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The J-Curve: Mapping Challenges in RAS Investment

Why has institutional investment been so elusive for RAS fish farming?

It's a valid (and frustrating) question that the aquaculture community has been wrestling with for years.

After all, fish farming using Recirculating Aquaculture Systems (RAS) has much to offer sustainability-minded investors, the fastest-growing institutional investor class. RAS farming addresses the many negative issues that the ocean aquaculture industry has been excoriated for in the past.

No more ocean acidification, sea lice, and algae outbreaks; no threat to indigenous wild fisheries. When domestically established, RAS is a play on food security that would minimize the carbon footprint of seafood overall. Fish grown in controlled environments decreases the use of antibiotics because

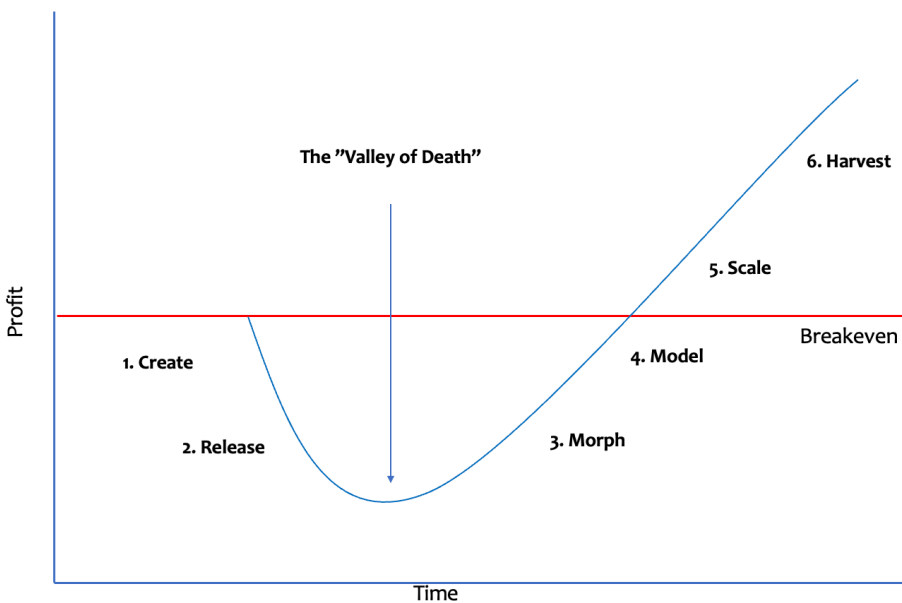
farmers can isolate infected cohorts and retain more control over environmental factors. There are also no microplastics for the fish to ingest like those reared in the ocean.

For all these positives and despite more than two decades of development, the RAS industry has failed to flourish as well as the ocean-cultured fish industry. Sure, there are a few triumphant (financing) tales such as Kingfish Zeeland, Atlantic Sapphire, Proximar, and Pure Salmon. Still, the industry continues to come up short of the optimistic predictions made by analysts and seafood publications.

MAPPING THE J-CURVE FOR RAS

The J-curve is a graph commonly used by venture capitalists and entrepreneurs to visualize the path new companies traverse from inception to success. It might also provide a useful perspective on why institutional money has been so skittish about the RAS space.

Figure 1



The traditional “J” was described well in Howard Love’s book *The Start-up J-Curve*, where he broke down the six phases of the curve, as seen in Figure 1.

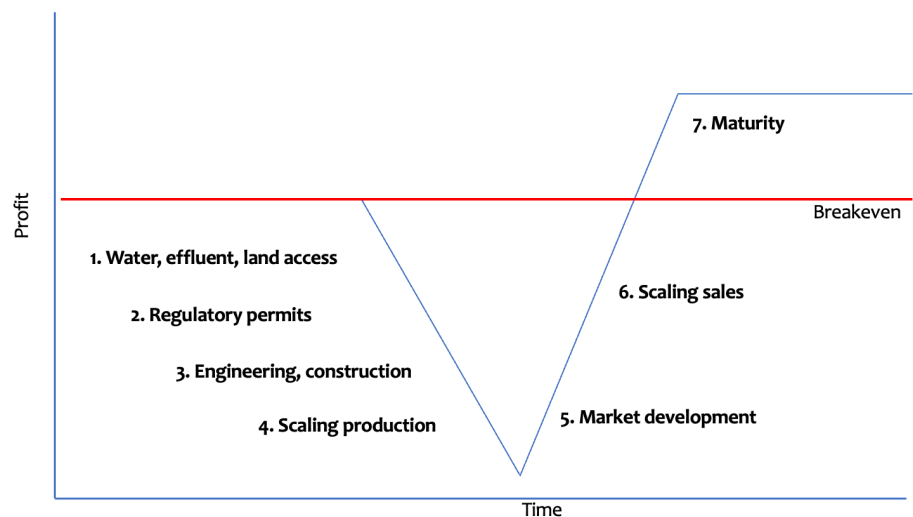
For start-ups, the “Valley of Death” is when young companies need to iterate on their product or business model to achieve the right “product-market fit.” This “morphing” period can be treacherous because companies are burning through cash and haven’t seen their sales scale, hence, the Valley analogy.

Applying this framework to RAS development, our team derived a different type of graph and conclusions. Our graph tended to form the shape of a radical, more commonly known as the square root symbol rather than a “J”. Figure 2 shows our “Square Root” RAS development graph:

Breaking down the phases in our graph, we have:

Figure 2

1. **Water, effluent, and land access:** Every RAS project must carefully select a site that gives the facility access to quality and consistent water supply; the ability to get rid of wastewater; and ample land for development.
2. **Regulatory approvals:** Securing permits, particularly, to access fresh or brackish water and dump effluent can be an expensive multi-year process.



3. **Engineering, construction:** A meticulous process that must take into account the site, the species raised, and trade-offs between Capex and Opex costs; it is also the phase where significant dollars must be deployed to lay the civil works, install the filtration systems, and build the site to scale.
4. **Scaling the biology of the fish:** Growing small cohorts to large ones and managing complexity across dozens of tanks and systems is where solid planning is needed; it has also been the key challenge of scaling.
5. **Market development:** Once fish can be grown with quality and consistency, then it all needs to find a home in the market; will it be sold fresh, frozen, as a filet, or smoked?
6. **Scaling sales:** Limited tonnage can often find a home in the premium, niche high-end food service or discerning consumer space, but significant quantities will need to be sold to retailers where relationships are built through consistent execution.
7. **Maturity:** There is no doubt that a scaled RAS facility would attract the interest of the public markets or several strategic investors.

GOING FROM “J” TO “SQUARE ROOT” MODEL

In the square root model, there are three main takeaways.

First, there are substantial sunk costs *before* you even get to test your product with customers. The first three phases of RAS development require a multidisciplinary team, capital to secure licenses, and complex design and construction experience before you can sample even one fish.

Contrast that to a technology start-up or even a new manufacturing business where prototypes can be made swiftly and at a nominal cost, we can begin to see why underwriting teams start to get uncomfortable.

The second point, which can be compared to the J-curve’s morph phase, is the scaling of biology and market development. Producing significant tonnage of live fish is a careful balancing act. You need an astute fish biologist, a knack for logistics, machinists, and, importantly, time. Mistakes can manifest over years as fish grow from egg to harvest weight.

Meanwhile, even if you’ve reached stable production, you still need to make certain that there is a vibrant market for your inventory before it spoils. Does the

market require a certain size? Filet or whole? Head on or off? In the parlance of the industry, you need to determine product-market fit.

The starkest difference between the two graphs is how they end; the J-curve lifts off to the upper right, while the square root graph flattens out.

This difference is because RAS facilities’ growth potential is capped. They are designed to produce a certain amount of fish and, as commodities, can’t support prices substantially above similar fish. That’s why the graph for a RAS business tends to flatten after it reaches optimal production levels. Unless, of course, you build an additional site or expand the system to accommodate more production.

But this may require another set of regulatory approvals, permits, and construction. In other words, *another* square root graph depicting the next phase of growth.

This is a major departure from the J-curve and where investors tend to raise real skepticism. After all, if you’re asked to take on significant risks with an upside that may be capped, it’s hard to be supportive.

LESSONS LEARNED

This square-root model, however, shouldn’t dampen enthusiasm for RAS.

The model already applies to many Capex-heavy industries where project financing risk is the norm, from energy to manufacturing or any business that must build a self-contained facility at a new site. There are many examples of industries with long histories of creating significant enterprise value for investors through project development models.

In short, sponsors must divorce themselves from thinking in tech startup terms and switch their optics toward project finance.

What lessons can be gleaned for those in the developing world of RAS? It seems obvious but it takes preparation, coordination, and responsiveness to be successful at any capital raise.

Experienced project developers establish detailed processes and can roll several facilities out at a time. But we’re often surprised that entrepreneurs have not taken steps to prepare for the invasive and often exhausting process of raising money.

RAS entrepreneurs should first identify where they are on the graph to determine what type of money is needed. The global capital markets are deep and sophisticated (though they can act silly at times), and not all investors will have the same objectives.

If you're raising capital for Stage 1 or 2 in the graph, you'll need development-minded or seed-stage investors. Meanwhile, infrastructure or even industrial real estate funds can fund the construction of a RAS project if you've tackled scaling production and know how to sell your fish. In other words, you're climbing to Stage 6.

Different types of investors will have pronounced differences in their diligence requirements, return expectations, investment, and tax structures. Knowing how to navigate them is the key to a successful raise.

ASSEMBLE YOUR A-TEAM

You'll also need a rapid response team formed to meet the diligence process for investors.

This multidisciplinary group needs to comprise the senior leaders of your project: CEO, CFO, senior aquaculturist, sales manager, and construction manager; the titles may differ at your organization, but the depth of experience you need to demonstrate remains the same. And be sure to appoint a team lead responsible for engaging, coordinating, and responding to investor inquiries.

This person doesn't need to be the CEO and given her other responsibilities probably shouldn't be, but you can't just have a "go-fer" in the role either. They need to be a credible representative of your team, able to organize and drive hard deadlines for information, and can professionally correspond with demanding investors.

Nothing sours a deal faster than a lack of momentum and enthusiasm. Asset managers and their teams are ultimately "selling" products, too; the difference is that they are selling financial structures to their limited partners. They are tasked with deploying capital into attractive situations swiftly; if a project owner isn't responsive, it's off to the next opportunity.

Make sure your response team is transparent with your risks and where you are in your development. You should be able to provide independent documentation to validate your point on the square

root graph. Signed permits, Letters of Intent, financial models, off-takers, and price information should be organized in an easy-to-access data room.

Also, ensure that a decent budget is allocated for the capital raise. The adage "it takes money to make money" is prevalent for a reason! Lawyers, accountants, investment banks, and appraisers must be factored into your use of proceeds. It is an often overlooked point in the financial models of entrepreneurs.

THE FUTURE OF RAS INVESTMENT

Institutional investors continue to become more knowledgeable and practical about RAS fish farming, particularly the risks. But the multifaceted opportunities in food inflation and security, carbon emissions, and ocean sustainability keep investors engaged in the space.

Early money that has been lost has redefined business models, uncovered risks, and shown how J-curve thinking is changing.

The RAS pioneers who understand this evolution but, more importantly, prepare for the challenges they need to overcome with institutional investors will find the road to a successful raise far less rocky.

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