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Tracking the Fortunes of Corporate Psychedelia

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Abstract

In recent years, new biotech companies have emerged hoping to cash in on a medical psychedelics market expected to be worth billions. This article examines the business models of two of the largest such companies. According to conventional wisdom, for-profit players are best positioned to deliver new cures for mental illness at scale because of their ability to tap capital markets. The analysis presented here challenges this story on two counts. First, it argues that profitability in the pharmaceutical business depends not on rapid scaling per se, but on controlling and restricting access to maintain pricing power. Second, it claims that the unruliness of psychedelics – manifested in the presence of cheap generics, murky intellectual property claims, and high costs of administration – raises serious questions about their commercial viability. The article then assesses the sector's embrace of Johnson and Johnson's patented form of esketamine, Spravato, as its prototype for commercialization. Spravato may provide a pathway for profitability, but patients must contend with high prices and a drug that provides only short-term relief and requires indefinite dosing. Rather than disrupt Big Pharma, corporate psychedelia replicates its main features, raising questions about its claims to tackle the mental health crisis.

Keywords: psychedelics; pharmaceuticals; medicalization; mental health crisis; business models

Introduction: Cashing In on the Psychedelic Renaissance

The 1950s and early 1960s were a fertile period for psychedelic research (Dyck 2008; Oram 2018; Stevens 1989). During this time, LSD, psilocybin, and mescaline were used to treat tens of thousands of patients for various psychiatric disorders. Thousands of scientific papers were published, with research showing safety and efficacy for these powerful substances in the treatment of depression and addiction. Such revelations would come as no surprise to countercultural types, who viewed psychedelics not only as key to individual healing but also to the spiritual transformation of all humanity. Nor would they surprise the indigenous communities in Central and South America, and in West Africa, that have used psychedelic plants and fungi as part of traditional medicine since time immemorial. The findings did, however, lend an air of respectability to these strange new molecules (Giffort 2020). Positive media reports and high-profile endorsements from Hollywood celebrities like Carey Grant followed.

But things changed in the latter half of 1960s. Politicians started to associate psychedelics, especially LSD, with growing social unrest. The War on Drugs pushed these substances outside the realm of legitimate science and into the illicit shadows of the underground. It would take nearly four decades for mainstream science to rediscover their healing powers. Since the early 2000s, a growing body of clinical evidence once again shows promise for psychedelic therapy in treating a long list of psychiatric disorders, from depression, anxiety, and addiction to post-traumatic stress disorder and anorexia nervosa. This “renaissance” in psychedelic research is now helping to restore credibility after prolonged prohibition (Giffort 2020). Scroll through Spotify or Netflix today and you will find countless documentaries and podcasts extolling the virtues of these substances. In Carey Grant's place we now have Prince Harry, Aaron Rodgers and Miley Ray Cyrus offering testimonials of how ayahuasca journeys healed their deep-seated traumas.

From a political economy perspective, what is particularly fascinating about this renaissance is the gold rush it has spawned. As drug laws loosen in the United States (US) and elsewhere, hundreds of new biotech companies are hoping to cash in on a medical psychedelics market that is expected to be worth several billions of dollars within the next decade. These companies are racing to develop their own psychedelic compounds and they are attracting serious money from Silicon Valley venture capital.

At the heart of this emerging psychedelic business model is a simple story about markets. On the demand side, the companies point to vast unmet need for effective mental healthcare treatment (Schwarz-Plaschg 2022). Their potential customer base is the billions of people around the globe currently suffering from some form of psychiatric illness. On the supply side, they emphasize the ineffectiveness and costliness of current mental healthcare, with Big Pharma failing to provide breakthrough treatments for decades. Mental healthcare is a market ripe for disruption. With their access to capital markets, psychedelic companies claim they are best positioned to rapidly scale-up delivery of these revolutionary new medicines. Corporate psychedelia’s vision for the future involves solid returns for shareholders and a triumphant end to the mental health crisis.

The starting point for my inquiry here is the following question: what happens when profit-seeking companies turn psychedelics into commercial pharmaceuticals? Delving into the

product development chain (Andersson et al. 2010), I suggest two reasons to be sceptical of the simple market story underpinning the psychedelic business model. The first reason, which applies to any company developing pharmaceutical drugs, is that scale does not necessarily translate into profitability. To finance their clinical trials, pre-revenue psychedelic companies must raise cash by convincing investors that they will eventually turn a profit. And profitability, I claim, hinges not on rapid scaling per se, but on controlling and restricting access to maintain pricing power (see also Nitzan and Bichler 2009). Psychedelic companies seek market power through various means. The most common is to follow a conventional tactic of the pharmaceutical business they claim to disrupt; namely, filing for patents that confer exclusive control over the production and distribution of these substances.

Another reason to doubt the simple market story has to do with the unique characteristics of psychedelics and the challenges these pose to profitability. Psychedelics are not like standard psychiatric drugs. Corporations trying to commodify them must contend with their inherent unruliness, as they evade attempts to tame and control them for profitable ends. Psychedelics are unruly in part because they are cheap. In seeking new forms of patenting, psychedelic companies must demonstrate how their compounds represent an innovation on cheap generics and the rich history of prior art that exists in the psychedelic space. Psychedelics are also unruly in their subjective effects. At higher doses, they occasion mystical experiences that are unpredictable, often extremely challenging and time-consuming. Safe and effective usage generally requires careful preparation before the experience, support during the “trip”, and integration afterward. How companies will make a profit given the potentially large costs of administering psychedelics remains unclear.

In the early years of this young sector, from around 2016 to mid-2021, investors seemed impervious to these challenges. At that time, psychedelic companies were riding the peak of the hype cycle. Investors were eager to dole out cash to pretty much any startup with even a half-baked scheme for commercialization, and they were massively inflating the values of companies going public. But since late-2021, the sector has experienced what can best be described as a *massive comedown*. As interest rates climbed, share prices tanked, funding dried up, many companies went bust, and survivors were forced to cut costs and scale back ambition. The comedown has served as a reality check. The task of bringing these medicines to market is taking a lot longer and is proving to be a lot harder than many had originally hoped. Amid this climate of uncertainty, the psychedelic sector has done plenty of soul searching. What has emerged is not a shift but a clarification of strategy, one aptly described as “Spravotisation” (Hardman 2024a). It involves using pharma giant Johnson and Johnson’s patented form of esketamine, an “atypical” psychedelic, as a model for commercialization of other psychedelics. It is not difficult to see why Spravato causes such excitement. After a slow start when it was launched in 2019, the drug has become a major commercial success, generating over a billion dollars of sales in the past three years.

As I will argue, psychedelic companies have embraced Spravato since the comedown not only because it is profitable, but also because it shows how unruliness can be managed. It proves that patents can be secured even in the presence of cheap generics, and even with rather tenuous claims to innovation. With only two hours of monitoring and no therapy required, it also shows how unruly psychedelics can be made cost-effective. Spravato may have blazed a trail for psychedelic profitability. But this comes at the cost of ripping apart the simple market story that underpins the psychedelic business model. Rather than disrupting Big Pharma,

psychedelic companies now see it as an inspiration. Following the pharma status quo makes the tensions between scale and profitability even more transparent. Generic ketamine costs a couple of dollars; Spravato often well over $1000 per dose with monitoring costs, making it unaffordable to many. To make matters worse, research shows that Spravato is not only less effective than generic ketamine, but also that its anti-depressant effects are short-lived and only maintained with repeated dosing (Moghaddam 2021). Rather than disrupt Big Pharma, corporate psychedelia instead plans to replicate its essential features, raising questions about its claims to tackle the mental health crisis.

The rest of the paper is organized into five sections. In section one, I situate my project within the existing literature on corporate psychedelia and lay out the conceptual and methodological foundations of the analysis. In section two, I analyze the psychedelic product development chain and show how it creates a tension between scale and profitability, one that characterizes all pharmaceutical development. In section three, I examine the unruliness of psychedelics and the unique challenges this poses for companies trying to turn them into pharmaceuticals. In the penultimate section, I discuss the comedown and Spravatoisation as a response to it. Finally, I conclude with some brief thoughts on the paradoxes of corporate psychedelia and the prospects for change.

Foundations

Corporate psychedelia is in its infancy, but it has already managed to attract scholarly attention, mostly within the new subfield of critical psychedelic studies (CPS) (Devenot 2023; Hauskeller and Schwarz 2023; Hauskeller and Sjöstedt-Hughes 2022; Letcher 2013; Pace and Devenot 2023). Working largely in the humanities, CPS warns us to the dangers of commercialisation and the growing influence of corporate actors in the psychedelic space. But what is thus far missing from the subfield is an in-depth study of psychedelic companies themselves and the strategies they are developing to transform psychedelics into profitable pharmaceuticals. A careful examination of these strategies is needed not only to understand the growing power of corporate actors in psychedelia, but also to assess the potential obstacles these once-forbidden substances pose to profit-making. In this paper, I aim to contribute to CPS by offering the first analysis of psychedelic business models.

By way of conceptual framing, it useful to explain how the business model is understood in the context of this paper. In the world of corporate psychedelia, executives make constant reference to their business model. The business model here refers loosely to an overarching plan to make profitable pharmaceuticals out of compounds like DMT and psilocybin. Put simply, the business model is a plan for making money off psychedelics. Such colloquial usage rankles academics in mainstream business and management, who see it as “an invitation for faulty thinking and self-delusion” (Porter 2001: 73). Other researchers are more pragmatic, asserting that the language surrounding business models is necessarily vague because they are performative (Doganova and Muniesa 2015, Doganova and Eyquem-Renault 2009). The business model is performative because its assemblage of narratives and numbers is staged for a public audience. As it circulates amongst investors and other stakeholders it invites interrogation. From the perspective of performativity, it is hard to pin down a precise definition of the business model because of the constant flux generated through circulation and contestation.

Taking on board these insights from the performativity approach, I define a business model simply as a plan for making money, one that is open-ended, malleable, and contested. The framing here lends itself to the tradition that foregrounds profitability in explaining political-economic outcomes (see Christophers 2022). The framing here also stresses the forward-looking temporality that governs profit making in a capitalist setting (see Nitzan and Bichler 2009). Business models aim to create value for investors through capitalization, which serves as a kind of meta-number in capitalism.[1] It is through the lens of capitalization that companies turn material and immaterial things (like psychedelics) into revenue-generating assets (like pharmaceuticals). Capitalization calculates the *present* value of an asset by discounting the earnings it is expected to make in an unknowable *future*. It contains four interrelated components:

*capitalization = expected future earnings * hype / risk * normal rate of return*

Valuation in the here-and-now is anchored in the earnings that investors expect that asset to generate in the future. Creating value for investors means boosting capitalization relative to some average benchmark. And this ultimately rests on the ability of a company, through its business model, to present a viable strategy for generating earnings from its assets, increasing the hype associated with those earnings, and decreasing the risk associated with those earnings. The normal rate of return, usually the current yield on "risk-free" government bonds, is used to discount expected earnings into present value.

Moving from the conceptual to the methodological, there are practical challenges facing any inquiry into psychedelic business models. According to the website *Psychedelic Alpha*, there are around 40 publicly listed psychedelic companies. Here I focus primarily on two publicly listed psychedelic companies: Berlin-headquartered atai Life Sciences and London-headquartered Compass Pathways (when discussing the two companies together hereafter I refer to them with the acronym AC).

Table 1 provides a brief overview of some of the main features of AC. The reason for centring the analysis on AC is fourfold. First, they are among the largest players in corporate psychedelia. At the end of 2023, AC had a 46 percent share of the total market capitalization of publicly listed psychedelic companies. Second, they are two of the oldest and most well-known psychedelic companies in a very young sector. Compass and atai were founded in 2016 and 2018 and went public on the Nasdaq in 2020 and 2021, respectively. The third reason is that the fates of the two companies are tied together. Atai (2022) employs a decentralized "hub and spoke" business model. In addition to developing its own compounds, which include proprietary formulations of DMT and ibogaine, atai also provides financing and support to affiliated companies. This includes a substantial investment in Compass's synthetic form of psilocybin, COMP360, for treatment resistant depression (TRD). The final and perhaps most important reason for focusing on AC is that they are both mid to late stage biotech companies furthest along in bringing medical psychedelics to market. At the time of writing, COMP360 for TRD is the only for-profit "classic" psychedelic in phase 3 of its clinical trial, the

[1] For an innovative conceptual weaving of performativity, capitalization and future-oriented temporality, and its application to the European debt crisis, see Samiee (2024).

final phase before regulatory approval.[2] As market leaders, the experiences of AC are shaping the development of the wider sector.

	atai Life Sciences	**Compass Pathways**
Headquarters	Berlin	London
Founded	2018	2016
IPO	2021 (June)	2020 (September)
Stock Exchange	Nasdaq	Nasdaq
Market Capitalization (September 1, 2024)	$215 million	$542 million
Net Income (since IPO)	-$369 million	-$328 million
Pipeline	BPL-003 / Intranasal 5-MeO-DMT for TRD [P2]* ELE-101 / Psilocin for MDD [P2]* Novel 5-HT2A Receptor Agonists for Undisclosed [Preclinical] EMP-01 / R-MDMA for SAD [P1] IBX-210 / Ibogaine for OUD [P1] RL-007 / Neuromodulator for Schizophrenia [P2]** VLS-01 / DMT for TRD [P1]	COMP360 / Psilocybin for TRD [P3] Comp360 / Psilocybin for PTSD [P2] COMP360 / Psilocybin for Anorexia Nervosa [P2] Prodrug Programme [Preclinical]

Table 1 Overview of Psychedelic Lead Corporations: atai Life Sciences and Compass Pathways

Notes: MDD = major depressive disorder, OUD = opioid use disorder, P = Phase, PTSD = post-traumatic stress disorder, SAD = social anxiety disorder, TRD = treatment resistant depression, *with Beckley Psytech, **with Recognify Life Sciences

Source: Company websites, annual reports

Much like my definition of business models, the methodology that guides my analysis here is intentionally loose. Rather than confine the analysis to AC, I use the data from these two sectoral leaders to provide a general account of corporate psychedelia. To examine the narratives and numbers of the business model, my approach uses both quantitative and qualitative methods (Andersson et al. 2010; Froud et al. 2006). For the former, I use commercial databases like Bloomberg Professional, Refinitiv Eikon and WRDS Compustat, as well as company annual reports, to assemble and analyze data from company financial statements, including net income, research and development (R&D) expenditures, capital structure (debt and equity), equity ownership, and cash flows (see Samman et al. 2022: 96-97). For the latter, I undertake content analysis of various documents produced by psychedelic companies and other stakeholders: annual reports, regulatory filings, earnings call transcripts, social media posts, media commentary, patent filings, press releases, and public presentations. I also conducted twelve semi-structured interviews with a range of subjects, from industry experts and patent attorneys to activists and venture capitalists. The purpose of the interviews is to triangulate some of the quantitative and qualitative findings, as well as to provide additional narrative context where needed.

[2] Psychedelics are commonly divided into classic and atypical forms. The former include LSD, psilocybin, mescaline, DMT and sometimes ibogaine. The latter include ketamine and MDMA. Classic psychedelics are serotonin receptor agonists (mimicking the effects of serotonin), MDMA promotes serotonin release, and ketamine disrupts the brain's glutamate system.

Overall, my purpose is to trace how narrative and number – quality and quantity – interact and ultimately feed into the meta-number of capitalization (Baines and Hager 2021). In the following sections, I use this conceptual and methodological framework to unpack the psychedelic business model and its forward-looking pursuit of profit. My aim is not only to provide a systematic account of how psychedelics are transformed into pharmaceuticals, but also to assess the consequences of this metamorphosis for the mental health crisis.

The Product Development Chain

The process of transforming psychedelics into pharmaceuticals can be conceived in terms of a product development chain (Andersson et al. 2010; Sabatier et al. 2010). Figure 1 visualizes this process, which characterizes any form of drug development, psychedelic or otherwise. The starting point is a new drug concept and the end point is approval from a regulatory body like the Food and Drug Administration (FDA) in the US. Regulatory approval is needed before a company can legally sell its drug. It is also normally a prerequisite for private and public health insurers to reimburse it. To get past the finish line, companies must undertake a series of clinical trials to generate data on the safety and efficacy of their new product. The chances of success are slim. According to a recent study, it takes an average of 10-15 years and $1-2 billion before a new drug is approved for clinical use (Sun et al. 2022). Even drug candidates that advance from the preclinical stage to clinical trial have a failure rate of 90 percent (ibid). With such low chances of success, drug development has been compared to a casino or to other highly speculative activities like oil and mineral prospecting (Anderson et al. 2010: 632).

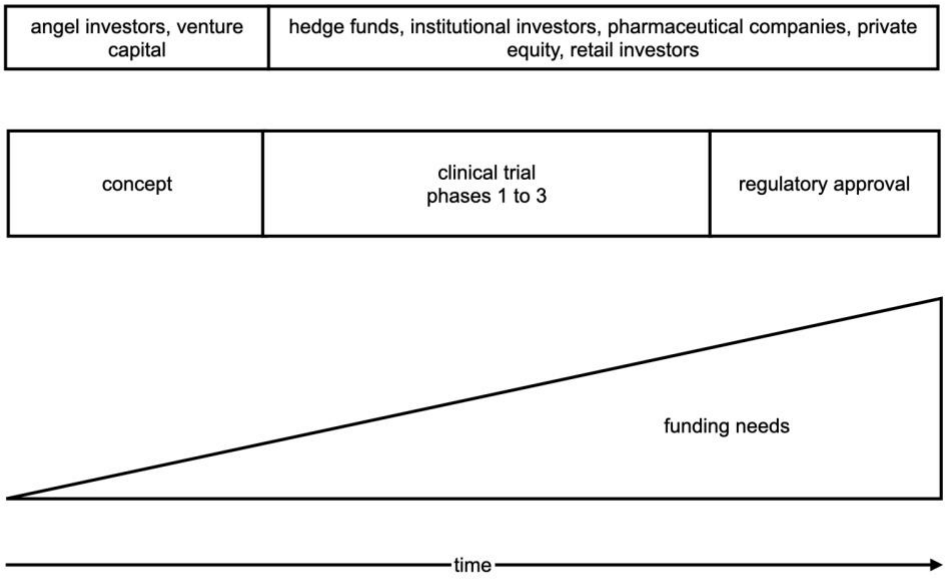

Figure 1 The Pharmaceutical Development Chain
Source: Adapted from Andersson et al. (2010)

As psychedelic companies advance through the product development chain, they require greater amounts of funding for R&D. Tallying numbers from annual reports, atai and Compass have spent on average $63 million and $55 million per year on R&D respectively since their initial public offerings (IPOs). Funding R&D requires steady cash flows. In earnings calls with

investors, often the first financial metric psychedelic executives cite is the “cash runway”: an estimate of how much cash the company has, usually measured in months, to continue funding its operations. Through the cash runway, investors assess whether the company will survive the clinical trial process and make it to regulatory approval.

Until their products have been approved, these companies have no revenues and therefore no steady internal source of cash. This means they must rely on capital markets to fund their operations. For pre-revenue biotech companies, capital market financing is the “lifeblood” that keeps everything afloat on the perilous path to market (Pisano 2006: 162). Capital market financing is also key to the simple market story that underpins the psychedelic business model. Despite the recent lifting of stigma, governments are still hesitant to fund psychedelic research. Non-profits offer an alternative philanthropic funding model but have taken decades to develop their own compounds. For-profit companies argue that their abilities to tap private capital markets gives them both speed and scale to bring psychedelic medicine to market (Angermayer and Doblin 2021; Beiner and Wilde 2021).

Figure 2 traces the major financing events for AC as they proceed through the product development chain. To date, atai has managed to raise $754 million in capital markets, while Compass has raised $598 million. Here we see a network of investors comprised mainly of venture capital (VC), private equity, hedge funds, and other investment funds. Both companies managed to raise significant funding from their IPOs, debuting on the stock market with massive hype and sky-high valuations. Recently both companies have taken out term loan facilities with Hercules Capital, an American non-bank lender to VC-backed companies.[3] The presence of Silicon Valley billionaires lends credence to the disruptor image of psychedelic companies: atai founder and anti-aging guru Christian Angermayer (Apeiron Investment Group), crypto enthusiast Mike Novogratz (Galaxy Investment group), as well as right-wing PayPal co-founder and venture capitalist Peter Thiel (Founders Fund, Rivendell Investment Group, and Thiel Capital) are all prominent psychedelic investors.[4] Also lending credence to this image is the almost complete absence of established players from the pharma sector. Aside from the McQuade Center, an arm of the Japanese drug company Otsuka contributing to Compass’s series B issuance, Big Pharma has mostly shied away from any strategic investments in psychedelics.

Table 2 provides a snapshot of the current ownership structure of AC. Of the top 10 owners of atai, only two have significant stakes. 21 percent of its equity is held by Angermayer’s Apeiron Investment Group and 6.4 percent by Novogratz’s Galaxy Investment Partners. With a 14 percent stake, atai is currently the largest shareholder in Compass. Other significant Compass shareholders include co-founders Goldsmith and Malievskaia (nearly 6% each), venture capital fund TCG Crossover management (5%), as well as hedge fund Citadel Advisors (5%). Since AC are publicly listed, late stage biotech companies, we might expect

[3] These loans represent a significant boost to cash runway of, but their business is still reliant mostly on equity financing. Since their IPOs, atai and Compass have had average annual leverage ratios (total liabilities as a percentage of total assets) of 12.5 percent and 8.7 percent respectively. As a comparison, similarly sized biotech and pharma companies (with assets between $100 and $500 million) had average annual leverage ratios of 34 percent from 2020-2023.

[4] For an examination of corporate psychedelia’s entanglement with Silicon Valley, see Devenot (2023), Tvorun-Dunn (2022). On the far right’s enthusiasm for psychedelics, and how this challenges widely held assumptions about the inherently progressive nature of these substances, see Pace and Devenot (2021)

major Wall Street institutions to start acquiring significant equity stakes (see Figure 1). But so far this has failed to materialize. BlackRock and Morgan Stanley are top 10 shareholders in atai, but their stakes are relatively small at 1 percent and 1.6 percent respectively. AC represent what appears to be a general trend in psychedelic investing, with retail investors dominating over larger institutional players (Psychedelic Alpha 2022a).

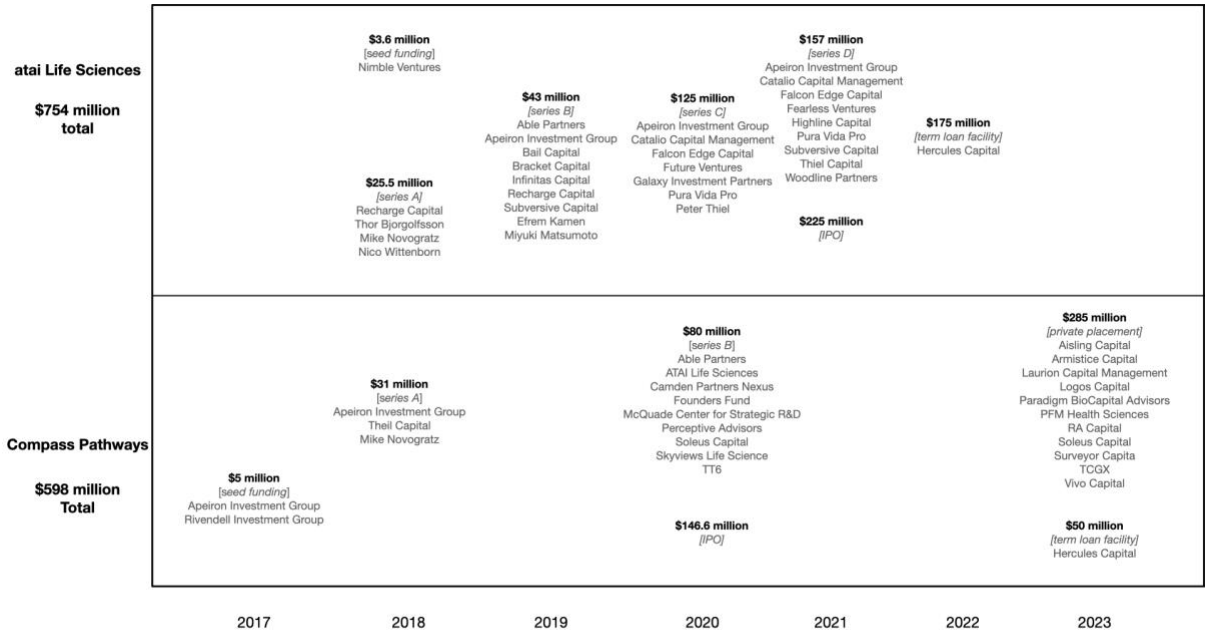

Figure 2 Financing Events: atai Life Sciences and Compass Pathways
Source: Company press releases and SEC filings

Given the grave risks involved in drug development, how do psychedelic companies convince investors to back them? A crucial part of the answer lies in patenting (Marks and Cohen 2021; Seidman 2022). If equity financing is the lifeblood that keeps the sector afloat in the pre-revenue stage, patents are the promised future lifeblood. Patents are the light at the end of the hazardous tunnel, ensuring outsized returns to investors willing to back these risky ventures. Viewed from the forward-looking temporality of capitalization, patents signal monopolistic control over future revenue streams. Patents might enable psychedelic companies to one day exert their own exclusionary control over product markets, or they could be sold off at a later stage to larger players once the products have proven to be commercially viable (Bourgeron and Geiger 2022; Pisano 2006). It is difficult to overstate the importance of securing intellectual property for the psychedelic business model. As part of this research, I interviewed a prominent psychedelic patent attorney, who requested anonymity (Anonymous 2024). This person claims that when meeting with venture capital clients interested in psychedelic investment, the first question these clients ask about the prospective companies is always the same: what is their intellectual property (IP)?

More established psychedelic companies like AC are at the forefront of patenting. In a leaked email, atai founder Angermayer (cited in Love 2021a) offered the following prognosis:

> I […] expect a starting differentiation between solid players in the psychedelic space – to be honest I really just see ATAI and Compass – and copycats. Most of these copycats

miss one important thing: patents. Many psychedelic companies out there will never be able to bring a product to market, as they will hit the patents of Compass and Atai.

With the World Intellectual Property Organization (WIPO), atai currently has 24 patent filings, with 5 granted, and Compass 18 filings, with 4 granted.[5] The inventions claimed in these filings touch upon every aspect of the product chain. AC are seeking patents for formulations of psychedelic compounds, the methods of producing and administering them, as well as various digital tools and technologies, such as virtual reality headsets, questionnaires, therapy apps, and machine learning models (see also Marks and Cohen 2021).

atai Life Sciences	Compass Pathways
Apeiron Investment Group (21.3%)	atai Life Sciences (13.8%)
Galaxy Group Investments (6.4%)	George Goldsmith (5.8%)
Walleye Capital (1.6%)	Ekaterina Malievskaia (5.8%)
Morgan Stanley (1.6%)	TCG Crossover Management (5.6%)
BlackRock (0.98%)	Citadel Advisors (5.4%)
Two Sigma Investments (0.45%)	Millenium Management (5%)
Brown University (0.43%)	Paradigm Biocapital Advisors (3.4%)
Millennium Management (0.39%)	ARK Investment Management (3.1%)
Michael Auerbach (0.31%)	Vivo Capital (2.4%)
Generation Investment Management (0.26%)	McQuade Center for Strategic R&D (2.3%)

Table 2 Top Ten Shareholders: atai Life Sciences and Compass Pathways
Source: Bloomberg Professional

Psychedelic patenting has sparked controversy, with Compass singled out for particularly egregious practices (Goldstein 2022; Hausfeld 2020; Love 2021b; McDaniel 2021). One of its patents, originally filed in April 2020, was the first to cause a stir (Compass Pathways 2023). In addition to specifying the dose of synthetic psilocybin to be administered in the treatment of various disorders, the filing also included extremely broad claims on the most basic aspects of psilocybin therapy. As part of the filing, which is still under consideration by the patent office, Compass seeks exclusive rights to administer psilocybin therapy in a room with a "high-resolution sound system" and "decorated using muted colors". The filing also includes claims on patient protocol, such as listening to music and wearing eyeshades as well as therapist protocol, such as providing "reassuring physical contact", even holding "the hand, arm or shoulder of the subject".

When it was made public, the Compass filing sparked worries about enforcement of IP in the psychedelic space. Would psychedelic therapists using high-resolution sound-systems, rooms decorated with muted colors, eyeshades and reassuring physical contact be prevented from doing so unless they receive a patent license from Compass? The non-profit Porta Sophia (2022) filed a third-party pre-issuance submission to the patent office, arguing that many of Compass's claims were already in the prior art. Bowing to pressure, Compass ended up cancelling 137 of the 162 claims originally in the filing.

Compass has also come under fire for its patenting of psychedelic molecules. In 2021, the company was awarded a patent for the process of producing a crystalline synthetic version of psilocybin known as "Polymorph A" (with the tradename COMP360). The precedent for

[5] These numbers come from the WIPO PATENTSCOPE database (https://patentscope.wipo.int/) and are current as of September 1, 2024. The announcement of patent filings is lagged by eighteen months, so the most recent filings will not show up in the data.

intellectual property claims over polymorphs was set in the late 1990s when researchers found that some polymorphs of the HIV drug ritonavir had a longer shelf life (Harrison 2020). But critics note that Compass has not specified the benefits of Polymorph A (ibid 2020). What is more, critics also claim that Polymorph A is not a truly novel invention, but a mixture of existing polymorphs that have been known for decades (Hodes 2022). A protracted and high-profile legal battle ensued. The non-profit group Freedom to Operate petitioned the US patent office for a post grant review on grounds that Compass's polymorph already existed in the prior art. In what has been described as an "unreserved win" for Compass, the patent office upheld the company's claim (Psychedelic Alpha 2022b). Yet the ruling raises murky legal questions about IP enforcement (Pechenik 2021). Will only infringements of "pure" Polymorph A be enforced? What happens if trace amounts of Polymorph A are found in the synthesized products of a Compass competitor? This question of "how much" is open to interpretation and may invite further legal contestation in the future.

Unruly Commodities

The simple market story of the psychedelic business model claims that private companies, in their ability to tap into capital markets, are best positioned to rapidly deliver psychedelic medicine at scale. According to this story, shareholders win big returns and patients win a revolutionary new mental health treatment. But analyzing the product development chain suggests things are more complicated than this. To lure capital market investors into this risky business, psychedelic companies need patents that are based on a principle of exclusion to maintain pricing power. Patents therefore create a tension within the simple market story. Rather than just profit from scale, psychedelic companies need to control, and ultimately restrict, scale in the name of profitability. When viewed in the context of the product development chain, there is nothing exceptional about the psychedelic business model. Like any other company in the pharmaceutical business, monopoly-conferring patents are a prerequisite for profitability. But this realization too creates tensions within the simple market story. If psychedelic companies are merely playing by the rules of the established game, then what are we to make of their carefully curated image as outside disrupters of Big Pharma?

As highlighted in the previous section, there are no guarantees that psychedelic patents will be awarded. All intellectual property rights are contestable in the sense that they all build on communal knowledge (Gagnon 2007). Assigning them to a single person or entity is, in the words of Lewis Mumford (1934: 142), a "convenient falsehood" that invites competing interpretations. But legal contestation of patents in the psychedelic space takes on a unique flavor. There is a rich history of prior art because people have used these substances for a long time (Devenot et al. 2022; Kawaoka 2023; Shams et al. 2023). The first wave of psychedelic research in the postwar period provided much of the scientific groundwork. And as components of complex rituals, healing practices, and artistic movements, psychedelics have become part of the fabric of certain cultures, both indigenous and countercultural. In short, there is an emotional connection to psychedelics not normally seen with pharmaceuticals. Emotion provides the fuel for contestation of exclusive IP claims. Despite Compass's legal victory over Porta Sophia, one reason why Wall Street and Big Pharma shies away from psychedelics is because of lingering uncertainties over patent protection (Wainer 2024; Weintraub 2021).

The perils of psychedelic patenting point to something distinctive about the process of trying to turn them into pharmaceuticals. There is an unruliness to psychedelics that makes them impervious to corporate attempts to control them for profitable ends. The idea of the unruly commodity first emerged in animal and resource geography (De Gregorio 2020). It refers to the ways in which nature imposes constraints on the commodifying logic of capital and the scaling of markets (Bakker and Bridge 2006; see also Tsing 2015). An especially evocative example is that of pigs in early medieval Gaul. In a rich ecological-historical account, Jamie Kreiner (2017) shows how these clever, boundary-crossing animals frustrated human attempts to bring them under their control. To profit from pig husbandry meant accommodating them and their complex environments as much as it meant mastering them. The flexibility required in human relations with pigs had wider reverberations, influencing Merovingian policymakers who adopted a similarly flexible approach to fiscal policy. The unruly commodity is also a useful concept for understanding psychedelics, both natural and synthetic. Like pigs, they are volatile and unpredictable. Psychedelics do not just trespass boundaries; they are known to dissolve them altogether. And yet the maintenance of boundaries, especially those associated with IPRs, is essential to the task of turning them into pharmaceuticals.

Another unruly aspect of psychedelics that frustrates patent enforcement is the existence of generic alternatives. Natural psychedelics like psilocybin mushrooms are unpatentable and the patent on synthetic ones like LSD expired decades ago. Generic means cheap (Joralemon 2023). The street price for a standard dose of LSD or psilocybin mushrooms is around $20. Easy-to-use “shroom” growing kits can be found online, yielding several high-dose trips for less than $50. Low-cost, abundant supply is great news for access and scalability, but it is a grave threat to companies investing hundreds of millions of dollars to develop them as pharmaceuticals (Devenot et al. 2022). Cheap generic options make it hard for corporations to wield monopoly power over psychedelics. There is an underground network of therapists already delivering psychedelic therapy, support, harm reduction, and other healing modalities outside of formal healthcare systems. Even for the insured, the generic-underground route will in many cases end up costing less than corporate medicalized treatment options when factoring in co-pay.[6]

Of course, the generic-underground route comes with risks that will not apply to the corporate medicalized one. The former may be the cheaper option but as the law stands right now, it could also land users in jail. As political momentum swings away from prohibition, the appeal of alternatives to corporate medicalized treatment stands to increase. Loosening drug laws may also help allay fears over the safety of non-medicalized options because it empowers members of the community to ensure the safe delivery of psychedelics by naming and shaming bad faith actors without fear of legal reprisal (Hardman 2024b). The lifting of prohibition will therefore likely make corporate efforts to tame psychedelic unruliness even more difficult to bring under the exclusionary power of capital. Psychedelic companies have designed their products under the assumption that legalized use will take a medicalized form (Schwarz-Plaschg 2022). In other words, their profitability depends on psychedelic treatment being approved strictly for their own patented compounds and therapies, which are being

[6] Psychedelic tourism – with Westerners travelling to countries where these substances are used in a shamanic context – offers another alternative to the corporate medical model. This type of tourism does raise its own ethical issues, from overharvesting to erasure of the historical and ongoing injustices against indigenous communities (Fotiou 2016; Williams et al. 2022).

created in a clinic setting for the treatment of specific psychiatric disorders. It is little surprise, then, that psychedelic companies have come out against drug reforms that sanction wider, non-medicalized use of these substances.

Drug reform laws passed in Oregon in 2020 are an illustrative example. The state's Measure 109 legalized psilocybin therapy with licensed practitioners, while Measure 110, eventually repealed, sought to decriminalize possession of all drugs, including psilocybin therapy to anyone seeking their services without requiring an official psychiatric diagnosis or prescription. Compass (2021) made known its views about Oregon's drug policy in a white paper: "It is critically important that any innovation, eg psilocybin therapy, is evidence-based and brought safely to patients suffering with a diagnosed mental health illness via a medically regulated route, not a legalization path." In a leaked email to researchers at Oregon Health and Science University in which he requested a meeting to discuss the white paper, then Compass CEO Goldsmith reiterated these views: "While we agree that there is a need for innovation in mental health care, we firmly believe that this should be developed along existing regulatory standards with FDA oversight. Clearly, a majority of Oregon voters think differently" (cited in Love 2021c).

In addition to frustrating patent enforcement, psychedelics are also unruly in their subjective effects (Sanabria 2021). Unlike standard depression drugs, such as selective serotonin reuptake inhibitors (SSRIs), psychedelics occasion mystical experiences that are difficult to put into words, that are unpredictable, volatile, and often difficult. Depending on the substance and dosage, intense trips can last from a couple of hours to a couple of days. And their effects are heavily influenced by "set and setting" – the mindset of the person taking them and the context in which they are taken.

The unruliness of the experience presents challenges for corporate medicalization. On the one hand, it makes it difficult to study psychedelics using conventional methods of clinical research, the gold standard of which is the double-blind randomized control trial (i.e., people tend to know when they have been given a psychedelic instead of a placebo; so too do the researchers observing them) (Giffort 2020). On the other hand, the intensity of the trip means that a trained professional is required to supervise the patient during its duration. For a profit-oriented company, the time and labour-intensive nature of the trip represents potentially huge costs. Shorter duration psychedelics like DMT alleviate some of the concerns about cost-effectiveness, but there are lingering questions about their therapeutic benefits. A recent study finds that the shared characteristic of all classic and atypical psychedelics is that they open the critical period for social reward learning (Nardou et al. 2023; see also Roseman et al. 2018). This opening is essential to the behavioral modifications that produce positive therapeutic outcomes. Crucially, the research suggests that the duration of the opening of the critical period is proportional to the duration of the subjective effect. In other words, the longer the trip, the greater the potential therapeutic benefit.[7]

[7] Microdosing is one way of surpassing these unruly subjective effects. This practice of taking a small, subperceptual dose of a psychedelic substance, first took root in Silicon Valley and has gained widespread popularity for its purported effects in boosting productivity, creativity and wellbeing. But the jury is still out on its effectiveness (Cavanna et al. 2022). Companies at the cutting edge of innovation in psychedelic research are trying to engineer the trip out of psychedelics altogether (Langlitz 2024). Clinical studies of these compounds are only getting started and so there is no systematic evidence of their efficacy.

Cost concerns extend well beyond supervision. The psychedelic business model's claim to be an alternative to Big Pharma is also a claim to be an alternative to the prevailing biomedical dogma that underpins it. According to the biomedical view, mental illness is a biological problem of the brain, to be solved with pharmaceutical intervention alone (Deacon 2013; Engel 1977). Despite the early hyping of psychedelics as miracle cures, there has been a general, if somewhat implicit and vague, understanding that lasting benefit from these substances requires some therapeutic element (Dumit and Sanabria 2022; Hauskeller and Schwarz 2023). This includes preparation before the session and integration after with a psychotherapist or some form of support network. But therapy adds to the cost of treatment and companies have little financial incentive to offer it, especially since most insurers do not cover therapy (Lambert 2024).

Compass's experience shows that attempts to patent the basic components of therapy are unlikely to succeed. The current design of the drug discovery process further incentivizes psychedelic companies to downplay the therapeutic element. Testing the efficacy of different types of therapy requires a large sample of participants, which adds further costs (Samuel 2024). Since regulators like the FDA are in the business of regulating drugs and not therapy, companies are more likely gain approval if they can demonstrate that the drug alone is responsible for the effect.[8] This structural imperative to minimize the importance of the therapeutic element reveals another tension in the psychedelic business model. Though the corporate medicalized model presents itself as a safe alternative to underground usage, the pursuit of profit entails cutting costs in ways that end up compromising patient safety (Hartogsohn 2023; Noorani 2019).

The Comedown

In the early years, psychedelic companies fumbled along without any strong need or desire to address the tensions underlying their business model. They were riding a massive hype wave. Hype allowed these companies to steer clear of the contradiction of wanting to disrupt Big Pharma while simultaneously engaging in Big Pharma-style patenting strategies. Hype also allowed these companies to dodge thorny questions about the unruliness of psychedelics and the problems this poses for profitability. But then like all hype waves this one came crashing down.

Figure 3 shows AC's share of capitalization in two markets: the Nasdaq and the world biotech sector. Capitalization gives us a window into the collective mindset of psychedelic investors, of how they diagnose the future revenue-generating capacities of these companies. In its short history, there has been a dramatic shift in the financial fortunes of corporate psychedelia. AC debuted on the stock market with sky-high valuations. But since late-2021, the sector has experienced what can best be described as a massive comedown. By both measures, AC's share of capitalization has fallen sharply. In this hostile new climate, many psychedelic companies have gone bust, while survivors have been forced to restructure, trim down pipelines, and lay off staff.

[8] At the time of writing (Summer 2024), the FDA rejected Lykos Therapeutics' MDMA-assisted therapy for PTSD. One of the many grounds for rejection was the lack of clear separation between the drug's effects and the therapy itself (Hardman 2024c).

The comedown can at least partly be blamed on changing macroeconomic conditions, especially rising interest rates starting in 2022 (Angermayer 2023). Higher interest rates have a negative effect on stock market valuations and make it harder to raise the financing that is the lifeblood of the psychedelics sector. But macroeconomic shifts can only be part of the story for a simple reason. The biotech sector in general is also reliant on financing and therefore interest rate sensitive. And yet, as we see in Figure 3, the performance of AC has fallen sharply not only relative to the Nasdaq but also to world biotech.

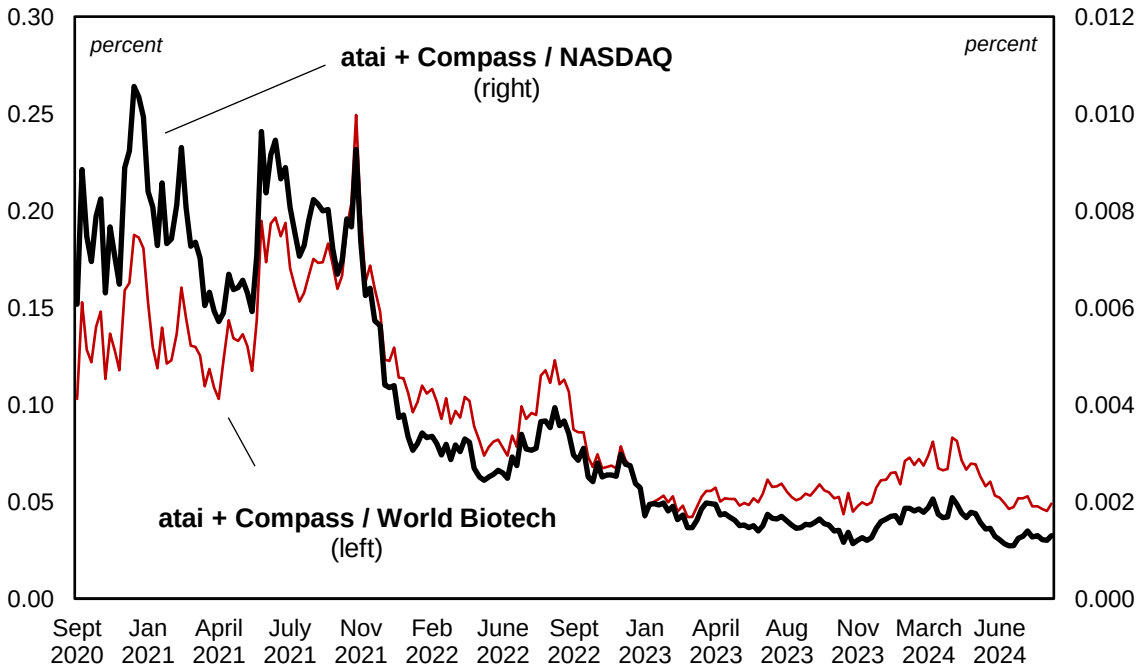

Figure 3 The Comedown: Psychedelic Shares of NASDAQ and World Biotech Capitalization

Source: Refinitiv Eikon

Why have psychedelic companies fared so much worse than other biotech companies? I posed this question to Josh Hardman (2024b), the founder of Psychedelic Alpha and one of the most respected commentators in the industry. For Hardman, the issue in large part boils down to risk perceptions in the investment community. Biotech stocks are risky, but within biotech, psychedelic stocks are the riskiest of the risky – they are, in Hardman's words, "uncharted biotech". And so when markets turn bearish, as they did in late-2024, it is the riskiest assets that suffer most. As Hardman notes, the bear market also tempered the hype surrounding the timeline for regulatory approval. At the height of the market frenzy in 2020 and early 2021, optimists were forecasting that FDA approval of psilocybin therapy was just around the corner, as early as 2023 by some estimates. Now in the depths of the comedown, legal medical use is not expected before 2027 at the earliest. According to Hardman, institutional investors tend to be more willing to weather storms of this type. But as mentioned earlier, one of the features of corporate psychedelia is the outsized presence of retail investors with short-term horizons. "As soon as the market started turning," Hardman explained, "a lot of these small-time investors needed to liquidate their positions to pay rent".

Hard times have forced psychedelic companies to do plenty of soul-searching. What has emerged is not really a shift or transformation but a clarification of purpose. Hardman (2024a) refers to this transformation as a process of "Spravatoisation". Spravato is the brand name of pharma giant Johnson and Johnson's (J&J) patented version of the atypical psychedelic ketamine. Before the comedown, psychedelic executives would occasionally mention Spravato as a potential model to follow. But since late 2021, the sector has been gripped by a near obsession with J&J's patented esketamine. In interviews, earnings calls, and conference talks, executives constantly mention Spravato as their newfound inspiration, the blueprint for bringing their own compounds to market. In the words of current Compass CEO Kabir Nath (2024a), Spravato is a "harbinger of what we could do".

Looking at the financial numbers, it is easy to see why Spravato causes so much excitement. The drug received FDA approval in 2019 for TRD and major depressive disorder (MDD) with suicidal thoughts or actions, to be used in conjunction with an oral antidepressant. Spravato got off to a slow start but has become a major commercial success, with over a billion dollars of sales in the past three years. It is expected to reach blockbuster status (over a billion dollars in yearly sales) as early as 2024. More fundamentally, psychedelic companies take inspiration from Spravato because it shows how to tame the unruliness of psychedelics.

Spravato instills confidence that murky claims to IP will be upheld even when claims to innovation are tenuous. Cheap, generic ketamine has been used "off label" in psychiatric treatment for decades. To make ketamine patentable, and therefore profitable, J&J developed Spravato as a nasal spray and shifted ketamine to one of its isomers: esketamine. The latter claim to innovation is particularly tenuous because studies have shown that esketamine is less effective than generic ketamine in treating depression (Nikolin et al. 2023). Spravato also inspires because it received FDA approval with minimal monitoring requirements and without need for therapy. As part of its Risk Evaluation and Mitigation Strategy, the FDA requires that Spravato be administered with two hours of monitoring by a trained professional. These light-touch requirements are especially heartening for psychedelic companies developing shorter duration compounds that fit within a two-hour monitoring session. Before Spravato's spectacular success, psychedelic companies claimed they were in the business of psychedelic-assisted psychotherapy. Now it is the drug effect alone that gets emphasized. Instead of therapy, the companies offer "digital support tools" – apps that are intended to help patients integrate their experience (Compass Pathways 2022). And instead of therapists, one company now refers to "dosing session monitors" – minimally trained staff who are explicitly instructed to only watch vital signs (Mind Medicine 2024).

Spravatoisation may be the surest pathway to commercial success. But adopting the Spravato paradigm only serves to exacerbate the underlying tensions of the psychedelic business model. After all, patented esketamine is a product of Big Pharma, the supposed target of psychedelic disruption. And when we look at how it has been rolled out, we see that Spravato embodies everything that corporatized psychedelic medicine claims to overcome. J&J has been accused of monopolistic price gouging (Bennett and Belser 2020). For millions without full insurance, the cost of Spravato is simply out of reach. It also represents a huge cost to healthcare systems, even though evidence suggests it is less effective than generic ketamine.[9]

[9] The United Kingdom's National Health Service (NHS) has not approved Spravato due to concerns about cost effectiveness (BBC 2020).

While generic ketamine costs a few dollars, Reddit users in the US report costs of around $1500 per dose of Spravato with monitoring (r/Spravato 2023). If the aim is to model their products on Spravato, then it is unclear how psychedelic companies will meet their goal of rapidly delivering psychedelic medicine at scale.

Adopting the Spravato paradigm also raises doubts about corporate psychedelia's ability to develop lasting cures for mental illness. When mainstream science first "discovered" its anti-depressant properties in the 1990s, ketamine was touted as a powerful cure for depression (Moghaddam 2021). The initial hype helped J&J get Spravato fast tracked through the FDA approval process. Now researchers are discovering that Spravato is not only less effective than generic ketamine, but also that its anti-depressant effects are short-lived and are only maintained with indefinite repeated dosing (ibid: 2021). In this way, Spravato fits within the Big Pharma strategy insofar as its profitability depends not on lasting healing, but chronic dependence. Psychedelic executives are aware of this aspect of Spravato. For example, Compass's embrace of the Spravato paradigm comes with a caveat. One of the disadvantages of COMP360 relative to Spravato is the monitoring time. Compass acknowledges that its proprietary psilocybin will does not currently fit within the two-hour clinical model (Nath 2024b). But it also argues that the cost of four to six hours of monitoring will be offset by fewer administrations than Spravato. Whether this alternative model will prove to be as profitable as Spravato remains to be seen. In any case, judging from the recent comedown, investors have yet to be convinced that psychedelics will follow Spravato to blockbuster status.

Conclusion: Transforming Corporate Psychedelia?

Spravatoisation makes the disrupter image of the psychedelic business model increasingly difficult to uphold. Yet the inability to distinguish itself from Big Pharma appears to be a necessary trade-off if the sector wants to profitably transform psychedelics into pharmaceuticals. Profitability appears to hinge on the sector's ability to tame the unruliness of psychedelics by putting them into a medicalized box. That taming process, however, comes at a cost that is existential if not financial. Indigenous and countercultural communities are diverse, making it difficult to generalize about their views on psychedelics. But one thing that unites these disparate communities is that they embrace the unruliness of the psychedelic experience as an essential part of healing. In other words, the transformative power of these substances derives from their intense subjective effects, from their weird, time-dissolving properties, from their time-consuming inconvenience. Communal rituals do not seek to control or tame unruliness. Instead, they try to channel it so that participants may themselves release control to the substances which are seen to have an agency, sentience, and wisdom all their own (Devenot et al. 2022; Sanabria 2021).

What emerges, then, is a paradox overlooked in the sector's simple market story. Corporate psychedelia tries to transform these substances into pharmaceutical medicines. To make them into pharmaceuticals they need to be profitable. And to be profitable, they need to be purged of the very elements essential to their healing power. This paradox is as old as capitalism itself. From the very beginning capitalism has commodified and coopted humans and more-than-human nature, absorbing them into the logic of capital, taming their unruliness and draining them of their radical potential (Fisher 2009). The cost has been a deep spiritual malaise, as the extension of capitalist logic into ever-greater areas of social life leaves us

feeling alienated from ourselves, from other humans, and from our natural environment (Hager 2023).

Reflecting on his first-hand encounter with the psychedelic renaissance, in which he sampled many of these substances, journalist Andy Mitchell (2024: 310) offers a sober assessment of its future. Conjuring Albert Einstein, Mitchell writes: "…we can't solve the problems we've created from the same level of consciousness from which we've created them. We have to change before psychedelics can really change us". Putting this in political economy terms: we can't solve the problem of the mental health crisis with capitalism because capitalism created the crisis in the first place. The "we" that needs to change must include the capitalists that steer the ship. But herein lies the problem. What incentive do psychedelic capitalists have to change when they are the ones that gain most from business as usual?

References

Andersson, Tord, Gleadle, Pauline, Haslam, Colin and Tsitsianis, Nick. 2010. Bio-pharma: A Financialized Business Model. *Critical Perspectives on Accounting*, 21(7): 631–641.

Angermayer, Christian. 2023. 14 Reasons Why I Am Increasing My Stake in atai Life Sciences. LinkedIn Profile, 29 March.
Available at: https://www.linkedin.com/pulse/14-reasons-why-i-am-increasing-my-stake-atai-life-angermayer/

Angermayer, Christian and Doblin, Rick. 2021. Research & Development - For-Profit or Non-Profit? That is the $100b Question. *PSYCH Investor Summit*, 8 July.
Available at: https://www.youtube.com/watch?v=yXJ0N3kmNjY

Anonymous. 2024. Interviewed by Sandy Hager [Zoom], 16 May.

atai Life Sciences. 2022. Stephen Bardin to Join atai Life Sciences as CFO Designate. 17 June.
Available at: https://ir.atai.life/news-releases/news-release-details/stephen-bardin-join-atai-life-sciences-cfo-designate

Baines, Joseph and Hager, Sandy Brian. 2021. The Great Debt Divergence and Its Implications for the Covid-19 Crisis: Mapping Corporate Leverage as Power. *New Political Economy*, 26(5): 885-901.

Bakker, Karen and Bridge, Gavin. 2006. Material Worlds? Resource Geographies and the Matter of Nature. *Progress in Human Geography*, 30(1): 5-27.

BBC News. 2020. Esketamine Spray for Treating Depression "Not Cost-effective". *BBC News*, 4 September.
Available at: https://www.bbc.co.uk/news/health-54014522

Bennett, Raquel and Belser, Alexander. 2020. Promise, Power, and Profit: The Economics of Ketamine Treatment. *MAPS Special Edition Bulletin*, 30(1): 24-26.

Beiner, Alexander and Wilde, Lars. 2021. Psychedelic Capitalism: Debate with Compass Pathways Co-Founder. *Rebel Wisdom*, 31 May.
Available at: https://www.youtube.com/watch?v=FdOzSHkyLlQ

Bourgeron, Théo and Geiger, Susi. 2022. (De-)assetizing Pharmaceutical Patents: Patent Contestations Behind a Blockbuster Drug. *Economy and Society*, 51(1): 23-45.

Cavanna, Federico, Muller, Stephanie, Alethia de la Fuente, Laura, Zamberlan, Federico, Palmucci, Matías, Janeckova, Lucie, Kuchar, Martin, Pallavicini, Carla and Tagliazucchi, Enzo. 2022. Microdosing with Psilocybin Mushrooms: A Double-blind Placebo-controlled Study. *Translational Psychiatry*, 12(1): 1-11.

Christophers, Brett. 2022. Fossilised Capital: Price and Profit in the Energy Transition. *New Political Economy*, 27(1): 146-159.

Compass Pathways. 2021. Responding to an Urgent Mental Health Crisis. *Compass Pathways White Paper*. August.

Compass Pathways. 2022. *Annual Review*.
Available at: https://compasspathways.com/annual-review-2022/

Compass Pathways. 2023. *Treatment of Treatment Resistant Depression with Psilocybin [pending]*. World Intellectual Property Organization, Publication number: WO2023086252.

De Gregorio, Julia. 2020. Trading Animal Genetics: On the “Marketization” of Bovine Genetics in the Dairy Industry. *Geographica*, No. 29, Uppsala: Department of Social and Economic Geography.

Deacon, Brett J. 2013. The Biomedical Model of Mental Disorder: A Critical Analysis of Its Validity, Utility, and Effects on Psychotherapy Research. *Clinical Psychology Review*, 33(7): 846-861.

Devenot, Neşe. 2023. TESCREAL hallucinations: Psychedelic and AI hype as inequality engines. *Journal of Psychedelic Studies*, *7*(S1), pp.22-39.

Devenot, Neşe, Conner, Trey and Doyle, Richard. 2022. Dark Side of the Shroom: Erasing Indigenous and Counterculture Wisdoms with Psychedelic Capitalism, and the Open Source Alternative: A Manifesto for Psychonauts. *Anthropology of Consciousness*, 33(2): 476-505.

Doganova, Liliana and Eyquem-Renault, Marie. 2009. What Do Business Models Do? *Research Policy*, 38(10): 1559-1570.

Doganova, Liliana and Muniesa, Fabian. 2015. Capitalization Devices: Business Models and the Renewal of Markets. In M. Kornberger, L. Justesen, A. Koed Madsen and J. Mouritsen (eds), *Making Things Valuable*, Oxford: Oxford University Press, pp. 109-125.

Dyck, Ericka. 2008. *Psychedelic Psychiatry: LSD from Clinic to Campus*, Baltimore: John Hopkins University Press.

Engel, George L. 1977. The Need for a New Medical Model: A Challenge for Biomedicine. *Science*, 196(4286): 129-136.

Fisher, Mark. 2009. *Capitalist Realism: Is There No Alternative?* Winchester: Zer0 Books.

Fotiou, Evgenia. 2016. The Globalization of Ayahuasca Shamanism and the Erasure of Indigenous Shamanism. *Anthropology of Consciousness*, 27(2): 151-179.

Froud, Julie, Johal, Sukhdev, Leaver, Adam and Williams, Karel. 2006. *Financialization and Strategy: Narrative and Numbers*, London: Routledge.

Gagnon, Marc-André. 2007. Capital, Power and Knowledge According to Thorstein Veblen: Reinterpreting the Knowledge-based Economy. *Journal of Economic Issues*, 41(2): 593-600.

Giffort, Danielle. 2020. *Acid Revival: The Psychedelic Renaissance and the Quest for Medical Legitimacy*. Minneapolis: University of Minnesota Press.

Goldstein, Luke. 2022. The Emerging Magic Mushroom Monopoly. *The American Prospect*, 10 January.
Available at: https://prospect.org/power/rollups-emerging-magic-mushroom-monopoly/

Hager, Sandy Brian. 2023. Capital as Death Denial. In A. Samman and E. Gammon (eds), *Clickbait Capitalism: Economies of Desire in the Twenty-First Century*, Manchester: Manchester University Press, pp. 41-60.

Hardman, Josh. 2024a. MindMed's 'Total Elimination' of Psychotherapy in LSD Study Stokes Debate Around Its Role in Psychedelic Therapies. *Psychedelic Alpha*, 5 April.
Available at: *https://psychedelicalpha.com/news/mindmeds-total-elimination-of-psychotherapy-in-lsd-study-stokes-debate-around-its-role-in-psychedelic-therapies*

Hardman, Josh. 2024b. Interviewed by Sandy Hager [Zoom], 10 April.

Hardman, Josh. 2024c. FDA Rejects Lykos Therapeutics' MDMA-Assisted Therapy For PTSD. *Psychedelic Alpha*, 9 August.
Available at: https://psychedelicalpha.com/news/breaking-fda-rejects-lykos-therapeutics-mdma-assisted-therapy-for-ptsd

Harrison, Ann 2020. Researchers Examine Psilocybin Patent Claims. *Lucid News*, 23 April.
Available at: https://www.lucid.news/researchers-examine-psilocybin-patent-claims/

Hartogsohn, Ido. 2023. The Corporadelic Set and Setting: On the Consequences of Psychedelic Commodification. *History of Pharmacy and Pharmaceuticals*, 65(1): 131-140.

Hausfeld, Russell. 2020. As COMPASS Pathways Continues its Attempts to Build a Psychedelic Monopoly, Usona Institute Keeps Publishing Open Research. *Psymposia*, 15 September.
Available at: https://www.psymposia.com/magazine/compass-psychedelic-psilocybin-patents-usona-open-science/

Hauskeller, Christine and Schwarz, Claudia Gertraud. 2023. Critical Doses: Nurturing Diversity in Psychedelic Studies. *Interdisciplinary Science Reviews*, 48(5): 697-711.

Hauskeller, Christine and Sjöstedt-Hughes, Peter (eds). 2022. *Philosophy and Psychedelics: Frameworks for Exceptional Experience*, London: Bloomsbury Academic.

Hodes, Dave 2022. Pending Patents: Can Any Company Own Psilocybin? *Green Market Report*, 13 January.
Available at: https://www.greenmarketreport.com/pending-patents-can-any-company-own-psilocybin/

Joralem, Vincent. 2023. Psychedelics are Cheap. Psychedelic Treatment is Not. *Bill of Health*, 6 October.
Available at: https://blog.petrieflom.law.harvard.edu/2023/10/06/psychedelics-are-cheap-psychedelic-treatment-is-not/#:~:text=Psychedelic%20Treatment%20Is%20Not.,-

October%206%2C%202023&text=Psychedelics%20hold%20immense%20potential%20to,the%20lines%20of%20socioeconomic%20status.

Kawaoka, Anneli E. 2023. Psychedelic Drugs and the Prior Art Problem. *Indiana Law Journal*, 99(1): 392-415.

Kreiner, Jamie. 2017. Pigs in the Flesh and Fisc: An Early Medieval Ecology. *Past & Present*, 236(1): 3-42.
Langlitz, Nicolas. 2024. Psychedelic Innovations and the Crisis of Psychopharmacology. *BioSocieties*, 19(1): 37-58.

Letcher, Andy. 2013. Deceptive Cadences: A Hermeneutic Approach to the Problem of Meaning and Psychedelic Experience. In D. Luke, C. Adams, A. Waldstein, B. Sessa and D. King (eds), *Breaking Convention: Essays on Psychedelic Consciousness*, London: Strange Attractor Press.

Love, Shayla. 2021a. Investors Are Debating Who Should Own the Future of Psychedelics. *Vice Motherboard*, 10 March.
Available at: https://www.vice.com/en/article/investors-are-debating-who-should-own-the-future-of-psychedelics/

Love, Shayla. 2021b. Can a Company Patent the Basic Components of Psychedelic Therapy? *Vice Motherboard*, 2 February.
Available at: https://www.vice.com/en/article/93wmxv/can-a-company-patent-the-basic-components-of-psychedelic-therapy.

Love, Shayla. 2021c. Psychedelics Are a Billion-Dollar Business, and No One Can Agree Who Should Control It. *Vice Motherboard*, 23 September.
Available at: https://www.vice.com/en/article/psychedelics-are-a-billion-dollar-business-and-no-one-can-agree-who-should-control-it/

Marks, Mason. and Cohen, I. Glenn. 2022. Patents On Psychedelics: The Next Legal Battlefront of Drug Development. *Harvard Law Review Forum*, 135: 212–235.

McDaniel, Piper. 2021 Is This Peter Thiel–Backed Startup Trying to Monopolize the Astral Plane? *Mother Jones*, 6 July.
Available at: https://www.motherjones.com/politics/2021/07/compass-pathways-peter-thiel-psilocybin-psychedics-monopoly-market-mushrooms-mental-health-depression-therapy-shrooms/

Mind Medicine. 2024. Form 8-K. United States Securities and Exchange Commission.

Mitchell, Andy. 2024. *Ten Trips: The New Reality of Psychedelics*, London: Penguin.

Mumford, Lewis. 1934. *Technics and Civilization*, London: Routledge and Kegan Paul.

Nardou, Romain, Sawyer, Edward, Song, Young Jun, Wilkinson, Makenzie, Padovan-Hernandez, Yasmine, De Deus, Júnia Lara, Wright, Noelle, Lama, Carine, Faltin, Sehr, Goff, Loyal A., Stein-O'Brien, Genevieve L. and Dölen, Gül. 2023. Psychedelics Reopen the Social Reward Learning Critical Period. *Nature*, 618(7966): 790-798.

Nath, Kabir. 2024a. Neuropsych Corporate Panel Discussion. *TD Cowen 2024 Health Care Conference*, Boston, 4 March.

Nath, Kabir. 2024b. *Compass Pathways Fourth Quarter 2023 Investor Call*, 29 February.

Available at: https://edge.media-server.com/mmc/p/6tw3dn6x/

Nikolin, Stevan, Rodgers, Anthony, Schwaab, Andreas, Bahji, Anees, Zarate Jr, Carlos, Vazquez, Gustavo and Loo, Colleen. 2023. Ketamine for the Treatment of Major Depression: A Systematic Review and Meta-analysis. *EClinicalMedicine*, 62: 1-15.

Nitzan, Jonathan and Bichler, Shimshon. 2009. *Capital as Power: A Study of Order and Creorder*, London: Routledge.

Noorani, Tehseen. 2019. Making Psychedelics into Medicines: The Politics and Paradoxes of Medicalization. *Journal of Psychedelic Studies*, 4(1): 34-39.

Oram, Matthew 2018. *The Trials of Psychedelic Therapy: LSD Psychotherapy in America*, Baltimore: John Hopkins University Press.

Pace, Brian A. and Devenot, Neşe. 2021. Right-Wing Psychedelia: Case Studies in Cultural Plasticity and Political Pluripotency. *Frontiers in Psychology*, 12: 1-21.

Pace, Brian and Devenot, Neşe. 2023. Blowing Glass at Stone Houses: An Interview with Psychedelic Anticapitalist David Nickles. *History of Pharmacy and Pharmaceuticals*, 65(1): 141-159.

Pechenik, Graham. 2021. [X], 4 November
Available at: https://x.com/calyxlaw/status/1456375302968340485

Pisano, Gary P. 2006. *Science Business: The Promise, the Reality, and the Future of Biotech*, Boston: Harvard Business School Press.

Porta Sophia. 2022. *COMPASS Pathways Amends Claims of US Patent Application Describing Psilocybin for the Treatment of Depression*. 25 August.
Available at: https://www.portasophia.org/news/press-releases/compass-pathways-amends-claims.html

Porter, Michael E. 2001. Strategy and the Internet. *Harvard Business Review*, 79(3): 62-78.

Psychedelic Alpha. 2022a. *Psychedelics in the Public Markets*.
Available at: https://psychedelicalpha.com/news/psychedelics-in-the-public-markets-2022

Psychedelic Alpha. 2022b. *Psychedelic Bulletin*, no. 108, 27 June.
Available at: https://psychedelicalpha.com/news/psychedelic-bulletin-108-compass-survives-patent-challenges-mindmed-secures-candyflipping-ip-will-psychedelics-companies-protect-access-to-abortion-for-employees

Roseman, Leor, Nutt, David J. and Carhart-Harris, Robin L. Quality of Acute Psychedelic Experience Predicts Therapeutic Efficacy of Psilocybin for Treatment-resistant Depression. *Frontiers in Pharmacology*, 8: 1-10.

r/Spravato. 2023. Cost. Reddit.
Available at: https://www.reddit.com/r/Spravato/comments/170q3in/cost/

Sabatier, Valérie, Mangematin, Vincent, and Rousselle, Tristan. 2010. From Recipe to Dinner: Business Model Portfolios in the European Biopharmaceutical Industry. *Long Range Planning*, 43(2-3): 431-447.

Samiee, Maziar. 2024. *European Futures: Corporate Performance, Public Finance, and Social Balance in Post-2008 Crises*. Unpublished PhD Dissertation, Department of International Relations, University of Sussex.

Samman, Amin, Boy, Nina, Coombs, Nathan, Hager, Sandy, Hayes, Adam, Rosamond, Emily, Wansleben, Leon and Westermeier, Carola. 2022. After the Boom: Finance and Society Studies in the 2020s and Beyond. *Finance and Society*, 8(2): 93-109.
Samuel, Sigal. 2024. The Biggest Unknown in Psychedelic Therapy is Not the Psychedelics. *Vox*, 19 June.
Available at: https://www.vox.com/future-perfect/355687/fda-mdma-therapy-maps-lykos-cult

Sanabria, Emilia. 2021. Vegetative Value: Promissory Horizons of Therapeutic Innovation in the Global Circulation of Ayahuasca. *BioSocieties*, 16(3): 387-410

Schwarz-Plaschg, Claudia. 2022. Socio-psychedelic Imaginaries: Envisioning and Building Legal Psychedelic Worlds in the United States. *European Journal of Futures Research*, 10(1): 1-16.

Seidman, Jennifer S. 2022. Tripping on Patent Hurdles: Exploring the Legal and Policy Implications of Psilocybin Patents. *Cornell Law Review*, 108: 1017-1040.

Shams, Shahin, Pratt, Amanda Rose, Li, Sisi and Isenbarger, Tom. 2023. The Evolving Role of History in the Past, Present, and Future of Psychedelic Patenting. *History of Pharmacy and Pharmaceuticals*, 65(1): 117–130.

Stevens, Jay. 1989. *Storming Heaven: LSD and the American Dream*, London: Flamingo.
Sun, Duxin, Gao, Wei, Hu, Hongxiang and Zhou, Simon. 2022. Why 90% of Clinical Drug Development Fails and How to Improve It? *Acta Pharmaceutica Sinica B*, 12(7): 3049–3062.

Tsing, Anna Lowenhaupt. 2015. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*, Princeton: Princeton University Press.

Tvorun-Dunn, Maxim. 2022. Acid Liberalism: Silicon Valley's Enlightened Technocrats, and the Legalization of Psychedelics. *International Journal of Drug Policy*: 1-9.

Wainer, David. 2024. Psychedelics Are Going Mainstream. Investing in Them Hasn't. *Wall Street Journal*, 6 January: B12.

Weintraub, Arlene. 2021. Investors are Tripping on Psychedelics Startups Despite a Murky Path to Commercial Success. *Fierce Biotech*, 16 August.
Available at: https://www.fiercebiotech.com/biotech/investors-are-tripping-psychedelics-startups-despite-a-murky-path-to-commercial-success

Williams, Keith, Romero, Osiris Sinuhé González, Braunstein, Michelle and Brant, Suzanne. 2022. Indigenous Philosophies and the "Psychedelic Renaissance". *Anthropology of Consciousness*, 33(2): 506-527.