RMIT BUSM2615 Open Innovation

The Vehicle Challenge

Facilitator brief and run sheet

Do not show this document to students

It contains the bag contents, the technology allocation, the lead users' hidden insights, and the reason the supplier cannot sell a radar. Everything students need is in the student deck and on their own role card.

This is the Tidd & Bessant new product development game with three open innovation mechanics added: asymmetric resources, ecosystem access, and a mid-game disruption. The original structure is untouched — same materials, same price list, same design/production split, same handling rules.

Item	Detail
Duration	About 100 minutes — 10 setup, 47 play, 15 judging, 25 debrief
Class size	16–35. Three teams at 25+, two teams below
You play	The customer, the regulator, and the clock. Nothing else.
Your materials	Student deck (projected), role cards (printed), this document
Never say	That collaboration is allowed, encouraged, or rewarded

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1. About the game

The Vehicle Challenge is an adaptation of the new product development game devised by Joe Tidd and John Bessant, in which competing teams design a self-propelled vehicle under a budget and a clock, then hand the design to a separate production team who have never seen it. The original is a study of the boundary inside the firm: design and production fail to talk, the customer is misread, and the product arrives late and wrong. It works because it is rigged to fail in instructive ways.

This version keeps that structure intact and adds a second boundary — the one between the firm and everyone outside it. Teams can no longer succeed on their own resources, a mandatory requirement arrives mid-session that most of them cannot meet internally, and the room contains suppliers, users and rivals who hold what they lack. The original traps still fire. The new ones sit on top.

The design principle behind every change

Openness is never instructed, encouraged or rewarded in words. It has to become the obviously better move because of how the resources are distributed. Students who open up will do it because they are short of something, which is why firms do it, and the debrief can then ask them why they assumed otherwise for the first ten minutes.

What this version adds to the original

Original	This version	Why
Identical bags for every team	Asymmetric, sealed bags	Creates resource dependence, so trade has a point
Fixed requirements throughout	A mandatory requirement lands at minute ten	Forces a sourcing decision under time pressure
Supplier sells materials	Supplier, lead users and rival firms all hold something	Turns one counter into an ecosystem
Technologies are used or not used	Technologies can be licensed, sold or traded	Brings in the outbound half of open innovation
Handling rules are a nuisance	Handling rules attach to acquired modules	Makes integration cost real, so more search is not always better
Winner on product and profit	Same, plus a spoken account of how they got what they needed	Exposes the gap between the story and the ledger

Learning outcomes

By the end of the session students should be able to do the following. The middle column is what produces the learning; the right-hand column is the evidence you can point at in the debrief.

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Outcome	What produces it	Evidence in the room
Explain why firms cross their own boundaries to innovate	Bags that cannot build a competitive vehicle alone	Teams leaving the table, and what they went for
Distinguish inbound from outbound open innovation	Licensing in to meet the regulation; selling an unused module	The ledger — money paid out, and money earned
Judge how much external search is worth doing	A clock that never stops while they search	Minutes away from the table against distance and net position
Explain why acquired knowledge is not free to use	Handling rules attached to every acquired module	Which teams finished the build, and how many modules they carried
Weigh what to share, sell, or protect	A rival holding the one thing they need	The knowledge decision log, refusals included
Recognise internal resistance to external ideas	Ten closed minutes long enough to fall in love with a design	Observer notes on ideas argued down for coming from outside
Elicit a requirement a user will not volunteer	Lead users who answer only what they are asked	Which teams found the hidden need, and what they asked
Collaborate across functions and organisational boundaries	Distinct marketing, R&D, design and production roles, plus access to rival firms and ecosystem actors	Who crossed each boundary, what knowledge moved, and where functional priorities conflicted
Communicate knowledge effectively through a design-to-production handover	A five-minute verbal-only handover to a production team that has not seen the design	Differences between the intended design, what production understood, and the vehicle ultimately built
Adapt strategy to an unexpected regulatory and market disruption	Collision avoidance becomes mandatory while new external sourcing and user-research options open	How quickly teams reframe the problem, compare routes and revise their design, sourcing and budget decisions

Concepts, and the exact moment each one lands

Every concept below is experienced before it is named. Hold the terminology until the mapping slide in the debrief — the point is that students supply the label for something they have already done.

Concept	Where it happens in the game	Key reference
Closed vs open innovation	The first ten minutes, when nobody thinks to leave the table	Chesbrough (2003); Chesbrough & Bogers (2014)
Four modes of openness: acquiring, sourcing, selling, revealing	Buying the sensor, questioning a user, licensing out a spare radar, telling a rival something for free	Dahlander & Gann (2010)
Search breadth and the inverted U	Time spent walking is time not spent designing	Laursen & Salter (2006)
Absorptive capacity	A module arrives, and production cannot assemble it in time	Cohen & Levinthal (1990); Zahra & George (2002)

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Concept	Where it happens in the game	Key reference
Lead-user innovation	The courier's real requirement, released only on a second question	von Hippel (1986, 2005)
Not-invented-here	An outside idea argued down because of where it came from	Katz & Allen (1982)
Appropriability and complementary assets	Team B deciding what a spare radar is worth, and to whom	Teece (1986)
Co-opetition	The best deal available is with the firm you are trying to beat	Brandenburger & Nalebuff (1996); Bengtsson & Kock (2000)
Resource dependence	A bag that cannot produce a competitive vehicle	Pfeffer & Salancik (1978)
Boundary spanning	Marketing and R&D carrying knowledge across the edge of the firm	Tushman (1977)
Innovation intermediaries	The broker charging $100 for an introduction	Howells (2006)
Innovation ecosystems	The room as a whole — rivals, supplier, users, broker	Adner (2006, 2017)
Cross-functional and design–manufacturing integration	Marketing, R&D and design make interdependent choices, then brief a production team that has never seen the design	Tidd & Bessant, the original game

Check these against your own reading list before you hand them out — they are the standard sources for each concept, not necessarily the ones set for this unit.

Skills practised

Alongside the concepts, the session gives students an hour of practice in things that are hard to teach from a slide.

- Collaborating across marketing, R&D, design and production while working to defined roles and competing priorities.
- Communicating knowledge effectively during a challenging verbal design-to-production handover, and discovering what was understood rather than merely what was said.
- Negotiating with a competitor under time pressure, with no script and something real at stake.
- Making an external sourcing decision — build it, buy it, license it, or invent around it — using incomplete information.
- Deciding what knowledge or technology to share, sell, license or protect, and recording the reasoning behind that choice.
- Questioning lead users to uncover needs that are not immediately visible and will not be volunteered without effective follow-up.
- Responding to an unexpected regulatory shock and changed market conditions by revising the design, sourcing route and budget in real time.
- Managing resource dependencies, a budget and a clock at once, while recognising the integration costs attached to external knowledge and technology.
- Experiencing co-opetition, boundary spanning and absorptive capacity as practical challenges rather than abstract concepts.

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- Reflecting on team behaviour against observer notes, movement data, decision logs and the financial ledger rather than memory alone.

The skill the debrief is really testing

Each team gives a ninety-second account of how it got what it needed, and you hold the ledger and the movement log while they do. The distance between the account and the record is the most valuable thing produced all session, and it is the same distance that exists between most firms' innovation narratives and their actual behaviour.

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2. What the three mechanics do

Asymmetric resources

Each team gets a different sealed bag and a different set of R&D technologies, and cannot see what rivals hold. No team can build a competitive vehicle alone. This is what makes the open phase a search rather than a swap meet — teams have to find out who has what before they can trade for it.

Ecosystem access

From the Ecosystem Update onward, teams may approach rival teams, the supplier, and the lead user station. Talking is free. The cost is the clock, which never stops. Do not add a consultation fee: the time cost is already real, and a second currency only adds bookkeeping.

Mid-game disruption

Ten minutes in, collision avoidance becomes mandatory. Three routes satisfy it and they are deliberately unequal, so the cheapest and best route runs through a direct competitor. Nobody is forced to collaborate and nobody is locked out.

The mechanic that makes over-openness fail

The handling rules already in the Production brief now attach to acquired technology modules. Red needs two people at all times, green needs tweezers, blue needs two minutes of cooling, white needs gloves. Every module a team brings in from outside adds a physical constraint to a fifteen-minute build.

One module is manageable. Four ties up both production workers, imposes a cooling delay and requires tweezers — the team cannot physically finish.

> **Do not explain this to the design teams**
>
> It appears on the Production card and nowhere else, and Production is out of the room. A design team that walks over and asks will find it. Almost none do. That gap is absorptive capacity, and the class watches it happen instead of hearing about it afterwards.

Roles

Role	16–24 students	25–35 students	Notes
Design teams	2 × 5–6	3 × 5–6	PM, marketing, R&D, designers
Production	2 per team	2 per team	Out of the room until handover
Supplier	1–2	2	One desk, serves everyone
Lead users	2	3	Separate station, seated apart
Process observer	1 per team	1 per team	Watches behaviour and movement
Ledger keeper	1	1	The bank. Not you.
Broker	—	1 (optional)	Only worth staffing at three teams

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3. Before class

Bags — use opaque bags, never label the contents

Team	Contents	Deliberately missing
A — Volta Mobility	3 balloons, 8 straws, 6 small paper plates, 2 large paper plates, 1 Blu Tack, 8 paper clips, 1 pencil	Rubber bands, scissors, tape, paper cups, sticks
B — Kestrel Motors	10 rubber bands, 6 sticks, 4 paper cups, 1 sticky tape, 4 small paper plates, 2 pens	Balloons, straws, scissors, large paper plates, Blu Tack
C — Meridian Vehicles	1 scissors, 8 large paper plates, 3 clothes pegs, 4 sticks, 1 Blu Tack, 1 sticky tape, 3 rubber bands	Balloons, straws, paper cups, paper clips, propulsion

The logic: A has the only balloons but nothing to cut with. B has the only paper cups and plenty of elastic propulsion but no straws for axles. C has the only scissors and plenty of large plates for structure, but almost no propulsion. Every team needs at least one other team.

Technology allocation

Team	R&D holds	Handling rule in production
A — Volta	Entertainment (red) × 1, comms (white) × 1	Two people at all times; gloves
B — Kestrel	Collision avoidance radar (blue) × 2	Two minutes cooling before assembly
C — Meridian	Advanced safety (green) × 1, comms (white) × 1	Tweezers; gloves

List prices, for when a team asks you: entertainment (red) $100, comms and office (white) $250, advanced safety (green) $500, collision avoidance radar (blue) $500, aftermarket proximity sensor (red) $800.

Team B holds exactly two radar units and needs one

When the regulation lands, two rivals will be chasing one spare unit. That auction is the best scene in the session — protect it by getting the count exactly right. Do not hand out a third.

Two-team version: use bags A and B only, move the scissors to the supplier at full price, and give B a single radar plus advanced safety.

4. On the day

Set-up checklist

Sort the role cards by colour before students arrive. Rust is Production, and it must leave the room unread by anyone else. That is the one distribution mistake that breaks the session.

- Three opaque bags, contents as above, unlabelled
- Coloured dot stickers: red, green, blue, white
- Gloves, goggles or sunglasses, tweezers — for production only
- Supplier price list, and a supplier desk away from the design tables
- A user research corner, seated apart, with the three lead user cards (alternatively, you can play the role of user/customer)
- Printed role cards, one per person, sorted by colour — plus one price list card per team
- The student deck open at slide 1, with slides 9 and 10 not yet visible

Materials, money and timing

This is the part that most often drifts in the room, so it is worth being exact. Three separate pools of stuff exist, and they become available at different moments.

Pool	Available	Rules
The team bag	Issued at setup	Asymmetric and sealed. Free to take, but every item used in prototyping is charged at full list price. At handover the PM declares the total to the ledger keeper and returns the bag to the supplier.
The supplier desk	From the Ecosystem Update, and all through the build	Full price list, plus the aftermarket proximity sensor. Every purchase carries a lead time of one to five minutes, and the clock does not stop for it.
Other teams	From the Ecosystem Update	Anything they hold — materials or technologies. Instant, no lead time, price negotiated. Logged on a licence form, both sides recorded.

Production is issued nothing

This differs from the original game, where production had a duplicate bag. Here they hold no materials at all and buy every part of the finished vehicle from the supplier during the build. Do not put bags on the production tables out of habit — it removes the lead-time pressure that makes the build phase bite.

The bags go back at handover

Collect all three at the supplier desk as production returns. If a team can simply slide its leftover materials across the table, production buys nothing, the lead times never bite, and the build phase loses its teeth. Returning the bags also restocks the supplier for the build, so it costs you nothing to enforce.

The two-charge rule

Prototype materials and production materials are charged separately. A team that prototypes a full vehicle and then builds it pays twice. That is deliberate, and it comes straight from the original game.

How technology modules are paid for

Three routes, three different charges. Keep this straight or the ledger will not close.

- A team's own R&D module: charged to their budget at list price when it goes into the production model. They do not buy it from the supplier.
- A module licensed from a rival: the negotiated fee, paid to that team and recorded on both sides. No list-price charge on top.
- A module bought from the supplier: the supplier's price, plus the lead time.

This is why the supplier cannot stock the radar. If they could, Team B's own units would be worthless and the licensing negotiation would never happen. Issue the blue dots to Team B's R&D only, and give the supplier no blue dots at all.

Who physically holds the dot stickers

- R&D members: their own allocation, issued at setup (A: red and white; B: two blue; C: green and white).
- Supplier: a stock of red, green and white dots to sell. No blue.
- You: a few spares, in case a team invents around the regulation and you accept it.

Run sheet

Slide numbers refer to the student deck.

Clock	Slide	Phase	What you do
0:00–0:10	1–7	Setup	Allocate roles and hand out cards by colour. Send Production out of the room with their card and no explanation. Hand each team its sealed bag. Supplier sets up; lead users take their station and stay quiet. Walk the deck to slide 7.
0:10–0:20	8	Design sprint	Teams work internally. No external contact. Be available as the customer if marketing approaches you, but volunteer nothing.

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Clock	Slide	Phase	What you do
0:20	9	Ecosystem update	Stop the room. Show slide 9 and read it out. Then stop talking.
0:22–0:37	10	Open phase	Teams may move. Watch who leaves and who stays. Refuse to advise. Answer certification questions with “that will be judged at the test”.
0:37–0:42	11	Handover	Production returns. Five minutes, verbal only. Police the no-written-notes rule — it will be tested. Supplier collects all three bags; PMs declare prototype spend.
0:42–0:57	12	Build	Production builds and buys. Design may not touch the vehicle. Overruns at $250 a minute.
0:57–1:12	13	Test and judging	Certification, distance, customer fit, ledger close, ninety-second statements.
1:12–1:37	14–23	Debrief	Observers first, then the mapping slide, then the concept reveal.

At 0:20 — read this out

> “Two updates. First, regulatory: collision avoidance is now mandatory. No vehicle will be certified without it, and an uncertified vehicle cannot be sold at any price. Second, market: the supplier desk and the user research station are now open, and there are no restrictions on who any of you may speak to. You have fifteen minutes.”

Then stop talking. Do not say “you may collaborate with other teams”. “No restrictions on who you may speak to” is the whole permission, and the teams who work out what it means are the teams who have earned the insight. If asked directly whether they can talk to a rival, say yes, flatly, and walk away.

The three routes out of the regulation

Route	Cost	Catch
License a radar from Team B	Negotiated	Best option. Requires walking up to a competitor and asking. Only one spare unit exists.
Buy the aftermarket sensor	$800, 5 min lead	Red-dot item — ties up both production workers for the whole build.
Invent around it	Free	Must be a visible forward-facing feature. You judge it at the test, and you keep the standard vague.

> **If Team B refuses to license, that is a good outcome — protect it**

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Do not lean on them. The substitute and the invent-around keep the refused team playing, so nobody dies. Then in the debrief you get the best question in the session: Team B, you refused, and it cost you a licensing fee you could have banked. Was that a strategy or a reflex?

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5. What each card hides

Every card carries a hidden-information meter in its top right corner — four dots, filled to show how much the holder knows that nobody else does. This is what is behind each one.

Card	Dots	The hidden part
Production	4	The handling rules. Every acquired module slows the build. Design teams are never told, and Production is instructed not to volunteer it.
Lead users	4	Each persona has a surface line for anyone and a real insight released only under specific questioning. Brief these three properly or the station fails.
Innovation broker	4	The complete ecosystem map — who holds which technology. Charges $100 for an introduction.
R&D (all three)	3	What they hold, and the fact that they have no idea whether it is unique to them.
Supplier	3	Cannot obtain a radar at any price, and must not say who does have one.
Marketing	2	That the customer answers but never volunteers.
Process observer	2	That the movement log is the centrepiece of the debrief.
Ledger keeper	1	That the ledger is read out in the debrief, refusals and all.
Project manager	1	The knowledge decision log will be collected.
Designers	0	Nothing. They are the control group.
Price list	0	Nothing hidden. Prices and lead times, one copy per team, held by the PM.

Your hidden customer/user preferences

Reveal these only under questioning, one answer per question asked:

- You are a parent of two young children.
- You want four wheels, because three feels unstable.
- Your favourite colour is blue.
- You want something that keeps the children occupied on long drives.

Marketing has to ask. If nobody asks, say nothing, and score them accordingly.

The lead users — brief them before class (you can skip lead users roles and have you as main customer)

The whole station fails if the three players are helpful rather than literal. Give them their cards early and make sure they understand: answer only what is asked, give the surface line to anything vague, and release the real insight only on a specific second question.

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Persona	Surface line	What the real insight changes
Mara	Wants it to be quick.	Single-use balloon or hand-wound elastic fails her outright. A flat load surface is a real requirement.
Dev	Wants it safe.	Entertainment becomes part of the safety case. The red-dot module is suddenly worth paying for.
Priya	Wants it comfortable.	Narrow wheelbases and three-wheel layouts are a genuine risk. Ground clearance competes with speed.

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6. Judging

Certification is a gate, not a score. An uncertified vehicle is worth nothing regardless of how far it travels. Among certified vehicles, rank on net financial position, with customer fit as a qualifier.

- Certification — mandatory collision avoidance present and accepted, no obvious safety hazard.
- Distance — one push, then unaided, measured to the nearest ten centimetres.
- Customer fit — your hidden preferences, one point each out of five, plus one for anything showing they actually asked you rather than guessed.
- Net position — $10,000, less materials, less overruns (design $50 a minute, production $250 a minute), plus any licensing revenue received.
- Strategy statement — ninety seconds per team. Announce it, publish no criteria for it, and keep the observer log and ledger in your hand while they present.

	A — Volta	B — Kestrel	C — Meridian
Certified? (Y/N)			
Collision avoidance route			
Distance (cm)			
Customer fit (/5)			
Materials spend ($)			
Overruns ($)			
Licensing revenue ($)			
Net position ($)			
Minutes away from table			
Modules in final build			
Build completed? (Y/N)			

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7. Running the debrief

Slides 14 to 23. Run the observers first and let the data land before any concept is named.

Evidence to capture during play

- Which functions surface, translate or suppress customer, technical and production knowledge.
- The teams' first response to the regulatory announcement and how their plans change during the next five minutes.
- Who crosses a team boundary, whom they approach, what they ask and how long they remain away from the table.
- Offers, deals and refusals involving materials, technology or knowledge, including the reason recorded for each decision.
- Information omitted, distorted or misunderstood during the verbal handover.
- The number of external modules acquired compared with whether production completes the build.

Order of play

1. Movement logs. Read out total minutes away from the table, per team.
2. Ledger. Any money that moved between teams, and any deal that was refused.
3. Decision logs. Read a refusal out loud, including the reason the team wrote down.
4. Slide 16 — the original traps. Ask who visited production.
5. Slide 17 — the traps you added. Now they can see the design.
6. Slide 18 — group discussion, ten minutes.
7. Slides 19 to 22 — the mapping, the four modes, the curve, the stages.
8. Slide 23 — the four takeaways and the closing question.

The two numbers to put side by side

Minutes away from the table, and build completed. Write both on the board for every team. If the team that searched hardest is also the team that did not finish, the class has produced its own evidence that openness has an optimum — and you never have to argue for it.

The closing question

"For the first ten minutes, nobody told you that you had to solve this alone. Why did you all assume it?"

Questions that reliably open things up

- Where was the knowledge you needed? Inside or outside your own team?
- Why did you open up? Not because it was encouraged — because you lacked something.
- Team B, you had a spare radar. Did you sell it? Was refusing a strategy or a reflex?
- Who visited production before the handover, and what did the rest of you not find out?

- Which team told the best story about its strategy, and does the ledger support it?
- Where did collaboration break down between marketing, R&D, design and production, and what would have prevented it?
- What knowledge did your team possess but fail to transfer across a functional or organisational boundary?
- How did the regulatory announcement change your priorities, and what did you stop, start or redesign?
- Which external input created value, and which one created more integration burden than benefit?

If it goes wrong

Problem	What to do
Nobody leaves their table in the open phase	Say nothing for five minutes. If it holds, remind the room only that the supplier desk is open. Never mention rivals. A closed run is a valid outcome and a very good debrief.
A team stalls on the regulation	Point them at the supplier. Do not mention Team B. The substitute exists precisely so nobody is stuck.
The room runs long	Cut the build to ten minutes rather than the debrief. The debrief is the lesson; the build is the evidence.
A lead user gives away the insight early	Let it stand. Note who got it and when, and use it in the debrief as a comparison with the teams who never asked.
Only two teams	Drop the broker, use bags A and B, give B a single radar. Everything else runs unchanged.

One last thing

If a team asks you directly whether they are allowed to talk to another team, say yes, plainly, and walk away. Do not elaborate, do not encourage, and do not look pleased. The moment it sounds like the right answer, it stops being their discovery.

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