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Mental Models I Find Repeatedly Useful

Update: I'm co-authoring a book about the mental models from this post. Get notified when the book comes out [here](#).

Around 2003 I came across [Charlie Munger's](#) 1995 speech, [The Psychology of Human Misjudgment](#), which introduced me to how behavioral economics can be applied in business and investing. More profoundly, though, it opened my mind to the power of seeking out and applying mental models across a wide array of disciplines.

A mental model is just a concept you can use to help try to explain things (e.g. [Hanlon's Razor](#)—"never attribute to malice that which is adequately explained by carelessness."). There are tens of thousands of mental models, and every discipline has their own set that you can learn through coursework, mentorship, or first-hand experience.

There is a much smaller set of concepts, however, that come up repeatedly in day-to-day decision making, problem solving, and truth seeking. As Munger says, “80 or 90 important models will carry about 90% of the freight in making you a worldly-wise person.”

This post is my attempt to enumerate the mental models that are repeatedly useful to me. This set is clearly biased from my own experience and surely incomplete. I hope to continue to revise it as I remember and learn more.

How-to Use This List

I find mental models are useful to try to make sense of things and to help generate ideas. To actually be useful, however, you have to apply them in the right context at the right time. And for that to happen naturally, you have to know them well and practice using them.

Therefore, here are two suggestions for using this list:

1. For mental models you don't know or don't know well, you can use this list as a jumping off point to study them. I've provided links (mainly to Wikipedia) to start that process.
2. When you have a particular problem in front of you, you can go down this list, and see if any of the models could possibly apply.

Notes

- Most of the mental models on this list are here because they are useful outside of their specific discipline. For example, use of the mental model “peak oil” isn't restricted to an energy context. Most references to “peak x” are an invocation of this model. Similarly, inflation as a concept applies outside of economics, e.g. grade inflation and expectations inflation.
- I roughly grouped the mental models by discipline, but as noted, this grouping is not to be taken as an assertion that they only apply within that discipline. The best ideas often arise when going cross-discipline.
- I realize my definition of mental model differs from some others, with mine being more broadly defined as any concept that helps explain, analyze, or navigate the world. I prefer this broader definition because it allows me to assemble a more wide-ranging list of useful concepts that may not be mental models under other definitions, but I nevertheless find on relatively equal footing in terms of usefulness in the real world.

- The numbers next to each mental model reflect the frequency with which they come up:
 (1)—Frequently (63 models)
 (2)—Occasionally (43 models)
 (3)—Rarely, though still repeatedly (83 models)
- If studying new models, I'd start with the lower numbers first. The quotes next to each concept are meant to be a basic definition to remind you what it is, and not a teaching tool. Follow the link to learn more.
- I am not endorsing any of these concepts as normatively good; I'm just saying they have repeatedly helped me explain and navigate the world.
- I wish I had learned many of these years earlier. In fact, the proximate cause for posting this was so I could more effectively answer the question I frequently get from people I work with: "what should I learn next?" If you're trying to be generally effective, my best advice is to start with the things on this list.

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Explaining

- (1) Hanlon's Razor—"Never attribute to malice that which is adequately explained by carelessness." (related: fundamental attribution error—"the tendency for people to place an undue emphasis on internal characteristics of the agent (character or intention), rather than external factors, in explaining another person's behavior in a given situation.")
- (1) Occam's Razor—"Among competing hypotheses, the one with the fewest assumptions should be selected." (related: conjunction fallacy, overfitting, "when you hear hoofbeats, think of horses not zebras.")
- (1) Cognitive Biases—"Tendencies to think in certain ways that can lead to systematic deviations from a standard of rationality or good judgments." (See list of cognitive biases)
- (1) Arguing from First Principles—"A first principle is a basic, foundational, self-evident proposition or assumption that cannot be deduced from any other proposition or assumption." (related: dimensionality reduction; orthogonality; "Reasonable minds can disagree" if underlying premises differ.)

- (1) Proximate vs Root Cause—“A proximate cause is an event which is closest to, or immediately responsible for causing, some observed result. This exists in contrast to a higher-level ultimate cause (or distal cause) which is usually thought of as the ‘real’ reason something occurred.” (related: 5 whys—“to determine the root cause of a defect or problem by repeating the question ‘Why?’”)

Modeling

- (1) Thought Experiment—“considers some hypothesis, theory, or principle for the purpose of thinking through its consequences.” (related: counterfactual thinking)
- (1) Systems Thinking—“By taking the overall system as well as its parts into account systems thinking is designed to avoid potentially contributing to further development of unintended consequences.” (related: causal loop diagrams; stock and flow; Le Chatelier’s principle, hysteresis—“the time-based dependence of a system’s output on present and past inputs.”; “Can’t see the forest for the trees.”)
- (1) Scenario Analysis—“A process of analyzing possible future events by considering alternative possible outcomes.” (related: “Skate to where the puck is going.”; black swan theory—“a metaphor that describes an event that comes as a surprise, has a major effect, and is often inappropriately rationalized after the fact with the benefit of hindsight.”)
- (1) Power-law—“A functional relationship between two quantities, where a relative change in one quantity results in a proportional relative change in the other quantity, independent of the initial size of those quantities: one quantity varies as a power of another.” (related: Pareto distribution; Pareto principle—“for many events, roughly 80% of the effects come from 20% of the causes.”, diminishing returns, premature optimization, heavy-tailed distribution, fat-tailed distribution; long tail—“the portion of the distribution having a large number of occurrences far from the “head” or central part of the distribution.”; black swan theory—“a metaphor that describes an event that comes as a surprise, has a major effect, and is often inappropriately rationalized after the fact with the benefit of hindsight.”)
- (1) Normal Distribution—“A very common continuous probability distribution...Physical quantities that are expected to be the sum of many independent processes (such as measurement errors) often have distributions that are nearly normal.” (related: central limit theorem)

- (1) Sensitivity Analysis—“The study of how the uncertainty in the output of a mathematical model or system (numerical or otherwise) can be apportioned to different sources of uncertainty in its inputs.”
- (1) Cost-benefit Analysis—“A systematic approach to estimating the strengths and weaknesses of alternatives that satisfy transactions, activities or functional requirements for a business.” (related: net present value—“a measurement of the profitability of an undertaking that is calculated by subtracting the present values of cash outflows (including initial cost) from the present values of cash inflows over a period of time.”, discount rate)
- (3) Simulation—“The imitation of the operation of a real-world process or system over time.” (related: Queuing theory—“the mathematical study of waiting lines, or queues.”)
- (3) Pareto Efficiency—“A state of allocation of resources in which it is impossible to make any one individual better off without making at least one individual worse off...A Pareto improvement is defined to be a change to a different allocation that makes at least one individual better off without making any other individual worse off, given a certain initial allocation of goods among a set of individuals.”

Physics

- (2) Critical Mass—“The smallest amount of fissile material needed for a sustained nuclear chain reaction.” “In social dynamics, critical mass is a sufficient number of adopters of an innovation in a social system so that the rate of adoption becomes self-sustaining and creates further growth.”
- (2) Activation Energy—“The minimum energy which must be available to a chemical system with potential reactants to result in a chemical reaction.”
- (2) Catalyst—“A substance which increases the rate of a chemical reaction.” (related: tipping point)
- (2) Leverage—“The force amplification achieved by using a tool, mechanical device or machine system.” (related: Theory of constraints—“a management paradigm that views any manageable system as being limited in achieving more of its goals by a very small number of constraints.”)
- (2) Inertia—“the resistance of any physical object to any change in its state of motion; this includes changes to its speed, direction or

state of rest. It is the tendency of objects to keep moving in a straight line at constant velocity.” (related: strategy tax—“sometimes products developed inside a company...have to accept constraints that go against competitiveness, or might displease users, in order to further the cause of another product.”; flywheel—“a rotating mechanical device that is used to store rotational energy. Flywheels have an inertia called the moment of inertia and thus resist changes in rotational speed.”)

- (2) Half-life—“the time required for a quantity to reduce to half its initial value. The term is commonly used in nuclear physics to describe how quickly unstable atoms undergo, or how long stable atoms survive, radioactive decay.” (related: viral marketing)
- (3) Heisenberg Uncertainty Principle—“A fundamental limit to the precision with which certain pairs of physical properties of a particle, known as complementary variables, such as position x and momentum p , can be known.”

Brainstorming

- (1) Lateral Thinking—“Solving problems through an indirect and creative approach, using reasoning that is not immediately obvious and involving ideas that may not be obtainable by using only traditional step-by-step logic.”
- (1) Divergent Thinking vs Convergent Thinking—“Divergent thinking is a thought process or method used to generate creative ideas by exploring many possible solutions. It is often used in conjunction with its cognitive opposite, convergent thinking, which follows a particular set of logical steps to arrive at one solution, which in some cases is a ‘correct’ solution.” (related: groupthink; Maslow’s hammer—“if all you have is a hammer, everything looks like a nail.”)
- (2) Crowdsourcing—“The process of obtaining needed services, ideas, or content by soliciting contributions from a large group of people, especially an online community, rather than from employees or suppliers.” (related: wisdom of the crowd—“a large group’s aggregated answers to questions involving quantity estimation, general world knowledge, and spatial reasoning has generally been found to be as good as, and often better than, the answer given by any of the individuals within the group.”; collective intelligence; bandwagon effect—“a phenomenon whereby the rate of uptake of beliefs, ideas, fads and trends increases the more that they have already been adopted by others.”; Stone Soup)

- (2) Paradigm shift—“a fundamental change in the basic concepts and experimental practices of a scientific discipline.” (related: The Structure of Scientific Revolutions—“An episodic model in which periods of such conceptual continuity in normal science were interrupted by periods of revolutionary science; Planck’s principle—“the view that scientific change does not occur because individual scientists change their mind, but rather that successive generations of scientists have different views.”; punctuated equilibrium)

Experimenting

- (1) Scientific Method—“Systematic observation, measurement, and experiment, and the formulation, testing, and modification of hypotheses.” (related: reproducibility)
- (1) Proxy—“A variable that is not in itself directly relevant, but that serves in place of an unobservable or immeasurable variable. In order for a variable to be a good proxy, it must have a close correlation, not necessarily linear, with the variable of interest.” (related: revealed preference; Proxy War—“A conflict between two nations where neither country directly engages the other.”)
- (1) Selection Bias—“The selection of individuals, groups or data for analysis in such a way that proper randomization is not achieved, thereby ensuring that the sample obtained is not representative of the population intended to be analyzed.” (related: sampling bias)
- (1) Response Bias—“A wide range of cognitive biases that influence the responses of participants away from an accurate or truthful response.”
- (2) Observer Effect—“Changes that the act of observation will make on a phenomenon being observed.” (related: Schrödinger’s cat)
- (2) Survivorship Bias—“The logical error of concentrating on the people or things that ‘survived’ some process and inadvertently overlooking those that did not because of their lack of visibility.”

Interpreting

- (1) Order of Magnitude—“An order-of-magnitude estimate of a variable whose precise value is unknown is an estimate rounded to the nearest power of ten.” (related: order of approximation, back-of-the-envelope calculation, dimensional analysis, Fermi problem)
- (1) Major vs Minor Factors—Major factors explains major portions of the results, while minor factors only explain minor portions. (related: first order vs second order effects—first order effects directly

follow from a cause, while second order effects follow from first order effects.)

- (1) False Positives and False Negatives—“A false positive error, or in short false positive, commonly called a ‘false alarm’, is a result that indicates a given condition has been fulfilled, when it actually has not been fulfilled...A false negative error, or in short false negative, is where a test result indicates that a condition failed, while it actually was successful, i.e. erroneously no effect has been assumed.”
- (1) Confidence Interval—“Confidence intervals consist of a range of values (interval) that act as good estimates of the unknown population parameter; however, the interval computed from a particular sample does not necessarily include the true value of the parameter.” (related: error bar)
- (2) Bayes’ Theorem—“Describes the probability of an event, based on conditions that might be related to the event. For example, suppose one is interested in whether a person has cancer, and knows the person’s age. If cancer is related to age, then, using Bayes’ theorem, information about the person’s age can be used to more accurately assess the probability that they have cancer.” (related: base rate fallacy)
- (2) Regression to the Mean—“The phenomenon that if a variable is extreme on its first measurement, it will tend to be closer to the average on its second measurement.” (related: Pendulum swing; variance; Gambler’s fallacy)
- (2) Inflection Point—“A point on a curve at which the curve changes from being concave (concave downward) to convex (concave upward), or vice versa.”
- (3) Simpson’s Paradox—“A paradox in probability and statistics, in which a trend appears in different groups of data but disappears or reverses when these groups are combined.”

Deciding

- (1) Business Case—“Captures the reasoning for initiating a project or task. It is often presented in a well-structured written document, but may also sometimes come in the form of a short verbal argument or presentation.” (related: why this now?)
- (1) Opportunity Cost—“The value of the best alternative forgone where, given limited resources, a choice needs to be made between several mutually exclusive alternatives. Assuming the best choice is

made, it is the ‘cost’ incurred by not enjoying the benefit that would have been had by taking the second best available choice.” (related: cost of capital)

- (1) Intuition—Personal experience coded into your personal neural network, which means your intuition is dangerous outside the bounds of your personal experience. (related: thinking fast vs thinking slow—“a dichotomy between two modes of thought: ‘System 1’ is fast, instinctive and emotional; ‘System 2’ is slower, more deliberative, and more logical.”)
- (1) Local vs Global Optimum—“A local optimum of an optimization problem is a solution that is optimal (either maximal or minimal) within a neighboring set of candidate solutions. This is in contrast to a global optimum, which is the optimal solution among all possible solutions, not just those in a particular neighborhood of values.”
- (1) Decision Trees—“A decision support tool that uses a tree-like graph or model of decisions and their possible consequences, including chance event outcomes, resource costs, and utility.” (related: expected value)
- (1) Sunk Cost—“A cost that has already been incurred and cannot be recovered.” (related: “throwing good money after bad”, “in for a penny, in for a pound”)
- (1) Availability Bias—“People tend to heavily weigh their judgments toward more recent information, making new opinions biased toward that latest news.”
- (1) Confirmation Bias—“The tendency to search for, interpret, favor, and recall information in a way that confirms one’s preexisting beliefs or hypotheses, while giving disproportionately less consideration to alternative possibilities.” (related: cognitive dissonance)
- (3) Loss Aversion—“People’s tendency to strongly prefer avoiding losses to acquiring gains.” (related: diminishing marginal utility)

Reasoning

- (1) Anecdotal—“Using a personal experience or an isolated example instead of a sound argument or compelling evidence.”
- (1) False Cause—“Presuming that a real or perceived relationship between things means that one is the cause of the other.” (related: correlation does not imply causation, or in xkcd form)
- (1) Straw Man—“Giving the impression of refuting an opponent’s argument, while actually refuting an argument that was not ad-

vanced by that opponent.”

- (1) Plausible—Thinking that just because something is plausible means that it is true.
- (1) Likely—Thinking that just because something is possible means that it is likely.
- (1) Appeal to Emotion—“Manipulating an emotional response in place of a valid or compelling argument.”
- (1) Ad Hominem—“Attacking your opponent’s character or personal traits in an attempt to undermine their argument.”
- (1) Slippery Slope—“Asserting that if we allow A to happen, then Z will eventually happen too, therefore A should not happen.” (related: broken windows theory—“maintaining and monitoring urban environments to prevent small crimes such as vandalism, public drinking, and toll-jumping helps to create an atmosphere of order and lawfulness, thereby preventing more serious crimes from happening.”)
- (1) Black or White—“When two alternative states are presented as the only possibilities, when in fact more possibilities exist.”
- (1) Bandwagon—“Appealing to popularity or the fact that many people do something as an attempted form of validation.”
- For a longer list, see Thou shall not commit logical fallacies (I have this poster on my office door.)

Negotiating

- (1) The Third Story—“The Third Story is one an impartial observer, such as a mediator, would tell; it’s a version of events both sides can agree on.” (related: Most Respectful Interpretation)
- (1) Active Listening—“Requires that the listener fully concentrates, understands, responds and then remembers what is being said.”
- (1) Trade-offs—“A situation that involves losing one quality or aspect of something in return for gaining another quality or aspect.”
- (1) Incentives—“Something that motivates an individual to perform an action.” (related: carrot and stick—“a policy of offering a combination of rewards and punishment to induce behavior.”)
- (2) Best Alternative to a Negotiated Agreement (BATNA)—“The most advantageous alternative course of action a party can take if negotiations fail and an agreement cannot be reached.”

- (2) Zero-sum vs Non-zero-sum—“A zero-sum game is a mathematical representation of a situation in which each participant’s gain (or loss) of utility is exactly balanced by the losses (or gains) of the utility of the other participant(s)...In contrast, non-zero-sum describes a situation in which the interacting parties’ aggregate gains and losses can be less than or more than zero.” (related: win-win—“A win-win strategy is a conflict resolution process that aims to accommodate all disputants.”)
- (3) Alternative Dispute Resolution (ADR)—“Dispute resolution processes and techniques that act as a means for disagreeing parties to come to an agreement short of litigation.” (related: mediation; arbitration; “extend an olive branch.”)
- (3) Prisoner’s Dilemma—“A standard example of a game analyzed in game theory that shows why two completely ‘rational’ individuals might not cooperate, even if it appears that it is in their best interests to do so.” (related: Nash equilibrium, evolutionarily stable strategy)

Mitigating

- (1) Unintended Consequences—“Outcomes that are not the ones foreseen and intended by a purposeful action.” (related: collateral damage—“Deaths, injuries, or other damage inflicted on an unintended target.”; Goodhart’s law—“When a measure becomes a target, it ceases to be a good measure”; Campbell’s law; Streisand Effect—“The phenomenon whereby an attempt to hide, remove, or censor a piece of information has the unintended consequence of publicizing the information more widely, usually facilitated by the Internet”; cobra effect—“when an attempted solution to a problem actually makes the problem worse.”; “Kick a hornet’s nest.”)
- (2) Preserving Optionality—“A strategy of keeping options open and fluid, fighting the urge to make choices too soon, before all of the uncertainties have been resolved.” (related: tyranny of small decisions—“a situation where a series of small, individually rational decisions can negatively change the context of subsequent choices, even to the point where desired alternatives are irreversibly destroyed.”; boiling frog—“an anecdote describing a frog slowly being boiled alive.”; path dependence; “Everybody has a plan until they get punched in the mouth.”; fog of war; OODA loop)
- (2) Precautionary Principle—“If an action or policy has a suspected risk of causing harm to the public, or to the environment, in the absence of scientific consensus (that the action or policy is not harm-

ful), the burden of proof that it is not harmful falls on those taking an action that may or may not be a risk.”

- (2) Short-termism—“Short-termism refers to an excessive focus on short-term results at the expense of long-term interests.”

Managing

- (1) Weekly 1-1s—“1-1’s can add a whole new level of speed and agility to your company.”
- (1) Forcing Function—“A forcing function is any task, activity or event that forces you to take action and produce a result.”
- (1) Directly Responsible Individual—A management concept, originally championed by Apple, that good things come if someone is explicitly responsible for something. (related: diffusion of responsibility—“a sociopsychological phenomenon whereby a person is less likely to take responsibility for action or inaction when others are present.”; bystander effect—“a social psychological phenomenon that refers to cases in which individuals do not offer any means of help to a victim when other people are present.”)
- (1) Pygmalion Effect—“The phenomenon whereby higher expectations lead to an increase in performance.” (related: market pull technology policy—where the government sets future standards beyond what the current market can deliver, and the market pulls that technology into existence.; Radical Candor)
- (1) Virtual Team—“A group of individuals who work across time, space and organizational boundaries with links strengthened by webs of communication technology.” At least in some circumstances, it is possible to have a completely virtual team. The downsides in lack of face-to-face communication can be outweighed by the upsides in sourcing from the entire world.
- (2) Introversion vs Extraversion—“Extraversion tends to be manifested in outgoing, talkative, energetic behavior, whereas introversion is manifested in more reserved and solitary behavior. Virtually all comprehensive models of personality include these concepts in various forms.”
- (2) IQ vs EQ—“IQ is a total score derived from one of several standardized tests designed to assess human intelligence.” “EQ is the capacity of individuals to recognize their own, and other people’s emotions, to discriminate between different feelings and label them appropriately, and to use emotional information to guide thinking and behavior.”

- (2) Growth Mindset vs Fixed Mindset—“Those with a ‘fixed mindset’ believe that abilities are mostly innate and interpret failure as the lack of necessary basic abilities, while those with a ‘growth mindset’ believe that they can acquire any given ability provided they invest effort or study.”
- (2) Hindsight Bias—“The inclination, after an event has occurred, to see the event as having been predictable, despite there having been little or no objective basis for predicting it.” (related: Pollyanna principle—“tendency for people to remember pleasant items more accurately than unpleasant ones”)
- (2) Organizational Debt—“All the people/culture compromises made to ‘just get it done’ in the early stages of a startup.”
- (2) Generalist vs Specialist—“A generalist is a person with a wide array of knowledge, the opposite of which is a specialist.” (related: hedgehog vs fox—“A fox knows many things, but a hedgehog one important thing.”)
- (2) Consequence vs Conviction—“Where there is low consequence and you have very low confidence in your own opinion, you should absolutely delegate. And delegate completely, let people make mistakes and learn. On the other side, obviously where the consequences are dramatic and you have extremely high conviction that you are right, you actually can’t let your junior colleague make a mistake.”
- (3) High-context vs Low-context Culture—“In a higher-context culture, many things are left unsaid, letting the culture explain. Words and word choice become very important in higher-context communication, since a few words can communicate a complex message very effectively to an in-group (but less effectively outside that group), while in a low-context culture, the communicator needs to be much more explicit and the value of a single word is less important.”
- (3) Peter Principle—“The selection of a candidate for a position is based on the candidate’s performance in their current role, rather than on abilities relevant to the intended role. Thus, employees only stop being promoted once they can no longer perform effectively, and ‘managers rise to the level of their incompetence.’”
- (3) Maslow’s Hierarchy of Needs—“Maslow used the terms ‘physiological’, ‘safety’, ‘belongingness’ and ‘love’, ‘esteem’, ‘self-actualization’, and ‘self-transcendence’ to describe the pattern that human motivations generally move through... [though there is] little evi-

dence for the ranking of needs that Maslow described or for the existence of a definite hierarchy at all.”

- (3) Loyalists vs Mercenaries—“There are highly loyal teams that can withstand almost anything and remain steadfastly behind their leader. And there are teams that are entirely mercenary and will walk out without thinking twice about it.”
- (3) Dunbar’s Number—“A suggested cognitive limit to the number of people with whom one can maintain stable social relationships..with a commonly used value of 150.”
- (3) Zero Tolerance—“Strict punishment for infractions of a stated rule, with the intention of eliminating undesirable conduct.”
- (3) Commandos vs Infantry vs Police—“Three distinct groups of people that define the lifetime of a company: Commandos, Infantry, and Police: Whether invading countries or markets, the first wave of troops to see battle are the commandos...Grouping offshore as the commandos do their work is the second wave of soldiers, the infantry...But there is still a need for a military presence in the territory they leave behind, which they have liberated. These third-wave troops hate change. They aren’t troops at all but police.”

Developing

- (1) Technical Debt—“A concept in programming that reflects the extra development work that arises when code that is easy to implement in the short run is used instead of applying the best overall solution.”
- (1) Binary Search—“A search algorithm that finds the position of a target value within a sorted array. It compares the target value to the middle element of the array; if they are unequal, the half in which the target cannot lie is eliminated and the search continues on the remaining half until it is successful.” (related: debugging)
- (1) Divide and Conquer—“Recursively breaking down a problem into two or more sub-problems of the same or related type, until these become simple enough to be solved directly. The solutions to the sub-problems are then combined to give a solution to the original problem.”
- (1) Design Pattern—“The re-usable form of a solution to a design problem.” (related: anti-pattern—“a common response to a recurring problem that is usually ineffective and risks being highly counterproductive.”, dark pattern—“user interfaces designed to trick people.”)

- (1) Black box—“a device, system or object which can be viewed in terms of its inputs and outputs (or transfer characteristics), without any knowledge of its internal workings. Its implementation is ‘opaque’ (black).”
- (3) Zawinski’s Law—“Every program attempts to expand until it can read mail. Those programs which cannot so expand are replaced by ones which can.” (related: Greenspun’s tenth rule—“any sufficiently complicated C or Fortran program contains an ad hoc, informally-specified, bug-ridden, slow implementation of half of Common Lisp.”)
- (3) Moore’s Law—“The observation that the number of transistors in a dense integrated circuit doubles approximately every two years.”
- (3) Metcalfe’s Law—“The value of a telecommunications network is proportional to the square of the number of connected users of the system...Within the context of social networks, many, including Metcalfe himself, have proposed modified models using $(n \times \log n)$ proportionality rather than n^2 proportionality.”
- (3) Clarke’s Third Law—“Any sufficiently advanced technology is indistinguishable from magic.”

Business

- (1) Minimum Viable Product (MVP)—“A product with just enough features to gather validated learning about the product and its continued development.” (related: perfect is the enemy of good; de-risking; Customer Development, “Get out of the building.”)
- (1) Product/Market Fit—“the degree to which a product satisfies a strong market demand.” (related: pivot—“structured course correction designed to test a new fundamental hypothesis about the product, strategy, and engine of growth.”, “rebuilding year”)
- (1) Reversible vs Irreversible Decisions—For reversible decisions: “If the decision was a bad call you can unwind it in a reasonable period of time. An irreversible decision is firing an employee, launching your product, a five-year lease for an expensive new building, etc. These are usually difficult or impossible to reverse.” (related: Jeff Bezos on Type 1, Type 2 decisions)
- (2) Capital Allocation Options—“Five capital allocation choices CEOs have: 1) invest in existing operations; 2) acquire other businesses; 3) issue dividends; 4) pay down debt; 5) repurchase stock.

Along with this, they have three means of generating capital: 1) internal/operational cash flow; 2) debt issuance; 3) equity issuance.”

- (2) Open Platform vs Closed Platform—“A closed platform, walled garden or closed ecosystem is a software system where the carrier or service provider has control over applications, content, and media, and restricts convenient access to non-approved applications or content. This is in contrast to an open platform, where consumers generally have unrestricted access to applications, content, and much more.”
- (2) Freemium—“a pricing strategy by which a product or service (typically a digital offering or application such as software, media, games or web services) is provided free of charge, but money (premium) is charged for proprietary features, functionality, or virtual goods.” (related: “If you’re not paying for it, you’re the product.”; pay to play)
- (3) Luck Surface Area—“When you do something you’re excited about you will naturally pull others into your orbit. And the more people with whom you share your passion, the more who will be pulled into your orbit.”
- (3) Hunting Elephants vs Flies—“Salespeople sometimes refer to ‘elephants’, ‘deers’ and ‘rabbits’ when they talk about the first three categories of customers. To extend the metaphor to the 4th and 5th type of customer, let’s call them ‘mice’ and ‘flies’. So how can you hunt 1,000 elephants, 10,000 deers, 100,000 rabbits, 1,000,000 mice or 10,000,000 flies?” (related: brontosaurus, whale, and microbe)
- (3) Secrets—“Every one of today’s most famous and familiar ideas was once unknown and unsuspected... There are many more secrets left to find, but they will yield only to relentless searchers.”
- (3) Strategic Acquisition vs Financial Acquisition vs Aquihire—Different motivations for an acquiring company typically have significantly different valuation models. (related: rollup—“a technique used by investors (commonly private equity firms) where multiple small companies in the same market are acquired and merged.”, P/E-driven acquisitions, auction)

Influencing

- (1) Framing—“With the same information being used as a base, the ‘frame’ surrounding the issue can change the reader’s perception without having to alter the actual facts.” (related: anchoring)

- (2) Cialdini's Six Principles of Influence—Reciprocity (“People tend to return a favor.”), Commitment (“If people commit...they are more likely to honor that commitment.”), Social Proof (“People will do things they see other people are doing.”), Authority (“People will tend to obey authority figures.”), Liking (“People are easily persuaded by other people they like.”), and Scarcity (“Perceived scarcity will generate demand”). (related: foot-in-the-door technique)
- (3) Paradox of Choice—“Eliminating consumer choices can greatly reduce anxiety for shoppers.” (related: Hick's Law, “increasing the number of choices will increase the decision time logarithmically.”)
- (3) Major vs Minor Chords—“In Western music, a minor chord, in comparison, ‘sounds darker than a major chord.’”
- (3) Coda—“A term used in music primarily to designate a passage that brings a piece to an end.” (related: CTA.) People psychologically expect codas, and so they can be used for influence.

Marketing

- (1) Bullseye Framework—“With nineteen traction channels to consider, figuring out which one to focus on is tough. That’s why we’ve created a simple framework called Bullseye that will help you find *the channel* that will get you traction.”
- (1) Technology Adoption Lifecycle—“Describes the adoption or acceptance of a new product or innovation, according to the demographic and psychological characteristics of defined adopter groups. The process of adoption over time is typically illustrated as a classical normal distribution or “bell curve”. The model indicates that the first group of people to use a new product is called ‘innovators’, followed by ‘early adopters’. Next come the early majority and late majority, and the last group to eventually adopt a product are called ‘laggards’.” (related: S-curve, Crossing the Chasm, Installation Period vs Deployment Period)
- (3) Jobs To Be Done—“Consumers usually don’t go about their shopping by conforming to particular segments. Rather, they take life as it comes. And when faced with a job that needs doing, they essentially ‘hire’ a product to do that job.”
- (3) Fear, Uncertainty, and Doubt (FUD)—“A disinformation strategy used in sales, marketing, public relations, politics and propaganda. FUD is generally a strategy to influence perception by disseminating negative and dubious or false information and a manifestation of the appeal to fear.”

Competing

- (2) Supply and Demand—“An economic model of price determination in a market. It concludes that in a competitive market, the unit price for a particular good, or other traded item such as labor or liquid financial assets, will vary until it settles at a point where the quantity demanded (at the current price) will equal the quantity supplied (at the current price), resulting in an economic equilibrium for price and quantity transacted.” (related: perfect competition; arbitrage—“the practice of taking advantage of a price difference between two or more markets.”)
- (2) Winner Take All Market—A market that tends towards one dominant player. (related: lock-in; monopoly; monopsony)
- (2) Two-sided Market—“Economic platforms having two distinct user groups that provide each other with network benefits.”
- (3) Barriers to Entry—“A cost that must be incurred by a new entrant into a market that incumbents don’t or haven’t had to incur.”
- (3) Price Elasticity—“The measurement of how responsive an economic variable is to a change in another. It gives answers to questions such as ‘If I lower the price of a product, how much more will sell?’” (related: Giffen good—“a product that people consume more of as the price rises and vice versa.”)
- (3) Market Power—“The ability of a firm to profitably raise the market price of a good or service over marginal cost.”
- (3) Conspicuous Consumption—“The spending of money on and the acquiring of luxury goods and services to publicly display economic power.” (related: Veblen goods—“types of luxury goods, such as expensive wines, jewelry, fashion-designer handbags, and luxury cars, which are in demand because of the high prices asked for them.”)
- (3) Comparative Advantage—“An agent has a comparative advantage over another in producing a particular good if they can produce that good at a lower relative opportunity cost or autarky price, i.e. at a lower relative marginal cost prior to trade.”
- (3) Creative Destruction—“Process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one.” (related: Software is Eating the World—“in many industries, new software ideas will result in the rise of new Silicon Valley-style startups that invade existing industries with impunity.”)

- (3) First-mover advantage vs First-mover disadvantage—“the advantage gained by the initial (“first-moving”) significant occupant of a market segment.” (related: Why now?)

Strategizing

- (1) Sustainable Competitive Advantage—Structural factors that allow a firm to outcompete its rivals for many years.
- (1) Core Competency—“A harmonized combination of multiple resources and skills that distinguish a firm in the marketplace.” (related: circle of competence—“you don’t have to be an expert on every company, or even many. You only have to be able to evaluate companies within your circle of competence. The size of that circle is not very important; knowing its boundaries, however, is vital.”)
- (1) Strategy vs Tactics—Sun Tzu: “Strategy without tactics is the slowest route to victory. Tactics without strategy is the noise before defeat.”
- (1) Sphere of Influence—“A spatial region or concept division over which a state or organization has a level of cultural, economic, military, or political exclusivity, accommodating to the interests of powers outside the borders of the state that controls it.”
- (2) Unknown Unknowns—“Known unknowns refers to ‘risks you are aware of, such as cancelled flights....’ Unknown unknowns are risks that ‘come from situations that are so out of this world that they never occur to you.’ (related: Cynefin framework)
- (2) Switching Costs—“The costs associated with switching suppliers.”
- (3) Network Effect—“The effect that one user of a good or service has on the value of that product to other people. When a network effect is present, the value of a product or service is dependent on the number of others using it.”
- (3) Economies of Scale—“The cost advantages that enterprises obtain due to size, output, or scale of operation, with cost per unit of output generally decreasing with increasing scale as fixed costs are spread out over more units of output.”

Military

- (2) Guerilla warfare—“a form of irregular warfare in which a small group of combatants such as paramilitary personnel, armed civilians, or irregulars use military tactics including ambushes, sabotage, raids, petty warfare, hit-and-run tactics, and mobility to fight a

larger and less-mobile traditional military.” (related: asymmetric warfare; “Punch above your weight.”)

- (3) Two-front War—“A war in which fighting takes place on two geographically separate fronts.”
- (3) Flypaper Theory—“The idea that it is desirable to draw enemies to a single area, where it is easier to kill them and they are far from one’s own vulnerabilities.” (related: honeypot)
- (3) Fighting the Last War—Using strategies and tactics that worked successfully in the past, but are no longer as useful.
- (3) Rumsfeld’s Rule—“You go to war with the Army you have. They’re not the Army you might want or wish to have at a later time.” (related: Joy’s law—“no matter who you are, most of the smartest people work for someone else.”; Effectuation)
- (3) Trojan Horse—“After a fruitless 10-year siege, the Greeks constructed a huge wooden horse, and hid a select force of men inside. The Greeks pretended to sail away, and the Trojans pulled the horse into their city as a victory trophy. That night the Greek force crept out of the horse and opened the gates for the rest of the Greek army, which had sailed back under cover of night. The Greeks entered and destroyed.”
- (3) Empty Fort Strategy—“Involves using reverse psychology (and luck) to deceive the enemy into thinking that an empty location is full of traps and ambushes, and therefore induce the enemy to retreat.” (related: Potemkin village—“any construction (literal or figurative) built solely to deceive others into thinking that a situation is better than it really is.”; vaporware—“a product, typically computer hardware or software, that is announced to the general public but is never actually manufactured nor officially cancelled.”)
- (3) Exit Strategy—“A means of leaving one’s current situation, either after a predetermined objective has been achieved, or as a strategy to mitigate failure.”
- (3) Boots on the Ground—“The belief that military success can only be achieved through the direct physical presence of troops in a conflict area.”
- (3) Winning Hearts and Minds—“In which one side seeks to prevail not by the use of superior force, but by making emotional or intellectual appeals to sway supporters of the other side.”
- (3) Mutually Assured Destruction—“In which a full-scale use of nuclear weapons by two or more opposing sides would cause the com-

plete annihilation of both the attacker and the defender. It is based on the theory of deterrence, which holds that the threat of using strong weapons against the enemy prevents.” (related: Mexican standoff, Zugzwang)

- (3) Containment— “A military strategy to stop the expansion of an enemy. It is best known as the Cold War policy of the United States and its allies to prevent the spread of communism abroad.”
- (3) Appeasement— “A diplomatic policy of making political or material concessions to an enemy power in order to avoid conflict.” (related: Danegeld, extortion)
- (3) Winning a Battle but Losing the War— “A poor strategy that wins a lesser (or sub-) objective but overlooks and loses the true intended objective.” (related: sacrifice play)
- (3) Beachhead— “A temporary line created when a military unit reaches a landing beach by sea and begins to defend the area while other reinforcements help out until a unit large enough to begin advancing has arrived.”
- (3) Attrition warfare— “a military strategy in which a belligerent attempts to win a war by wearing down the enemy to the point of collapse through continuous losses in personnel and material.”

History

- (3) Nuclear option— “a parliamentary procedure that allows the U.S. Senate to override a rule or precedent by a simple majority of 51 votes, instead of by a supermajority of 60 votes... The name is an analogy to nuclear weapons being the most extreme option in warfare.”
- (3) Cargo cult— “a millenarian movement first described in Melanesia which encompasses a range of practices and occurs in the wake of contact with more technologically advanced societies. The name derives from the belief which began among Melanesians in the late 19th and early 20th century that various ritualistic acts such as the building of an airplane runway will result in the appearance of material wealth, particularly highly desirable Western goods (i.e., “cargo”), via Western airplanes.”

Sports

- (2) Unforced Error— In tennis, an “error in a service or return shot that cannot be attributed to any factor other than poor judgement and execution by the player; contrasted with a forced error,” “an error caused by an opponent’s good play.”

- (3) Hail Mary Pass—“A very long forward pass in American football, made in desperation with only a small chance of success... has become generalized to refer to any last-ditch effort with little chance of success.”

Market Failure

- (2) Social vs Market Norms—“People are happy to do things occasionally when they are not paid for them. In fact there are some situations in which work output is negatively affected by payment of small amounts of money.”
- (3) Information Asymmetry—“The study of decisions in transactions where one party has more or better information than the other.” (related: adverse selection—“when traders with better private information about the quality of a product will selectively participate in trades which benefit them the most.”; moral hazard—“when one person takes more risks because someone else bears the cost of those risks.”)
- (3) Externalities—“An externality is the cost or benefit that affects a party who did not choose to incur that cost or benefit.” (related: tragedy of the commons—“A situation within a shared-resource system where individual users acting independently according to their own self-interest behave contrary to the common good of all users by depleting that resource through their collective action”; free rider problem—“when those who benefit from resources, goods, or services do not pay for them, which results in an under-provision of those goods or services.”; Coase theorem—“if trade in an externality is possible and there are sufficiently low transaction costs, bargaining will lead to a Pareto efficient outcome regardless of the initial allocation of property.”; NIMBY—“Not In My Back Yard”)
- (3) Deadweight Loss—“A loss of economic efficiency that can occur when equilibrium for a good or service is not achieved or is not achievable.”

Political Failure

- (2) Chilling Effect—“The inhibition or discouragement of the legitimate exercise of natural and legal rights by the threat of legal sanction...Outside of the legal context in common usage; any coercion or threat of coercion (or other unpleasanties) can have a chilling effect on a group of people regarding a specific behavior, and often can be statistically measured or be plainly observed.”

- (2) Third Rail—“The third rail of a nation’s politics is a metaphor for any issue so controversial that it is ‘charged’ and ‘untouchable’ to the extent that any politician or public official who dares to broach the subject will invariably suffer politically.”
- (3) Regulatory Capture—“When a regulatory agency, created to act in the public interest, instead advances the commercial or political concerns of special interest groups that dominate the industry or sector it is charged with regulating.” (related: Shirky principle —“Institutions will try to preserve the problem to which they are the solution.”; “Sunlight is the best disinfectant.”)
- (3) Duverger’s Law—“A principle which states that plurality-rule elections (such as *first past the post*) structured within single-member districts tend to favor a two-party system, and that ‘the double ballot majority system and proportional representation tend to favor multipartism.’”
- (3) Arrow’s Impossibility Theorem—“When voters have three or more distinct alternatives (options), no ranked order voting system can convert the ranked preferences of individuals into a community-wide (complete and transitive) ranking while also meeting a pre-specified set of criteria.” (related: approval voting)

Investing

- (2) Fear of Missing Out (FOMO)—“A pervasive apprehension that others might be having rewarding experiences from which one is absent.”
- (2) Preferred Stock vs Common Stock—“Preferred stock is a type of stock which may have any combination of features not possessed by common stock including properties of both an equity and a debt instrument, and is generally considered a hybrid instrument.”
- (3) Margin of Safety—“The difference between the intrinsic value of a stock and its market price.”
- (3) Investing vs Speculation—“Typically, high-risk trades that are almost akin to gambling fall under the umbrella of speculation, whereas lower-risk investments based on fundamentals and analysis fall into the category of investing.”
- (3) Compound Interest—“Interest on interest. It is the result of reinvesting interest, rather than paying it out, so that interest in the next period is then earned on the principal sum plus previously-accumulated interest.”

- (3) Inflation—“A sustained increase in the general price level of goods and services in an economy over a period of time.” (related: real vs nominal value, hyperinflation, deflation, debasement)
- (3) Gross Domestic Product (GDP)—“A monetary measure of the market value of all final goods and services produced in a period (quarterly or yearly).”
- (3) Efficient-Market Hypothesis—“Asset prices fully reflect all available information...Investors, including the likes of Warren Buffett, and researchers have disputed the efficient-market hypothesis both empirically and theoretically.” (related: alpha)
- (3) Purchasing Power Parity—“Allows one to estimate what the exchange rate between two currencies would have to be in order for the exchange to be at par with the purchasing power of the two countries’ currencies.”
- (3) Insider Trading—“The trading of a public company’s stock or other securities (such as bonds or stock options) by individuals with access to nonpublic information about the company.”
- (3) Poison Pill—“A type of defensive tactic used by a corporation’s board of directors against a takeover. Typically, such a plan gives shareholders the right to buy more shares at a discount if one shareholder buys a certain percentage or more of the company’s shares.” (related: proxy fight).

Learning

- (1) Deliberate Practice—“How expert one becomes at a skill has more to do with how one practices than with merely performing a skill a large number of times.”
- (3) Imposter Syndrome—“High-achieving individuals marked by an inability to internalize their accomplishments and a persistent fear of being exposed as a ‘fraud’.”
- (3) Dunning-Kruger Effect—“Relatively unskilled persons suffer illusory superiority, mistakenly assessing their ability to be much higher than it really is...[and] highly skilled individuals may underestimate their relative competence and may erroneously assume that tasks which are easy for them are also easy for others.” (related: overconfidence effect)
- (3) Spacing Effect—“The phenomenon whereby learning is greater when studying is spread out over time, as opposed to studying the same amount of time in a single session.”

Productivity

- (1) Focus on High-leverage Activities—“Leverage should be the central, guiding metric that helps you determine where to focus your time.” (related: Eisenhower decision matrix—“what is important is seldom urgent, and what is urgent is seldom important.”, “The best time to plant a tree was 20 years ago. The second best time is now.”, law of triviality—“members of an organisation give disproportionate weight to trivial issues.”)
- (1) Makers vs Manager’s Schedule—“When you’re operating on the maker’s schedule, meetings are a disaster.” (related: Deep Work)
- (2) Murphy’s Law—“Anything that can go wrong, will.” (related: Hofstadter’s Law, “It always takes longer than you expect, even when you take into account Hofstadter’s Law.”)
- (3) Parkinson’s Law—“Work expands so as to fill the time available for its completion.”
- (3) Gate’s Law—“Most people overestimate what they can do in one year and underestimate what they can do in ten years.”

Nature

- (2) Nature vs Nurture—“the relative importance of an individual’s innate qualities as compared to an individual’s personal experiences in causing individual differences, especially in behavioral traits.”
- (2) Chain Reaction—“A sequence of reactions where a reactive product or by-product causes additional reactions to take place. In a chain reaction, positive feedback leads to a self-amplifying chain of events.” (related: cascading failure, domino effect)
- (2) Filling a Vacuum—A vacuum “is space void of matter.” Filling a vacuum refers to the fact that if a vacuum is put next to something with pressure, it will be quickly filled by the gas producing that pressure. (related: power vacuum)
- (2) Emergence—“Whereby larger entities, patterns, and regularities arise through interactions among smaller or simpler entities that themselves do not exhibit such properties.” (related: decentralized system, spontaneous order)
- (3) Natural Selection—“The differential survival and reproduction of individuals due to differences in phenotype. It is a key mechanism of evolution, the change in heritable traits of a population over time.”

- (3) Butterfly Effect—“The concept that small causes can have large effects.” (related: bullwhip effect—“increasing swings in inventory in response to shifts in customer demand as you move further up the supply chain.”)
- (3) Sustainability— “The endurance of systems and processes.”
- (3) Peak Oil— “The point in time when the maximum rate of extraction of petroleum is reached, after which it is expected to enter terminal decline.”

Philosophy

- (2) Consequentialism—“Holding that the consequences of one’s conduct are the ultimate basis for any judgment about the rightness or wrongness of that conduct.” (related: “ends justify the means”)
- (2) Distributive Justice vs Procedural Justice—“Procedural justice concerns the fairness and the transparency of the processes by which decisions are made, and may be contrasted with distributive justice (fairness in the distribution of rights or resources), and retributive justice (fairness in the punishment of wrongs).”
- (3) Effective Altruism—“Encourages individuals to consider all causes and actions, and then act in the way that brings about the greatest positive impact, based on their values.”
- (3) Utilitarianism—“Holding that the best moral action is the one that maximizes utility.”
- (3) Agnosticism—“The view that the truth values of certain claims—especially metaphysical and religious claims such as whether God, the divine, or the supernatural exist—are unknown and perhaps unknowable.”
- (3) Veil of Ignorance—“A method of determining the morality of a certain issue (e.g., slavery) based upon the following thought experiment: parties to the original position know nothing about the particular abilities, tastes, and positions individuals will have within a social order. When such parties are selecting the principles for distribution of rights, positions, and resources in the society in which they will live, the veil of ignorance prevents them from knowing who will receive a given distribution of rights, positions, and resources in that society.”

Internet

- (2) Filter Bubble—“In which a website algorithm selectively guesses what information a user would like to see based on infor-

mation about the user (such as location, past click behavior and search history) and, as a result, users become separated from information that disagrees with their viewpoints, effectively isolating them in their own cultural or ideological bubbles.” (related: [echo chamber](#))

- (2) [Botnet](#)—“A number of Internet-connected computers communicating with other similar machines in which components located on networked computers communicate and coordinate their actions by command and control (C&C) or by passing messages to one another.” (related: [flash mob](#))
- (2) [Spamming](#)—“The use of electronic messaging systems to send unsolicited messages (spam), especially advertising, as well as sending messages repeatedly on the same site.” (related: [phishing](#) —“the attempt to acquire sensitive information such as usernames, passwords, and credit card details (and sometimes, indirectly, money), often for malicious reasons, by masquerading as a trustworthy entity in an electronic communication.”, [clickjacking](#), [social engineering](#))
- (3) [Content Farm](#)—“large amounts of textual content which is specifically designed to satisfy algorithms for maximal retrieval by automated search engines.” (related: [click farm](#)—“where a large group of low-paid workers are hired to click on paid advertising links for the click fraudster.”)
- (3) [Micropayment](#)—“A financial transaction involving a very small sum of money and usually one that occurs online.”
- (3) [Godwin’s Law](#)—“If an online discussion (regardless of topic or scope) goes on long enough, sooner or later someone will compare someone or something to Hitler or Nazism.” (related: “Take the high road.”, “Rise above the fray.”, “Don’t stoop down to their level.”)

Update: I’m co-authoring a book about the mental models from this post. Get notified when the book comes out [here](#).



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