrijmaken, bevrijden”) people to experiment.
  2. The process ensures that literally every part of plan, from the broad strokes to the fine details, is scrutinized (“onder de loep genomen”) and tested.
  3. An iterative process corrects for a basic cognitive bias that psychologists call the “illusion of explanatory depth”.
  4. Planning is cheap, though not in absolute terms perhaps.



The illusion of explanatory depth (IOED) describes our belief that we understand more about the world than we actually do. It is often not until we are asked to actually explain a concept that we come face to face with our limited understanding of it.

- The “Minimum Viable Product” model (MVP) comes close to the idea of good testing and planning upfront by starting a smaller project and learn before trying to make it real big.
  - ✓ When a MVP approach is not possible, try a “Maximum Virtual Product”.
- Once you make a planning as an active, iterative process of trying, learning and trying again, all sort of ways to “play” with ideas, as Gehry and Pixar did very successfully, will suggest themselves.

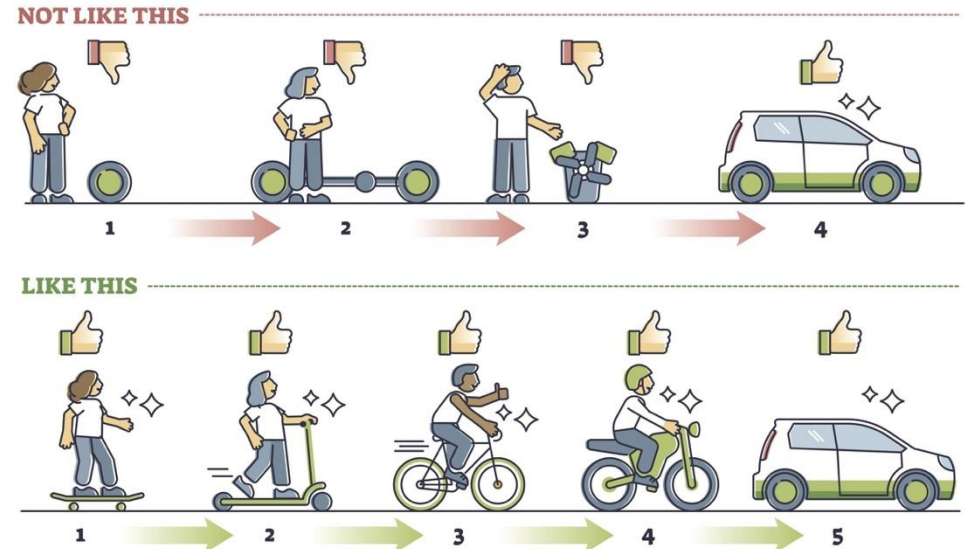
What is a minimum viable product?

A minimum viable product, or MVP, is a product with enough features to attract early-adopter customers and validate a product idea early in the product development cycle.

**WHAT IS A MINIMUM VIABLE PRODUCT**

		
<b>M</b> Minimum	<b>V</b> Viable	<b>P</b> Product
The most rudimentary, bare-bones foundation of the solution possible	Sufficient enough for early adopters	Something tangible customers can touch and feel

**HOW TO BUILD A MINIMUM VIABLE PRODUCT**



## 5) Are you experienced?

*Experience is invaluable. But too often it is overlooked or dismissed for other considerations. Or it is simply misunderstood and marginalized. Here's how to avoid that.*



- The ambition of being the first with something is another way experience get sidelined.
  - Planners don't value experience to the extent they should because they commonly suffer yet another behavioural bias, "uniqueness bias" which means they tend to see their project as unique, one-off ventures that have little or nothing to learn form earlier projects. And so, they commonly don't.
- "First Mover Advantages" are mostly overstated.
- A "fast follower" learns fast from the "first mover".
- Technology is "frozen experience" => to reuse the gained experience of a proven technology.
  - ✓ Often, we do not see Technology this way.
  - ✓ Too often we assume the newer is better. Risk for being inexperienced!
- An experienced leader and/or team of a project, are also influencing the changes for success.
  - ✓ Genuine experts may have "skilled intuition" and is very valuable!

In project management, uniqueness bias refers to the tendency to view projects as unique, singular, one of a kind and unrelated to other projects, thus undervaluing the potential for learning from past experiences. 8 okt 2024

What is skilled intuition?

Processing unconscious information and using it at our will is a skilled art that some people can master. We call them highly intuitive people, those individuals who are not afraid of trusting their instincts and listening to the powerful voice that speaks without words.

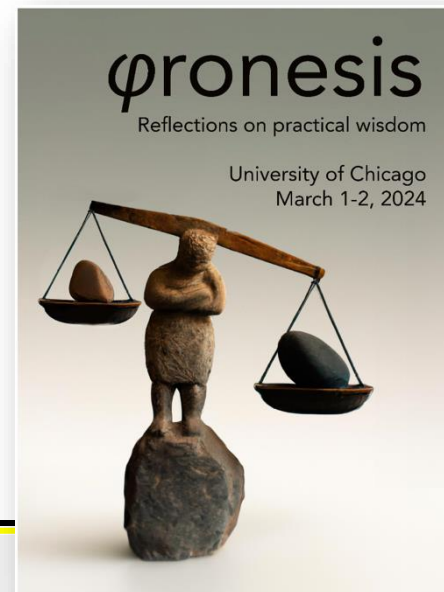
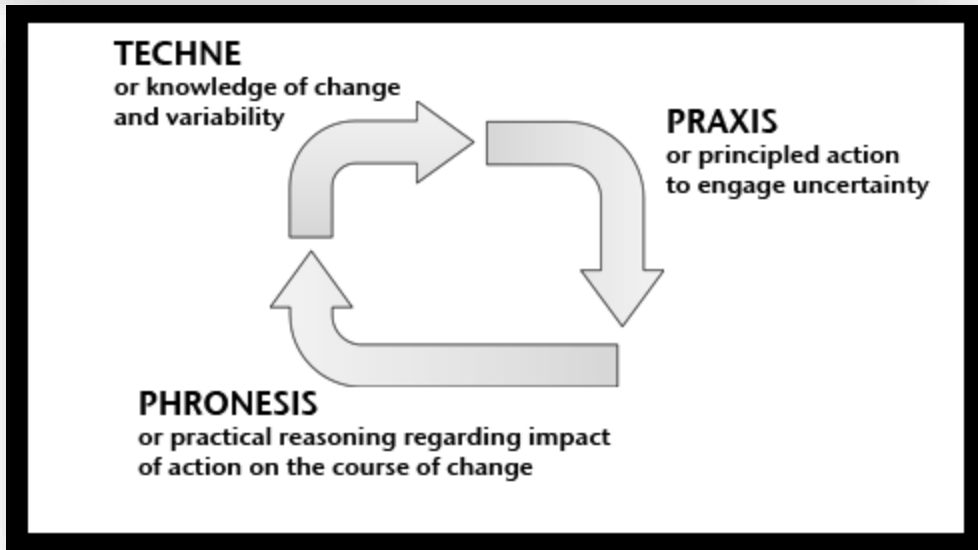


- A good plan, a great plan was explained before.
- A best plan maximises experience and experimentations and is drafted and delivered by project Leder and team with “phronesis”.

Phronèsis is **morele bedachtzaamheid of praktische wijsheid bij het proberen te sturen van het eigen handelen en dat van anderen.** Aristoteles behandelde het begrip in Boek VI van Ethica Nicomachea. Het gaat om een intellectuele deugd op zichzelf, maar wordt ook verondersteld bij de karakterdeugden.

### wisdom in determining ends

Phronesis, “**wisdom in determining ends and the means of attaining them, practical understanding, sound judgment,**” comes from Latin phronēsis, from Greek phrónēsis, meaning “practical wisdom, prudence in government and public affairs” in Plato, Aristotle, and other heavy hitters. 20 feb 2020



## 6) So you think your project is unique?

*Think again. Understanding that your project is “one of those” is key getting your forecast right and managing your risks.*



- When delivery fails, efforts to figure out why tend to focus exclusively on delivery-blaming the work not the forecast. That’s understandable, but it’s a mistake, because the root cause of why delivery fails often lies outside delivery, in forecasting, years before delivery was even begun.
- How long will a project take? How much effort will it cost? Forecasting is critical to any project.
- However, even excellent forecasts cannot cope with the rare but disastrous turn of events (e.g. flooding or earthquake or epidemic,...) also known as “black swans”.
  - ✓ Those call for risk management and risk mitigation, not forecasting.
- Forecasting: it’s the estimate, stupid!
- In Psychology, the process to create forecasts could be based on “anchoring & adjustments”.
  - ✓ The estimated starting value / point is the “anchor”.
  - ✓ Then you slide the figure up or down as seems reasonable, the “adjustment”.
- Basing forecasting on “anchoring and adjustments” is tricky. As Psychologists have shown in many experiments, final estimates made this way are biased towards the anchor, so a lower anchor produces a lower estimate than a higher anchor point does.
  - ✓ That means the quality of the anchor is critical.

What is anchoring and adjustment?

Anchoring and adjustment is a cognitive heuristic where a person starts off with an initial idea and adjusts their beliefs based on this starting point. Anchoring and adjustment have been shown to produce erroneous results when the initial anchor deviates from the true value.

- The “anchor” can be influenced by environment or circumstance.
  - ✓ For example, experiment, a result of a wheel of fortune with numbers between 1 and 100 influences the answer on estimate of a question. In this case the question the percentage of UN members that are Africans.
  - ✓ In case the “wheel” provided a high number the estimated percentage was higher than in the examples where the “wheel” provided a low number. And there is not any correlation between “wheel outcome” and real percentage.
- That makes, you estimate based on experience you have an that “makes your anchor”. If you write articles in newspapers, in estimating writing a book your anchor will be based on writing newspaper articles and might be far from realistic.
- Conclusion: to create a successful project estimate, you must get the “anchor” right!



## “Reference class” (based on article 1979 from Kahneman, Nobel Prize Winner in Economic Sciences)

- To understand what “reference class” is, bear in mind there are two fundamentally different ways to look at a project:
  1. To see it as its own special undertaking. All projects are special to some degree. Even if the project isn’t something wildly creative as making a Pixar film, going to Mars, fighting a pandemic, even if it’s a mundane (“werelds”) as remodelling a suburban house or as common as building a small bridge, developing a software program, or hosting a conference, at least some aspects will be unique in the project. There will always be something that makes this project different from others.
    - ✓ People recognise this, though tend to exaggerate (“overdrijven”) just how unusual their specific project really is.
    - ✓ This is the “**uniqueness bias**”
  2. A project can be seen as “one of those” in a certain category.
    - ✓ For example, the very new Opera House (Sydney) is in the end just an opera house and many items can be compared within that category.
- According to Kahneman, two perspectives (both very valuable, though they are very different as well):
  1. “**inside view**” - looking at the individual project in its singularity)
  2. “**outside view**” - looking at a project as part of a class of projects, as “one of those”
- Although there is little danger that a forecaster will ignore the inside view, overlooking the outside view is routine, that’s a fatal error.
  - ✓ To produce a reliable forecast, you need the outside view!!

In project management, uniqueness bias refers to **the tendency to view projects as unique, singular, one of a kind and unrelated to other projects**, thus undervaluing the potential for learning from past experiences. 8 okt 2024

Het valse-uniekheidseffect is een attributietype cognitieve vooringenomenheid in de sociale psychologie dat beschrijft hoe mensen de neiging hebben om hun kwaliteiten, eigenschappen en persoonlijke eigenschappen als uniek te beschouwen, terwijl ze dat in werkelijkheid niet zijn.  
[Wikipedia \(Engels\) >](#)

- “Outside view” ⇒ make use of “Reference Class Forecasting” (RCF).
  - ✓ See your project as “one of those”
  - ✓ Use data from the class – about cost, time, benefits or whatever else you want to forecast – as your “anchor”.
  - ✓ Then adjust up or down, if necessary, to reflect how your specific project differs from the mean (“gemiddelde”) in the class.
    - ❑ Only if there are clear compelling (“niet te stuiten”) reasons to think that your project will be well above or below the mean.
    - ❑ The more you adjust the more your project is different from the “average project in class”
    - ❑ Your project feels special, so more and more to be adjusted and feels good. That is a mistake (to much “uniqueness bias talking”).
    - ❑ Keep the class broadly! Find the data that support to deviate from average in only clear compelling reasons.
    - ❑ When in doubt about adjustment, skip it.
    - ❑ The class mean is the anchor, and the anchor is your forecast.
  - ✓ It’s that simple 😊
  
- The method is proven to be a better forecast technique. Even Daniel Kahneman wrote in *Thinking, Fast and Slow* that using Reference Class Forecasting is “the single most important piece of advice regarding how to increase accuracy in forecasting through improved methods”.
  
- Challenge: Find the Data! (a common challenge)
  - ✓ Old project data are seldom considered a valuable resource and collected.
  - ✓ In part, that is because Project Planners & Project Managers have a mindset focussed on the future, not the past.
  - ✓ But it’s also because those who see value in data have an interest in keeping theirs under wraps.
    - ❑ For example, home construction companies do not want their homeowners good data on their renovation cost.
    - ❑ That means at least, companies or trade associations, etc., can make their own databases based on old projects.

- For those who do not have access to a database or cannot create, the Reverence Class Forecasting method is still useful, you just have to take a rough-and-ready approach to it.
  - ✓ For example, you want to know how long it will take to write a book (because you never did), call some authors, say 20, ask them how long it will take. Add the given answers and divide by the quantity authors that answered, and you have an average that is your anchor. Then ask yourself if there are good reasons that you can do faster or slower than the anchor and adjust to your forecast.
  - ✓ Or see that you can get a percentage of overruns in the class you have your project (for example kitchen renovations), then calculate your estimate on the usual way and multiply with the percentage overrun and that is your forecast.
    - ❑ In this way you combine the value of the “inside view” (detail calculation) with the value of the “outside view” (accuracy).
- Of course: The more data available the better. The more accurate the available data is, the better.
- Even the data of one completed project are valuable. Obviously, it would be wrong to call that a “reference class”. But it is real world experience. Call it “reference point”. Then compare it to your planned project and ask, “Is our project likely to perform better or worse than this “reference point”?” The discussion might be surprisingly useful.
- The smallest number of data is zero. In the truly rare case in which a project can be accurately described as unique – the one and only of its kind – that’s how many projects there are in the reference class.
  - ✓ Even in that case, RCF may be useful.
  - ✓ Better to compare with something than with nothing.
  - ✓ Be creative!

## Regression to the tail

- In a normal distribution, there is regression to the mean, meaning that observation in a sample to tend toward the mean of the population as more observations are included.
  - ❑ For example, a kitchen builder who has renovated more than 100 comparable kitchens he will have reliable value of the renovation projects.
  - ❑ When they renovate an unusual kitchen, it is likely that the next one, other things being equal, will be closer to the mean and therefore cheaper.
- When you are dealing with a normal distribution, it is fine to use the mean cost in a reference class forecast.
- Though for big (complex) projects, only minority are normally distributed. The majority (rest) have fat-tailed distributions and have more extreme outcomes in the tails of their distributions.
- With fat-tailed distributions, the mean are **not** representative of the distribution and therefor is **not** a good estimate for forecast.
- For the most fat-tailed distributions there isn't even a stable mean that you can expect outcomes to cluster around because an even more extreme outcome can (and will) come along and push the mean further out, into the tail toward infinity.
  - ✓ So instead of "regression to the mean" you will get "regression to the tail".
  - ✓ In that situation, relying on the mean and assuming that your results will be close to it is a dangerous mistake!

- What does explanation of previous slide mean in practice:
  - Ideally, you want to know whether you are facing a fat-tailed distribution or not.
  - But most likely you may not know upfront.
  - In that case, you are better off using the average – or using imagination – than using nothing!
  - But following the precautionary principle, you should also err (“afdwalen”) on the side of caution and assume that your project is part of fat-tailed distribution, because it is much more likely to be the case than not.
  - That means you should assume that your project has at least some risk of not merely finishing a little late or a little over budget; it may go hay-wire (“op hol slaan”) and end very badly. To protect yourself against that, you need to mitigate risk.
    - ✓ If you expect it is normal or near normal distributed (find the evidence!) there is about 50% risk for cost overrun and therefore add 10 ... 15 percent contingency (reserve) budget and you are done.
    - ✓ If you expect fat-tailed distribution, shift your mindset from forecasting a single outcome (the project will cost “x”) to forecasting risk (the project is “x” percent likely to cost more than “y”, using the full range of the distribution.
    - ✓ In a typical fat tailed distribution in project management, about 80 percent of the outcomes will make up the body of the distribution. That is pretty normal, nothing really scary there. For that portion of distribution, you can protect yourself the usual way with affordable contingencies that will fit into a budget.
      - ❑ But the tail outcomes – the black swans – cover about 20% of the distribution.
      - ❑ That means a 20% percent change of ending up in the tail, which is too much for organisations.
      - ❑ Contingencies might have to be 300, 400, or 500 percent over the average cost – or 700% as was the case for the Montreal Olympics . That is prohibitive (“onbetaalbaar”).
      - ❑ What you can do about the tail? Cut it off!! You can do that with **risk mitigation** (hereafter called “**black swan management**”)

## Black swan management

- Some tails are simple to cut off. Tsunamis are fat-tailed, but if you build well inland or erect high enough seawall, you will eliminate the risk.
- For big projects, black swan management typically requires a combination of measures.
  - ✓ The “Think slow, act fast” way of work with exhaustive planning that enables shift delivery will “narrow the time window that swans can crash through” and is an effective means of mitigating risks.
  - ✓ Finishing, is the ultimate form of black swan prevention; after a project is done, it can’t blow up, at least not as regards delivery.
  - ✓ The critical next step is to **stop** thinking of black swans the way most people do. They are **not bolt-from-the-blue-freak** (uit het niets, complete verrassing) accidents that are impossible to understand or prevent. They can be studied. And mitigated!
- In this complex world, we can and must move the probabilities in our favour, but we can never achieve certainty. Good risk managers know this in their bones and are prepared for it!



## 7) Can ignorance be your friend?

*Planning ruins projects, some say. Just get going! Trust your ingenuity!  
It's a wonderful sentiment backed by superb stories. But is it true?*



- There are good examples where creativity and “just do it” approach became very successfully, e.g. Apple. Albert O. Hirschman was a renowned economist at Columbia University wrote an essay that has been influential ever since.
- Hirschman argued that planning is a bad idea. “Creativity always comes as a surprise to us,” he wrote. “Therefore, we can never count on it and we dare not believe in it until it has happened”.
  - ✓ But if we know that big projects pose big challenges that can be overcome only by creativity and we don't trust creativity to deliver its magic when we need it, why would anyone launch a big project?
  - ✓ They shouldn't. Yet they do.
  - ✓ For that, Hirschman argued, we must thank ignorance; it's our friend in getting project started. He called it “providential ignorance”.
- When we ponder (“overdenken, overpeinzen”) a big project, Hirschman observed, we routinely fail to see the number and severity (“ernst, hevigheid”) of the challenges the project will pose. This ignorance makes us too optimistic. And that's a good thing, according to Hirschman. “Since we necessarily underestimate our creativity”, he wrote, “it is desirable that we underestimate to a roughly similar extent the difficulties of the tasks we face, so as to be tricked by these two offsetting underestimates into undertaking tasks which we can, but otherwise would not dare, tackle”.
- In Hirschman's view, people ‘typically’ underestimate the cost and difficulties of big projects, leading to budget overruns and blown schedules. But these negatives are dwarfed (“verkleind”) by the project's larger than expected benefits. He suggested a name for this principle: “Since we are apparently on the trail here of some sort of Invisible or Hidden Hand that beneficially hides difficulties from us, I propose the “Hiding hand”

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## Hiding hand principle

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The **hiding hand principle** is a [theory](#) that offers a framework to examine how [ignorance](#) (particularly concerning future obstacles when person first decides to take on a project) intersects with [rational choice](#) to undertake a project; the intersection is seen to provoke creative success over the obstacles through the deduction that it is too late to abandon the project. The term was coined by economist [Albert O. Hirschman](#).

DM2D

Het 'hiding hand'-principe is een theorie die een raamwerk biedt om te onderzoeken hoe onwetendheid en rationele keuze om een project te ondernemen elkaar kruisen; men ziet dat het kruispunt creatief succes over de obstakels uitlokt door de conclusie dat het te laat is om het project op te geven.

[Wikipedia \(Engels\) >](#)

- Hirschman provided only a handful of different examples of success gained by this approach. For example the movie Jaws. The script was crap, weather was uncooperative, the created mechanical Shark malfunctioned., looked goofy and not scary. That drove Spielberg to the edge and brought creativity because he focussed to the people and the terror in the water for most of the movie, which turned out much scarier than any image of the shark. The movie was an enormous hit and a masterpiece of suspense.
- Hirschman not gathered much data, he had only 11 case studies. Not enough to make clear "patterns" n what he claimed as "general principle" or "typical".
- Risk for "Survivorship bias" here. It is not enough reliable data to draw "general conclusions".

Survivorship bias or survival bias is **the logical error of concentrating on entities that passed a selection process while overlooking those that did not**. This can lead to incorrect conclusions because of incomplete data.

### Survivorship bias :

Survivorship bias of overlevingsbias is de logische fout om je te concentreren op entiteiten die een selectieproces hebben doorstaan, terwijl je degenen over het hoofd ziet die dat niet hebben gedaan. Dit kan leiden tot onjuiste conclusies vanwege onvolledige gegevens. [Wikipedia \(Engels\) >](#)

## The Statistician Saved Their Lives

A young statistician saved thousands of lives.

During World War II, the U.S. was facing issues with its bombers in the Pacific and decided to add reinforcement armor to specific areas of its planes.

A group of analysts examined returning bombers and plotted the bullet holes and damage on them.

Based on this analysis, they came to the conclusion that adding armor to the tail, body, and wings would improve their odds of survival.

But a young statistician named Abraham Wald immediately noted that this would be a tragic mistake...

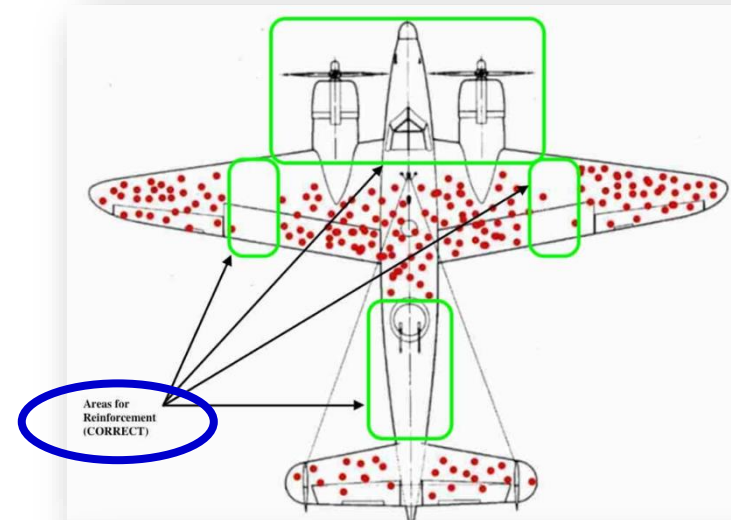
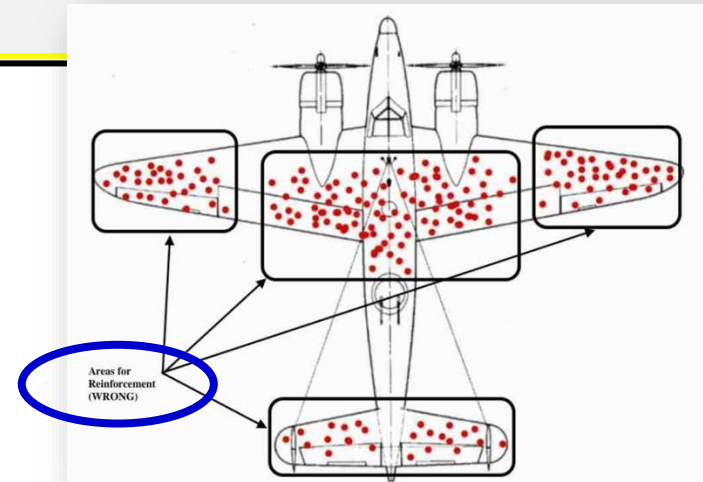
By only plotting data on the planes that returned, they were systematically omitting the data on a critical, informative subset: The planes that were damaged and unable to return.

Abraham Wald had recognized a simple fact:

- "Seen" planes had sustained damage that was survivable.
- "Unseen" planes had sustained damage that was not survivable.

Wald concluded that, contrary to the original analysis, armor should be added to the *unharmed* regions of the returning planes. Where the survivors were *unharmed* was actually where the planes were most vulnerable.

Based on his insight, the military reinforced the engine and other vulnerable parts, significantly improving the safety of the crews during combat and saving thousands of lives.



### Avoiding Survivorship Bias

Abraham Wald had identified a cognitive bias called *Survivorship Bias*:

The error resulting from systematically focusing on survivors (successes) and ignoring casualties (failures) that causes us to miss the true base rates of survival (the actual probability of success) and arrive at flawed conclusions.

- For people as CEOs and venture capitalist – and even governments- what matters isn't the performance of any one project but a whole portfolio of projects performs.
  - ✓ For them it may be fine to take losses on 80 percent of projects as long as the gains of the 20% of projects that deliver Hirschman's happy ending are so big that they more than compensate for the losses.
  - ✓ According data of the author of this book, based on his gathered data, the results were equally clear: losses far exceed gains. Whether it's the average project or a portfolio of projects. Hirschman's argument just doesn't hold up.
- A 2010 meta-analysis of seventy-six studies found that stress is particularly corrosive in 2 circumstances:
  1. When we feel that the situation is mostly beyond our control.
  2. When we feel that others are judging our competence.
- So, a project in trouble is exactly the sort of situation in which we can expect stress to hamper creativity!
- Imaginative leaps ("springen") belong in planning, not delivery. When stakes and stress are low, we are freer ("vrijer") to wonder, try and experiment. Planning is creativity's natural habitat!
- Via serendipity ("toevalstreffer") you can leap with a goof success story according Hirschman's story.

## 8) A single, determined organism

*As important as it is to do the slow thinking that produces excellent planning and forecasting, acting fast in delivery takes more than a strong plan; you need an equally strong team. How are diverse people and organizations with different identities and interests turned into a single "us" – a team- with everyone rowing in the same direction: toward delivery?*

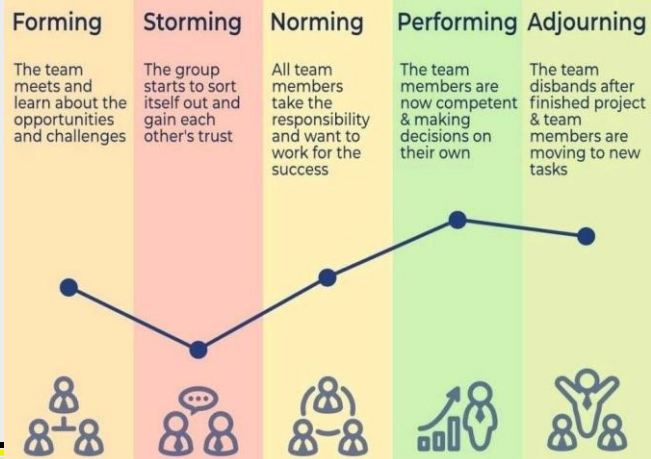


- The word *deadline* comes from the American Civil war, when the prison camps set boundaries and any prisoner who crossed a line was shot.
- We perform at our best when we feel united, empowered, and mutually committed to accomplish something worthwhile.
  - ✓ Most psychological and organisational research tells us so.
  - ✓ It's also common sense.
  - ✓ There is a word to describe a group of people who feel that way: they are a **team**.

Waar staat team voor?

"De definitie van een team is een groep personen die door middel van samenwerking een gezamenlijk doel nastreeft, waarbij de teamleden afhankelijk van elkaar zijn om het doel te bereiken."

### 4 Phases of Team Development



The screenshot shows the Wikipedia article for 'Team'. The article defines a team as a group of people working together towards a common goal. It mentions the concept of 'synergie' and the importance of communication within a team. A historical photo of the Belgian national football team from 1905 is included as an example of a sports team.

**Making your projects work!**

## 9) What is your Lego?

*Get a small thing, a basic building block. Combine it with another until you have what you need. That is how a single solar cell becomes a solar panel, which become a solar array, which becomes a massive megawatt- churning solar farm.*

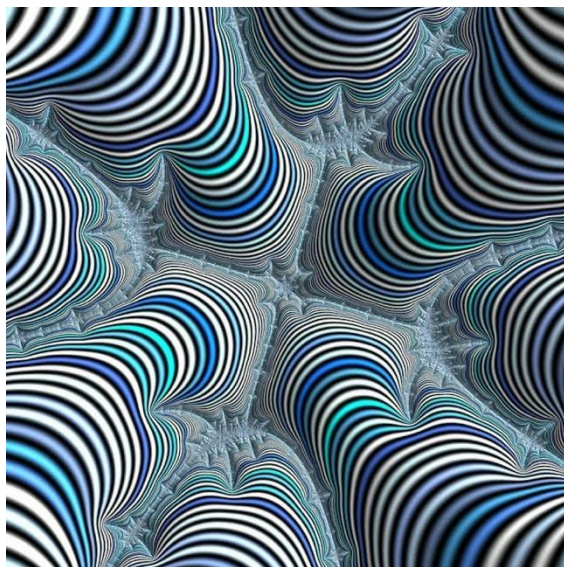
**Modularity** delivers faster, cheaper and better, making it valuable for all project types and sizes. But for building at a truly huge scale – the scale that transforms cities, countries, even the world – modularity is not just valuable, it's indispensable (“onmisbaar, noodzakelijk”)



- Complex bespoke-ness alone (“op maat gemaakt”) makes huge project hard to deliver:
  1. First, there is little or no experimentation (the one half of “expiriri”)
  2. Second, there is little or no t no experience (the other half of “expiriri”)
  3. Third, there is the financial strain (to earn money back only when project is successfully delivered).
  4. Finally, don’t forget the “black swans”. All projects are vulnerable to unpredictable shocks, with their vulnerability growing a stime passes.
- So, with little or no experimentation and little or no experience , makes exactly first-time right delivery very difficult or almost impossible.
- “Negative learning” might happen as Operation experts call it, the more you learn the more difficult and costly it gets.
- Modularity is a clunky (“onhandig, klunzig”) word for the elegant idea of big things made from small things.
- The core of modularity is repetition.
- Repetition is the genius of modularity, it enables experimentation.
- Repetition also generates experience, making your performance better. This is called “positive learning”.
- Cars are extremely modular.
  - ✓ Even very expensive cars are assembled Lego style
  - ✓ Fully possible for the words, *modular, beautiful* and *high quality*.

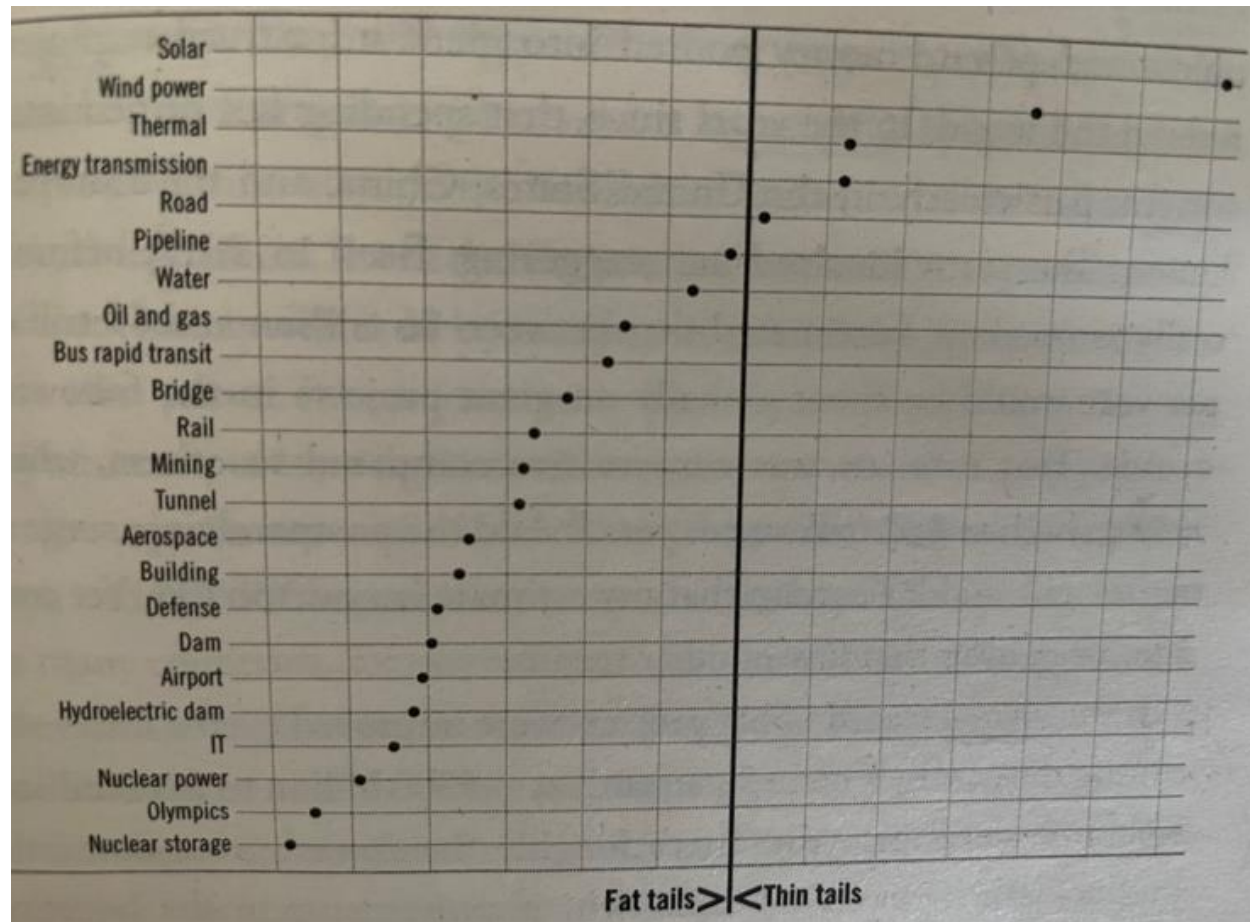
➤ **Magic of scale-free scalability:**

- ✓ Scale free => numbers can be scaled up or down as much as you like, without changing the character of the whole
- ✓ Similarly, as behaviour flock of sparlings (“kudde spreeuwen”) and does not matter wether is are 50, 500 or 5.000 sparlings.
- ✓ The mathematician Benoit Mandelbrot, who first laid out the science of scale-free scalability, called this attribute “fractal”.



Een fractal, soms ook fractaal genoemd, is een meetkundige figuur die zelfgelijkend is, dat wil zeggen opgebouwd is uit delen die min of meer gelijkvormig zijn met de figuur zelf. Fractals hebben een oneindige hoeveelheid details, en bij sommige fractals komen motieven voor die zich op steeds kleinere schaal herhalen. [Wikipedia](#) >

A chart with all project types arranged by how “fat-tailed” they are in terms of cost – meaning how much they are in danger of extreme cost overruns that destroy project and careers, blow up corporations, and humiliate governments.

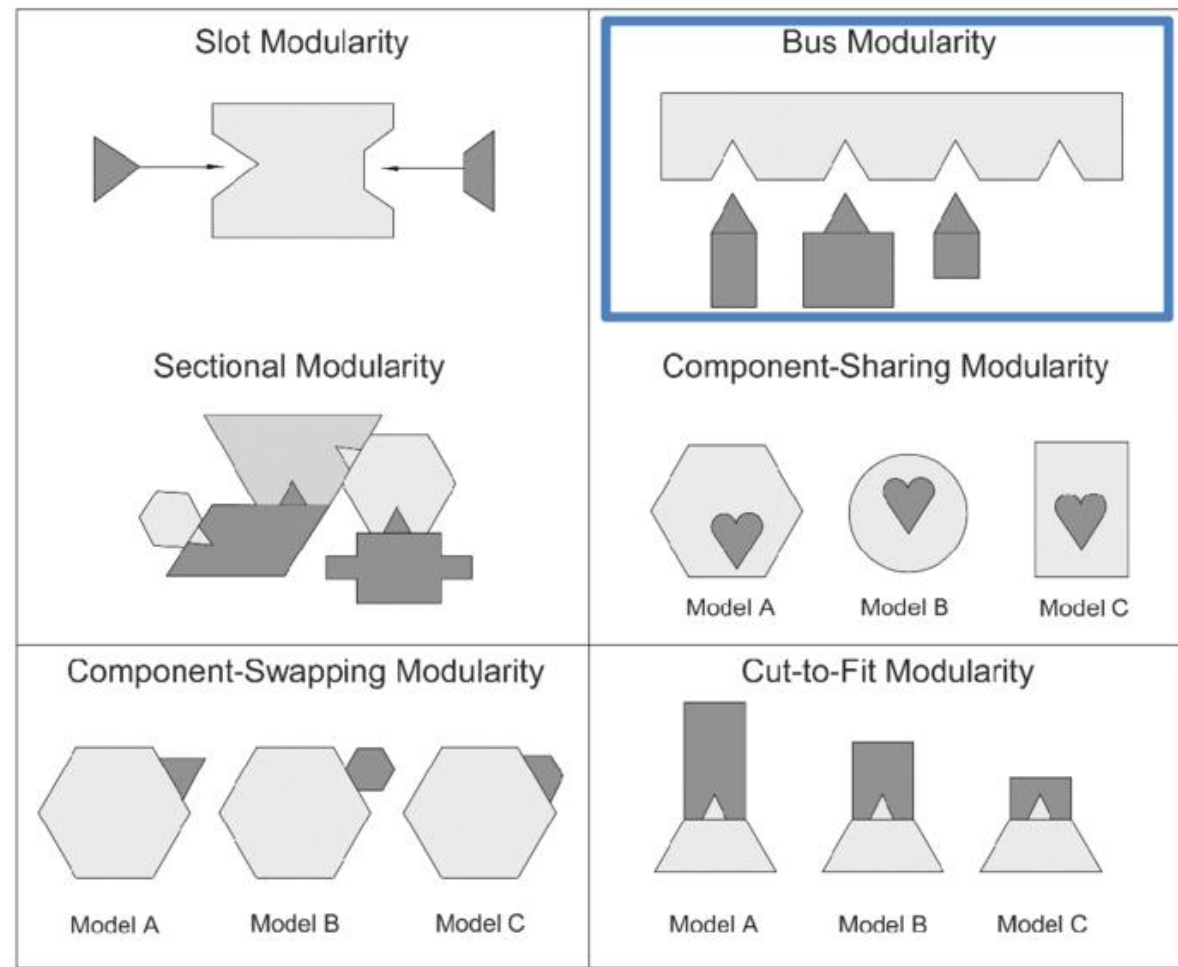
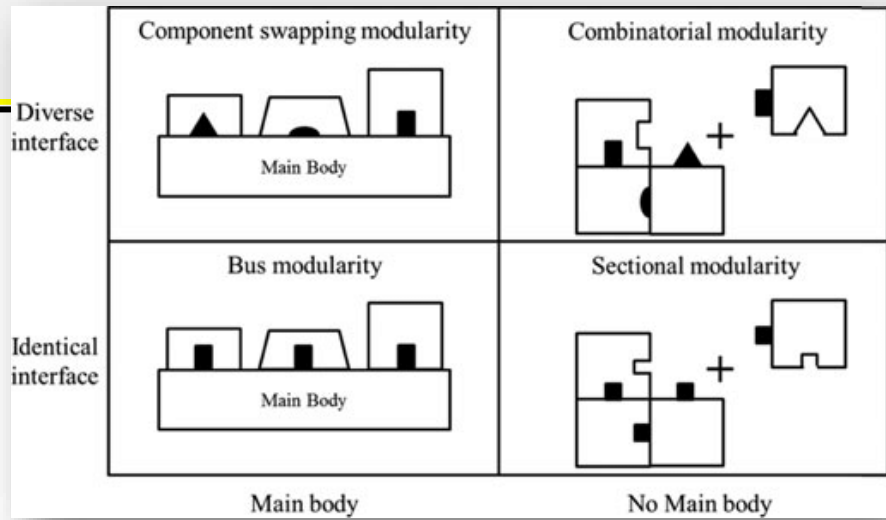


Modular examples

So modular is faster, cheaper and less risky

Example, in future Small Modular Reactors (SMR's) might bring better scalable nuclear plants.

Classic “one huge thing” projects



# The Power of Modularity



## 11 heuristics for better project leadership (1/2):

1. Hire a master builder
  - ✓ Getting a master builder with all required “phronesis” as is needed to make the project happen.
2. Get your team right
  - ✓ Give a good idea to a mediocre (“middelmatig”) team and they will screw up.
  - ✓ Give a mediocre idea to a great team, and they will fix it or come up with something better.
3. Ask “why?”
  - ✓ “Check constantly by asking whether present actions effectively contribute to the results on the right.”
  - ✓ Asking why you are doing your project will focus you on what matters, your ultimate purpose, and your results! (the right spot in your project chart).
4. Build with Lego
  - ✓ Big is best build from small. Build with basic building blocks (modularity).
5. Think slow, act fast
  - ✓ What’s the worst that can happen during “planning”?
  - ✓ What’s the worst that can happen during “delivery”?
  - ✓ “Planning” is relatively cheap and safe, “delivery” is expensive and dangerous.
6. Take the outside view
  - ✓ Your project is special, but unless you are doing what is literally never done before – building a time machine, engineering a black hole – it is **not** unique; it is part of a larger class of projects.
  - ✓ Think of your project as “one of those”, gather data and information, and learn from all the experience those numbers represent by making “reference class forecasts”. Use the same focus to spot and mitigate risks.

Key Takeaways. Heuristics are mental shortcuts for solving problems in a quick way that delivers a result that is sufficient enough to be useful given time constraints. Investors and financial professionals use a heuristic approach to speed up analysis and investment decisions.



## 11 heuristics for better project leadership (2/2):

### 7. Watch your downside

- ✓ It is often said that opportunity is as important as risk. That is false! Risks can kill your project. No upside can compensate for that.
- ✓ A fat tailed risk, which is present in most projects, forget about forecasting risks; go directly to mitigation by spotting and eliminating dangers.
- ✓ Successful Project Leaders focus on not losing, every day, while keeping a keen eye on the prize, the goal they are achieving.

### 8. Say no and walk away

- ✓ Staying focussed is essential for getting projects done.
- ✓ Saying no is essential for staying focussed.
- ✓ Does an action contribute to achieving the goal in the box on the right? If not, say no and skip it. Say no to “untested technology; to lawsuits; etc.

### 9. Make friends and keep them friendly

- ✓ Cultivate the understanding and support of Stakeholders (even if it requires much of your time).
- ✓ It's risk management! If something goes wrong, the project's fate depends on the strength of those relationships.
- ✓ And when it goes wrong, it is too late to start developing and cultivating them. “Build your bridges before you need them.”

### 10. Build climate mitigation in your project

- ✓ No task is more urgent today than mitigating the climate crises – not only for the common good but for your organization, for yourself, and your family

### 11. Know that your biggest risk is you

- ✓ It's tempting (“verleidelijk”) to think that project fail because the world throws surprises at us: price and scope changes, accidents, weather, new management – the list goes on.
- ✓ But this is shallow thinking. It is you that should be keen on everything (also behavioural biases), and act accordingly on what is required. That is true for every one of us and every project.

