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Entropy Theory

Packy McCormick

21-27 minutes

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Hi friends 👋,

Happy Monday! I know you probably look at me and think, "Woah. Packy writes a newsletter, spends a lot of time on Twitter, and started a Debate Club for fun. That's a cool dude." Thank you. But it's not all glitz and glamor over here. I'm actually kind of a nerd. Two things prove that point, and got me thinking about today's topic:

1. I'm reading *The Redemption of Time*, an unofficial, fan-fic fourth installment in Liu Cixin's sci-fi hit *Remembrance of Earth's Past Trilogy*.
2. I marked on my calendar that tomorrow is the fifth anniversary of Ben Thompson's Aggregation Theory.

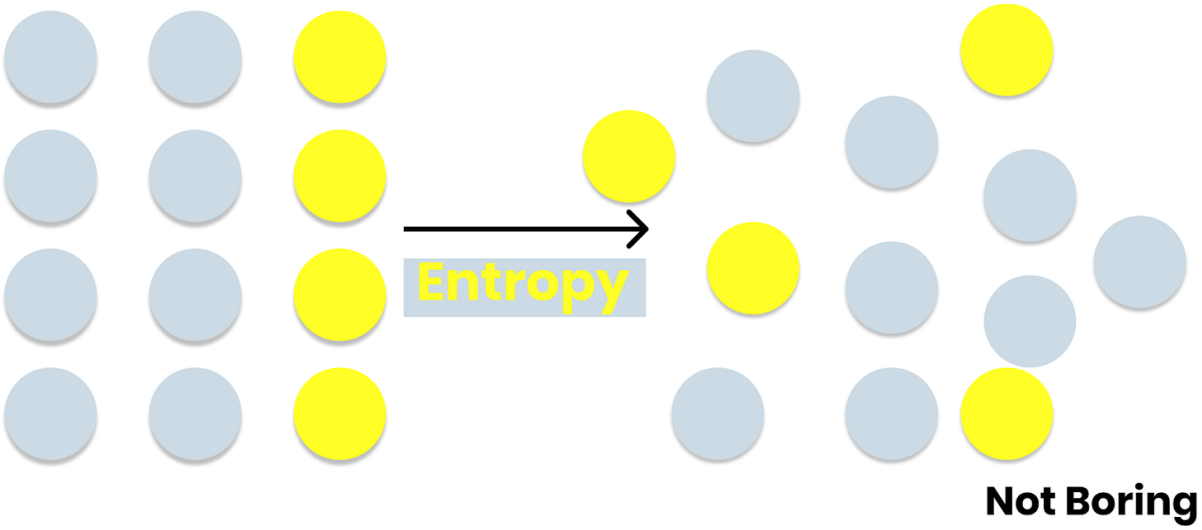
In honor of Aggregation Theory's anniversary, and because I'm feeling a little presumptuous this week, I'm dropping a new theory of my own today.

Let's get to it.

🎧 *If you prefer listening, bring your ears over here: Entropy Theory (Audio Edition)*

Everything tends towards chaos and disorder.

This isn't a quarantine-induced panic thought, it's an inexorable fact of the universe. The Second Law of Thermodynamics states that all closed systems tend to maximize **entropy**. The universe tends to get messier and more disordered all the time.



Like the universe, the market also gets messier and more chaotic all the time.

Every industry is on a parallel journey of increasing, accelerating entropy. New tools create more optionality. More choice, speed, and flexibility create more chaos, which in turn creates opportunities for companies to capture value by temporarily bringing order to the ever-increasing entropy. The companies and people that create order from the chaos are Entropy Wranglers.

The upward-sloping push and pull between entropy and its opposite, negentropy, is responsible for humanity's forward progress. Each new burst of entropy creates more surface area for innovation.

This idea explains so much - from business theories to industry evolution to company success - that I'm giving it a name: **Entropy Theory**.

Entropy Theory explains industry evolution as a story of ever-increasing chaos and suggests that the most successful businesses are those that use the latest technology to wrangle that chaos, until entropic forces unleash the next set of opportunities.

Entropy Theory sits on top of and connects so many of the other theories that we talk about here: Aggregation Theory, Disruption Theory, Creative Destruction, Coase's Theory of the Firm, The Law of Conservation of Attractive Profits, and more.

It adds a directional vector to Jim Barksdale's oft-repeated quote: "There's only two ways I know to make money: bundling and unbundling." Bundling and unbundling is Sisyphean -- bundle, unbundle, start over again, repeat. Ever-increasing entropy gives work **verve**. We're not just bundling and unbundling, but unleashing energy, organizing it, and then unleashing new energy on the next thing.

Entropy Theory explains global progress, industry trends, and company success and failure. One example: last week I wrote about Twitter, and said that it captures less of the value it creates than any company in the world. Another way to say that is that by deciding to play whack-a-mole with trolls instead of better facilitating search, conversation, and creation, it has insufficiently wrangled the conversational entropy unleashed by the internet.

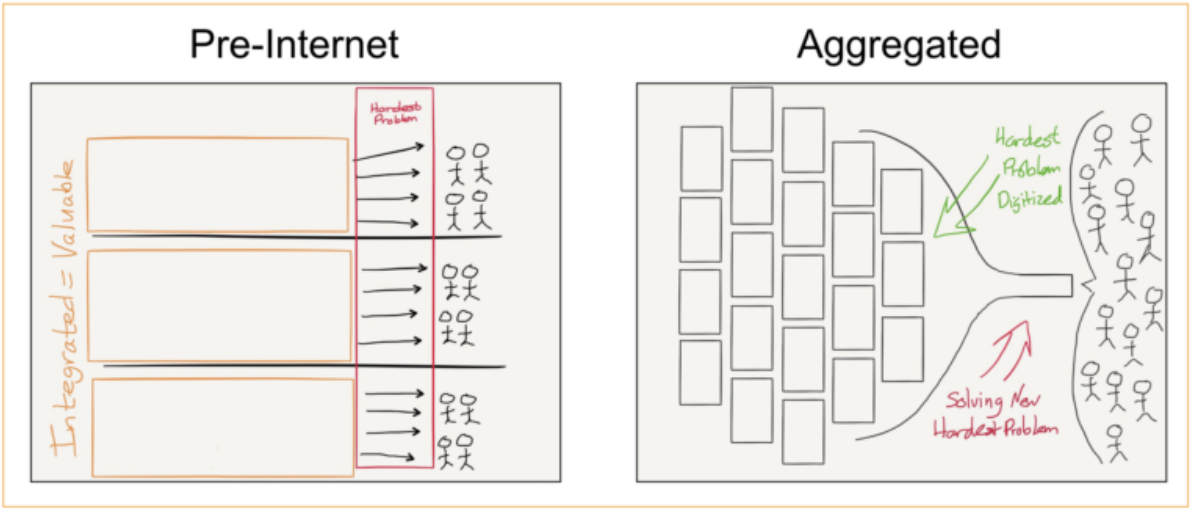
There are a lot of ways to take this, and many posts to be written, but to flesh out the idea, we'll cover how Entropy Theory explains Aggregation Theory, two long-term industry trends, one successful company, and one failure:

- **Aggregation.** Aggregators like Google, Facebook, and Uber succeed by wrangling the supply entropy created by the internet for consumers.
- **Office Real Estate.** The history of the office - from government-owned to remote work - is the history of increasing entropy.
- **Employment.** The rise of One Person Businesses is the natural progression of increasing employment entropy.
- **Spotify.** Spotify wrangled music industry entropy created by the internet and file-sharing, and is running the Entropy Wrangler playbook again on podcasts.
- **Quibi.** Quibi's failure can be explained by its inability to realize how entropic short-form, mobile entertainment creation has become.

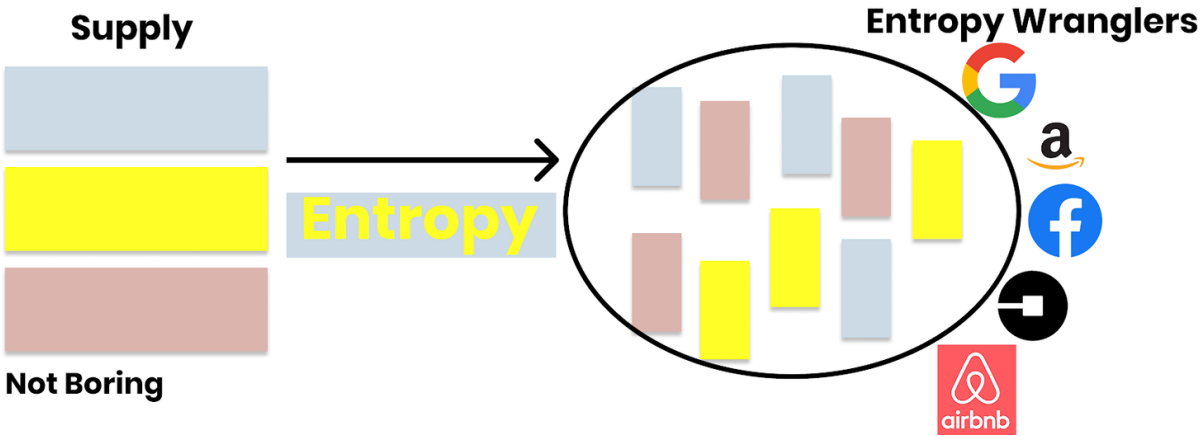
Increased chaos isn't good or bad, it's just a fact of the universe. Entropy creates more surface area for innovation. Understanding and applying Entropy Theory can help you see and seize opportunity in the chaos.

Aggregation and Entropy Theory

Aggregation Theory provides one answer to entropy in our internet-enabled world of abundance. In Thompson's words: "Aggregation Theory describes how platforms (i.e. aggregators) come to dominate the industries in which they compete in a systematic and predictable way." Here's the first graphic Thompson drew to explain it, back in 2015.



Aggregation Theory only applies to digital businesses and doesn't try to explain the trends in something like office real estate. Entropy Theory can handle both. Here's Aggregation Theory explained through Entropy Theory.



Look what happens to supply. It becomes more entropic. Instead of your local newspaper, all the articles in the world. Instead of whatever books your local bookstore stocked, all the books in the world. Instead of a taxi dispatch, anyone with a car, a smart phone, and free time. That created the need for new ways of ordering, and the opportunity for Aggregators like Facebook, Google, and Uber to use technology to bring order to the chaos. Aggregators are Entropy Wranglers.

Take **Google** for example. The internet changed the way that media is created and consumed. Instead of consuming content from a few, trusted sources, suddenly, there was content coming from everywhere. It was hard to find content, and even harder to tell what was good. Google became the powerhouse that it is today by bringing order to that mess. With Google, instead of flailing about the internet in the dark, consumers could search for the topic they're interested in, and instantly receive an orderly, ranked list that uses entropy - millions of people creating and billions of people clicking links - as an input.

So if entropy is always increasing, where is the disorder in the system being created to offset the new order? I have three hypotheses that work together.

1. **Entropy Wranglers both wrangle pre-existing entropy and enable new entropy.** Google wrangled the entropy of the early internet *and* more people and companies create more content and products because Google exists.

2. **Entropy Wranglers capture such a large amount of the value in the ecosystem that they force new entrants to create workarounds.** For example, the influencer economy is supported by companies' search for cheaper ways to market their products than paying Facebook and Google 40¢ of every dollar they raise.

3. **Competitors see the opportunity and counter-position themselves against the Entropy Wranglers**, definitionally adding more entropy into the system. No one is seriously trying to

compete with Google in search or intent marketing; they're trying to move the battle for ad dollars to new playing fields. I'd be remiss if I didn't mention GPT-3 here - making sense of all of the internet's information contextually might be a way to bypass Google altogether at some point.

As these three things happen, entropy increases in new places, and new opportunities to wrangle entropy emerge.

You can frame each one of the Aggregators that Thompson lists in his original post - Google, Facebook, Amazon, Netflix, Snapchat, Uber, and Airbnb - in a similar way. Each uses technology to bring order to a recently disordered industry.

I think that Entropy Theory can also help explain and connect other theories and frameworks, and I'm excited to explore those connections in future posts.

Offices, Employment, and Entropy Theory

One of the things about Entropy Theory that tickles my brain is that it's more broadly applicable than Aggregation Theory, albeit potentially at a lower resolution. The same theory that explains Google's success can also explain trends in two slower-moving areas: office real estate and employment.

Office Real Estate

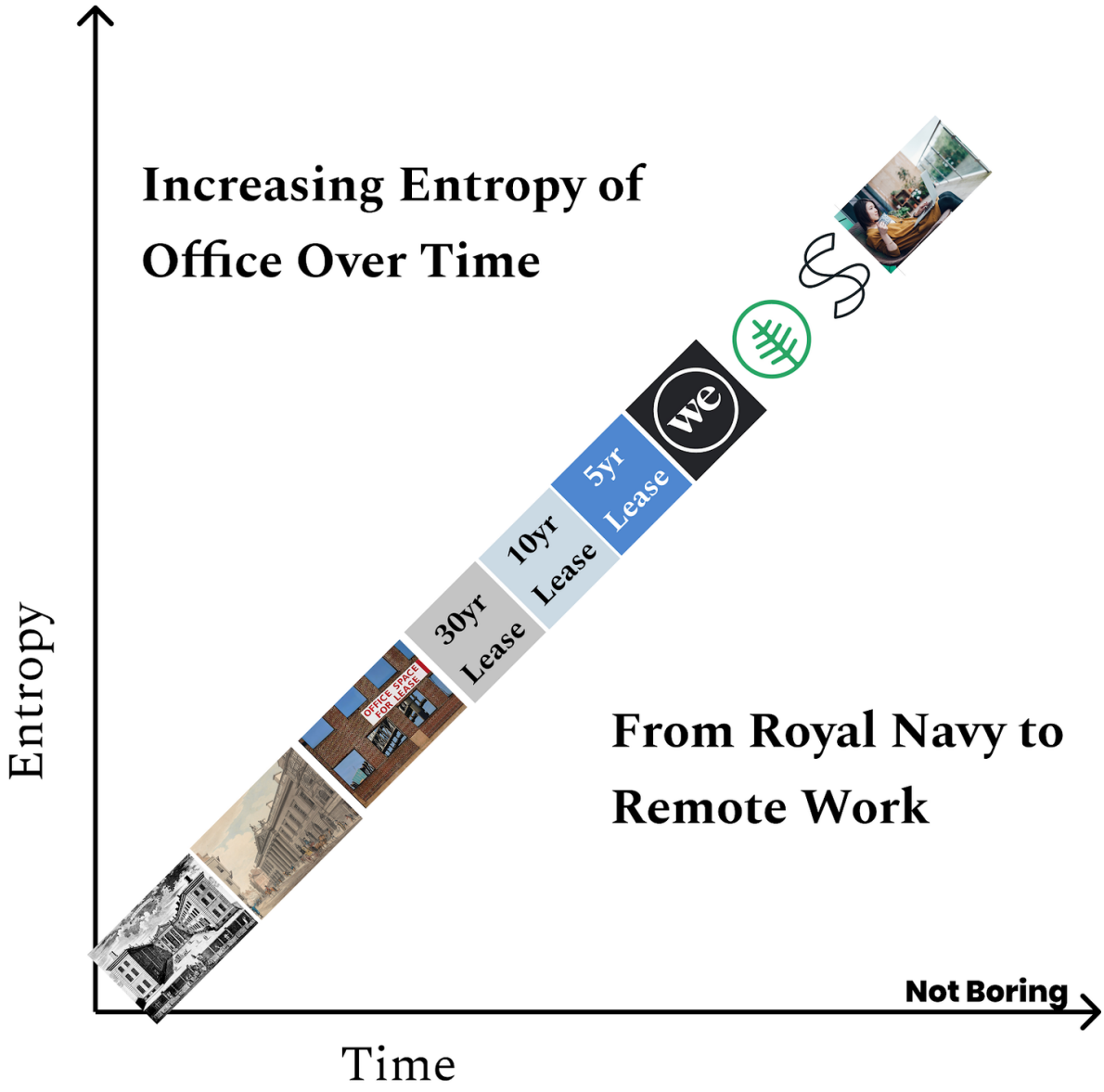
It's hard to imagine something less entropic than office real estate. Office buildings are large, heavy, and expensive, and once built, stand for decades or even centuries. But the history of the office actually follows the same forces that gave rise to Google.

Before I became a full-time thinkboi, I worked at Breather, a real estate startup that allows people to book office space for as little as an hour and as long as two years. From the perspective of someone 250, or even 50, years ago, the idea of thousands of people renting offices for an hour seems inconceivable. Through the lens of Entropy Theory, though, it seems inevitable.

The first modern office was built in 1726 in the UK to house the Royal Navy. Three years later, the East India Company built the East India House, the first non-governmental office. The first office leases - which allowed tenants to rent space from the building's owner - appeared in the late 18th century. Leases dramatically increased entropy by introducing a lower-commitment way to use an office.

Since their inception, leases keep getting shorter -- a necessity in a world in which corporate lifespans are dramatically shrinking (another example of increasing entropy). In 1958, the average lifespan of a company on the S&P 500 was 61 years. Today, it's under 18. The typical office lease dropped from 30 years in the 1950s to 5 years in the 2010s.

Over the past decade, co-working and flexible office gave companies the option to sign leases as short as a month. Breather, which makes one-hour bookings possible, is the natural continuation of the increasing office entropy trend, and even shorter options emerged after Breather.

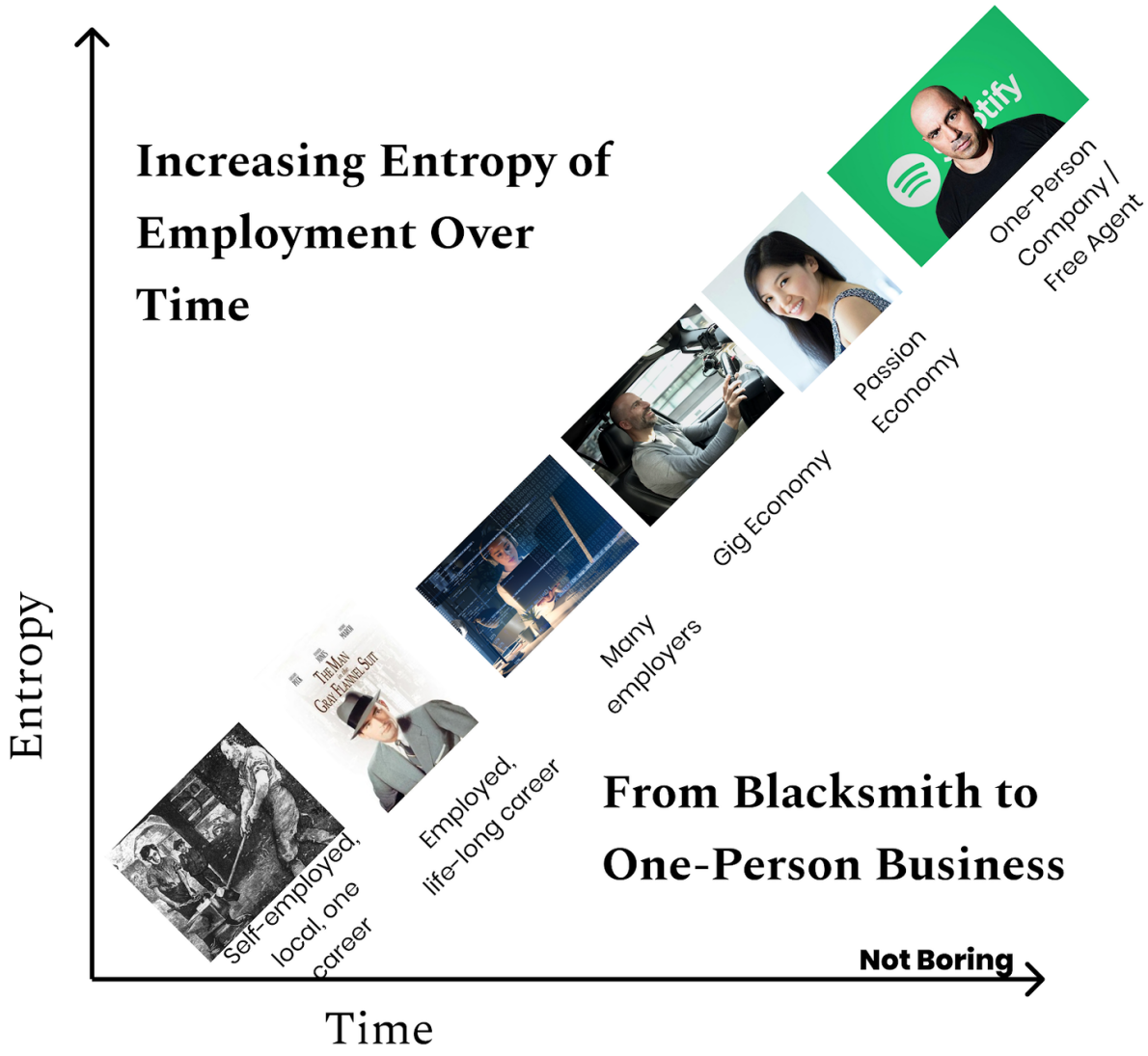


With each major increase in entropy, new players sprung up to bring order to the new reality. Brokerages, for example, helped tenants make sense of the various options available to them. JLL, one of the world's largest brokerages, began its life in London in 1783, around the time of the first office leases. WeWork attempted to spend and grow its way into being the lowest-entropy way for companies to access high-entropy office space -- co-working -- but may have just increased entropy in the market.

Today, COVID has created massive entropy, and correspondingly huge opportunities for Entropy Wranglers. Remote work is a thing now, and even though it's imperfect, anti-social, and lossy, major shifts don't generally reverse. Companies aren't rushing to buy their office building, or even going back to thirty-year leases; similarly, remote work, once out of the bottle, is here to stay. It's the highest-entropy state for office yet, and the prize for wrangling that entropy will be massive. It's why Zoom has so dramatically outperformed the market, why I'm so bullish on Slack, and why there will be multiple multi-billion dollar companies created that take advantage of the new remote-first office paradigm. Entropy has shifted the definition of office.

Employment

Employment has come a long way since *The Man in the Gray Flannel Suit.* We no longer spend our entire career with one company, working 9-5, five days a week for forty years until we can retire with the pension and the gold watch. In fact, many people don't work for just one company, and an increasing number don't work for a company at all.



Viewed from one angle, Uber ushered in the era of the Gig Economy in the 2010s, forcing disruption on an established, corrupt taxi industry through sheer force of will and determination.

Viewed through the lens of Entropy Theory, though, Uber, Lyft, TaskRabbit, Postmates, DoorDash, and dozens of other companies captured value by wrangling natural employment entropy. In that view, people were always going to go from one job for their whole career to working for multiple companies, temporarily, at-once. The intersection of the technological entropy trendline, from mainframes to mobile, enabled the Gig Economy leaders to wrangle and capture value from the employment entropy trendline.

An even more recent trend, the Passion Economy is one current expression of increasing employment entropy. Instead of working for one company forever, or one company at a time for shorter amounts of time, many talented, creative people have decided to strike out on their own to pursue their passions. It was inevitable.

The Passion Economy-enabling companies that Li Jin writes about, like Substack, Discord, and Teachable, are attempting to capture value from increased talent entropy. Similarly, Nikhil Basu Trivedi's *The Rise of the Solo Capitalists* speaks to increasing entropy in venture investing, and as Brett Bivens points out in *One Person Companies*:

> *The next L'Oreal started as a blog, the next ESPN as an Instagram page in a dorm room. The next McKinsey, Harvard, or Benchmark might start on Substack, with a Teachable course, or as a podcast.*

So what type of Entropy Wranglers might form around this higher-entropy form of employment? In *Will Joe Rogan IPO*?, Mario Gabriele and Aashay Sanghvi point to the new tools, financing methods, and mediums available to individual creators. They even suggest that GPT-3 and its successors might enable creators to reproduce themselves, providing scale and an answer to key man risk where none existed before. Entropy Theory suggests that the tools they list are just the beginning.

A keen observer might notice that the trend towards self-employment feels like a return to the way that humans worked for centuries, and suggest that maybe entropy is cyclical. I think the big difference between being a blacksmith in the 15th century and an Instagram influencer today, though, is the global scale and optionality afforded to one person businesses today. Working in one job from your teenage years to your grave and serving a captive audience in a non-competitive environment, even if you work for yourself, is a much lower-entropy career.

Word limits prevent me, but we could analyze the history of so many industries through the same framework. Media. Food. Transportation. Finance. Rest Stops. Energy. Hospitality. Even before the internet, each of these industries has been defined by the inexorable march of entropy and valiant attempts to harness it using the latest technology of the day.

Company Success and Failure Through Entropy Theory

Entropy Theory is useful in explaining why certain companies have been successful where others have failed. Often, it comes down to whether the company is victimized by increasing entropy (worst), creating entropy (better but too early), or wrangling entropy (best). Spotify, one of my favorite companies, is a perfect example of the latter.

Spotify

The music industry exhibits the same increasing entropy as real estate and employment. Musicians throughout most of history made a living from performing live concerts. Thomas Edison's 1877 invention of the phonograph paved the way for Emile Berliner's 1894 7-inch gramophone records, and in the 1920s, the earliest record labels sprung up to wrangle the increased entropy created by the ability to distribute the same track to many people. The music labels went on an uninterrupted tear from records to tapes to 8-tracks to CDs right up until 1999, when Napster dramatically increased entropy in the music industry by allowing people to illegally share and download music, for free.

Napster increased the entropy of the music industry (creating entropy) and was shut down in 2001 under legal pressure. The music industry (victimized by entropy), wielding lawsuits in an attempt to go back to the way things were, fared no better. Whether via Napster, Limewire, or any other number of online music file sharing services, the genie was out of the bottle and the entropy had increased: people wanted to listen to what they wanted, when they wanted, online.

Two companies wrangled the entropy and captured the value. In 2001, Apple launched iTunes, and sold individual songs for $0.99 each. Spotify, launched in 2006, wrangled musical entropy further, into the form in which it's still consumed today: one monthly subscription for access to all of the songs. Spotify is the music industry's Entropy Wrangler.

Today, Spotify boasts 286 million Monthly Active Users, 130 million of whom pay for a subscription, good for $6.8 billion in 2019 revenue. Spotify's stock has nearly doubled since March as it continues to make strides towards harnessing the high-entropy podcast industry, bringing its market cap to $50 billion. Why has Spotify been able to adapt and wrangle entropy multiple times? One theory is that its organizational structure - organized into squads, tribes, and guilds - is appropriately entropic to move quickly and nimbly.

Entropy Theory also explains why competing attempts at subscription music services, like Deezer and Tidal, haven't worked. Spotify wrangled the Napster-induced entropy, and hasn't created enough entropy to create opportunities to attack it. Spotify has very little entropy leak.

The threat to Spotify won't be another subscription music streaming service. It will be a company that takes advantage of the next big increase in entropy to deliver audio content from a new set of creators in a new way.

The Counterexample: Quibi

Will you allow me a brief moment to shit on Quibi again? It's a cautionary tale of what happens when you don't realize what entropy level your industry has reached.

Entropy Theory actually perfectly explains why Quibi failed where TikTok has succeeded. Quibi tried to apply a paradigm from entertainments's previous entropy level, but entertainment entropy has increased past the point at which Quibi's model makes sense. It's not enough to get the mobile trend right by itself. To succeed, you need to ride an industry-specific entropy wave.

Quibi realized that because of mobile's ubiquity, anyone can consume content on their phone at any time. They didn't realize that that same technology means that anyone can also *create* high-quality short-form content at any time. That makes the video content creation more chaotic, and leaves anyone trying to apply the old paradigm, like Quibi, in the dust. Short-form mobile video content is past the point where a central studio can play tastemaker without the help of an algorithm.

Netflix still works in this world for three reasons:

1. Not everyone can create high-quality, longform, big screen content… yet.
2. Netflix has years of data that helps it make smart decisions about which content to create and which content to serve to each user.
3. Its huge user base means that it spends much less per user to create content (compare that to Quibi's *$100k per minute* content budget!).

But TikTok might be best-suited of all. TikTok is built for the current level of video entropy. People everywhere are creating better and better content, all the time. TikTok's algorithm wrangles that entropy to surface the signal from all of the noise and reward creators for their creativity in the form of virality, fame, and ultimately, influencer money.

Applying Entropy Theory

I've been on a brain-high for the past three days as I've thought of examples, tested whether they fit into Entropy Theory, and realized that they did. Again, I'm a nerd. This is my idea of a fun weekend. Part of me thinks: of course they fit; increasing entropy is the Second Law of Thermodynamics and a natural law of the universe. The other part of me thinks: this is actually a really useful way to make sense of business and industry trends, and we're going to be revisiting it often in Not Boring.

Nailing a backtest is an important start, but for this thing to really get legs, it needs to be actionable and predictive.

So how might we apply Entropy Theory to our careers and investments?

If you're a founder or operator, you should be looking for pockets in your industry where entropy has increased, and look for ways to wrangle that entropy without trying to go back to the way things were. Be wary of timing, and of not trying to increase entropy yourself: companies that try to force it too early take all the arrows; companies that hold on too long at the end throw away money trying to go back to the way things were; companies that bring new tools to industries in which entropy has naturally increased stand to capture enormous value.

If you're an investor, it's helpful to understand broad trends and where the companies you're looking at fit in. One practical implication: worry less about TAM when looking for Entropy Wranglers. Uber rode increasing entropy to a larger-than-anticipated ride-sharing market. Stripe is doing the same with online payments - its mission is to "Increase the GDP of the Internet." Entropy Wranglers see that something has changed before others do; in a way, they're Worldbuilders.

What kind of predictions can we make with Entropy Theory?

We should be able to predict that more entropic outcomes are more likely than less entropic ones over time, and that valuable companies will be created that bring order to the chaos.

- Instead of going back to one office for one company post-COVID, employees are likely to work remotely and even for more than one company at the same time. Short office / long tools that facilitate remote collaboration and multi-company employment.

- Education will become more a la carte. The best students won't get a degree from one school. Instead, they'll study with the best professors from across the world and combine the disparate credits into one degree. This presents opportunities for new forms of credentialing and ways of matching the right students with the right teachers.

I think Entropy Theory is going to be foundational to the way that I think about and analyze businesses, and I hope you feel the same. But it's still messy, and I'm looking forward to wrangling it with all of you. A few questions I'm looking forward to digging into in the coming weeks and months ahead:

- How does Entropy Theory play with Network Effects, and with Hamilton Hemler's Seven Powers more broadly? h/t Nikhil Basu Trivedi

- What are the implications of Entropy Theory for Disruption Theory and incumbents? h/t Sari Azout

- Are businesses with decentralized org structures like Amazon, Spotify, Stripe, and Uber better positioned to evolve and capture value as entropy increases? h/t Brett Bivens

- Is there a velocity component to Entropy Theory? i.e. Does a faster entropy release lead to more innovation than a slower one?

As Aggregation Theory turns 5, Entropy Theory turns 0. It takes a village to raise a theory. I'd love to hear your feedback, confirming examples, counterexamples, challenges, and questions in the comments.

Leave a comment

Thanks to Dan, Mike, Sari, Brett, Brett, Leon, Puja, and Nikhil for their input and edits.

Thanks for reading,

Packy