

SLATE

Transformative Industry Collaboration

Why, when, and how competitors use collaborative vehicles to achieve breakthrough innovation, with learnings from the design of the Electric Mine Consortium.



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Why do competitors collaborate?

Working collaboratively with competitors seems counterintuitive but cooperation is crucial to long-term survival when challenges are complex and industry wide. When done properly, collaborating within or across industries improves the innovative capacity of both large and small-scale operators, often resulting in the most productive business and social outcomes. We've investigated why companies collaborate with their competitors and how a well-designed collaboration model can be successful, with reference to the Electric Mine Consortium¹ (EMC) as a case study.

"There are three ways to make a living in this business. Be first, be smarter, or cheat. And I don't cheat." – John Tuld, Margin Call

Competition is ultimately inevitable. Positive collaboration is simply a vehicle that can shift the focus of competition from between entities within an industry, to solving for challenges that are much more productive for industry members and society. Conversely, collusive collaboration extracts value from society and feeds it into outsized profits for a few. Forms of collusion (such as price fixing and sharing confidential commercial information) discourages new market entrants, which hampers productivity and innovation efforts. Therefore, a key part of positive collaboration is in the establishment of competitive codes of conduct, and the adoption of transparency. When companies collaborate effectively, the focus moves beyond individual company efficiency to higher-level innovations, allowing rapid transformative change to be achieved.

The trade-off: to grow or transform?

All companies must **scale and be efficient**, but they also need to **transform and adapt** at certain points in time to survive. Collaboration is key for transformational innovation due to the inherent trade-off between the focus that growth requires and the adaptability that transformation requires. These functions often occur in a punctuated cycle according to inflection points in major external forces. Knowing when to grow and when to transform is the art of strategy.

Some of the most apt metaphors for the motives behind collaboration come from the natural world. For example, brine-shrimp, popularly known as sea-monkeys, which many of us may recall purchasing as a child in a dry sachet and watching in wonder as they came to life in an aquarium. Sea-monkeys are one of the few creatures, along with aphids and seahorses, that can reproduce both asexually and sexually. When times are good (the pond gets bigger, nutrients are flowing, sunlight is shining, and predators are few) they grow through female's replicating. When times are tough, they reproduce by females seeking out the few males there are to mate. The greater genetic diversity of these offspring increases the probability of one of them being able to navigate the new environment. The strategy of replicate (or grow) when times are good and collaborate (or adapt) when the times are challenging is a survival mechanism innate to the simplest of life forms.

"A problem cannot be solved at the level created" – Einstein

¹ <https://www.electricmine.com/>

There is also a cultural reason why larger companies collaborate to push breakthrough innovation. Rapid innovation requires diversity, which is almost invariably reduced as company size (and capacity) increases. Big companies are likely to have the resources to innovate at scale, however they have difficulty in executing when compared with smaller, newer entities. Larger companies can: be bureaucratic; have a greater vested interest in the status quo; and lose sight of their customers interests (actual and potential). Over time the culture tends towards conformity, promulgated by the balance of people who choose to stay and those who leave, which can be destructive to company performance over time.

State of Play² data reveals that 61% of mining executives incentivise innovation through their culture, which points to the importance of nurturing an open, and dynamic workplace environment. Collaboration can solve for this dilemma by bringing diverse skill sets, systems, and cultures together with the superior technical capabilities of large industry players. Small players benefit from access to resourcing far beyond their scale and large companies are injected with cultural diversity through cross-pollination of ideas.

What circumstances are conducive of collaboration?

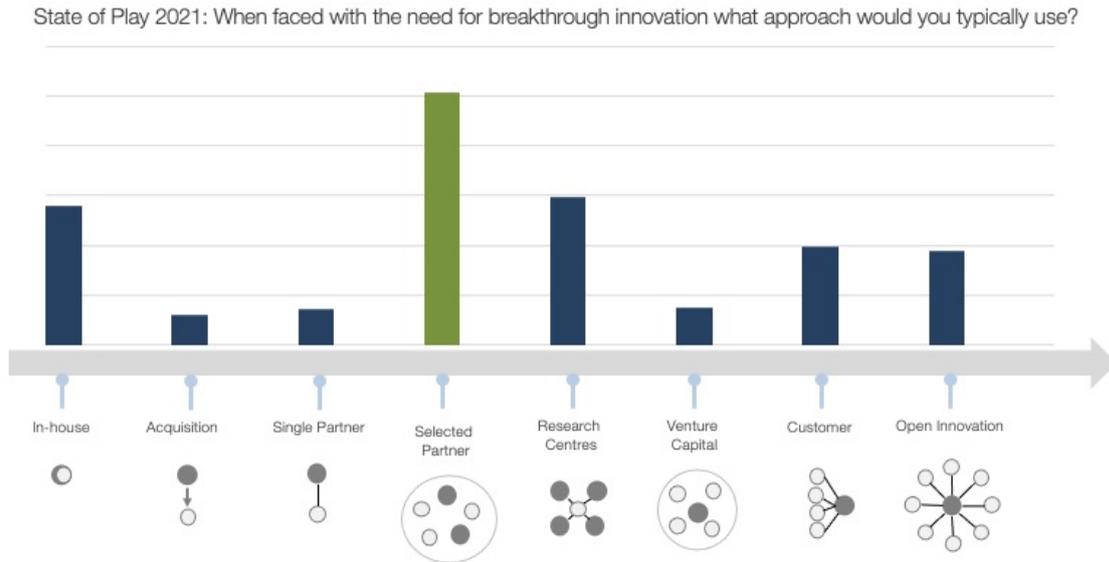
When the metaphorical food source is shrinking and the predators are circling, companies are more likely to collaborate to address five key barriers to solving major challenges:

1. Enhance internal **capability** to meet a challenge:
Significant critical mass of skills and influence is not achievable alone. Partnering with other organisations enables access to a greater pool of resources, technical expertise, intellectual property, and external influence.
2. Navigate a particularly **complex** environment which is uncertain:
Complex problems require diversified skill sets, on both a technical level and a cultural level, which is challenging to achieve in any single entity, regardless of size. Furthermore, homogenous workplaces tend to suffer cultural biases that they cannot see or address and need to engage externally to identify and overcome these barriers.
3. Face **risks** where the threats and potential implications are beyond a single company's capacity to address:
High-level decision making is primarily based on the objective of balancing of risk and reward. Collaboration brings high-risk ventures into the realm of possibility by allowing each company to accept a portion of the risk, and to apply their own specialist mitigation methods.
4. Raise **capital** to address an opportunity beyond their limits, both in quantum and risk appetite:
The net cost of pilots, trials, and new technology implementation can be radically reduced through collaboration. This is crucial for small players who don't have the capital and benefit large corporations' who can attract more capital to projects.
5. Move at a **pace** when it is beyond their abilities to realise opportunity or avoid risk:

² <https://www.stateofplay.org/>

The pace of innovation naturally increases when more resources are systematically deployed. Companies can work on different challenge areas simultaneously whilst also benefiting from the compounding effect of their shared knowledge.

What form of collaboration to apply?



The choice of collaborative vehicle will depend on the strategic goal, nature of competition, and technology readiness level (TRL) of the solution. Our 2020 major industry survey showed that the preferred approach to achieving breakthrough innovation for 60% of respondents' is collaborating with **selected partners**.

A deliberately designed collaborative consortium (like the EMC) is a form of selected partnership that is useful to co-ordinate and execute large-scale innovation when the TRL level is high and the competition level relatively low. Alternatively, when the TRL is low and competition is low, people turn more to research centres (36%). When companies believe they have a competitive advantage, they tend to stay in house (33%).

	In-house	One-on-one	Consortium	Research Centre	VC	Open innovation
TRL	High	High	High	Medium	Medium	Low
Competition	High	High	Low	Low	High	Low

Open “boundary-less” forms of innovation (such as open-source software) lag the popularity of selected partnerships, reflecting the ever-present nature of competition, and the capital-intensive nature of mining that requires long-term strategic goals and large capital expenditure commitments. Staying focussed on a strategic mission and regulating information flows is impossible in open-source licenses, which in turn suffer from free-riders. Consortium and select-partner frameworks build in trust through barriers to entry, mutual capital commitments and shared goals, reducing the risk of indirect intellectual property spill overs. However, open crowd challenges are an effective way of encouraging collaboration on early-stage innovations while keeping participants focussed on one problem area.

Case Study: Think and Act Differently (TAD) Crowd Challenge³

In 2022 The Electric Mine Consortium and OZ Mineral's undertook an extensive open design challenge to build and develop a mine design simulation platform. Their call out resulted in 23 submissions, designed by 179 participants, from 36 countries. Five teams were then selected to join an OZ Minerals led incubator program where they are supported to develop and test their simulations. If successful, a simulation platform will allow the EMC to quickly build and test different electric mine designs and compare metrics such as productivity, costs, emissions, and energy requirements.

How to design an effective consortium?

The **consortium model** works when members' strategic and competitive goals are aligned over a common ambition and imperative to collaborate (i.e., complexity, capability, capital, risk, and pace). In practice, the framework for designing collaborative vehicles is an area for considerable creativity, guided by a few key factors; (1) the nature of the driving objective, (2) the degree of competition between members, and (3) the agreed upon level of openness.

(1) Driving objective

There are two predominant objectives for establishing a collaborative consortium between competitors: to pull through demand or push adoption of technology. **Demand-pull** consortia (like the EMC) are driven by the desire to find solutions to a common need. Alternatively, a cluster of technology-driven businesses might collaborate in a **technology-push** to advance the development of their offering.

Case Study: The QED-C⁴

The Quantum Economic Development Consortium (QED-C) is an example of a highly successful technology-push consortia. The QED-C is a collaboration between hundreds of leading US technology corporations, academics, and government stakeholders, unified under the aim of growing a robust commercial quantum-based industry in the US and positioning themselves as global leaders. The consortium was initiated in 2018, off the back of the US Federal Government's 'Quantum Information Strategy'. Quantum computers, lasers and sensors have the potential to be a highly disruptive and economically lucrative. The QED-C is working to unlock quantum capabilities that isolate, control and sense individual quantum particles such as electrons and photons and commercialise these technologies. Advancements in quantum code can also be used to secure communications networks, which has massive implications for National Security. China also invests billions into their quantum industry, which put pressure on the US to ramp up their efforts to outpace them.

(2) Competition

On one hand collaboration enhances capability and opportunity, on the other hand, it dilutes individual value capture. Therefore, it is only natural that collaboration is adapted to the competitive landscape to avoid giving away more than is gained. Non-disclosure agreements and legal frameworks will be appropriate for consortia depending on the level of competition. Clear boundaries for information sharing should be established early on and facilitated by a leadership team.

³ <https://unearthed.solutions/u/competitions/electric-mine-simulation>

⁴ <https://quantumconsortium.org/>

(3) Openness

A foundational decision when designing a consortium is who to collaborate with and how openly? Consortiums vary from fully open industry-wide or national-level collaborations to closed groups, with very select roles. If the consortium has an industry level objective, such as the QED-C, the governance design will be more open and welcome to a broader selection of participants. If there is substantial competition between partners, the collaboration will require more structured agreements and information sharing will be constrained. In the case of the EMC, the cohort of medium sized businesses are open to a galvanising and largely non-competitive consortium environment, in comparison to larger industry players like BHP and Rio Tinto.

The nature of the consortium objective, competition and openness will vary greatly but can act as a guide for making fundamental decisions around consortium design. Once formed each consortium is a unique and ever-evolving mechanism that must remain highly responsive to the external environment. Long-term success will ride on the ability to stay focussed towards achieving a common objective, guided by an adaptive leadership team.

How was the Electric Mine Consortium designed?

The EMC model was a bespoke design and has proven very successful, having been formulated at a critical time for the industry. The consortium was established in 2020 following a State of Play research drill-down into electrification⁵ and has grown into a major collaboration between 23 global mining (11) and services (12) companies (to date). It was well understood that to achieve such an ambitious objective of zero-emission mining in the desired timeframes, combined industry effort was required. However, the design of the EMC was not immediately apparent when the idea was first realised. Based off the previous three guiding dimensions and deliberate design around the idea of ‘accelerating a zero-carbon, fully electrified mine’, the EMC was built on **10 fundamental principles**:

1. **Common industry issue** – One big vision that defines what the challenges are centred around, i.e., a fully electric, zero-carbon mine that creates a better working environment.
2. **Challenge focussed** – Six high-impact technical working groups that are focused on key mine electrification challenges and facilitated by several enabling workstreams.
3. **High technology readiness level** – Concentrate efforts towards the most viable technologies where trials can provide proof of concept and accelerate adoption.
4. **Distinct member and partner roles** – Mining companies set the challenges and lead the challenge streams and technology/services companies work with them on the solutions. The miners create the demand-pull, and the services companies respond to the investment signal.
5. **Program agility** – The facilitation team (Slate Advisory) and participants remain agile and entrepreneurial to overcome barriers to progress and allow the consortium design to evolve as the external environment changes.
6. **Accountability and self-selection** – Working groups are overseen by a self-selecting team, so that they are engaged and motivated to contribute meaningfully
7. **Data and information sharing** – Build and continually add to a consortium data sharing platform to accelerate understanding and reduce the effective cost of piloting.

⁵ <https://www.stateofplay.org/publications#>

8. **Demand aggregation** – Deliberately aggregate demand to shape suppliers’ programmes and choices in bringing technology to market.
9. **Tipping point initiatives** – Focus projects and interventions on work that delivers rapid outcomes and creates a compelling and irrevocable case for industry change.
10. **External communication** – Generate momentum behind the ideas and initiatives, create excitement, publicity, and broader influence.

What have we learnt about collaboration from the EMC’s success?

Since its establishment in late 2020, the EMC has emerged as a world leading decarbonisation initiative in mining. It is a case study in how well-designed collaboration can accelerate development, reduce costs, manage risks, and effect transformative change across a sector.

Aside from its growth and tangible achievements (many dozens of technology trials, a data platform, external market shaping and other strategic initiatives), we have recognised several direct benefits from *collaboration* that drive its success.

- An internal feedback survey revealed that ‘knowledge transfer’ and ‘networking’ are the two greatest perceived benefits to EMC companies, proving that firms can gain greater returns on their innovative activities and intellectual property by loosening their control of both.
- Although it’s difficult to measure, participants have confirmed the consortium initiates a “Hawthorne effect”. By communicating internally, exchanging with peers, and being held accountable for progress the participants are indirectly motivated to act.
- With more than 70% of the world’s emissions now covered by net-zero pledges, societal pressure is mounting, and participants are increasingly driven by the imperative to meet their customer and shareholder obligations. The consortium benefits from a natural growth in momentum as ‘The EMC’ becomes a recognisable industry signal synonymous with commitment to decarbonisation and electrification.

Conclusion

Consortiums are difficult to establish unless the external conditions are conducive to rapid transformation. When there is a confluence of outside factors – a big social push and technology advancing, there will be rapid change. In the case of the Electric Mine Consortium, the mining industry mobilised in the face of mounting government and shareholder pressure to decarbonise, geopolitical tensions, critical minerals supply chain issues, and changing digital operating models. The imperative for miners to collaborate is greater than ever – the greatest risk is failing to adapt. These conditions opened the door for a collaborative vehicle to successfully accelerate transformative innovation towards a focussed goal.

Let us not forget that competition is all pervasive and timing is critical. Like the sea-monkeys, once environmental threats have been overcome, those who adapted to survive will invariably break ties and focus on rapid growth and expansion in a race to take their share of the pond.