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The Great Mental Models: General Thinking Concepts

Intro

- **I believe in the discipline of mastering the best of what other people have figured out. Charlie Munger**
- They come from the likes of Charlie Munger, Nassim Taleb, Charles Darwin, Peter Kaufman, Peter Bevelin, Richard Feynman, Albert Einstein, and so many others. As the Roman poet Publius Terentius wrote: "Nothing has yet been said that's not been said before
- The quality of your thinking depends on the models that are in your head
- The key to better understanding the world is to build a latticework of mental models.

Father of Mental Models

- **Munger, Charlie (Charles),**
- 1924 - American investor, businessman and philanthropist. Vice-Chairman of Berkshire Hathaway.
- Avid proponent that elementary, worldly wisdom and high ethical standards are required in business

INVERSION

- **The root of inversion is "invert," which means to upend or turn upside down. As a thinking tool it means approaching a situation from the opposite end of the natural starting point**.
- 2 approaches
  - **Start by assuming that what you're trying to prove is either true or false, then show what else would have to be true.**
  - Instead of aiming directly for your goal, think deeply about what you want to avoid and then see what options are left over.
- Most people want to get more done in less time. Applying inversion to productivity you could ask, **"What if I wanted to decrease my focus? How do I end up distracted?" The answer to that question may help you discover interruptions you can eliminate to free up more time and energy each day**.
- Kurt Lewin
  1. Identify the problem
  2. Define your objective
  3. Identify the forces that support change towards your objective
  4. Identify the forces that impede change towards the objective
  5. Strategize a solution! This may involve both augmenting or adding to the forces in step 3, and reducing or eliminating the forces in step 4.
- **Project managers use inversion in an exercise called pre-mortem.**
- The team gathers to imagine it's six months from now and the project they've worked on has failed. They examine this potential scenario by asking questions like "What went wrong?", "What mistakes did we make?" or "Why did this project fail?".
- In other words, the default should be to give anything away that does not "spark joy" in your life. This shift in mindset inverts decluttering by focusing on what you want to keep rather than what you want to discard.
- Bernays's efforts to make smoking in public socially acceptable had equally startling results. He linked cigarette smoking with women's emancipation. To smoke was to be free. Cigarettes were marketed as "torches of freedom."
  - **Although the campaign utilized more principles than just inversion, it was the original decision to invert the approach that provided the framework from which the campaign was created and executed. Bernays didn't focus on how to sell more cigarettes to women within the existing social structure. Sales would have undoubtedly been a lot more limited. Instead he thought about what the world would look like if women smoked often and anywhere, and then set about trying to make that world a reality. Once he did that, selling cigarettes to women was comparatively easy**
- The test of a first-rate intelligence is the ability to hold two opposing ideas in mind at the same time and still retain the ability to function. One should, for example, be able to see that things are hopeless yet be determined to make them otherwise.

Circle of Competence

- How do you operate outside a circle of competence?
  - Learn at least the basics of the realm you're operating in
  - Talk to someone whose circle of competence in the area is strong. Take the time to do a bit of research to at least define questions you need to ask, and what information you need, to make a good decisiona
- Learn from the mistakes of others. You can't live long enough to make them all yourself
- There is no shortcut to understanding. Building a circle of competence takes years of experience, of making mistakes, and of actively seeking out better methods of practice and thought
- When you are honest about where your knowledge is lacking you know where you are vulnerable and where you can improve.
- Within our circles of competence, we know exactly what we don't know. We are able to make decisions quickly and relatively accurately. We possess detailed knowledge of additional information we might need to make a decision with full understanding, or even what information is unobtainable.
- Finally, you must occasionally solicit external feedback. This helps build a circle, but is also critical for maintaining one.
- Falsibiality
  - If they can't ever be proven false because we have no way of testing them, then the best we can do is try to determine their probability of being true.
  - This means a good theory must have an element of risk to it—namely, it has to risk being wrong. It must be able to be proven wrong under stated conditions
  - Falsification is the opposite of verification; you must try to show the theory is incorrect, and if you fail to do so, you actually strengthen it

Acquiring Wisdom

- A mental model is simply a representation of how something works. We cannot keep all of the details of the world in our brains, so we use models to simplify the complex into understandable and organizable chunks
- This often comes down to understanding a problem accurately and seeing the secondary and subsequent consequences of any proposed action
- "I don't want to be a great problem solver. I want to avoid problems—prevent them from happening and doing it right from the beginning."

Second Order Thinking

- **Second-order thinking teaches us two important concepts that underlie the use of this model. If we're interested in understanding how the world really works, we must include second and subsequent effects. We must be as observant and honest as we can about the web of connections we are operating in. How often is short-term gain worth protracted long-term pain?part of our food chain**.
- Second-order thinking is thinking farther ahead and thinking holistically. It requires us to not only consider our actions and their immediate consequences, but the subsequent effects of those actions as well
- Example
  - When it comes to the overuse of antibiotics in meat, the first-order consequence is that the animals gain more weight per pound of food consumed, and thus there is profit for the farmer. Animals are sold by weight, so the less food you have to use to bulk them up, the more money you will make when you go to sell them.
  - The second-order effects, however, have many serious, negative consequences. The bacteria that survive this continued antibiotic exposure are antibiotic resistant. That means that the agricultural industry, when using these antibiotics as bulking agents, is allowing mass numbers of drugresistant bacteria to become part of our food chain.
- Second-order thinking and realizing long-term interests:
- We must ask ourselves the critical question: And then what?
- Failing to consider second- and third-order consequences is the cause of a lot of painfully bad decisions, and it is especially deadly when the first inferior option confirms your own biases. Never seize on the first available option, no matter how good it seems, before you've asked questions and explored - Ray Dalio

Regret Minimization Framework - Jeff Bezos

1. Project yourself to age 80.
2. Imagine yourself looking back on your life at that age, knowing that you want to feel as few regrets as possible.
3. Ask yourself, "In X number of years, will I regret taking this action (or not taking this action)?"

Thought Experiment

- STEPS
  1. Ask a question
  2. Conduct background research
  3. Construct hypothesis
  4. Test with (thought) experiments
  5. Analyze outcomes and draw conclusions
  6. Compare to hypothesis and adjust accordingly (new question, etc.)
- Areas to Apply
  1. Imagining physical impossibilities
  2. Re-imagining history
  3. Intuiting the non-intuitivempare to hypothesis and adjust accordingly (new question, etc.)

The map is not the territory

- The map of reality is not reality. Even the best maps are imperfect. That's because they are reductions of what they represent
- In other words, the description of the thing is not the thing itself. The model is not reality. The abstraction is not the abstracted.
- Maps have long been a part of human society. They are valuable tools to pass on knowledge. Still, in using maps, abstractions, and models, we must always be wise to their limitations. They are, by definition, reductions of something far more complex. There is always at least an element of subjectivity, and we need to remember that they are created at particular moments in time.
- When we mistake the map for reality, we start to think we have all the answers. We create static rules or policies that deal with the map but forget that we exist in a constantly changing world. When we close off or ignore feedback loops, we don't see the terrain has changed and we dramatically reduce our ability to adapt to a changing environment.
- Reality is the ultimate update: When we enter new and unfamiliar territory it's nice to have a map on hand. Everything from travelling to a new city, to becoming a parent for the first time has maps that we can use to improve our ability to navigate the terrain. But territories change, sometimes faster than the maps and models that describe them. We can and should update them based on our own experiences in the territory. That's how good maps are built: feedback loops created by explorers
- Always look for the alternatives.Even if your thougts look nonsense at first

First Principles Thinking

- **I think people's thinking process is too bound by convention or analogy to prior experiences. It's rare that people try to think of something on a first principles basis. They'll say, "We'll do that because it's always been done that way." Or they'll not do it because "Well, nobody's ever done that, so it must not be good. But that's just a ridiculous way to think. You have to build up the reasoning from the ground up—"from the first principles" is the phrase that's used in physics. You look at the fundamentals and construct your reasoning from that, and then you see if you have a conclusion that works or doesn't work, and it may or may not be different from what people have done in the past**
  - Rockets are absurdly expensive, which is a problem because Musk wants to send people to Mars. And to send people to Mars, you need cheaper rockets. So he asked himself, "What is a rocket made of? Aerospace-grade aluminum alloys, plus some titanium, copper, and carbon fiber. And ... what is the value of those materials on the commodity market? It turned out that the materials cost of a rocket was around two percent of the typical price."
- Techniques for establishing first principles
  - Socratic questioning and the Five Whys.
    - Socratic
      1. Clarifying your thinking and explaining the origins of your ideas. (Why do I think this? What exactly do I think?)
      2. Challenging assumptions. (How do I know this is true? What if I thought the opposite?)
      3. Looking for evidence. (How can I back this up? What are the sources?)
      4. Considering alternative perspectives. (What might others think? How do I know I am correct?)
      5. Examining consequences and implications. (What if I am wrong? What are the consequences if I am?)
      6. Questioning the original questions. (Why did I think that? Was I correct? What conclusions can I draw from the reasoning process?)
  - The discovery that a bacterium, not stress, actually caused the majority of stomach ulcers is a great example of what can be accomplished when we push past assumptions to get at first principles
  - Researchers then looked at why meat tastes like meat. Part of the answer is a chemical reaction between sugars and amino acids during cooking, known as the Maillard reaction. This is what gives meat its flavor and smell. By replicating this exact reaction, scientists expect to be able to replicate the first principles of meat: taste and scent
  - Starting in the 1970s, scientists began to ask: what are the first principles of meat? The answers generally include taste, texture, smell, and use in cooking. Do you know what is not a first principle of meat? Once being a part of an animal. Perhaps most important to consumers is the taste. Less important is whether it was actually once part of a cow.
  - **first principles thinking identifies the elements that are, in the context of any given situation, non-reducible.**

Occam's Razor

- Why are more complicated explanations less likely to be true? Let's work it out mathematically. Take two competing explanations, each of which seem to equally explain a given phenomenon. If one of them requires the interaction of three variables and the other the interaction of thirty variables, all of which must have occurred to arrive at the stated conclusion, which of these is more likely to be in error? If each variable has a 99% chance of being correct, the first explanation is only 3% likely to be wrong. 6 , 7 , 8 The second, more complex explanation, is about nine times as likely to be wrong, or 26%. The simpler explanation is more robust in the face of uncertainty.
- Anybody can make the simple complicated. Creativity is making the complicated simple.
- Simpler explanations are more likely to be true than complicated ones.
- But always remembering that a simpler explanation is more likely to be correct than a complicated one goes a long way towards helping us conserve our most precious resources of time and energy
- **Occam's Razor can be quite powerful in the medical field, for both doctors and patients.**
  - It's a way of using general background knowledge in solving specific problems with new information. **We know that generally the flu is far more common than Ebola, so when a good doctor encounters a patient with what looks like the flu, the simplest explanation is almost certainly the correct one**. A diagnosis of Ebola means a call to the Center for Disease Control and a quarantine—an expensive and panicinducing mistake if the patient just has the flu. Thus, medical students are taught to heed the saying, "When you hear hoofbeats, think horses, not zebras."

10-10-10 Rule

- The idea is to take whatever decision you need to make, and then ask yourself 3 questions:
  - (1) How will I feel about it 10 minutes from now?
  - (2) How will I feel about it 10 months from now?
  - (3) How will I feel about it 10 years from now?

40-70 rule

- He says that anytime you face a difficult decision, you should have no less than 40% and no more than 70% of the information you need to make that decision