RESEARCH PAPER

The psychedelic renaissance: a case of outlaw user innovation in the pharmaceutical industry

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ABSTRACT

Psychedelic substances are undergoing a renaissance. As they have been out-of-bounds for public research for half a century, the development process has been driven by drug user communities. With the prospect of a legalization of psychedelics, the data collected by users about toxicity, dosage, etc. have been turned into billion-dollar assets. Know-how stemming from stigmatized user communities is being transferred to companies and put under the protection of patent law. This transfer of information is predicated on psychedelics being reframed as therapeutic. The psychedelic renaissance provides an entry point for reflecting in a more critical vein about 'user innovation'.

Introduction

The so-called 'psychedelic renaissance' holds out the prospect of a normalization of drugs which have hitherto been unlawful to possess and study. This scores as a victory for drug users and activists in the harm reduction movement. Their campaign for legalization has pivoted on foregrounding the therapeutic benefits of psychedelic drugs. The medicalization of psychedelics is an intermediate step towards letting the products circulate on markets for prescription medicines. Pharmaceutical companies stand to appropriate data and know-how that have accumulated in drug user communities for decades. Information about toxicity, effects, dosage, etc. has been collected by users through collective processes of trial-and-error. Information stemming from unauthorized research practices that have taken place in a legal grey zone is now providing the groundwork for corporate patent claims.

The psychedelic renaissance offers an entry point for reflecting in a more critical vein about the notion of user innovation. It is old news that users contribute to corporate research and development. Many innovation studies academics interpret this trend as a democratization of knowledge production. The argument hinges on the assumption that the opening-up of innovation processes to non-firm actors is beneficial to everyone – users, firms, and the general public. In this paper it is argued that a more adequate understanding of user innovation requires us to adopt an interpretative framework that puts antagonism at its center. The argument works towards the conclusion that the integration of psychedelics in markets for prescription medicines will boost a trend in the pharmaceutical industry, already underway for some decades, where the user community occupies the centrepiece of an open and inductive drug discovery process. In this way, firms may work around legal constraints and avoid liabilities. It becomes urgent to pose critical questions about the distribution of risks and rewards among the actors in this model of innovation.

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Theories about outlaw user innovation

Literature about user innovation and lay involvement in scientific discovery is prolific. Two familiar buzzwords from the innovation studies field are 'open innovation' (Chesbrough, 2003), and 'democratisation of innovation' (von Hippel 2005; for a literature review, see Storvang *et al*., 2020). Academics in science and technology studies have made the same normative investment in the alleged, democratic potential of 'research in the wild' (Callon and Rabeharisoa, 2003) and 'citizen science' (Irwin, 1995), to mention but two influential notions.

The study of bottom-up innovation occupies a niche within the innovation studies field which is otherwise dominated by top-down perspectives and policy-driven discourses. This bestows street cred upon scholars writing about innovations and discoveries stemming from users, subcultures and social movements. However, the case studies mobilized in support of the fight-the-power-rhetoric tend to be innocuous: users optimizing mountain bikes (Luthje *et al.*, 2005), mothers creating juvenile products (Shah and Tripsas, 2007) or patients tweaking therapeutic protocols to improve their well-being (Lettl *et al.,* 2006; Akrich and Rabeharisoa, 2012). In other words, the empirical sample is skewed towards law-abiding users.

An exception is the notion of 'outlaw innovation', introduced by Stephen Flowers (2005) and affiliated researchers (Schulz and Wagner, 2008). Giving their due to von Hippel's writings about user innovation, they add the observation that a firm may derive profitable ideas from users irrespective of whether the latter abide by laws and regulations. Examples are drawn from hackers, fans and video gamers committing minor offences against intellectual property law and user agreements. The stakes are low with this kind of violation and the malpractice is generally condoned by the public. More importantly, those studying outlaw innovation do not wish to problematize the legal system. They give no thought to the circumstance that the fans and gamers did not commit any crime until copyright law was extended at the behest of the same companies that now stand to profit from the outlawed practices (Söderberg, 2017).

The intersection between science and technology studies and social movement studies can offer sanctuary to more critical theories of innovation. David Hess has described the fragile alliance that social movement actors sometimes strike with for-profit businesses to promote a new product or to induce a shift in industrial standards perceived to be politically desirable. With market success, however, their goals diverge, and frictions grow between activists and entrepreneurs, and between different factions within the social movement. Innovations driven by ideological convictions and grievances are side-tracked by commercial interests and directed towards profit maximization (Hess, 2005; see also, Smith *et al.*, 2017).

What is missing from the social movement perspective on innovation is a reflection on the structural dependency of firms upon this method of innovation procurement. In the media and IT sector, user communities have long been furnishing firms with blue-sky thinking, development work and beta testing. This model is particularly advantageous when companies are prevented by laws and regulations from investigating certain methods or topics. Two examples from the IT sector are the exploration of security hacking and file sharing techniques (Söderberg and Maxigas, 2022).

As Stephen Flowers observed recently, the extensive regulation of medical research and the time lags this imposes on commercial development make the model of outlaw user innovation very attractive to the pharmaceutical industry. Concerns about patient safety, Flowers suggests, can be waived in those cases when patients suffer from chronic illnesses and remedies are missing (2017). My argument here is that the psychedelic renaissance is not just a one-off move to enclose an information commons in medicine. What is more, the transformation of psychedelics into prescription medicines will demonstrate to the pharmaceutical industry that the outlaw model for procuring innovation can be successfully applied to the drug discovery process.

Background on the psychonaut subculture

There are big variations among different kinds of drug user communities. For the purposes of this paper, i.e., to discuss user innovation in the pharmaceutical sector, focus is on a group of drug users that go by the name of 'psychonauts'. Key to their subcultural identity is a commitment to unauthorized research and self-experimentation with psychedelic drugs. The illegal and stigmatized nature of their studies has fostered a strong oppositional identity *vis-à-vis* mainstream society. Linked to this collective identity is a counter-expertise in the use and development of the drugs in question. Most users of psychedelic drugs do not identify themselves as psychonauts. Members of the subculture tend to frame the consumption of psychedelics as an intellectual and/or spiritual pursuit rather than merely a recreational one.

The psychonaut subculture is held together by a sense of common history and common destiny. A focal point in this legacy is 1960s American counterculture. To the pantheon of this subculture belong (besides Timothy Leary) the fiction writer Aldous Huxley, the inventor of lysergic acid diethylamide, Albert Hofman, and Alexander Shulgin, a legendary chemist who synthetized and made publicly available more than 200 novel psychoactive substances. The output of books and 'fanzines' is prolific and feeds the reading public in the subject area. The literature covers trip reports, how-to-do manuals, moral and political arguments for decriminalization, and spiritual and/or neuroscientific interpretations of subjective drug experiences, among other things.

The counter-expertise of the psychonaut underground targets the epistemic authority of government agencies, educational institutions, the medical profession and pharmaceutical companies. Vocal opposition to publicly recognized experts and institutions is an attitude held in common with other medical subcultures, such as patient groups and advocates of alternative medicine (Klepal and Stöckelová, 2019). In all of these settings, one finds that the division between the mainstream and the underground is reproduced as an internal division within the subculture itself. Inevitably, the subculture produces its own lay experts and semi-stable institutions, which (to various degrees) interact with their mainstream counterparts. One pole of the subculture renounces the hegemony of Western rationality *in toto*: another pole tries to lay claim to some of the prestige of science and medicine to lend legitimacy to the cause (Goldner, 2004).

Because drug users tend to have little confidence in official sources of information, health personnel and law officers often have access to their clients only through the information channels established by harm reduction activists. This provides activists with a lever for institutionalizing their agenda inside government-sponsored organizations working for drug education and monitoring of the drug market. Unsurprisingly, attempts to institutionalize a counter-discourse on drugs are met with strong resistance from established institutions. The situation can be compared with the resistance that advocates of complementary and alternative medicine regularly encounter inside hospitals and clinics.

In addition to contesting the content of drug education and drug prevention, psychonauts rally against the obstacles preventing free research about psychoactive chemicals. Some hurdles are lack of public funding for academic research, the strictures imposed by ethics committees and the security clearances and licences required for doing research on such substances. The surplus costs imposed by these regulations mean that once a substance has been subjected to control measures, it is likely to stay out of bounds for medical research. That is to say, once a substance has been declared by public authorities as lacking legitimate therapeutic effects, it is very unlikely that pharmaceutical companies will make the investments required to discover any potential, therapeutic uses of the substance in question. The legal prohibition is a self-fulfilling prophecy.

The more respectable camps within the psychonaut community petition officials and research institutions to win public acceptance for research on controlled substances. Funds are crowdsourced to support research in their area of interest. A case in point is the Multidisciplinary Association for Psychodelic Studies (MAPS). Others reject the very separation between eligible and non-eligible lines of research and assert that any user or psychonaut is competent and justified

to do his or her own research. The purpose and direction of grassroots experimentation with controlled substances deviates a great deal from the goals that steer established academic institutions and corporate laboratories. Of note is the goal to innovate in order to circumvent the letter of the law. This is candidly testified to by a writer in the flagship publication of the psychonaut underground, *The Vaults of Erowid*:

> What is novel about the *now* is not any individual new discovery or product. Instead, it is the pattern of a constant stream of new materials, packaging, and grey-marketing methods, allowing the right consumers to know that something is an interesting drug for as long as possible before law enforcement catches up and prohibits it. (Erowid and Erowid, 2010)

Legal highs: innovation against the law

A major incentive for actors in the psychonaut underground to engage in innovation is to avoid detection by law enforcement agencies or, even better, to circumvent existing legal definitions altogether. The discovery that novelty can be exploited as a loophole in drug law was directly linked to the expansion of the law in question. A watershed moment was the ideological confrontation in the 1960s between the American counterculture and public authorities, centred on the criminalization of lysergic acid diethylamide (LSD). The ban on LSD was first introduced in 1966 in California state law. Four years later it was written into US federal law (Schou, 2010). In 1971, LSD was banned worldwide with the passing of the UN treaty convention on psychotropic substances, which complemented an emerging global framework on drug control and law enforcement.

The counterculture responded to the criminalization of LSD by searching for plants and chemicals which had escaped the attention of legislators, notably MDMA, better known as 'ecstasy'. Ecstasy remained unclassified in the United States until 1985, and even later in most European countries (Collin, 2009). The drug was targeted by legislators in the late 1980s and early 1990s, inscribed in an ideologically charged confrontation between governments in the UK and Europe on the one side, and the rave movement on the other. As with LSD before it, the clampdown on ecstasy unleashed a wave of discoveries and innovation in the psychedelic subculture. A case in point is the surge in popularity of scavenging and/or growing psilocybin-containing 'magic mushrooms' in the early 2000s. Magic mushrooms have a very long history in the subculture. However, expanding market demand because of tightened control on other substances spurred a wealth of process innovations. For instance, kits for growing mushrooms at home developed at a rapid pace. The same observation can be made in regard to the invention of new chemical compounds with psychoactive properties, so-called 'legal highs'.

The defining trait of legal highs is that the molecule structure is novel and has not yet been defined in law, although its medical properties are nearly identical to familiar, and controlled, substances. Hence, the production, possession and sale of legal highs are not yet subject to law enforcement. Everything hinges on timing and novelty. When a substance has been prohibited, a small tweak in the molecular structure may suffice to circumvent the legal definition. What changes are required depends on the legal procedures in the jurisdiction in question (Hillebrand *et al.*, 2010).

To provide a taxonomy of something as ephemeral as legal highs is self-defeating from the start. Nonetheless, it is worth mentioning some of the main classes of legal highs to give an idea of the phenomenon. Synthetic cathinone mimics the psychoactive compound of khat, a plant traditionally used in east Africa. One derivative that made headlines is mephedrone. Its first known use was in 2007, but it became widespread in 2009 in response to new legislation in the UK that banned some other designer drugs. Subsequently, mephedrone was banned in the UK in 2010, as well as in the Netherlands and the Nordic countries (Hughes and Winstock, 2011). Just a few months later, however, it was replaced with a new synthetic cathinone, naphyrone (Vardakou *et al.*, 2011). Another major class of drugs is synthetic cannabinoids. On the street they go under the name of 'spice' and were for some years marketed as a legal alternative to marijuana. The synthetic extract

of cannabis is sprayed on inert, herbal leaves (Griffiths *et al.*, 2010). Piperazines have effects similar to those of ecstasy. One version of this substance, 1-benzylpiperazine (BZP), became a *cause célèbre* after New Zealand recognized its legal status, a decision that was later revoked (Sheridan and Butler, 2010).

In the early days, the design and production of novel psychoactive molecules was a user-driven innovation process geared towards private consumption and/or peer recognition in the subculture. The margin of profit was such, however, that more organized competitors entered the market. The innovation process has been systematized and integrated in a global value chain where Chinese laboratories and organized crime play a prominent role. Hence, the pace of innovation has accelerated considerably. Some years ago, the *UN World Drug Report* observed that the number of new psychoactive substances by far exceeds the number of 'classic' substances, i.e., those controlled under the original, international drug conventions (UN Office on Drugs and Crime, 2014).

Legal highs weaponize the self-imposed limits laid down by legal definitions in states abiding by the rule of law. That said, public authorities have responded in kind to the innovators by creatively applying less restrictive and more malleable regulations, such as environmental protection clauses and special requirements for edible products. Thus, they have managed to shut down businesses that sell drugs without violating the letter of drug laws (Hughes and Winstock, 2011). The vendors on their part take precautions; for instance, by mislabeling their products as 'research chemicals' or 'bath salts' and declaring on the package that the product is 'not for human consumption'. A consequence of this strategy is that the seller cannot give consumer information about dosages or how to minimize risks when administrating the drug (Schaller, 2013).

The dilemma facing policy makers is how to stay within a properly legislated space while accelerating the response rate of law enforcement in order to cope with the pace of innovation in the drug market (Reuter, 2012). The original UN treaties established a regulatory regime where substances subject to control were listed individually. Many countries have abandoned this principle in response to a situation where legal definitions are being circumvented through innovation at a speed that renders drug laws toothless. One attempt from the lawmaker to overcome this challenge is the creation of a temporary class drug order. It was first introduced in the US in 1984 in response to the surge in synthetic drugs in those days (King, 2013). The same approach has been introduced in many European countries in response to the recent wave of legal highs. Temporary control is established through an emergency procedure that takes about a week to complete. The control measure expires after a year. It gives the scientific advisory board enough time to make an evaluation of the compound and place the compound under regular, permanent control measures if need be.

Even with these emergency procedures in place, a legal high can often be licitly marketed for a much longer period than a week. Detection of novel compounds poses problems as enforcement agencies lack the reference material by which an unknown substance can be identified. Innovators of designer drugs do what they can to prolong the lag in detection. For instance, when artificial cannabis (spice) was seized by custom for the first time, identification of the psychoactive component of the plant material proved difficult. After a laboratory in Frankfurt had isolated the compound sprayed onto the leaves, there were even indications that chemicals had been added just to lead forensic researchers astray (Griffith *et al*., 2010). Testimonies from clandestine chemists confirm that they are closely monitoring legal developments. Often they have worked out a list of new molecules in advance that can be released at the same pace as the old ones are being scheduled (Whalen, 2010).

Even when the legal response time is hastened to just a week, incentives to innovate novel substances remain unabated. The deterrent effect of emergency listing is minimal because control is invoked *ex post* the act of innovation. It stays within the basic legal framework of UN treaties where controlled substances are listed individually. The first departure from this principle was taken in the US Federal Analogue Act of 1986 when an *ex ante* approach to drug control was introduced. Control measures are extended to analogues of already-controlled substances without, crucially, specifying what those structures look like in advance. The law was passed in the wake of

a scandal caused by impurities in a designer drug inducing Parkinson's disease in users. The concoction had been prepared by two lawyers turned clandestine chemists in an attempt to make an analogue of heroin. The lawyers could not be convicted since the substance they had tried to manufacture was not classified at the time. In the context of the overall argument of this paper, it is noteworthy that the fate of the addicts provided significant clues to researchers on Parkinson's disease (Langston and Palfreman, 1996).

Variations of what might be described as an analogue system have been introduced in Canada, New Zealand, Latvia, Bulgaria and Norway, although fundamental differences in legal traditions make the comparison tenuous. Many European countries have reformed their drug laws in recent years in response to the latest wave of legal highs. The trend is that restrictions in the applicability of drug laws are loosening. Human rights activists express alarm about the implications of such a trend for the rule of law. The Analogue Act has often been criticized for violating the US constitutional principle that control must not be invoked retrospectively (Kau, 2008; Stackhouse, 2012). Likewise in Europe, where the European Convention on Human Rights lays down that no one may be prosecuted for acts that have not yet been codified as unlawful (Amsterdam, 2012, p.12; Amsterdam *et al.,* 2013). Viewed from the opposite standpoint, however, uncertainty about the limits of the control is precisely the advantage of such laws. As one UK policy document puts it, uncertainty about the regulatory space makes the law 'future-proof':

> However, those selling for recreational markets also have a hard time knowing for sure whether they have succeeded in staying just inside the boundary of what is legal, and that uncertainty may perhaps be counted as something of a benefit. Usually clear rules are thought to be the most effective deterrents, but that may pertain more to impulsive deviance than the premeditated actions of people trying to skirt the boundary of the law. (Association of Chief Police Officers, 2010, p.3)

Initiatives to future-proof drug laws testify to a more general problem that legislators confront in a range of policy areas: how to anticipate innovation stemming from heterogeneous (non-firm) actors, notably user communities. Legal highs are an exception only in so far as public authorities are determined to prevent innovation from happening. Fatal incidents have prompted resolute responses from policy makers. That said, negative externalities from techno-scientific advances are abundant in every industry (ranging from structural unemployment and peaks in local cancer prevalence to the collapse of entire ecosystems) without regulators being moved to respond with the same ardour. Drug policy is a case apart: the arrival of a 'psychedelic renaissance' suggests that the exception will not last much longer.

Indeed, the legal highs phenomenon is indicative of how innovation works in the economy at large. Innovation is often prompted by the ambition to circumvent existing regulation. A case in point is research and development geared towards circumventing the letter of patent law. New ways to do the same old thing are continually made up to avoid legal entitlements held by competitors. And the same lesson applies in a wide range of other policy areas. A novel and still unregulated compound allows companies to circumvent restrictions on pesticides, limits on pollutants, the use of hazardous food supplements and so on. In sum, innovation is a means of circumventing constituted order.

Self-regulating the drug market with harm reduction and responsibility

It is not only the efforts of states to regulate the drug market that are derailed by innovation. The attempts by drug user communities to self-regulate market actors are undermined by the pace of change and lack of trust in supply chains. False labelling and the use of adulterants are commonplace. In the absence of state-backed consumer regulations, a modicum of safety is sought in the community of drug users. Consumer safety requires staying up to date with developments in the marketplace. In a landscape characterized by information overload and deliberate misinformation, the user community provides a means for real-time processing of events and validation of sources

of information. For the most part, this happens informally when users share their experiences with one another, physically or over web forums. Consumer reviews blend into peer education about risk and harm reduction (Bancroft and Reid, 2016). Out of these spontaneous interactions have grown more sustained efforts to systematize information exchanges and to broadcast alerts to the larger community. At the centre of organized efforts for peer education about drugs is the social movement promoting harm reduction. Social movement activists monitor developments in the market, produce education material for inexperienced users and engage in outreach activities at night clubs and festivals, as well as maintaining web forums dedicated to harm reduction issues.

Accidental overdosing because of mislabelling is the primary cause of concern. This risk has been much aggravated in recent years by the introduction of cheap but potent, synthetic opioids, notably fentanyl. Law enforcement agencies analyse the chemical composition of the pills that end up in forensic laboratories, but public authorities are reluctant to broadcast the information. In countries with a liberal drug policy, such as the Netherlands, the police issue a warning to the public when a particularly dangerous substance has been discovered circulating on black markets. The police are wary not to hand out details about pills causing extra alarm, however. Such a specification could be interpreted as an official sanctioning of non-identified, and, by implication, less dangerous, pills.

Hence, a major undertaking of the harm reduction movement is to fill this void. It tests pills and posts alerts when something particularly dangerous is in circulation. Some organizations (EcstacyData in the US, EnergyControl in Spain and Medecins du Monde in France), but only a handful, have resources enough to commission their own laboratory tests. Users may submit pills to one of these organizations and have the substance analysed. Similar resources are available in the Netherlands, where pill testing has been integrated in national drug policy since the early 1990s.

In other European countries, for instance in Germany and France, grassroot pill testing takes place in a legal grey zone. Local and regional governments fund organizations providing the service to users, and cooperation with emergency wards and rehabilitation clinics is commonplace. Much depends on who happens to be in charge of the public administration and the police district. Whenever there is a transition of office, the pressure against drug testing activities might resume. The varying degree of integration of the different pill testing organizations is reflected in their diverse stands on making test results public. For instance, the Berlin-based group Eve and Rave asserts the right of users to be informed, and subsequently makes all analytical data public. Many other organizations only pass the information on to the concerned user, not wishing to provide validation services to drug dealers (Kriener *et al.*, 2001).

The reluctance towards making test data public relates to the difficulty of separating the user, potentially a victim of mislabelled drugs, from the dealer, potentially the predator and propagator of such drugs. Many users sell some part of the drugs they are using in their extended friendship circles. Hence, testing facilities are always on the verge of being enrolled in market circulation and price setting. In addition to this scenario, government officials tend to be suspicious that harm reduction initiatives are called upon as a culturally acceptable front for a more far-reaching agenda about drug legislation. Nor are those suspicions entirely unfounded.

A particular telling case is a short-lived trade association for so-called ‘head shops’ (vendors of legal highs) that promoted risk reduction and industry self-regulation. It passed itself off as responsible compared with unfederated head shops which did not sign up to the pledges of the trade association (Ryall and Butler, 2011). Cultural acceptance of biomedical risk taking is fostered in the psychonaut subculture by demarcating one’s own (responsible) research practices from something even further out on the fringe. In particular, psychonauts are anxious to disassociate themselves from drugs and drug users linked to severe addiction problems and coerced treatment programmes. Alternatively, a distinction is made between knowledgeable and responsible psychonauts, on the one hand, and know-nothing ‘recreational’ drug users, on the other. The latter take drugs at parties and festivals with no sustained commitment to the chemicals in question. Embedded in this narrative is a negative judgement about the reckless and uninformed manner in which inexperienced

users take drugs. The judgement is important because medical emergencies are put down to uninformed substance use, as opposed to being attributed to the inherent, pharmaceutical properties of the substance as such.

The construction of this boundary draws on the distinction often made in the subculture between drug, set and setting. The first refers to the inherent, biochemical properties of a substance. The second to the state of mind of the user when a drug is administrated. The third designates the physical environment and other precautions taken by the user at the time of administrating the drug. The point of this distinction is to counterbalance the single-minded focus on chemical properties in much public discourse about drugs. Instead, the emphasis is placed on set and setting for determining what the outcome of the trip will be.

The observation that context matters is obviously correct, but the claim is also expedient for redistributing responsibility for adverse events. Are clandestine chemists really at fault for releasing untested substances on the market for the sole purpose of circumventing legal definitions, while being indifferent towards consumer safety? Or is it the regulators who, on the pretext of fighting predatory business practices, push users into taking ever more experimental substances? Alternatively, are adverse events the price that users must pay for having made uninformed choices about their own health?

Reckless use of drugs not only puts the individual at risk, but also the whole collective. Emergencies attract media attention and accelerate the pace of procedure through which novel substances are scheduled. In spite of the subculture's refusal to accept the prerogatives of the state to regulate drug markets in the name of consumer safety, a paternalistic flavour is present in the opinion, often voiced by psychonauts, that research chemicals should be kept out of hands of know-nothing, recreational party-goers.

Attempts to temper the black market with harm reduction initiatives and trade associations warrant the question, much as do policy directives on responsible innovation, whether such initiatives strive to transform dangerous practices, or rather to legitimize the same practices so that they may go on unabated. Critics have often voiced the suspicion that policy makers talk about responsible innovation in order to justify the lack of regulation of irresponsible, techno-scientific risk taking by corporations (Delvenne, 2017; Genus and Iskandarova, 2018). Much the same can be said about harm reduction, which often is inscribed in a broader agenda of legalisation. It is next to inevitable that the mitigation of biomedical risk, whether actual or imagined, fosters a heightened cultural acceptance among users to be engaged in such risk taking.

The subculture has a tolerance level for taking risks that is much higher than is culturally acceptable in society at large. This appetite for self-experimentation places the psychonauts in a strategic position in the open innovation model that the pharmaceutical industry is about to roll out, a development trend which is likely to receive a major impetus with the legalization of psychedelic substances. Drug user communities, analogous to the symbiotic relationship between hacker communities and the computer industry, furnish the pharmaceutical industry with a reservoir of beta-testers in a massive, inductive drug discovery process (Cooper, 2012).

Corporate appropriation of outlawed user innovation of psychedelics

It is old news that the pharmaceutical industry derives secondary profits from black markets in leaked prescription medicines and controlled substances. A case in point is methamphetamine cooking. It fuels demand for over-the-counter sales of cold medicine from which a key precursor is procured, ephedrine. Proposed regulations of cold medicine that could prevent the conversion of ephedrine into methamphetamine have been defeated on repeated occasions in the US congress due to corporate lobbying. This suggests that the revenue stream from black market sales is sufficiently important to merit acts of 'product defense' by pharmaceutical companies (Reding, 2009).

That said, the psychedelic renaissance is a game changer. The opening-up of psychedelics to public research, with the prospect that these products will soon start to circulate on markets for prescription medicine, is a massive give-away to private companies. More than a one-off grab for

the money, it will boost the ongoing transformations within the pharmaceutical industry to reorganize the drug discovery process around self-medicating drug users or patients. The trend in outsourcing the drug discovery process to patients has been underway for some time. A pioneer in the field is the digital platform Patients-like-me, which renders the collection of self-reported patient data systematic and tailored for information processing (Swan, 2009). The windfalls from the psychedelic renaissance, however, will bring the point home to Big Pharma that discoveries made by stigmatized and outlawed drug users can be flipped over and turned to corporate assets. It is estimated that the global market for psychedelics on prescription will be worth US$8 billion by 2029 (PR Newswire, 2022).

The turning point for psychedelics came when two controlled substances made headway in the Food and Drug Administration's (FDA) approval pipeline. In 2017, the FDA designated MDMA (ecstasy) a therapy for post-traumatic stress disorder. In 2019, the agency identified psilocybin (magic mushrooms) as a therapy for treatment-resistant depression and major depressive disorder. The regulatory decisions have been followed up with a row of clinical trials. Depending on the outcome of the clinical trials, the claim that these substances have therapeutic purposes, which previously relied on anecdotal testimonies, may well become hard fact (Aday *et al.,* 2020; Mason and Glenn, 2022).

For as long as research on psychedelic substances was out of bounds for public institutions and firms, data about their medical properties remained in an information commons of sorts, protected under criminal law. With upcoming legalization, however, entrepreneurs have moved in to enclose the information commons. Firms battle over anticipated market shares in the provision of psychedelic-assisted psychotherapy. They seek to consolidate power by claiming ownership over every possible aspect of the therapeutic procedure.

A particular notorious patent filed by Compass Pathways covers the kind of music played during therapy sessions (Love, 2021). Arguably, the setting within which the drugs are taken, ambient background music, softened lights, paraphernalia, etc., is as much a product of the psychonaut subculture as are the Drugs . Psychonauts are being deprived of the cultural resources that they themselves have developed during the past decades in processes of collective experimentation and learning-by-doing. Legal controls on using and studying psychedelic substances have barely been lifted when new restrictions are introduced through intellectual property law (Devenot *et al.*, 2022). Particularly noteworthy are the concerns voiced by members of the subculture that the safety and well-being of patients will be jeopardized for the sake of profit maximization. A case in point is the informal rule that underground providers should have had a psychedelic experience prior to introducing others to mind-altering drugs. It is unlikely that this 'best practice' can be replicated in the corporate model of psychedelic-assisted psychotherapy. In some respects, ironically, the risk profile of taking psychedelics will increase when they are consumed in a legally sanctioned and scientifically validated setting (Noorany, 2020).

The story about how magic mushrooms made their way from the psychedelic underground to corporate boardrooms is emblematic of the ongoing enclosure movement. The therapeutic properties of psilocybin have been mapped out by users self-medicating against various medical conditions. A celebrity case in the psychonaut underground involves the patient group Clusterbusters. Suffering from a severe condition called 'cluster headache', the patients accidentally discovered that the cyclical outbreak of headache disappeared when they consumed magic mushrooms. Information about the cure spread on a web forum dedicated to the medical condition. Through the web forum, patients organized a collective research project to experiment and share data about the best practices for administrating the substance (Frood, 2007; Kempner and Bailey, 2019). Psilocybin's alleged, anti-depressive effects were mapped out in much the same way. Users suffering from anxiety self-medicated and shared their experiences, often drawing on web forums and information resources provided by the psychonaut subculture.

In 2016, long after a body of knowledge about psilocybin had matured in the user community, Compass Pathways entered the picture. Initially, the company was set up as a non-profit

charity. The non-profit status of the venture was key to convincing academic experts and community leaders to volunteer their time and share their knowledge with the entrepreneurs. Once this transfer of knowledge had taken place, the charity was closed down and replaced with a for-profit venture. It was thereafter disclosed that the venture was bankrolled by angel investors, such as Paypal founder, Peter Thiel (Piper, 2021).

Likely to follow in the tracks of MDMA and psilocybin is a less well-known hallucinogenic called ibogaine. The substance is derived from a shrub in west Africa, where it is used for shamanic purposes. In the 1960s, opioid addicts discovered they could use the plant to mitigate withdrawal symptoms (Rienzo and Beal, 1997). News about the plant's anti-addictive properties spread by word-of-mouth among addicts. In the next couple of decades, networks of underground ibogaine providers emerged. Many of the providers are ex-addicts who claim to have been cured with the plant. (Rodger, 2011).

Ibogaine is a controlled substance in the US and in many European countries. Hence, providers in those countries must administer the cure clandestinely. In the 1990s, off-shore clinics started to crop up in Mexico catering to American patients, and in the Czech Republic and the Balkans, receiving patients from other European countries. Alternatively, the drug can be ordered from more or less reliable web shops. In either case, the provision of ibogaine treatment exposes the patient to considerable risks. The substance interferes with the heart rhythm and fatal accidents happen on a regular basis. Community leaders have tried, though with limited success, to impose guidelines and a code of conduct for ibogaine addiction care. The community is sundered by rival commercial interests. Conflicts over intellectual property claims have been ongoing since the 1990s. One of the claimants in the first patent conflict, Deborah Mach, raised the stakes by starting Universal Ibogaine in 2017. The company aspires to dominate the future market in ibogaine addiction care in much the same way as Compass Pathways tries to consolidate its grip over the market in psilocybin-assisted therapy.

The opening up of a white market in psychedelics hinges on the medicalized reframing of the drugs in question. In fact, corporations have imported the medicalized language from social movement actors. Harm reduction activists and key organizations, such as MAPS, have consciously promoted the therapeutic benefits of cannabis, psilocybin, ketamin, MDMA, etc. as a legitimization strategy. However, to many of the activists, the search for new cures for psychedelics is a waystation towards the ultimate goal – a full legalization of the substances in question. And the same goes for the pharmaceutical firms. Executives and shareholders too have their sights on markets lying beyond the treatment of narrowly defined, medical conditions. The addition of psychedelics to corporate portfolios aligns with the trend of Big Pharma expanding its business model from curing sick people to the potentially much bigger market for optimizing the performance and mood of healthy people. Microdosing in the psychedelic subculture converges with the expanding market in chemically assisted mood control (Gandy, 2019). Hence, the medicalized framing of psychedelics should be understood as a temporary strategy. It is tailored for the needs at this juncture in time to persuade the public and legislators about the safety and legitimacy of compounds they have been told are inherently dangerous and useless. Medicalization of psychedelics qualifies as a textbook example of how hazardous research is discursively repackaged as ethical and responsible. Once the subculture's know-how has been locked up in patents, and the consumption of psychedelics has become culturally accepted, we can expect that off-label uses of prescribed psychedelics for various performance-enhancing purposes will proliferate.

Concluding discussion

This paper presents the psychedelic renaissance as a textbook case of outlaw user innovation. The inclusion of psychedelics in corporate portfolios brings the pharmaceutical industry closer to an open model of innovation, long established in the media and IT sectors, where development work is outsourced to users/patients. From the company's perspective, open innovation cuts inhouse

labour costs and lowers financial and legal risks. The model has an additional benefit in the field of psychedelics. Since public institutions have been barred from researching those substances for half a century or more, the drug user community is on the cutting edge of development. Although outstripped in terms of resources, the freedom that users enjoy to experiment on their own bodies gives them a head start over academic and corporate researchers.

If we apply the conventional narrative about user innovation to the psychedelic renaissance, the appropriation of user/patient data by companies must be applauded as a democratic inclusion of previously marginalized groups in society's knowledge production. This is a story with only winners. Psychonauts and harm reduction activists advance their political goal of legalization, firms make more profit and the public will have access to more potent cures. However, the risk profile of biomedical research on human subjects should give pause for thought. The fatal accidents linked to experiments with 'research chemicals' are part and parcel of this trial-by-error development process, which has resulted in, among other things, breakthrough medicines for Parkinson's disease, and a general improvement of our knowledge of mind-altering chemistry. The unequal distribution of risks and rewards among the actors calls for an interpretation of user innovation that is more attentive to the prevalence of antagonism.

The psychedelic underground tries to mitigate some of these risks by organizing peer education campaigns, tracking the circulation of dangerous substances, and imposing guidelines and best practices on market actors. Keeping up to date with developments in the market is the closest one gets to consumer safety. In their reliance on the user community for processing and validating information, the psychonauts have lessons in store for of the rest of us. They teach us how to cope in a future of unregulated pharmaceutical markets and unhinged techno-scientific exploration.

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