



Ensemble
Consulting
Group

ENGINEERING
CASE STUDY

Delivering massive value via a constrained resource

—
Let's
Redefine
What's
Possible
—

OVERVIEW

Delivering massive value via a constrained resource

In an epic iron-ore boom, the world's largest mining company should have been in heaven. Instead, they were sweating.

RESULTS - PERCENTAGE

33% ↑

IMPROVEMENT
in **productivity**

RESULTS - DOLLAR SAVINGS

\$100m

IN ADDITIONAL **PROFIT**

Unprecedented demand was piling pressure onto the company's port facilities. As the supply chain's weakest link, they needed an urgent upgrade. While the initial project plan called for 50% more engineers, the boom meant the experts required simply weren't there to hire.

If the port couldn't expand fast enough, it would become a major bottleneck, with a dramatic adverse effect on revenue. And with demand greatly exceeding supply, every tonne of iron ore went straight to the bottom line. The three-week construction shutdown was valued at an opportunity cost of 10,000 tonnes/hour, a total cost of more than \$250m.

The company engaged Ensemble to manage the rapid expansion of the constrained part of its supply chain. Our expertise in optimising critically constrained resources as well as our advanced planning and scheduling capabilities were seen as critical success factors.

The Ensemble Effect

Using our systems approach, we sequenced our client's project plan to ramp up port capacity in line with the increased mine production. Our methods delivered 33% higher productivity than client expectations—increasing engineering output, reducing project lead time, lowering costs and freeing up resources early to work on the next phase of expansion.

The result? Additional profit of over \$100m over the shut. The increased flow in the expanded port delivered an additional 4,000 tonnes of iron ore per hour, valued at more than \$1.5 billion of extra annual profit.

Challenges

Elevate port capacity to accommodate expanded mine production and maximize client's share of a booming market.

Engineering work completed
3 weeks ahead of schedule

Optimise use of constrained engineering resources in a very tight labour market.

33% improvement in the productivity of people working on the project.

Minimise production lost during construction shutdown.

The shut sequence was precisely choreographed for the minimum down time of just **16** weeks

Take maximum advantage of financial contribution of every additional tonne to be sold.

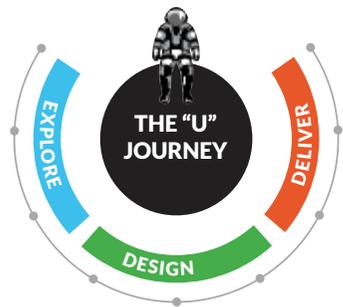
Each hour completed early was worth \$500,000-realising a total of more than **\$100m** in additional profit.

“Using Critical Chain and Concerto, it was like I learnt how to properly conduct the orchestra.”

Engineering Manager

ENGINEERING

Transforming the system



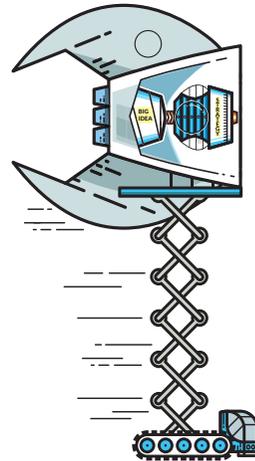
EXPLORE:
IDEATION
GENERATIVE INTERVIEWS
FOUNDATION WORKSHOP



DESIGN:
LEARNING JOURNEYS
RETREAT & REFLECT
CRYSTALLISE INTENT



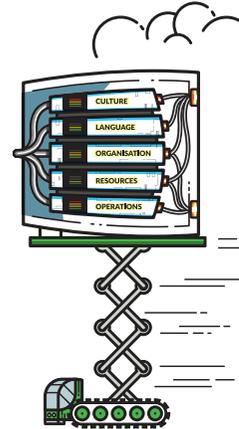
DELIVER:
PLAN THE WORK
WORK THE PLAN
WIN RESULTS



Explore

Generative interviews gave us deep insights into the negative effects of unsynchronised work across the whole value stream. Listening to our client's project director, his peer in the EPCM (engineer, procure & construction management) and their direct reports, we unpacked the risks to on-time delivery of 'first ore'—our first step to building a high-performance team.

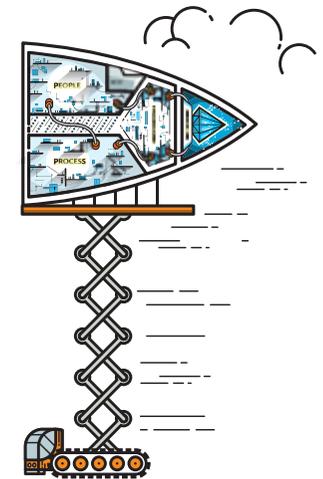
The Foundation Workshop gave the leadership team new ways of working that addressed the logistics of synchronisation, from design through to construction. Exploring the connections between themselves and their work, the team collectively built a high-level series of work-plans to inform the next phase of the process—the Learning Journeys.



Design

Learning Journeys led to a redefined project process of what was possible, given our client's scarce resources. Repeated modelling around process improvement identified a 'performance management' approach based on engineering deliverables. Through maxims such as 'fail often to succeed sooner' and 'enlightened trial and error succeeds over the pursuit of the lone genius', a culture arose that made it safe to try more creative problem solving.

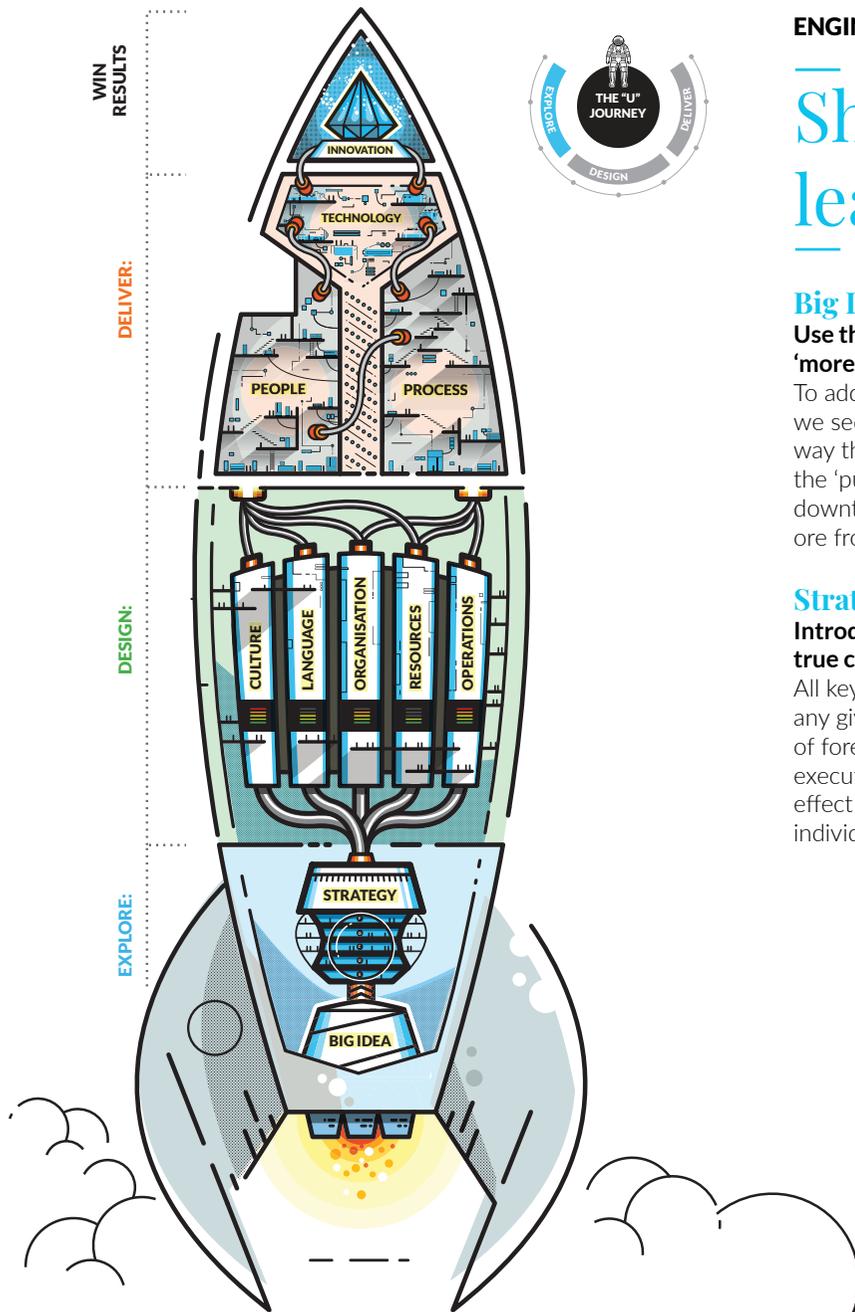
Tough conversations were held to ensure that everyone, from senior engineers to those on the lowest rung of the drafting office, would collaborate to support the bottleneck. The bottleneck itself was identified by the dynamic fact-base developed during modelling and continuously improved through use.



Deliver

Win Results yielded a strategy to achieve sustainable financial and cultural outcomes using insights gained from the design phase. Distilling best practices, we aligned around value flow to transform the prototype learnings into a logically consistent suite of methods and tools.

The 'performance management' approach was encoded in dashboards focused on three principles: accurate and timely data; the importance of context, and management by exception. A cycle of daily, weekly and monthly meetings was defined with clear context, purpose, outcomes, resources and timing for each. Engineers, detailers, fabricators, and the commissioning and construction teams now enjoyed genuine communication and sustainable relationships.



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Shortening lead times

Big Idea

Use the construction schedule to align to the goal of 'more rocks on ships'.

To address the industry-wide shortage of engineers we sequenced engineering design in an innovative way that delivered the shortest lead time. Based on the 'pull' of a construction schedule, it minimised downtime and maximised the opportunity to ship more ore from increased mine capacity.

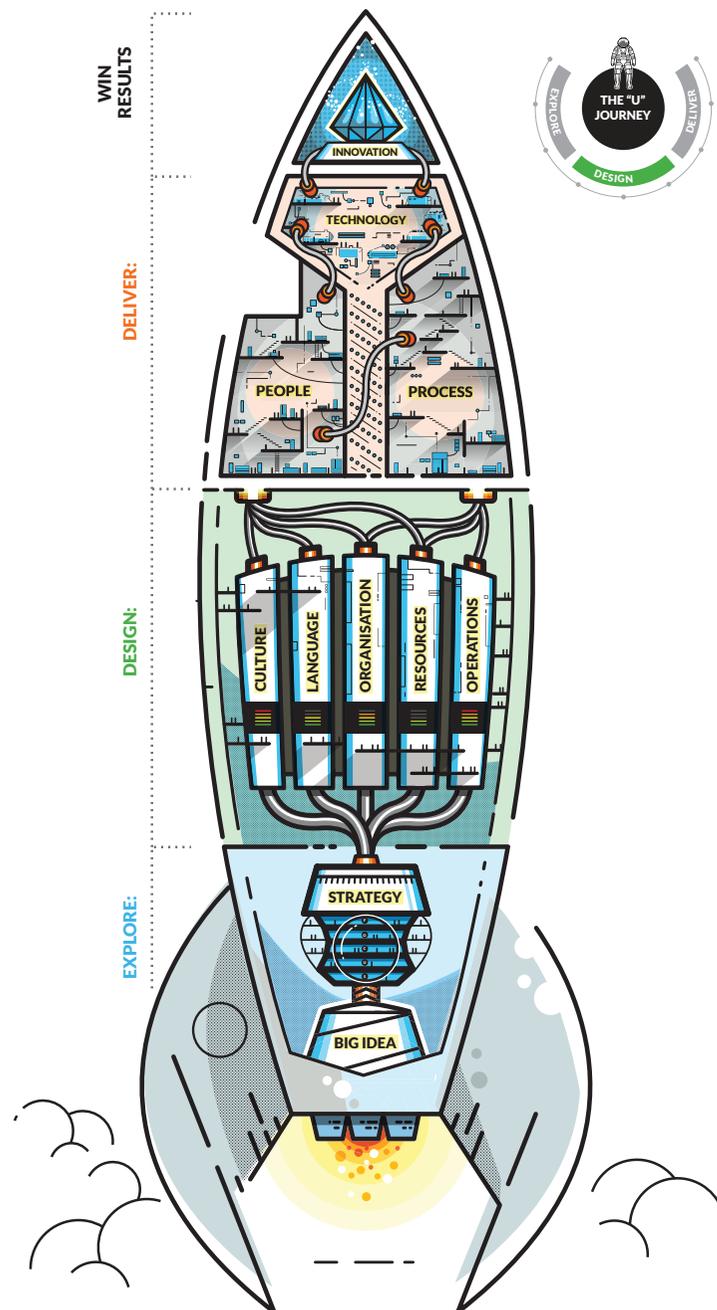
Strategy

Introduce advanced instrumentation to visualise the true cost of delay.

All key staff came to understand that the value of any given hour on the project was worth \$500,000 of foregone contribution. Hence, every planning and execution decision would be measured against its effect on delivery of the extra tonnes—not on the individual efficiencies of each functional silo.

“Ensemble’s approach forced detailed planning and lead thinking.”

Project Director



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A 'one team' mentality

Culture

Create a 'one team' mentality around a common goal: 'more rocks on ships'.

Disparate owner and vendor teams at both head office and site had resulted in a culture rife with tension. We facilitated a high-performance culture by changing the micromanaged style to one of empowered teams using a single, reliable fact-base to support effective decision-making.

Language

Unify terms to adopt by all: managers, engineers, construction workers.

Department, discipline and trade-specific dialects gave way to a new common language driven by an understanding of opportunity cost, supporting the imperative to stay on schedule. Concepts such as 'critical path', 'full kitting', and 'cost of delay' created a unified understanding across disparate teams.

Organisation

Restructure, with team leads accountable for on-time, in-sequence delivery.

Diverse engineering and trade teams were all organised around processes that delivered to the overall goal of getting 'more rocks on ships' in the shortest time. Accountabilities were established down to the task level, with processes for cross-functional work assignment and rapid escalation of stuck tasks.

Resources

Standardise and centralise control of resource management.

In support of the new structures, Ensemble created standard definitions and master data for the projects many resource types. This enabled a dynamic understanding of supply-side capability—at any point in time and in any location—to proactively anticipate and mitigate bottlenecks.

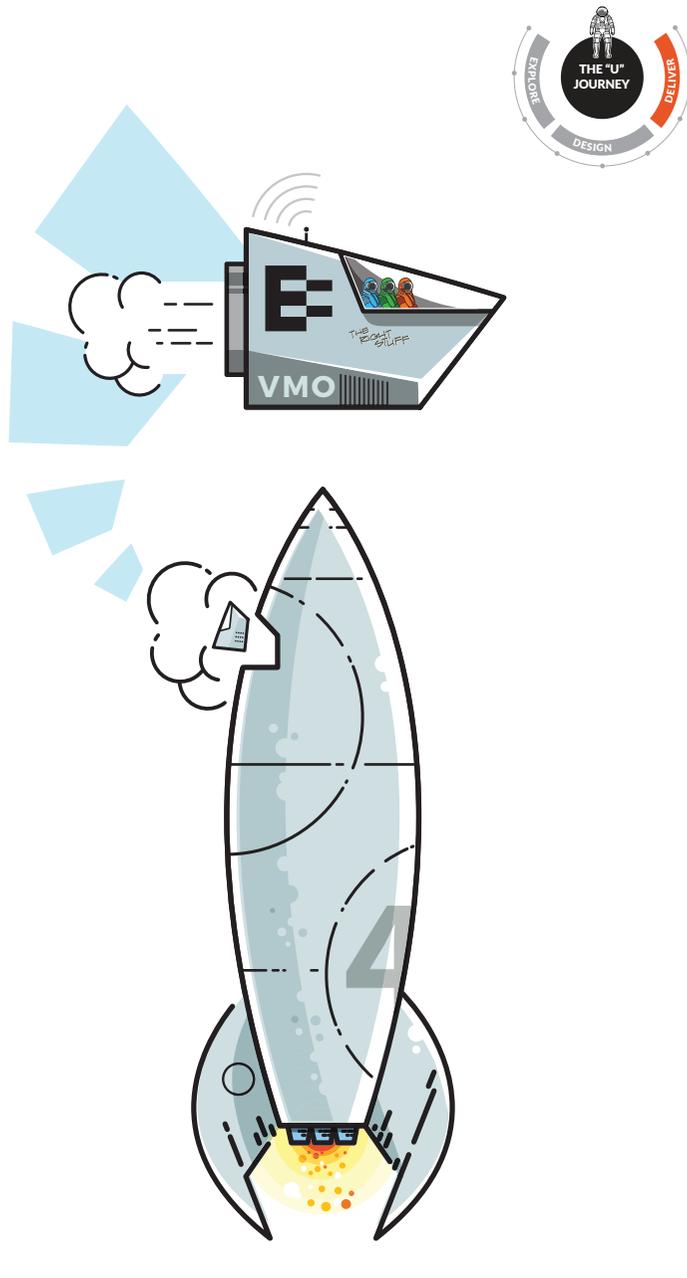
Operations

Build a single source of the truth for all work, from design to construction.

Every aspect of work was represented, prioritised, levelled, and accelerated. Standard operating procedures, new project reports and better ways of running meetings all fostered mutual understanding, collaboration and high-performance outcomes.

“Constraints thinking helps focus and integrates well with Lean and Six Sigma.”

Project Director



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Greater flow, better profits

After the project's success, we helped our client develop an expert system of management that made visible all work—and the capability required to deliver it—from a single source of the truth.

Upgrading the port to cope with greatly increased demand was just the first step. It became clear that 'materials flow' for engineering and construction was essentially the same, whether at the port or the mines. Creating new standards to define, prepare, organise and perform all work allowed us to aggregate demand for scarce engineering resources against a shared pool of people capable of doing the work.

On top of that, many scenarios allowed for reusable templates, making it much easier for project managers to develop and articulate detailed schedules. They could now confidently and accurately 'plan the work' to reflect the actual effort, then 'work the plan' to engage the right resources to perform it.

Using the Critical Chain method as the common approach, the 33% increase in productivity delivered not only greater revenue but a saving in operating

expense per extra tonne. And thanks to the newly found capacity, the opportunity cost of the scarce engineering resources was also minimised - they could be deployed sooner to other project bottlenecks.

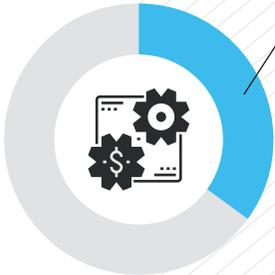
By scaling and institutionalising our innovative approach to getting 'more rocks on ships' we redefined what was possible. The Centre of Excellence we created generated enormous ongoing value and became the blueprint for Ensemble's Value Management Office.

“
Prioritises today's work
and helps us know what
happens next week, not
only what happened
last week.”

Project Director

Our Results: Percentage and Dollar values

Business Management Systems



35% REDUCTION IN LEAD TIMES

despite independent auditors giving a 3% chance of on-time completion

\$180m IN COST SAVINGS

Manufacturing



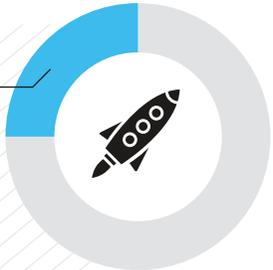
25% CAPACITY REALISED

\$45m

ADDITIONAL PROFIT IDENTIFIED

New Product Development

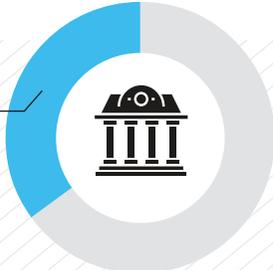
25% INCREASE IN PRODUCT LAUNCHES from 100 to 125



\$20m IN ADDITIONAL REALISED PROFIT

Banking

35% REDUCTION IN CREDIT APPROVAL LEAD TIMES



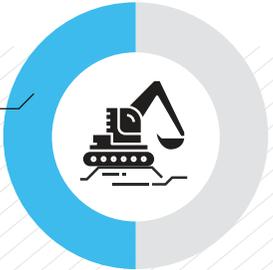
Generated capacity for

\$45m

IN ADDITIONAL INCOME

Construction

50% IMPROVEMENT IN PRODUCTIVITY

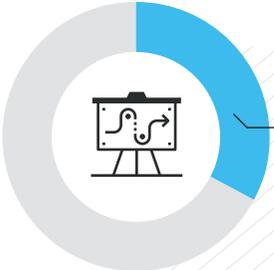


Liquidated damages in excess of

\$100m AVOIDED

Engineering

33% IMPROVEMENT IN PRODUCTIVITY



\$100m

IN ADDITIONAL PROFIT

So, why Ensemble?

We help organisations create more value for more people—in less time, every time.

Focussed

Our singular focus on 'innovations in productivity' has far-reaching effects. Our management systems can bring you more value than product innovation. Yet when you develop new products, better ways of working will bring those to market faster, too.

Tailored

As a specialist consultancy, we are nimble, hungry and dedicated to personal relationships. More Savile Row than off the peg, our approach isn't for everyone. But those leaders who get us enjoy both the process and its remarkable fruits.

Tested

Our uniquely experienced team knows what it takes to deliver real value in productivity, performance and profit. We've been doing this for blue-chip companies in Australia for over 15 years, with a proven track record in delivering outcomes faster, with greater reliability and agility — at lower cost.

Empowering

By helping to build a 'learning organization', we transfer our capabilities, giving you even greater results that are sustainable well beyond our initial engagement. From initial project engagement to our own Academy, we really do want to seed new ways of seeing the world of work.

True

Simplifying complexity is what makes us tick. We combine an engineer's curiosity with a business owner's obsession with results. We value the courage and particular quality of mind that enables a person to over the fear of difficulty or danger and remain true to their convictions.

Our innovations in productivity give ambitious executives three ‘value levers’

1. **Deliver your promised business case** – in full, on time, every time;
2. **Mindfully manage resources** to reduce your ‘cash burn’;
3. **Free up your people sooner** to tackle the next big idea.



BHP



Breville



CCA
COCA-COLA AMATIL



Jetstar



BOMBARDIER



THIESS



coles



onesteel

We've been giving tier-one Australasian companies this leverage for over 15 years.



Ensemble
Consulting
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“

Even if I was allowed to mention dollar value numbers,
this is still the first thing I would always write:

**These outcomes are so valuable they literally print
their own money.”**

VP Projects



Are you an ambitious
executive looking to
apply the Theory of
Constraints and other
innovations in
productivity to your
organisation?
Get in touch

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