

Allied Minds (ALM LN)

A Venture-Capital Junk Drawer for 3x NAV

Allied Minds (LSE:ALM) is a London-listed, US-based firm that operates like a specialized venture capitalist, investing in early-stage technologies created by academic researchers and attempting to bring them to market. Trading at 7x book value and 3x net asset value – using the company’s own valuations of its subsidiaries, which we believe are baselessly optimistic – Allied Minds enjoys tremendous benefit of the doubt on the part of investors, who evidently believe that its magic touch has turned ~\$340mm of cash raised into \$1.8 billion of present value, embedded in a portfolio whose largest positions include such duds as an unprofitable vendor of specialty pasteurization equipment for nuts and prunes and the maker of expensive machines that enable slightly different methods of extracting small bits of frozen blood and feces from larger samples.

But Allied Minds has done nothing to deserve the market’s faith. In a world where most VC funds have failed to generate meaningful alpha and trade in the secondary market at significant discounts to stated NAV, it’s absurd for an investment vehicle with no objective evidence of commercial success to fetch a \$1.2-billion premium. Since its inception almost ten years ago, Allied Minds has not sold any of its portfolio companies, has not taken a single one public, has not generated any material licensing revenues from its intellectual property, and has produced negligible revenue even from its “mature” subsidiaries. Indeed, of the five companies Allied Minds formed in 2006, four failed completely and were dissolved, while the fifth, Cephalogics, remains stuck in R&D mode, has at best a modest advantage over similar companies and research groups, and is still many years away from generating real revenue. Key Allied Minds personnel, including the company’s founder and the CEOs of its two purportedly most valuable subsidiaries, have checkered track records presiding over small-scale technology firms that went on to fail or go bankrupt. Simply put, there is no good reason to believe, as the company’s valuation implies, that this is among the best VC funds of all time.

For all of Allied Minds’ talk of “disruption” and “innovation,” its subsidiaries are developing products that are at best minor variations on existing alternatives, often in the face of significant competition and without plausible business models. Even supporters are hard-pressed to justify the current price: one sell-side firm has maintained its “buy” rating even though its own target price (already ridiculously rich at 2x “fair” value) suggests that the stock is overvalued by 61%. Allied Minds is a true triumph of mind over matter, style over substance – a dressed-up collection of high-risk, low-reward gambles that we believe has at least 70% downside.

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I. Investment Highlights

The pieces are just not here on this Optio Labs. I'm literally not seeing anything unique, proprietary, or exemplary. ... I looked at that whole set of companies, and the whole thing together is barely worth \$33 million. Allied Minds itself is worth \$33 million, in my opinion, at best, and that's giving them a lot of credit!

—business-development expert in web and mobile security

\$250 million?! Uh. [Long pause.] Well. Uh. Just my gut feel on this...but – that seems kind of lofty. That seems kind of high.

—leader at innovative computer-memory firm when presented with Allied Minds' implied valuation of its largest portfolio company, Spin Transfer Technologies

I would not invest in this business if I was interested in that market. ... I don't think there's any bones to it. ... I just don't see them exploding. I see them imploding.

—food-safety vendor regarding Allied Minds' third largest portfolio company, RF Biocidics

I'm just one guy who's had a lot of experience and met a lot of customers in this field with one opinion, but I'll tell you, with all my heart, this is not the next iPhone. If you're interested in – maybe they're looking for a venture-capital infusion or something of this nature? You could probably do better. ... Who's going to buy it?...It's like a car that gets five-miles-per-gallon better gas mileage. Well, so what, if I have to spend \$10,000 more to get that car and I won't see a return on my investment for 15 years? That doesn't make sense! And that's what this is. This is – yeah, it would be cool to have, but I'm not going to pay for it.

—former laboratory-equipment sales executive with more than 25 years of experience offering his assessment of CryoXtract, one of Allied Minds' only “commercial stage” portfolio companies

Took a look and listen at SoundCure this morning. I am not that overly impressed at all. Certainly not worth the money in my book. Didn't seem to be any better than my phone playing sound files or white noise. (#)

I paid \$2,400 out-of-pocket for this piece of 'S'#\$%. I used it as prescribed for four months, and never experienced one iota of benefit. In fact, I believe it worsened my condition... (#)

Yeah, It was a dud as far as I'm concerned. It seemed to make my noise worse. I returned mine after about 2 months... (#)

I've been trying Soundcure Serenade for almost 4 months now, and it has been a colossal disappointment. At best I got minimal & erratic relief which never lasted. More often than not it aggravated the tinnitus instead! (#)

Give up on it and don't waste your time and money. I used this system as the first person in Las Vegas in 2012 and it made the Tinnitus worse and bothered me greatly...i discontinued its use. (#)

—representative comments from the TinnitusTalk Support Forum regarding the flagship product sold by SoundCure, another one of Allied Minds' "commercial stage" portfolio companies

Early-stage investing – including, in particular, investing in academic research – has an overwhelmingly poor track record. Seduced by the eye-popping successes of venture capitalists like Paul Graham and Peter Thiel, some public-market investors seem to believe that investing in a portfolio of high-tech start-ups through an entity like Allied Minds is a reliable path to high returns. The data, however, tell a different story. Systematic studies of VC returns, like the Kauffman Foundation's [influential paper from 2012](#), demonstrate that the vast majority of VC funds perform little better than small-cap equity indices, with an average internal rate of return scarcely greater than zero over the past decade's cohort of fund vintages. Only a tiny handful of investors have proven to be consistently capable of creating value through early-stage investing; the odds are not in Allied Minds' favor.

While Allied Minds tries to distinguish itself by focusing on commercializing intellectual property from universities and, to a lesser extent, government-sponsored research groups, this concept is far from novel. Publicly traded venture investors specializing in these areas date back to more than 30 years ago, when University Patents, Inc., acted as patent and technology licensor for eight universities, including NYU, Princeton, the University of Chicago, and the University of Pennsylvania. But over time University Patents was unable to extract enough value from its IP to sustain new R&D, and the company's equity has lost almost 100% of its value since 1983.

This outcome was by no means an outlier: other publicly traded technology-commercialization companies, including Interregnum, UTEK Corp., MMI Group, The Generics Group, Flintstone Technologies, XL TechGroup, and Ipso Ventures, have lost almost all of their value and in some cases were delisted (see table headed "Publicly Traded Technology-Commercialization Firms," p. 17). Even including successes like IP Group, we estimate that the average IRR since inception of all firms in this category (excluding Allied Minds) has been -13% per year. All of them invested in exciting-sounding technology with some plausible basis in real science, yet barely any of them managed to overcome the immense difficulties of guiding a disparate collection of longshots to commercial viability. Instead, they relentlessly destroyed shareholder wealth – a fate we view as Allied Minds' likely future.

In fact, Allied Minds has already wasted millions of dollars on low-potential concepts that are now confirmed failures. For instance, SaltCheck, based on research from Cornell, was touted as

“a groundbreaking patient salt intake monitoring system,” and in 2009 Allied Minds’ COO [praised](#) its “commercial progress” and “look[ed] forward to bringing this groundbreaking test to the market to help patients and doctors worldwide in managing hypertension.” Notwithstanding such hype, the product never gained traction; four years later, Allied Minds quietly shut the company down. Ten other subsidiaries have shared the same fate. Consider Precision Augmented Reality Works, Inc.: after forming it in July 2012, Allied Minds [announced](#) that it had “developed the fastest and most precise mobile software for the rapid-growth field of Augmented Reality,” noting that it had already “received international acclaim” for its “unique architecture.” But as PAR Works’ director of engineering later [candidly admitted](#), the company had a “great start” but “no idea on [sic] what the customers want to do,” with no strategy beyond “simply demo the tech and wait.” Though employees ultimately tried to “focus on a narrow range of problems and domains,” it was too late, and in December 2013 the company was dissolved. Of course, failure is common in the world of start-ups, but the PAR Works experience underscores the flaws in Allied Minds’ investment process, including a tendency to be mesmerized by technology developed by academics with no clear value proposition or business model. Time and again with Allied Minds, breathless rhetoric far exceeds tangible progress; almost a decade of R&D has yielded no breakthrough discoveries, no exits, negligible revenues, and, even among its most mature portfolio companies, no clear path to profitability. While management would prefer to focus on the current slate of grandiose ideas and not past failures, the team that now promotes vague and uninspiring concepts like BridgeSat and Federated Wireless as the next big thing is the same team that funded firms like SaltCheck and Precision Augmented Reality Works that have since failed and disappeared.

Allied Minds’ current portfolio companies hold little promise. With more than 20 subsidiary businesses spread across a wide range of sectors, each with its own technical jargon and competitive dynamics, Allied Minds can be difficult to analyze. This complexity, coupled with the absence of traditional evidence of success like positive earnings, makes it easy for shareholders to indulge in blue-sky fantasies and avoid thinking too hard about the individual businesses. After all, according to management, they’re all equally “disruptive.” In the [words](#) of CEO Chris Silva at the company’s recent Capital Markets Day:

We...do what we think is a very rigorous screening and selection process. So we’re looking for high-impact disruptive technologies in very, very large markets. Again, today you will see that exactly with our portfolio companies that we’re highlighting today, but we believe that’s across all our 22 companies. Very disruptive technologies, very large markets, big impact.

But this broad-brush characterization is, to be blunt, ridiculous. How is a machine that pasteurizes nuts and prunes with radio waves “disruptive,” especially when a competitor has been selling the same basic product for decades? How is the development of magnetoresistive RAM (MRAM) “disruptive” when multiple start-ups have already begun to sample or sell highly similar technology and every major memory company in the world has its own research effort in the area? How is a preclinical knock-off of an unsuccessful epilepsy drug “disruptive”? The

realities of Allied Minds' portfolio belie management's bluster. On closer inspection, the portfolio harbors no clear winners and a multitude of likely zeroes.

Consider the companies Allied Minds discussed in detail at its aforementioned Capital Markets Day (all valuations cited are for the companies as a whole; Allied Minds' stakes are smaller):

- *Spin Transfer Technologies*, valued by Allied Minds at \$250 million, has undertaken MRAM research since 2007 yet has generated no revenue and no products. Meanwhile, competitors like Everspin, Crocus, and Avalanche have already begun to commercialize their own versions of MRAM and spin-torque MRAM, while firms like IBM, Micron, and Samsung have their own large, ongoing next-generation memory projects. With mass-market adoption of MRAM a decade or more away and with so many potential alternative producers, a \$250 million valuation is stunningly aggressive. Even Spin Transfer's intellectual property, the essence of the company given its lack of commercial progress, has come under fire: in March, Crocus successfully overturned several components of one of Spin Transfer's key patents.
- *SciFluor Life Sciences*, valued by Allied Minds at \$116 million, has two pre-clinical drug candidates and a high-level concept of using advanced fluorination chemistry to create improved versions of existing drugs. But the concept makes little sense: expert fluorination chemists have no special insight into biology or the drug market and thus have no particular edge when it comes to finding compounds that fluorination would render more valuable. By contrast, drug-development professionals are already fully aware of the potential benefits of fluorination and often consider it during their existing research processes, suggesting an absence of low-hanging fruit. Sure enough, SciFluor has struggled since its 2010 founding, failing to attract commercial interest in its fluorination reagents and undergoing a round of layoffs. Its lead drug candidate is a knock-off of an epilepsy drug that has a unique mechanism of action but no incremental efficacy relative to available alternatives, resulting in a lukewarm commercial reception and only \$13 million of annual revenue before additional concerns about serious side effects emerged. SciFluor now claims that its version of the drug won't have those side effects, but in the case of the most alarming ones – skin discoloration and potential ocular damage – SciFluor's development of its drug predates the discovery of the side effects. SciFluor has presented no clinical evidence to support its assertion that the fluorinated version of the drug won't face similar problems.
- *Federated Wireless* has received \$5.8 million in funding but lacks a clear business plan. Its goal seems to be to function as a service provider in the ecosystem surrounding the 3.5GHz shared spectrum band recently brought into being by the Federal Communications Commission, but even if this band becomes commercially successful, Federated Wireless has no competitive advantage in a world where Google – the biggest backer of the band – may give away its “spectrum access system” for free to foster adoption (as it has done with its [TV-white-space spectrum](#)

[database](#) and many other products). Other established companies like [Comsearch](#) (a subsidiary of CommScope) and [Key Bridge](#) are also likely competitors. Being the number-four spectrum-access-system provider in a band that will be little used for many years to come is neither disruptive nor, in all likelihood, especially profitable.

- *Optio Labs*, valued by Allied Minds at \$41 million, generated just \$305 thousand of revenue in 2013 and has not made great strides since then. While management presents Optio as a play on the mobile-device security mega-trend, it ignores the fact that many other companies have already established themselves as leaders in this area, with features like anti-virus scanning, mobile device management, containerization, firewalls, and geofencing already bog-standard. Moreover, Optio's exclusive focus on Android devices is an enormous handicap given the disproportionate importance of iOS to enterprise clients who actually have money to spend.

But the companies that Allied Minds did *not* present are, if anything, more revealing. The firm chose not to showcase any of the three businesses it regards as “commercial stage,” none of which is profitable and none of which has blockbuster potential:

- *RF Biocidics*, valued by Allied Minds at \$104 million or 22x trailing revenue, sells equipment that uses radio waves to disinfect foods like nuts and dried fruit. The actual machines are built by the firm's partner, an Italian textile-dryer company with little experience in the food business, and revenue is non-recurring since the machines are supposed to last for many years. Not only is the addressable market small; Radio Frequency Company's higher-end Macrowave product has already taken the lion's share of significant opportunities.
- *CryoXtract*, valued by Allied Minds at \$19 million or approximately 19x trailing revenue, sells machines that essentially take small core samples from vials of frozen tissue, blood, or feces. The idea is to avoid having to thaw and then refreeze the master vial. But the biorepositories that form the theoretical market for the product already store samples in many small sub-units, or aliquots, to begin with; as a result, the freeze/thaw problem CryoXtract “solves” almost never arises. It is thus no surprise that CryoXtract still loses millions of dollars a year and has generated scarcely \$1 million of annual revenue on an invested capital base of \$13 million in seven years of existence.
- *SoundCure*, valued by Allied Minds at \$14 million on 2013 revenue of \$0.3 million and 2014 revenue characterized as “not as robust as first envisioned,” makes medical devices for the treatment of tinnitus (ringing in the ears) via specially crafted sound patterns. But as illustrated by the customer reviews quoted above – and others that are similarly negative – after years on the market, SoundCure has been met with resounding disappointment by tinnitus sufferers, and a disturbing number believe the device actually worsened their condition.

It's staggering to think that after so many years of research and investment, these three companies – all of which we expect to ultimately go out of business when Allied Minds gives up on funding their losses – are the best Allied Minds could come up with. It does not bode well for their earlier-stage counterparts.

Allied Minds' leadership team is weak. While successful VCs often extol the importance of funding good founders rather than merely good ideas – under the theory that passionate, talented, committed founders can adapt even if their initial ideas turn out to disappoint – Allied Minds typically brings in its own personnel to commercialize other people's academic research. But many of these leaders have checkered histories:

- Allied Minds founder and former chairman *Mark Pritchard* previously chaired FuturaGene and Gold Oil, AIM-listed small caps whose stock prices collapsed amid a broader [criminal insider-trading investigation](#) – characterized by the [Telegraph](#) as “the biggest insider trading investigation in UK history” – that has so far [put two people in jail](#) and led to the [arrest](#) of two early Allied Minds shareholders (listed as sellers in the IPO prospectus), Clive Roberts and Ben Anderson.
- *Omar Amirana*, the life-sciences managing director and acting CEO of SciFluor, co-founded Cardima, a medical-device company that [went bankrupt](#); served as an executive of (and later [sued](#)) MedicalLogic, an online medical-record company that [went bankrupt](#); and helped found Smart Pill Corp., which generated [a 90% realized loss for its VC backers](#).
- *Barry Hoberman*, the CEO of Spin Transfer, was the founder and CEO of InSilicon, a public company that lost more than 80% of its value from IPO to sale; served as CEO of Virtual Silicon, which [raised more than \\$40 million of funding but sold itself for \\$5 million](#) (a price later viewed by shareholders of the acquirer as “ill-advised”); and served for a time as CEO of TZero, a company developing a Wi-Fi alternative that never panned out, [leading to its ultimate demise](#).
- *Gregg Smith*, the CEO of Optio Labs, was the enterprise-mobility leader at Aether Systems, which [gave up on the business](#), sold it off, and ultimately [ceased operations](#) (under a different name). Several members of Smith's management team at Optio have the same background.
- *Zakiul Kabir*, the chief technology officer of Allied Minds' fuel-cell subsidiary, SiEnergy, was previously the CTO of ClearEdge, a fuel-cell company that [went bankrupt](#) in 2014 after [raising more than \\$100 million](#) in funding.
- *Michael Delmage*, the CEO of the biotech subsidiary ProGDerm/Novare (which has pivoted, improbably, from attempting to reduce wrinkles to attempting to treat arthritis

and fibrotic diseases), served as CTO of Senetek PLC, which utterly failed to commercialize its anti-aging treatments and lost almost all of its value before [being reinvented as an oil-and-gas exploration company](#).

In sum, the facts just don't add up. Investors are fooling themselves if they believe that this collection of unimpressive ideas and unimpressive people is worth three times an outrageously frothy net asset value. Like so many other would-be technology commercializers before it, Allied Minds has consistently destroyed value with its poor investment decisions – and isn't likely to stop any time soon.

II. Company Overview

| Allied Minds: Capitalization and Financial Results | | | | | | |
|--|---------|----------|----------------------------|---------|---------|---------|
| Capitalization | | | Financial results (USD mm) | | | |
| | GBP | USD | | 2012 | 2013 | 2014 |
| Share price | £ 4.99 | \$ 7.74 | Revenue | \$ 1 | \$ 3 | \$ 8 |
| Diluted shares (mm)* | 221.9 | 221.9 | Net inc. to ALM | (27) | (35) | (45) |
| Market cap (mm) | £ 1,107 | \$ 1,717 | BV per share | \$ 0.40 | \$ 0.74 | \$ 1.16 |

Source: company filings, Capital IQ, Kerrisdale analysis

* Shares O/S of 215.2mm plus dilutive impact of 9.6mm options struck at \$2.12 on average.

Allied Minds began operations in 2006 with the mission of bringing to the US an investment model that had achieved some (qualified) success in the UK: partnering with research universities to form companies striving to commercialize select academic discoveries. (Note that, unlike certain British peers, Allied Minds has no exclusive access to the concepts generated at the schools it works with; it has to contend with the likes of Kleiner Perkins and other “traditional” VCs.) The company added Invesco as a major shareholder in 2007, raised another \$70 million in 2010-11, raised an additional \$100 million in 2013, and then went public in 2014, raising \$144 million in net proceeds while also offering a partial exit for several company insiders, including the CEO and COO (“for personal tax reasons”), and certain early shareholders. Since its IPO, which priced at £1.90 per share, Allied Minds’ stock has performed very well, trading up 171%.

What has Allied Minds actually done with all the money it's raised? As of December 31, 2014, \$175.4 million still resided at the parent level, awaiting future funding needs; we estimate that, as of June 30, 2015, that number had declined to \$143mm. The rest of the cash was used to form 33 companies from 2006 to 2014, 11 of which have since been acknowledged as failures and dissolved, leaving 22 remaining (plus a [new one](#) formed just a week ago). Because these subsidiaries are consolidated for accounting purposes (as a result of Allied Minds’ large, typically majority holdings), they are carried on Allied Minds’ balance sheet at amortized cost,

but the company also discloses its own estimate of “gross subsidiary ownership adjusted value” (GSOAV), based on a combination of internal DCF models and marks derived from external investments. (However, since the vast majority of all external investments in its subsidiaries have come from Invesco or Woodford Asset Management – another major shareholder headed by former Invesco fund manager Neil Woodford – it’s difficult to regard those “third-party” marks as truly arm’s-length.) Combining these subsidiary valuations, which total \$488.0 million, with the holding company’s cash position, Allied Minds’ portfolio value appears to be \$631 million. However, this estimate fails to account for the Allied Minds “Phantom Plan,” under which executives will receive 10% of any gains upon the sale or public offering of any portfolio company. Adjusting for this off-balance-sheet liability (and neglecting tax liabilities due to Allied Minds’ large unrecognized deferred tax asset, driven by its years of operating losses), the company trades at 3.0x net asset value and 7.3x book value.

| Allied Minds: Net Asset Value and Valuation Multiples | | |
|---|-------------|--|
| | Value | Notes |
| (\$mm) | | |
| <u>Phantom Plan estimate</u> | | |
| Gross subsidiary value | \$ 488 | |
| Less: ALM invested capital | 166 | |
| Gross unrealized gain | \$ 323 | |
| Est. hurdle return* | 17 | Assume 4% for 2.5yrs on invested capital |
| Net gain for Phantom Plan | \$ 306 | |
| Cost of Phantom Plan | 31 | 10% of net gain |
| <u>Net asset value</u> | | |
| Gross subsidiary value | \$ 488 | |
| Plus: cash at parent | 143 | |
| Less: cost of phantom plan | (31) | |
| Net asset value | \$ 600 | |
| Diluted shares | 222 | |
| NAV per share | \$ 2.70 | |
| Price to NAV | 3.0x | |
| Price to book value | 7.3x | |
| <p><i>Note: cash at parent as of 1H2015 is estimated based on stated assets in the “Other Operations” segment, less an adjustment based on the difference between cash at parent and segment assets at YE2014.</i></p> <p><i>Source: company filings, Capital IQ, Kerrisdale analysis</i></p> | | |

These are stunning multiples considering that Allied Minds is, at its core, little more than an investment vehicle, which would typically be expected to trade near NAV when the underlying assets are easy to transact in (and often a discount to NAV otherwise). Here, by contrast, investors are paying an almost \$1.2 billion premium to a net asset value based on unverifiable prices *supplied by the company itself* for extremely illiquid and opaque assets. In effect, the market is declaring Allied Minds to be one of the greatest venture investors in the world, able to

take one dollar of invested capital and turn it into seven overnight. (Since 2000, according to a group of finance researchers [using data from over 200 institutional investors](#), the average multiple of invested capital achieved by venture funds has been approximately 1x, and even top-quartile funds averaged only 1.9x.)

But the notion that Allied Minds deserves such a leap of faith is difficult to square with either the contents of its current portfolio or the details of its past failures. Below we summarize both. In what follows we delve into the details of some of the firm's most important extant subsidiaries, but past failed investments are also informative. In every case, Allied Minds used similar promotional language to talk up the wonders of its latest big idea, only to quietly pull the plug on many; its purported enthusiasm seems to have little correlation with ultimate success.

Allied Minds: Current Portfolio Overview

| Name | Business stage | ALM valuation of stake (\$mm) | Implied | | Revenue, approx. (\$mm)* | Earnings, approx. (\$mm)* | % of ALM subsidiary value | Year founded | Sector |
|----------------------------|----------------|-------------------------------|--------------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------|--------|
| | | | total firm equity value (\$mm) | Revenue, approx. (\$mm)* | | | | | |
| Spin Transfer Technologies | "early" | \$ 121.0 | \$ 250.0 | \$ - | \$ (13.3) | 25% | 2007 | computer memory | |
| SciFluor Life Science | "early" | 91.4 | 115.7 | 0.2 | (4.4) | 19% | 2010 | drug development | |
| RF Biocidics | "commercial" | 69.6 | 103.7 | 6.5 | (4.5) | 14% | 2008 | food safety | |
| Optio Labs | "early" | 32.8 | 41.1 | 0.3 | (1.6) | 7% | 2012 | mobile-device security | |
| Cephalogics | "early" | 22.3 | 23.5 | - | (2.0) | 5% | 2006 | brain imaging | |
| CryoXtract Instruments | "commercial" | 17.8 | 19.1 | 0.7 | (3.3) | 4% | 2008 | biobanking/cold storage | |
| Novare Pharmaceuticals | "early" | 16.7 | 18.5 | 0.1 | (0.7) | 3% | 2008 | inflammatory disorders | |
| Precision Biopsy | "early" | 16.2 | 20.2 | - | (1.4) | 3% | 2008 | prostate-cancer diagnosis | |
| SiEnergy Systems | "early" | 15.3 | 15.3 | - | (1.8) | 3% | 2007 | fuel cells | |
| SoundCure | "commercial" | 11.5 | 13.6 | 0.3 | (4.7) | 2% | 2009 | tinnitus treatment | |
| Other subsidiaries | "early" | 73.4 | | | | 15% | | | |
| Total | | \$ 488.0 | | | | 100% | | | |

* Revenue and earnings for 2014 for Spin Transfer and RF Biocidics. Since 2014 figures are not disclosed for other subsidiaries, 2013 figures are shown.

Source: company filings, Kerrisdale analysis

Perusing the list of subsidiaries, it's clear that Allied Minds' largest "early stage" ventures have been around for a long time – Cephalogics, for example, has spent almost a decade developing its brain-imaging system yet remains a long way from commercial viability. Even subsidiaries that are, according to Allied Minds, "commercial stage" – namely, RF Biocidics, CryoXtract, and SoundCure – still lose large amounts of money on small amounts of revenue, yet Allied Minds values them at aggressive multiples of sales. RF Biocidics, for example, is valued at 22x LTM revenue, while CryoXtract is valued at more than 27x 2014 revenue and SoundCure, more than 40x. These multiples would raise eyebrows even for rapidly growing SaaS companies, but we know from Allied Minds' disclosures that SoundCure and CryoXtract combined saw revenue *decline* 21% in 2014 and 12% y/y in the first half of 2015. While RF Biocidics did increase revenue in 2014, its operating loss barely shrank, and since it primarily sells equipment that is meant to last for many years, its revenue is largely non-recurring; indeed, in the first half of

2015, revenue dropped 79% y/y. After so many years of development, it's striking how far all of these businesses still have to go to become self-sufficient, let alone meaningfully profitable.

| Allied Minds: Dissolved Subsidiaries | | | |
|---|---------------------|-----------------------|---|
| Name | Year founded | Year dissolved | Product description |
| GliaGen | 2006 | 2010 | "novel treatments for neuroaffective disorders including Multiple Sclerosis, Alzheimer's, and Parkinson's; as well as neurotrauma such as spinal cord injury" (#) |
| EndoScreen | 2006 | 2010 | "a non-invasive blood test for the early detection of endometrial cancer" (#) |
| SaltCheck | 2006 | 2013 | "a new patient salt intake monitoring system, not requiring the use of laboratory facilities" (#) |
| Purtein | 2006 | 2011 | "a protein purification technique for simply and cost-effectively isolating proteins from a superfamily of proteins sharing a common structural topology" (#) |
| LifeScreen | 2007 | 2010 | "a new non-invasive breast cancer diagnostic test which screens for carbohydrates that are present when a person has cancer" (#) |
| Illumasonix | 2007 | 2013 | "a new non-invasive vascular disease detection procedure" (#) |
| BA Logix | 2007 | 2011 | "robust and computationally efficient accelerated algorithms for digital systems" (#) |
| AXI | 2008 | 2011 | "strains of algae that will bridge the gap between the promise of clean energy generation and the reality of economical biofuel production systems" (#) |
| Allied Minds Devices | 2011 | 2014 | "The objective...is to take new medical device technologies and develop them into commercially viable products within two years," including "a new innovative product: an implantable device for monitoring the brain" (#) |
| Broadcast Routing Fountains | 2012 | 2014 | "a novel Internet architecture that seeks to efficiently and securely leverage broadcast channels for disseminating routing information" (#); "engineered directly to protect networks against cyber-attacks...and provide the next generation architecture capable of scaling to support billions of dynamic network pathways" (#) |
| Precision Augmented Reality Works | 2012 | 2013 | "PAR Works brings augmented reality -- the ability to overlay cyber imagery upon real world data feeds such as photos and videos -- to a new level, offering imagery overlay accuracy to the ground-breaking precision of millimeters, all performed nearly instantaneously on any mobile device" (#) |

Source: company web sites, archive.org, company filings, state corporate registries, Kerrisdale analysis

The table above reviews some of Allied Minds' tacitly admitted errors. (Though the company's [news page](#) includes press releases going back to 2007, all mention of the subsidiaries above has been removed retroactively, as if they never existed. However, many live on at [archive.org](#) and elsewhere.) Of course, failure is a normal part of life among start-ups, and in general Allied Minds did not lose enormous sums, though it did waste money allowing several subsidiaries to drag on for years without any real signs of success.

But what's clear is that, even if these concepts had worked out as intended, they would be far from the disruptive blockbusters that Allied Minds claims are at the core of its strategy. How disruptive, after all, is "a new patient salt intake monitoring system"? Other projects, like Precision Augmented Reality Works and AXI, have the trappings of "disruption," but only because their missions are so ill-defined (and, indeed, never managed to gel operationally). With Allied Minds, what sounds concrete usually isn't disruptive, and what sounds disruptive is usually vague. Is the portfolio in the table above really any less compelling on paper than Allied Minds' current holdings, which embody a similar mixture of micro-niche products and vaporware? How, then, can these firms be worth nothing while Allied Minds asserts that the survivors are worth hundreds of millions? One likely factor behind this misperception is irrational optimism about the realized returns on venture capital. But in reality, typical venture returns have fallen far short of the spectacular achievements of a few big names. Understanding these lackluster results makes it harder to justify the market's enthusiasm for Allied Minds, especially when its holdings look worse than average.

III. Venture Capitalists and Commercialization Companies Usually Do Poorly

Sell-side discussions of Allied Minds' valuation typically focus on multiples of some estimate of NAV, and on this basis the company already seems richly valued. This observation is only reinforced by data on the secondary market in other early-stage investment entities. GSV Capital Corp., for example – a publicly traded firm that owns shares in a [variety](#) of high-profile start-ups, including Palantir, Dropbox, Lyft, and Coursera, trades at 53% of stated NAV. The former Cogent Partners, a specialist in secondary transactions in PE and venture funds that is now part of the investment bank Greenhill, reported in January 2015 that stakes in venture funds were changing hands, on average, for 80% of stated NAV. Such figures highlight the absurdity of Allied Minds' vastly higher 3.0x multiple.

But multiples of NAV only tell part of the story because they take for granted the company's own aggressive valuations. A more informative starting point is the implied multiple of invested capital. The market is saying, in effect, that Allied Minds' current and future investments have transformed a dollar of invested capital into seven dollars of present value. An obvious way to gauge the reasonableness of this assumption is to examine the track record of other venture capitalists in general. Both investors and academic researchers have already undertaken this

task, and their conclusions are unflattering for the VC industry and should be unsettling for Allied Minds shareholders.

In short, after an early period of impressive returns generated by a handful of funds in the 1990s, VC funds have generally done little to justify their illiquidity and high fees, especially when benchmarked to market indices with similar fundamental characteristics, like small-cap equities. The Kauffman Foundation, a non-profit focused on promoting entrepreneurship, summarized its own representative experiences in a [scathing 2012 report](#):

Our research suggests that investors like us succumb time and again to narrative fallacies... We found in our own portfolio that:

- Only twenty of 100 venture funds generated returns that beat a public-market equivalent by more than 3 percent annually, and half of those began investing prior to 1995.
- The majority of funds—sixty-two out of 100—failed to exceed returns from the public markets, after fees and carry were paid.
- ...The average VC fund fails to return investor capital after fees.
- ...There are not enough strong VC investors with above-market returns to absorb even our limited investment capital.

...Industry returns data shows that VC returns haven't beaten the public market for most of the past decade.

While the Kauffman Foundation drew heavily on its own diversified portfolio of venture funds, other sources offer consistent perspectives. A [2014 paper](#) “using a research-quality dataset from Burgiss, sourced from over 200 institutional investors,” furnishes the following sobering statistics on the performance of recent VC-fund vintages:

| Venture-Capital Funds: Average Results by Vintage | | |
|--|-------------|--------------|
| Vintage | Average IRR | Average MOIC |
| 2000 | -2.7% | 0.91x |
| 2001 | 1.2% | 1.13x |
| 2002 | 0.8% | 1.08x |
| 2003 | -0.3% | 1.09x |
| 2004 | 1.0% | 1.25x |
| 2005 | 3.4% | 1.36x |
| 2006 | 2.4% | 1.14x |
| 2007 | 6.6% | 1.23x |
| 2008 | 10.6% | 1.27x |
| <i>Average</i> | <i>2.6%</i> | <i>1.16x</i> |

Source: Harris et al. 2014, Kerrisdale analysis

On average, then, when all is said and done, VC funds have returned little more than their initial capital. Even top-quartile funds, according to the same data set, returned less than 2x on average, while third- and fourth-quartile funds had *negative* returns:

| Venture-Capital Funds: Average Results for Post-2000 Funds by Quartile | | |
|--|-------------|--------------|
| | Average IRR | Average MOIC |
| Quartile 1 | 20.0% | 1.94x |
| Quartile 2 | 5.8% | 1.90x |
| Quartile 3 | -1.0% | 0.95x |
| Quartile 4 | -11.0% | 0.70x |

Source: Harris et al. 2014, Kerrisdale analysis

These returns were achieved over a period of many years. By contrast, Allied Minds trades at 7x invested capital *today*, suggesting that the expected long-term outcome is even higher. But it's difficult to credit this embedded prediction. What evidence, other than their own valuations of their own portfolio companies, is there to suggest that the leaders of Allied Minds rank among the uppermost echelons of early-stage investing?

Though it may be tempting to argue that Allied Minds, with its focus on commercializing academic research and its lack of a conventional two-and-twenty fee structure,* is sufficiently different from the typical venture fund to render these data points irrelevant, the track record of similar publicly traded firms, though smaller in sample size, is even worse. Unfortunately, this fact is easy to overlook because of survivorship bias: when assessing the prospects of a company like Allied Minds, investors tend to focus on entities like IP Group that are still standing, ignoring the less impressive achievements of past competitors that ended up in the dustbin of history. In the table below, we review the realized returns of publicly traded technology-commercialization firms from public listing to the last available sale price (in many cases at the point of delisting). These firms have achieved a median annual return of *negative* 14%, an appalling annihilation of shareholder value always justified *ex ante* by talk of cutting-edge innovations, usually derived from university research. Notably, one of the biggest long-term winners, BTG, gave up its broad intellectual-property focus in 2005 to become a more conventional specialty-pharmaceutical firm, and only after that strategic shift did the stock begin to perform well.

* Arguably, Allied Minds' embedded fee structure is worse than two and twenty: while its "Phantom Plan" is in essence a 10% performance fee, holding-company expenses, including executive compensation, totaled \$15 million in 2014, 8% of average book equity. (VC management fees are typically based on committed capital, not estimated marked-up NAV.)

| Publicly Traded Technology-Commercialization Firms | | | |
|--|------------|-----------|-------------|
| Name | Start date | End date | IRR |
| University Patents (Competitive Tech/Calmare) | 11/22/1983 | 9/21/2015 | -11% |
| BTG | 7/6/1995 | 9/21/2015 | 18% |
| Interregnum (Parkmead) | 3/13/2000 | 9/21/2015 | -21% |
| UTEK Corp. (Innovaro) | 10/24/2000 | 9/21/2015 | -37% |
| MMI Group plc | 11/14/2000 | 8/13/2009 | -34% |
| The Generics Group (Sagentia) | 12/1/2000 | 8/6/2008 | -39% |
| Flintstone Technologies (Proventec/Ospreyfrank) | 6/27/2002 | 2/22/2012 | -43% |
| IP Group | 10/15/2003 | 9/21/2015 | 12% |
| Angle | 3/17/2004 | 9/21/2015 | -4% |
| XL TechGroup | 10/11/2004 | 6/26/2008 | -48% |
| Biofusion (Fusion IP) | 2/2/2005 | 3/19/2014 | -5% |
| Amphion | 8/23/2005 | 9/21/2015 | -14% |
| Qinetiq | 2/9/2006 | 9/21/2015 | 3% |
| Imperial Innovations | 7/31/2006 | 9/21/2015 | 3% |
| Ipsos Ventures (Plutus) | 3/7/2007 | 9/21/2015 | -41% |
| Frontier IP | 1/31/2011 | 9/21/2015 | -18% |
| Karolinska Development | 4/15/2011 | 9/21/2015 | -25% |
| Net Scientific | 9/16/2013 | 9/21/2015 | 7% |
| Mercia | 12/18/2014 | 9/21/2015 | 53% |
| Average | | | -13% |
| Median | | | -14% |

* Start date represents oldest available data point from Bloomberg, not listing date.

Source: Bloomberg, Capital IQ, Kerrisdale analysis

In many cases – including University Patents, Interregnum, UTEK, MMI, Flintstone, XL, and Ipsos – the strategy of attempting to commercialize a broad array of technology concepts generated by non-commercial researchers has led to complete or near-complete losses over time. And these firms were by no means in obviously worse positions at the start than Allied Minds is in today. For instance, a 2007 [piece](#) in *Nature Biotechnology* highlighting the trend toward “quoted companies that focus on commercializing university intellectual property” spoke of now defunct or moribund firms like Amphion and Biofusion in the same breath as survivors like IP Group and Imperial Innovations. In the early 2000s, MMI Group operated a glitzy “[Bioscience Innovation Center](#)” in Cambridge and looked highly reputable – but by 2009 it was effectively dead. While each of these companies has its own story, the common bond is simply not enough major successes to cover for years of cash burned in search of the next big thing.

In light of this industry history – modest and often negative returns in venture capital broadly, and typically negative and often *highly* negative returns in publicly traded, university-focused technology-commercialization companies – Allied Minds’ valuation defies common sense. Were,

say, Amphion’s initial portfolio companies, [including](#) “Supertron, a spin-out from Columbia University...leading the development of next generation...[MRI coils]” and “Durham Scientific Crystals, a spin-out from Durham University (UK)...focused on the application of a patented, unique semi-conducting materials to the field of medical imaging,” really so much worse than Allied Minds subsidiaries like Cephalogics, likewise focused on novel forms of medical imaging? Yet Amphion has gone from ~30 pence per share to ~5 over the past decade. Given the weakness of Allied Minds’ portfolio, such an outcome should be regarded as a very realistic base case.

IV. The Allied Minds Portfolio Is Weak

One possible justification for Allied Minds’ valuation is that, even if typical and top-tier venture returns are at best modest, and even if similar firms have largely failed to create value in the past, the current Allied Minds portfolio contains enough hidden gems for it to defy the odds. But a closer inspection of the portfolio doesn’t support this view. Based on our research, industry observers and market participants in many of the sectors in which Allied Minds subsidiaries are involved are generally unaware of or unimpressed by their efforts, and competitors pay them little heed. Not only is it difficult to justify a large premium to stated NAV; it’s difficult to believe that NAV itself. Indeed, many Allied Minds subsidiaries will likely be out of business within the next five years – not surprisingly, since, based on the company’s disclosures, it doesn’t appear that any has ever turned a profit.

Below we review several key subsidiaries, focusing not just on the more open-ended platforms that Allied Minds prefers to discuss but also the “commercial stage” businesses that help to give a sense of what an Allied Minds “success story” really looks like.

Spin Transfer Technologies

Spin Transfer Technologies is, according to Allied Minds, its most valuable portfolio company: an R&D vehicle focused on producing a particular form of next-generation computer memory called spin-transfer-torque magnetoresistive random-access memory, or STT-MRAM. The science of memory is complex and outside the scope of this report, but the overview is simple: the technologies most widely used today, NAND flash and DRAM, are both expected to face severe difficulties as manufacturers attempt to scale them down to ever smaller sizes, and such scaling has been the major path by which they have achieved cost savings over time. Thus, for many years, memory makers have explored alternative ways to store digital information, in particular by using magnetic states rather than electric charge. The vision for STT-MRAM is to be fast like DRAM yet non-volatile like NAND flash, meaning that the information is not lost when power to the device is cut.

But Allied Minds’ Spin Transfer is far from the only firm pursuing this dream of a next-generation memory to supplement or replace NAND flash and DRAM. Indeed, in the [words](#) of one memory expert, “I think everybody and his brother has got an MRAM prototype somewhere,” and while

spin-torque MRAM is more sophisticated than generic MRAM – and Spin Transfer would like to portray its own *orthogonal* spin-transfer approach as distinctive – others in the industry don't view it as a major point of differentiation. Nor is MRAM the obvious long-term winner in terms of replacing incumbent technologies; other approaches, including phase-change memory (PCM) and resistive RAM (RRAM), have also undergone extensive study. Even in “legacy” NAND flash, producers like Samsung have recently introduced “3-D” or “vertical” versions of the technology, effectively stacking memory cells on top of each other to be able to pack more memory per unit area and thereby extending the technology's commercial longevity for [the foreseeable future](#). While Allied Minds crows about the sheer size of the \$60B memory market that it hopes to revolutionize, most industry observers expect current technologies to prosper well into the 2020s, with newer approaches to remain limited to a handful of relatively small niche markets. Micron and Intel's recent high-profile [joint announcement](#) of their “3D Xpoint” technology, a novel form of memory said to be 1,000x faster than NAND flash and 10x denser than DRAM but whose details are still shrouded in mystery, has introduced yet another monkey wrench into the works, potentially hitting the marketplace as early as next year.

Not only does Spin Transfer have to contend with behemoths like Micron and Intel that have their own advanced R&D and sophisticated process knowledge; it also faces many smaller, more nimble start-ups that have made far more commercial progress. Everspin, for example, is the clear commercial leader in MRAM, having shipped many millions of units to real-world customers; the company also benefits from a large-scale partnership with the semiconductor producer GLOBALFOUNDRIES, contributing crucial practical production know-how. Another start-up, Avalanche Technologies, is now [sampling](#) its own version of STT-MRAM, and other firms like [Crocus Technology](#) and [Crossbar](#), in addition to the incumbent memory giants, are at different stages of commercialization as well. Meanwhile, Spin Transfer has little to show to the outside world despite many years of development, and it has yet to prove that its “orthogonal” flavor of STT-MRAM can survive the rigors of mass manufacturing and not just work in the lab.

Indeed, the scientific founder of Spin Transfer, Professor Andrew Kent at NYU, recently co-authored a useful [review](#) of the technology, offering a candid perspective on not only the still unresolved challenges in bringing it to market but also the sheer number of players beyond Spin Transfer:

Advances in materials engineering are needed to improve the performance of STT-MRAM devices...Most importantly the write current must be further reduced to enable the use of smaller-area transistors...For embedded applications in particular, magnetic materials must be developed that can withstand processing at the industry standard temperature of 400 °C, instead of the ~300 °C that is now commonly used to process MRAM. An on-pitch etch must be developed that does not cause shorting or damage the magnetic properties of the magnetic tunnel junction...Improved etching to give lower spreads in resistance from bit to bit is also required...The height of the magnetic tunnel junction must be reduced...The layer composition of the magnetic tunnel junction may need to be simplified...

STT-MRAM has come a long way... Sony made the first integrated demonstration chip in 2005... Toshiba developed the first magnetic tunnel junction with perpendicular magnetization... Tohoku and IBM independently developed magnetic tunnel junctions with perpendicular magnetization using interface perpendicular magnetic anisotropy, and IBM demonstrated sufficient margins in write bias and reliable writing down to error rates of 10^{-12} . Samsung has realized the smallest functioning devices... TDK demonstrated a 400 °C process... Everspin is the closest to commercialization, now sampling an in-plane 64-Mbit chip.

What matters is less the technical detail of this passage than the thrust. First, many advances must still be accomplished to unlock the potential of STT-MRAM, from accommodating higher temperatures to simplifying processes for the sake of mass production, and there's no good reason to think that Spin Transfer, which has already fallen far behind the likes of Everspin, will be the one to succeed. Second, companies like Sony, Toshiba, IBM, and Samsung are not waiting on the sidelines for start-ups to invent the future of memory; they're deeply involved in R&D, both within STT-MRAM and in other areas. Against this industry backdrop, and with such scanty evidence of any tangible progress, it's staggering to consider that Allied Minds already values Spin Transfer as a whole – a pre-revenue company that hasn't even sampled chips – at \$250 million. Yet it's very plausible that, rather than suddenly vaulting into a leadership position within this field, Spin Transfer will simply fizzle away, as deeper-pocketed and more experienced firms retain their clear lead.

While Spin Transfer might have hoped to harvest some value from its intellectual property, it's interesting to note that in March it actually lost an *inter partes* review sought by its competitor Crocus, and, as a result, portions of one of its key patents have been invalidated, consistent with the notion that Allied Minds' market-facing rhetoric about the uniqueness of Spin Transfer's technology is largely – forgive the pun – spin.

SciFluor Life Sciences

The core technology initially licensed by SciFluor from academia pertained to fluorination chemistry – in essence, new ways of inserting fluorine atoms at desirable locations within small molecules, such as drugs. Adding fluorine to chemical structures can sometimes have beneficial effects, like extending the time a compound is active before it's degraded by enzymes, so the hope was that new fluorination methods would make it easier to create improved versions of existing drugs.

While the underlying chemistry is real, it's not unique: other research groups have developed their own advanced fluorination techniques that SciFluor has no claim on. Moreover, this category of novel fluorination methods, while interesting to chemists, has thus far proven commercially irrelevant. The scientific founder of SciFluor, Harvard chemist Tobias Ritter, co-authored a recent review entitled "[Late-Stage Fluorination: Fancy Novelty or Useful Tool?](#)" that frankly assessed the state of the art:

To date, the relatively recent advances in late-stage fluorination have not yet had a substantial impact on the synthesis of bulk chemicals, ^{18}F positron emission tomography (PET) tracers, or materials. ... The potential application of modern late-stage fluorination methods to the synthesis of ^{18}F PET tracers is often listed as a motivation for the development of novel fluorination reactions. But...the projected dramatic increase in the number of available PET tracers has not yet occurred. ... Modern fluorination methods cannot yet compete with the Halex process and fluorination with F_2 for the synthesis of bulk chemicals owing to the expensive nature of the majority of the reagents, starting materials, and catalysts used.

In short, while novel fluorination methods have generated a lot of new research, more traditional methods remain far more practical for large-scale production, so real-world uptake has been limited.

Moreover, even if SciFluor had commercially useful proprietary methods, the concept of coupling these methods with the development of new drugs makes little sense. Just inserting a fluorine atom in a molecule somewhere won't, on average, have any benefits, and finding a *good* place to put fluorine requires knowledge of drug mechanisms and market dynamics that fluorination chemists, for all their other virtues, do not generally possess. Meanwhile, medicinal chemists working in drug development are already aware of the possible benefits of fluorination and consider them carefully, which is precisely why so many successful drugs already contain fluorine. The notion that there exist large amounts of low-hanging fruit in this domain is at odds with the observation that fluorination is already widespread.

SciFluor's portrayal of itself also fails to square with the activities it's actually undertaken. The high concept as presented by Allied Minds is to generate ["me too" drugs](#) by taking known successes and adding fluorine, resulting in lower development costs and less risk. But SciFluor's actual pipeline after five years of work consists of a "me too" copy of a failed epilepsy drug and an altered version of an unproven treatment for certain retinal disorders – far from the low-risk profile suggested. The failed epilepsy drug, retigabine/ezogabine, is now little used, in part because of an unexpected side effect – blueish skin discoloration – that was discovered *after* SciFluor had already developed its knock-off. While SciFluor now asserts that its version won't discolor the skin (and risk damaging other areas like the eyes), that claim is still unproven, and doctors and patients will naturally be quite cautious. Moreover, even before the skin discoloration was discovered, retigabine was already a major commercial flop, generating just [\\$12 million in annual revenue](#) before dropping off further. In the words of one sell-side firm (discussing the drug outside of the context of Allied Minds), "Our consultants note that retigabine/ezogabine has no particular advantages but its mechanism of action is novel." Novelty in and of itself doesn't equal commercial success, and at least one major payer, the German government, [found](#) that the drug offered no proof of additional efficacy in epilepsy compared with standard treatments – *before* the discoloration problem surfaced. It is by no means obvious that SciFluor's attempt to replicate this drug will overcome all the negative sentiment, yet Allied Minds already values SciFluor as a whole at an aggressive \$116 million – for a company with an illogical business model and a preclinical copycat of a failed drug.

Federated Wireless

Allied Minds presents Federated Wireless as its “play” on spectrum, trotting out the usual statistics about the rapid rise in mobile data consumption. Specifically, Federated Wireless seeks to be a player in the nascent ecosystem surrounding the recently authorized 3.5GHz “Citizen Broadband Radio Service” – a wide swath of spectrum subject to complex FCC rules aimed at fostering sharing of the band between incumbent government users like the Navy, commercial carriers like AT&T and Verizon, and unlicensed users akin to conventional Wi-Fi. Though it remains unclear just how widely used the band will actually be – wireless industry groups like [CTIA](#) and the [Wi-Fi Alliance](#) have recently argued that aspects of the final rules will impair the band’s real-world value – it has had serious backing, both from the FCC and from Google. The latter, which has generally advocated greater availability of low-cost spectrum in order to generate more internet usage, has developed and demonstrated a 3.5GHz “[spectrum access system](#)” designed to manage potential interference between users of the band; some such system is required under the rules. Industry observers expect Google to offer the use of its system for free or at very low cost, in keeping with its goal of promoting the uptake of the band.

Where does this all leave Allied Minds and Federated Wireless? It’s bafflingly unclear. Federated Wireless includes key university researchers who helped develop the concepts behind 3.5GHz spectrum sharing, but it’s difficult to see how this expertise is commercially relevant in a world where Google is expected to be giving away its own (already functional) technology in order to convince users and device makers to adopt the band in the first place. At times, Federated Wireless suggests that it will help venues like hospitals and hotels set up their own private 3.5GHz networks for customers, but there’s no good reason why such institutions would not be far better off deploying Wi-Fi instead, given the low costs of Wi-Fi equipment (driven by huge production volume) and the ubiquity of Wi-Fi-enabled user devices. By contrast, 3.5GHz user devices don’t exist in commercial form today and thus will only be widespread (at best) many years from now. In short, while the 3.5GHz band may end up playing a role in the future of wireless data, just how *Federated Wireless* expects to make money as a result of this is maddeningly ill-defined. Despite presenting a 15-minute slideshow introducing Federated Wireless at its recent Capital Markets Day, Allied Minds still hasn’t outlined a coherent strategy for the firm. As with Spin Transfer and SciFluor, it aligns itself with an interesting technology yet has little to offer in its own right, perhaps hoping that a credulous audience won’t notice amid all the unfamiliar jargon.

Optio Labs

Another major trend that Allied Minds hopes to associate itself with is mobile-device security, and Optio Labs is its chosen vehicle, supposedly developing “transformational security products for the mobile enterprise” amid an “aggressively growing threat environment.” Looking through the hype, however, Optio’s offerings amount to very little. For one thing, they are exclusively focused on the Android operating system, not Apple’s iOS. But iOS drives a highly disproportionate share of mobile traffic and usage, especially among high-ranking employees

likely to have sensitive information. Optio's inability to serve these users makes it a non-starter with many of the most desirable clients, especially when similar existing products already work well with both operating systems.

In addition, the products that Optio offers have little to do with each other: how is the same team going to sell an Android firewall ("Optio Grizzly"); eye-tracking software designed to block third-party screen viewing, in competition with cheap physical privacy filters ("PrivateEye"); and a phone-monitoring app aimed at parents with young children ("Kodomo")? Moreover, the features that Allied Minds touts as unique to Optio, like location-based security settings, are standard (albeit little-used) parts of competing products like MobileIron and Lookout and have been around for [years](#). Our discussions with industry veterans failed to uncover a single element of Optio's products and proposed products that was both commercially relevant and distinctive, and, sure enough, the firm has had no visible impact in the marketplace despite having existed since 2012. While cyber-security in general has boomed, Allied Minds' focus on *mobile* security has proven misplaced: among all the recent high-profile data breaches, mobile devices have played no role, and true mobile malware scarcely exists outside of the artificial realm of security research. With almost no revenue and a mishmash of unconvincing products, Optio looks drastically overvalued at any price above zero – yet according to Allied Minds, it's the fourth most valuable investment in its portfolio.

RF Biocidics

Since Spin Transfer, SciFluor, Federated Wireless, and Optio are all still deemed "early stage" and hence, despite what are often long histories of product development, are not held to the standard of actually producing revenue or earnings, Allied Minds can get away with focusing on far-off possibilities and vague potential. By contrast, its three "commercial stage" enterprises – RF Biocidics, CryoXtract, and SoundCure – are supposed to be fairly mature. Yet their results are also strikingly poor; the firms that Allied Minds supports continue to falter and burn cash even after completing their R&D.

RF Biocidics is a case in point. The company, drawing on research from UC Davis, sells machines that employ radio-frequency electromagnetic radiation to disinfect certain foods – in practice, primarily nuts and dried fruit – without using chemicals. The concept is little different from using a household microwave to sanitize sponges, and indeed the market leader in RF pasteurization – which is not RF Biocidics but rather [Radio Frequency Company](#) – calls its product the "Macrowave." Radio Frequency has also been selling its product for decades, underscoring the absurdity of Allied Minds' claim that all of its subsidiaries are disruptive innovators. Moreover, RF Biocidics is going after a very small, specialized niche – even top-tier food vendors (who have not done business with the company) only buy a few pieces of equipment, which, when well made, last for many years. Despite having won a handful of clients, RF Biocidics still lost \$4.5 million in 2014, about as much as it lost in 2013, with no end to the red ink in sight. It's hard to imagine what assumptions Allied Minds is using to justify valuing this seven-year-old, non-innovative, consistently unprofitable niche business that is competing a larger and more experienced rival at more than \$100 million, or 22x LTM sales.

CryoXtract Instruments

CryoXtract, like RF Biocidics, sells durable equipment with a long replacement cycle, implying that whatever revenue it generates in one period is largely non-recurring. Also like RF Biocidics, it focuses on a very small niche market: repositories of frozen blood and tissue samples. CryoXtract addresses a highly specific need: extracting small sub-samples (aliquots) from larger master samples without having to fully thaw and then re-freeze them, which in some cases runs the risk of damaging the samples' integrity. But based on our discussions with frozen-storage experts, these expensive devices have almost no appeal. Professional bio-repository operators, already mindful of the risks of repeated freeze-thaw cycles, have several cheap and simple options, including just freezing samples into small aliquots from the start; buying a new freezer to store more aliquots would still be cheaper than buying a high-end CryoXtract machine. Another option is to use a larger vial for the master sample but then distribute it into smaller aliquots if and when it's actually requested from the repository for use, thus obviating the need for more than one freeze-thaw cycle. In any case, the marketplace has already spoken: after seven years and numerous sales pitches, CryoXtract still hasn't generated meaningful revenues – yet Allied Minds values the company at \$19 million and characterizes it as a success.

SoundCure

Allied Minds' final "commercial stage" subsidiary is SoundCure, which sells handheld devices that play patterns of sounds designed to mitigate tinnitus (ringing in the ears). In its 2014 annual report, Allied Minds admits that all is not well with this business:

Sales growth in 2014 has not been as robust as first envisioned and 2015 will see an expanded emphasis on market development.

Although Allied Minds doesn't explicitly report SoundCure revenue, it does report total revenue for its "commercial stage" businesses excluding RF Biocidics, and the only two such businesses are SoundCure and CryoXtract. We know that CryoXtract's sales increased year over year, yet the combination of CryoXtract and SoundCure declined from \$1.0 to \$0.8 million. We also know that CryoXtract's sales were \$0.7 million in 2013, while SoundCure's were \$0.3, so even if we assume that CryoXtract's sales stayed flat at \$0.7, then SoundCure's would have declined by *two-thirds*, from \$0.3 to \$0.1. "Sales growth...has not been as robust as first envisioned" is a rather understated way to describe this state of affairs.

Why, despite FDA clearance in the US and a CE mark in Europe, has SoundCure failed to justify its millions of dollars in expenses and development costs? The answer appears to be that the product just doesn't work well for many users yet is quite expensive. (In fact, according to many of the reviews quoted earlier in the report, some tinnitus sufferers find that the device *exacerbates* their condition.) On message boards like [Tinnitus Talk](#), the consensus is clearly negative. There's no obvious fix for a product problem as fundamental as this.

Stepping back, then, and surveying the fruit of Allied Minds' labors, we find no evidence that it's produced either an early-stage but highly promising sector leader (akin to unprofitable yet clearly valuable start-ups like Airbnb) or a mature, cash-generative business with real staying power. Instead, even its most developed "commercialization" efforts have yielded small, unprofitable firms with no clear path to supporting themselves, let alone earning reasonable returns on investment.

V. Conclusion

Allied Minds trades at optically ludicrous multiples of book value and NAV, the latter of which we believe is itself unjustifiably optimistic. While such a valuation is defensible in theory on the basis of, say, a few extremely high-potential subsidiaries that have already gained major commercial traction, no such subsidiaries exist. Somehow, in its decade-long history, despite having reasonably good access to the latest ideas generated at some of the world's best research universities, Allied Minds has managed to exclusively fund weak business ideas that have, to date, gone nowhere. No reasonable and impartial observer can possibly believe what the market implies – that, despite this track record of duds, the minds behind Allied Minds are, in fact, incredibly skillful venture investors. Rather than pay 3.0x inflated NAV, investors who understood the facts behind Allied Minds' history and portfolio would be very generous indeed if they paid 0.8x – in line with the VC secondary market and implying a 73% decline in the share price. But the final outcome will likely be far worse: when large subsidiaries like Spin Transfer and RF Biocidics are finally exposed as dead ends, NAV itself will plummet drastically. With "allies" like these, who needs enemies?

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