But we have always done it this way: Supply chain R&D results worth changing for

Australian Forest Operations Research Alliance
AFORA
Industry - Research - Innovation

University of the Sunshine Coast
The best of both worlds

Australian Forest Operations Research Alliance

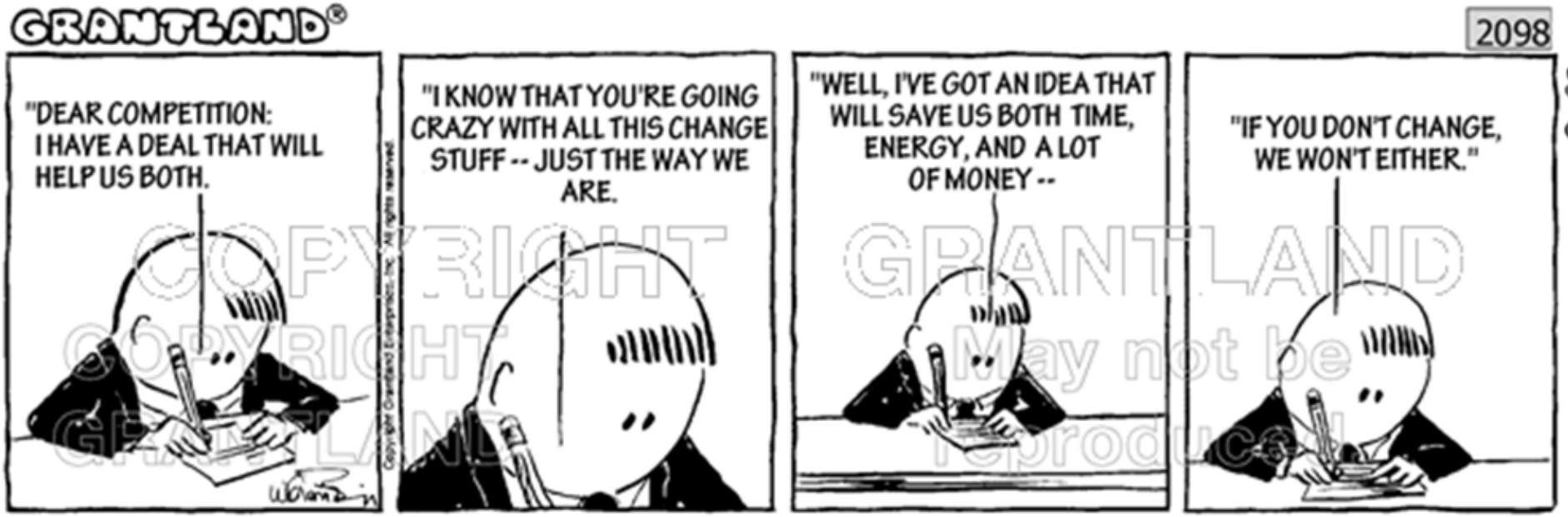
AFORA

Industry - Research - Innovation

- Industry Alliance
  - 18 partners (15 forest growers – ¾ industry)
- In the area of forest operations aims:
  - Improve cost management
  - Improve value recovery
  - Improve logistics planning and execution
- Established June 2013

Overview

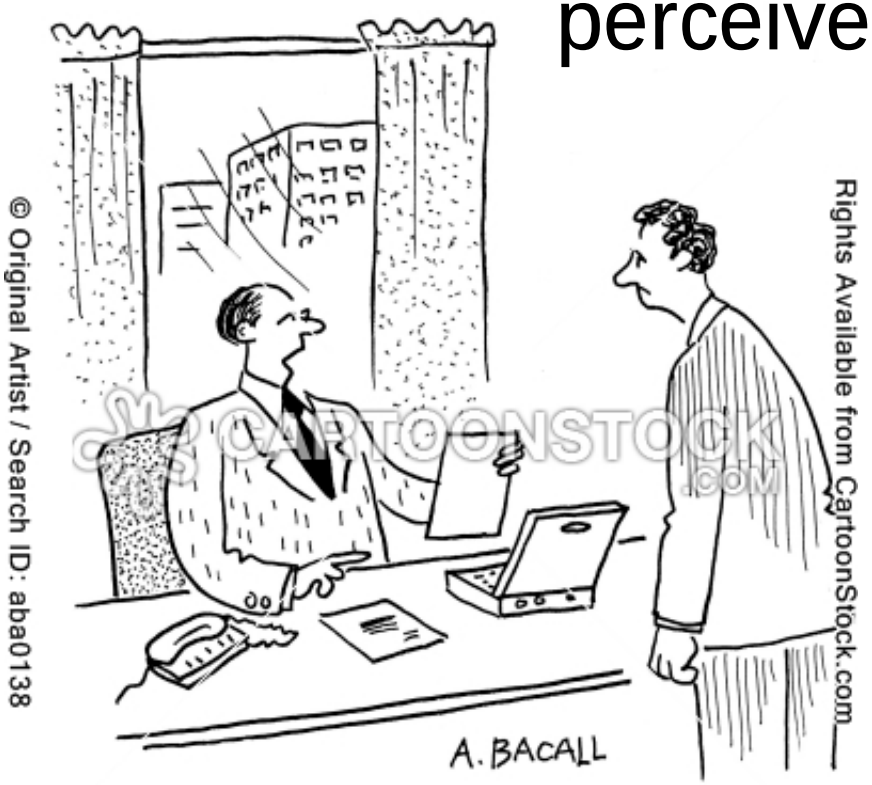
- Why change can be hard
- Importance of collaboration
- Success stories from overseas
  - Optigrade (collaborative from day dot)
  - Star Truck (collaborative integration)
- Australian success stories in the making
  - Fast Truck (early adopter collaboration)
- Summary and discussion



Not all change is hard…but most effective change is

Why can change be hard

It is not known as part of current real or perceived success



"Your proposal is innovative. Unfortunately, we won't be able to use it because we've never tried something like this before."

Why can change be hard

It takes people/organisations out of their comfort zone

"There's talk of innovation out here. Winds of change are headed your way. Lock you door, pull the shades and hide under your desk."

"I thought people were quite receptive to the change seminar."

Why can change be hard

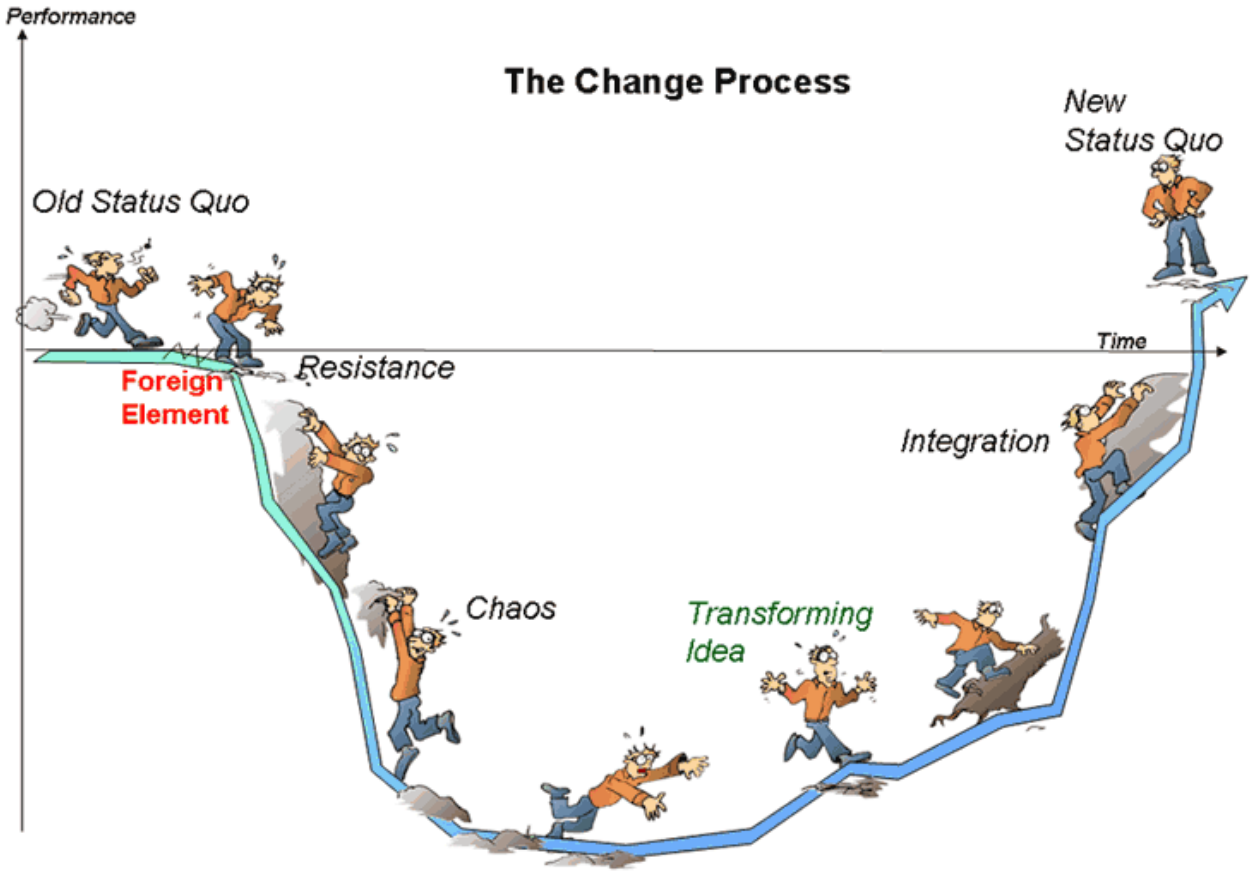
Different perspectives on what change is warranted/needed

Why can change be hard

Not really ready or open to change

Why can change be hard

It takes time & effort to see success



Operations vs. “Innovation Team”

Bureaucratic dinosaur

- Good at making the day to day business work well
- Know what currently works and what doesn’t

Undisciplined upstart

- New perspective new ideas willing to question
- Challenge the status quo

❖ Power is in the combination – the asset of experience challenged with new ideas

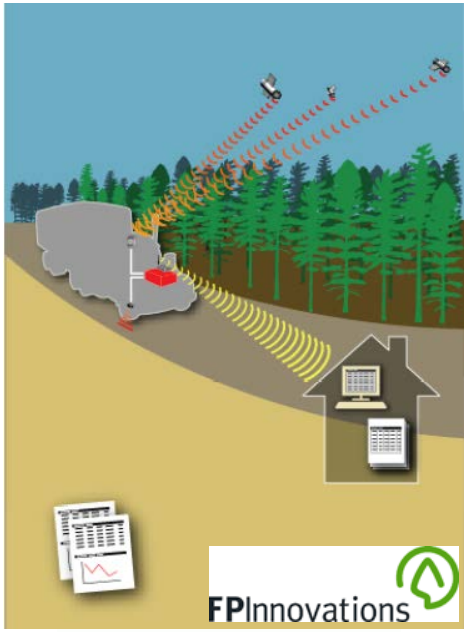
❖ Establish a collaborative team

– Right balance

– Engaged participants with right incentives

You need the right team but it can't be just the team

WHY INNOVATIVE COLLABORATION IS IMPORTANT



FERIC Optigrade

- Need identified by researcher & manager in the field together
- Research on solution approaches
- Iterative development w/industry
- Improved with technology
- Collaborative implementation

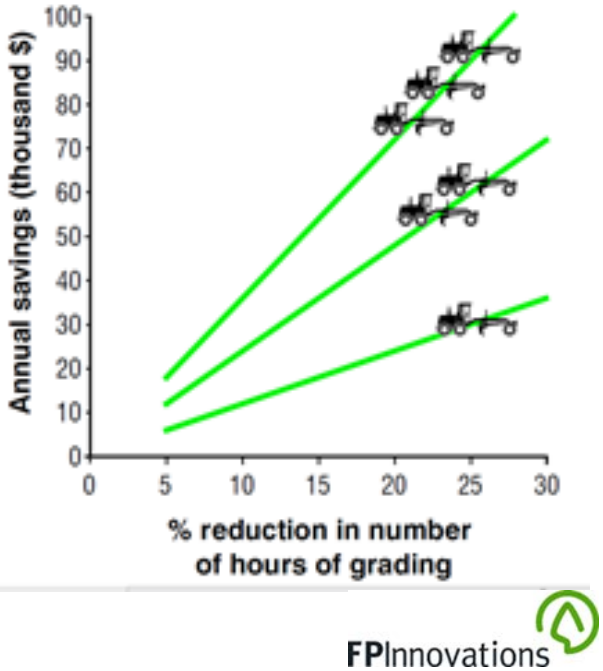
FERIC Optigrade

Objectives

- **Reduce costs** — Less grading means fewer graders and fewer operator-hours. Grading before crushed surface materials are lost will delay regravelling.
- **Improve quality** — Focusing grading where it's most needed frees up time for grader operators to do better work on the worst sections of road.
- **Increase flexibility** — Graders become available to do other work.
- **Improve roads** — Analyzing *Opti-Grade*'s data lets you identify and correct road design problems, further reducing the amount of grading required.

FPInnovations

Impacts



1) Reduced # graders from 3 to 2 (33% saving)
2) Increased range from 20-30km/day to 35-45km/day (25% saving)
3) Identified problem road section for rehab

Near full market uptake

FERIC “Star Truck”

- R&D “Inventory”
- Lots of missed opportunity
- “Ya but it won’t work here”
- “What has my R&D investment given me”

Objectives:

- optimize vehicle specifications
- increase vehicle payload
- improve vehicle efficiency and mechanical availability
- decrease vehicle emissions per unit of product transported

The process

Step 1: Establishing the current situation

The company's log haul operation is examined to establish the types of vehicles currently in use, the products hauled and the road network travelled (i.e., the combination of forest road, gravel road and highway travel).

Step 2: Identifying the potential for cost-savings

for each proposed component of the truck. Opportunities for improvement are identified, with no initial limitations based on cost or technology. This is followed by a comprehensive cost-benefit analysis of each proposed improvement to determine its technical and financial feasibility.

Step 3: Specifying the Star Truck

The fuel economy, vehicle efficiency, financial and safety benefits of various equipment and technologies are evaluated, taking into account the truck owner's needs and operational constraints. Final decision are made on all elements of the rig – from the tires and suspension to the trailer configuration, engine size and cab design – leading to an optimally spec'ed truck for the task and operating conditions.

Step 4: Implementing the technology

A truck is purchased and equipped according to the spec's identified in Step 3. This is done in close cooperation with the vehicle owner and his or her automotive technician. FERIC ensures that all parties involved in the implementation stage of the project are well-informed and properly trained to operate and/or maintain the chosen technologies.

Step 5: Tracking the vehicle's performance

Once in operation, the Star Truck is closely monitored for two years. Over the same period, the performance of a "control" truck, selected to represent the fleet average, is also monitored. This enables the project team to identify and substantiate any differences in performance between the two vehicles. Weekly reports are produced to inform the contractor and the forest company about the performance and operating costs of both vehicles. This helps maintain contractor enthusiasm throughout the project and enables FERIC to react quickly when sub-optimal performances are identified.

FPInnovations

Equipment	Star Truck	Equipment	Control Truck
Basic Tractor	$125,000	Basic Tractor	$120,000
Aluminum cab protector		Steel cab protector	$1,700
Aluminum bumper		Steel chrome bumper	$900
Single frame		Double frame	$4,100
On-board weigh scale	$6,500	On-board weigh scale	
CTI*	$12,000	CTI	
Cab auxiliary heater	$2,000	Cab auxiliary heater	
Lightweight multi-product semi-log trailer	$58,500	Multi-product semi-log trailer	$48,000
Severe-service rims	$12,500	Steel rims	$2,500
Total cost	$220,500	Total cost	$177,200
Cost differential for Star Truck	**$43,300**		

FPInnovations

Results based on 1st year

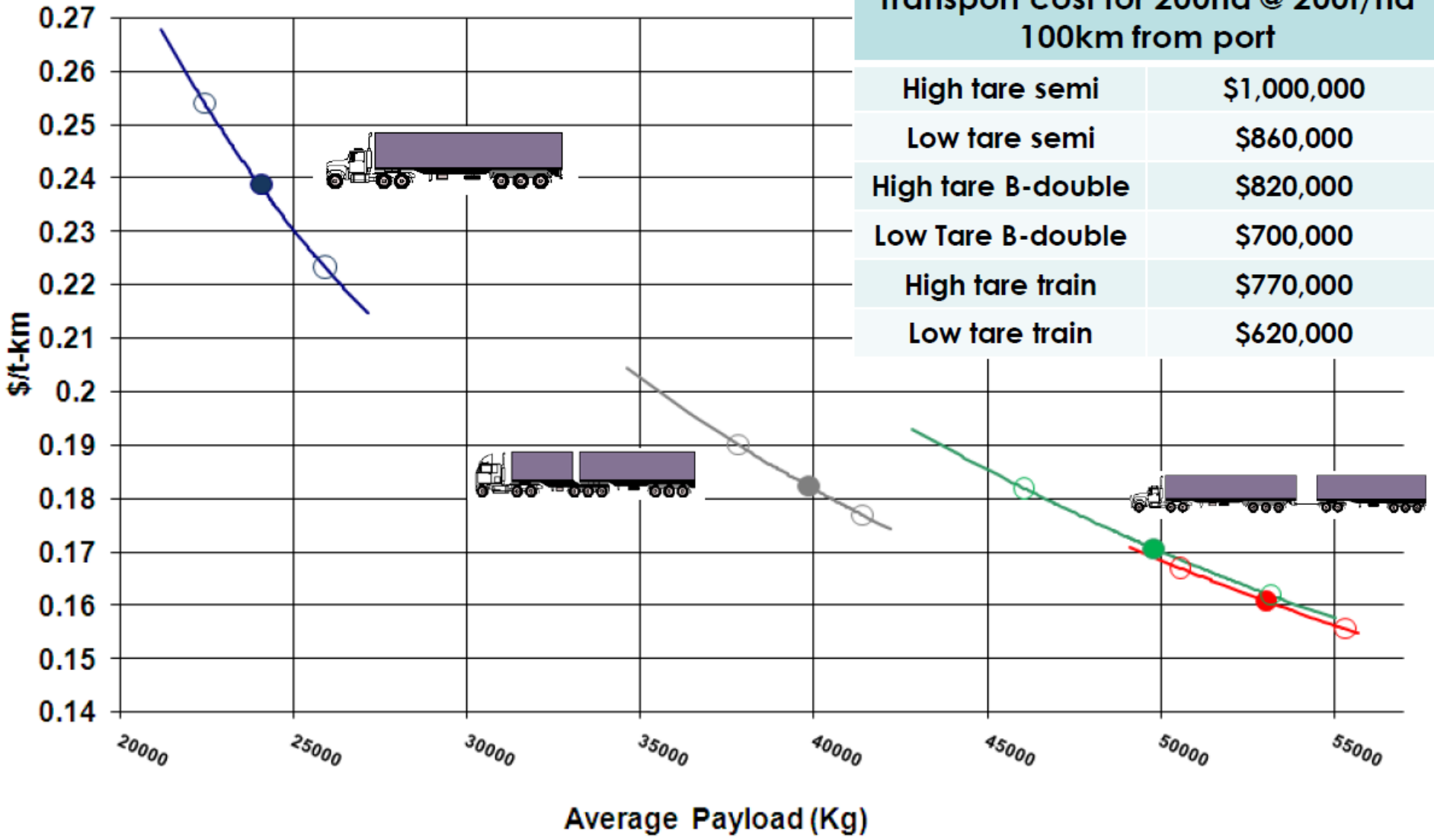
- Weight reduction - 3.2 t
- Additional cost - $40 000
- Additional payload - Around 3 t
- Net fuel savings - $0.26/t hauled
- Additional income- $20 000/year
- Payback period - 2 years
- **Additional income (over the 5-year life of the vehicle) - $60 000**

Then the real innovation kicked in…

	Star Truck	Control Truck
No. of loads transported	445	459
Average payload per trip	35 754 kg	36 187 kg
Average fuel consumed per trip†	220.5 L	207.5 L
Product transported per litre of fuel	162.1 kg	174.4 kg
Average fuel cost per tonne of wood transported*	$3.70/t	$3.44/t

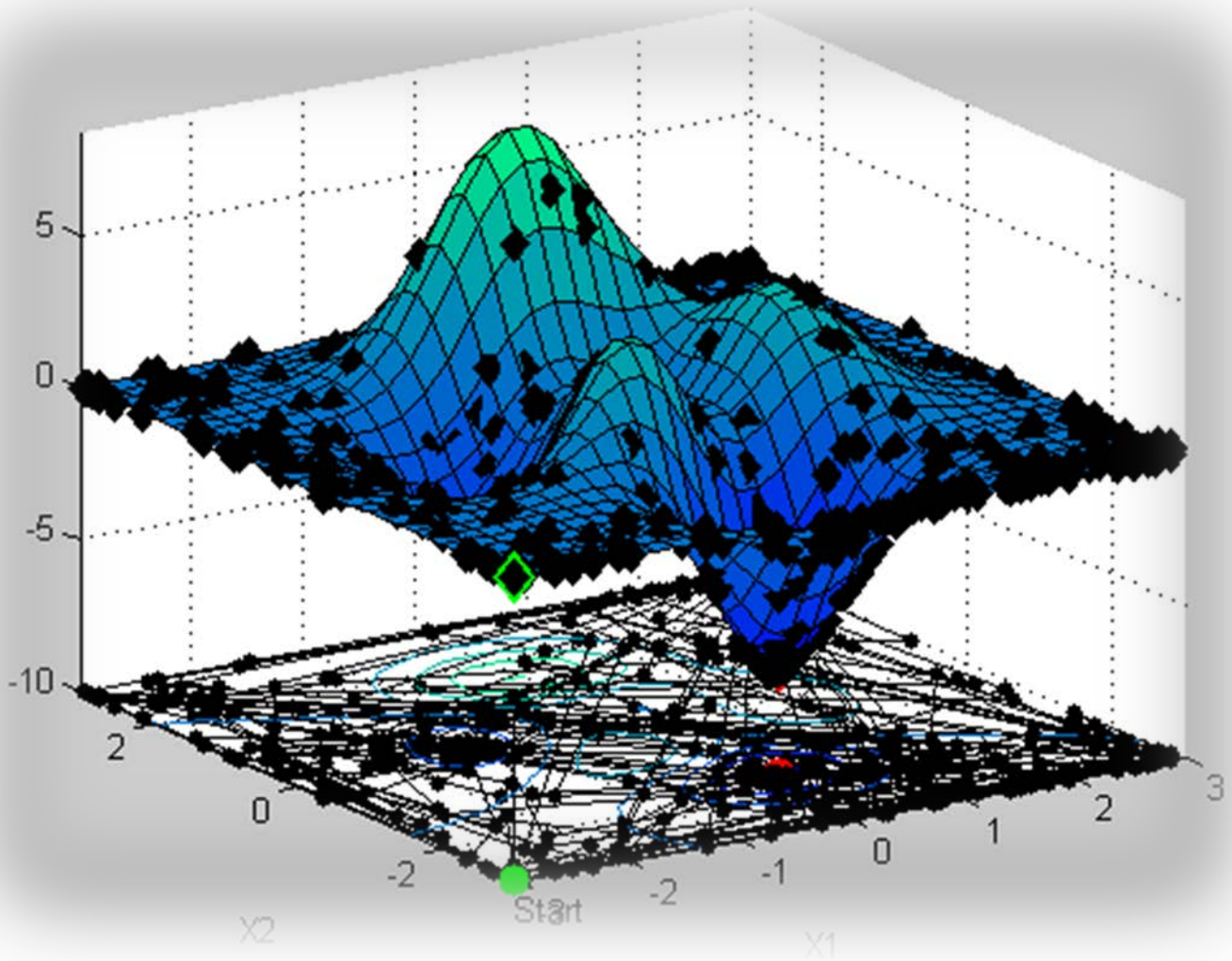
	Scenarios		
	Complete Fleet With Year 1 Control Trucks	Conversion of the Complete Fleet to Star Trucks	Conversion of the Complete Fleet to Improved Control Trucks
Annual fleet payload	130 000 t	130 000 t	130 000 t
Annual fuel consumed	767 720 L	797 640 L	706 672 L
Product transported per litre of fuel	169.3 kg	179.0 kg	205.4 kg
Fuel saved		45 670.0 L	58 048 L
GHG emissions saved		123.3 t	156.7 t

Transport cost for 200ha @ 200t/ha 100km from port	
High tare semi	$1,000,000
Low tare semi	$860,000
High tare B-double	$820,000
Low Tare B-double	$700,000
High tare train	$770,000
Low tare train	$620,000



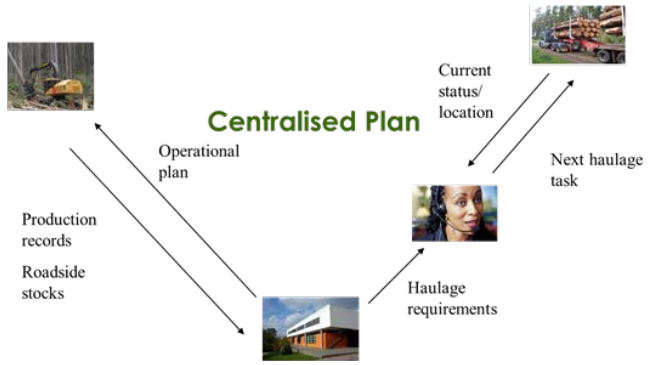
Optimised transport planning: Fast Truck

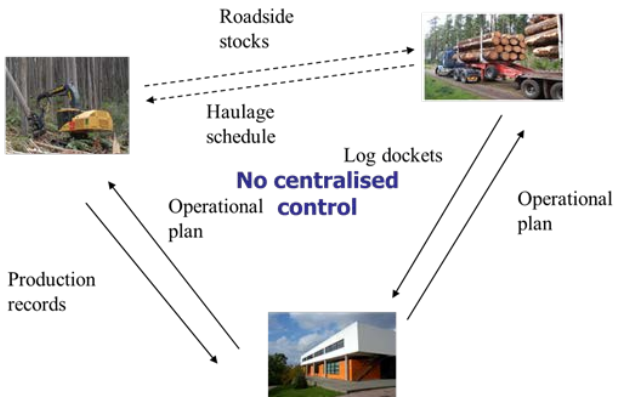
Using Heuristic theory generates optimal truck schedule to meet delivery demands; minimise costs



Sounds easy enough…

- Organisational change
- Lack of reliable inputs
- Intuition vs. data
- Who owns the process (shared benefits)
- Information sharing
- New task/effort





Fast Truck: collaboration in its infancy

"Sometimes I think the collaborative process would work better without you."

Exploring new contract definition

- Collected info on current
- Compared to centralised & optimised plan
- Reduced cost ~10% or about $3million/yr
- New knowledge influenced contract

	Current fleet	Optimised fleet
Location A	30	25
Location B	44	44
Location C	49	34
Location D	21	19

A little closer collaboration

With forest grower

- A year working one-on-one with managers
  - Base lined operations
  - Weekly comparison
  - Explored implementation
  - Identified foundation changes

With dispatcher

- A year working one-on-one with managers
  - Supporting real time
  - Data vs. intuition
  - Fixed vs. fluid
  - Generate optimal start point

- Identified increase information needs to drive a system
- Identified changes for Fast Truck to better match real needs

KPIs	Base Case	FastTruck Simulation	% Difference
Total Expenditure ($)	484 914	472 506	-2.6%
Total Deliveries (GMt)	31 917	32 091	0.5%
Average Trucks Used Daily	18.4	16.0	-13.3%
Average Daily Fleet Cost ($)	26 940	26 250	-2.6%
Average Daily Deliveries (GMt)	1 773	1 783	0.5%
Transport Unit Cost ($/GMt)	15.19	14.72	-3.1%
Average Lead Distance (kms)	103	100	-2.9%
Average Truck Utilisation (%)	78.4%	90.7%	15.7%
Total Distance Travelled (kms)	144 588	167 015	15.5%
Loaded Distance Travelled (kms)	69 011	79 353	15.0%
Average Fleet Loaded Running (%)	47.7%	47.5%	-0.2%
Average Daily Truck Revenue ($)	1 444	1 641	10.1%

Collaboration → Successful innovation

- Optigrade
  - Industry & research from birth of the idea
  - Wasn't success on day one
  - Became the solution of choice
- Star Truck
  - Hard but respectful collaboration to start
  - Early success lead to sector wide impact
  - Repeatable & opportunity exists in Australia

Fast Truck

- Still early but...
  - Now on a similar path to Optigrade but at a critical point
    - Can we persevere across the valley
  - Has similar challenge as Star Truck with many stakeholders needing to gain
    - Can business models and thinking shift enough

Need collaboration

"If it's any consolation, our lack of business innovation will be the subject of analysis in some of the finest M.B.A. programs in the country."

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