EPBM | BATCH 32 | IIM CALCUTTA DIGITAL TRANSFORMATION | MASTER NOTES

Digital Transformation

MASTER NOTES - the complete module, in plain English

What this document is. Three weekends of the Digital Transformation module, rewritten as one continuous set of notes. Nothing that was taught has been left out, and nothing has been left in that does not help you understand the subject. **It assumes you know nothing about the topic.** Every term is explained in ordinary words the first time it appears, and every idea gets an everyday example - a shop, a bank, a kitchen, a car - before any framework is put on top of it. **It is also built for the exam.** Each of the three parts ends with practice questions, and the full answer key at the back explains why each answer is right, not just which one it is. Read the parts in order. Part 2 will not make sense without Part 1, and Part 3 assumes both.

How this document is put together

PART 1

What digital transformation actually is

- The four rungs: digitisation, digitalisation, enablement, transformation
- Output versus outcome - the master distinction
- The value chain, and what 'value' really means
- The two levers: cost leader or differentiator
- ITOT, PT, BT, DT - four names, one map

PART 2

How you prove it worked

- The five building blocks of a data-driven organisation
- Three qualities: data, service, system
- The IS Success Model - the circuit that must not break
- Adoption is not usage
- Readiness diagnosis before you spend a rupee

PART 3

Which path, and what it runs on

- Value re-creation and value co-creation
- The need tree: outward opportunity or inward deficiency
- The five ingredients of a transformation
- Grassroots, big bang, and the hybrid
- Data products, and data governance

Read them in order. Part 2 makes no sense without Part 1, and Part 3 assumes both.
Each part ends with its own practice questions. The full answer key with explanations is at the very back.

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0 How to Read This Document

Five kinds of coloured box appear throughout. They are not decoration - each one is doing a different job, and knowing which is which will save you time when you are revising the night before.

Key insight	The load-bearing idea of that section. If you remember one thing, remember this.
Exam tip	A distinction or phrasing that examiners reward. Learn the wording, not just the idea.
Concept trap	A place where people confidently give the wrong answer. Read these twice.
In plain words	An everyday example - a shop, a kitchen, a car - before any framework arrives.
Quote from class	Something the professor said, kept in his own words because the phrasing is the point.

Tables are for comparisons. Diagrams are for structure. Everything in bold is worth underlining.

A note on the language

Wherever the class used a technical word, it is defined here in ordinary English first. Where an abbreviation appears - ERP, BI, KPI, ETL - it is spelt out the first time. If you hit a term you do not recognise, it will have been explained earlier in the document, because nothing is used before it is introduced.

If you are short of time

Read the section headed **Everything on One Page** near the back first, then work backwards into whichever part you feel least sure about. The practice questions at the end of each part are the fastest way to find out where the gaps actually are.

How to study this material

The professor's own method, stated in class: **read less, think longer**. One paragraph read carefully and turned over in your head for a week beats thirty pages skimmed. The sharpest idea in this whole document - the noun-and-verb test in Section 1.2 - came from him teaching grammar to his daughter, not from a textbook. Treat that as permission to slow down.

Where this module sits

The batch's first campus module was on artificial intelligence. This one picks up the thread and widens it, across three weekends. The three parts below follow those three sittings in order, so reading front to back is the same as sitting through the module again - starting from somebody who has never heard the phrase 'digital transformation', and ending with somebody who could design the data architecture behind one.

> *In the realm of AI enablement and digital journeys, it has less to do with technology and more to do with leadership, people and culture. The biggest bottlenecks come from those three directions - and that is learned in consulting rooms, not classrooms.*

That was the opening claim of the whole module, made in the first session, and it is worth writing down before any framework. Notice what it implies. When a digital programme fails, the software usually worked fine. What failed is that nobody's behaviour changed around it. Hold on to that thought - it is the entire module in one sentence.

PART 1

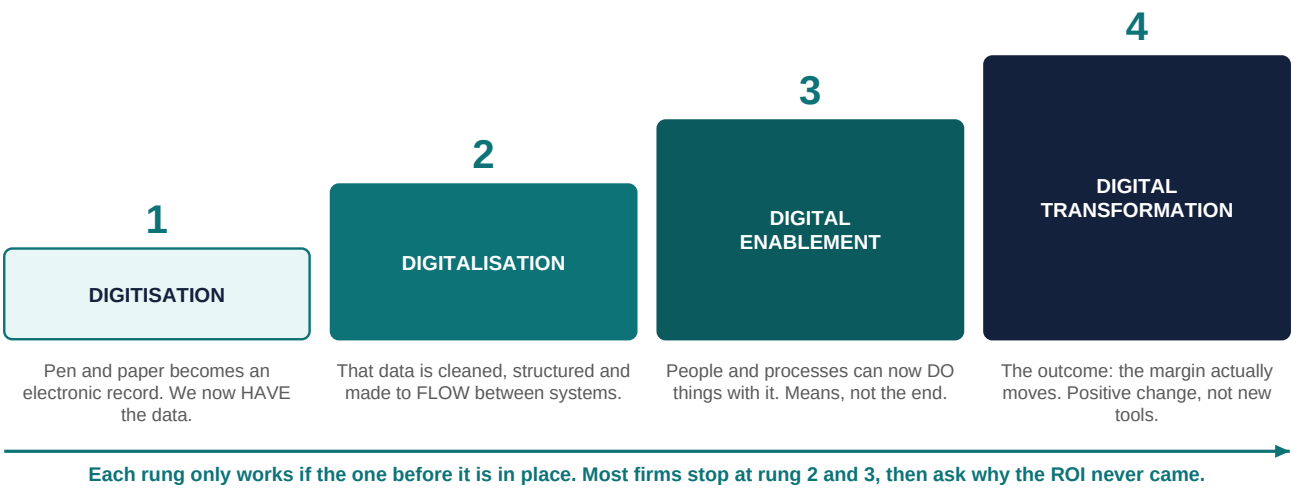
Day One - Getting the Words Right

Five words, one distinction, and where value is actually made

Sit in any technology meeting and you will hear five words used as though they mean the same thing. They do not. This part separates them properly, then does something harder: it shows you where a digital investment has to land inside a business before it can honestly be called value at all. The spine of the whole part is one distinction - an output is what you have bought, an outcome is what now happens differently. Money is spent on the first and judged on the second, and the gap between them is where most transformation programmes quietly die.

1.1 Five Words We Treat as the Same Thing

Five words get used interchangeably in board decks and business requirement documents: **digitisation, digitalisation, digital enablement, digital artefacts** and **digital transformation**. They are not synonyms. They are four rungs of a ladder, plus a bag of tools, and each rung only stands on the one below it.



The ladder. Digital artefacts are the tools sitting on rungs 1 and 2 - the ERP, the dashboard, the cloud account.

Word	The one-line test	A bank, at each rung
Digitisation	Have we replaced paper with an electronic record?	The withdrawal slip and the ledger become a database entry
Digitalisation	Is that data flowing, clean, and usable by other processes?	The ATM, then net banking, then UPI - transactions now process themselves
Digital enablement	Can our people and processes actually DO something with it?	Branch staff trained to act on the risk score the system shows them
Digital transformation	Did the business get measurably better because of all this?	Cost per account falls, new customers arrive, the model changes

The trap that costs money
Because the words blur, firms report rung-one and rung-two achievements and call them transformation. 'We have migrated to cloud' is a rung-two sentence wearing a rung-four costume. When the board later asks where the returns went, everybody is surprised - but the programme was never actually taken up the ladder.

1.2 Noun or Verb: the Oldest Question in the Module

The professor opened the module with a question borrowed from Aristotle, and it sounds far more abstract than it turns out to be. **Is an organisation a thing, or is it a process?** If it is a thing, it is a noun. If it is a process, it is a verb.

Line up what a company owns and what a company does, and the two columns look completely different.

THE NOUN VIEW - what we HAVE	THE VERB VIEW - what we DO
Assembly lines	Dynamic capabilities
IT systems	Agility
Capital expenditure	Planning
The balance sheet	Adoption
People on the payroll	Scaling
ERP, applications, servers	Transitioning, onboarding, storing
Platforms, tools, dashboards	Consolidating, orchestrating, deciding

We do not 'have' digital. We 'do' digital.

Every item on the left can be bought with a purchase order. Not one item on the right can.

This is the oldest question in the module, and it comes from Aristotle: is an organisation a thing, or a process?

The noun view gives you a value proposition on paper. The verb view is where value actually gets created.

Two ways of describing the same company. Only one of them can be bought.

The sentence the professor closed that section with
We do not 'have' digital. We 'do' digital. Everything else in this module - digitisation against digitalisation, output against outcome, enablement against transformation, artefact against value - is that same sentence wearing a different costume.

This is not word-play. It changes what you put on a review slide. A noun list is a list of purchases. A verb list is a list of things that now happen differently. Only one of those is evidence that anything improved.

1.3 Output Versus Outcome

This is the single most useful idea in the module, and it is deceptively simple.

Output and outcome, in one line
A gym membership is an output. A treadmill in the spare room is an output. Losing eight kilograms is the outcome. Nobody has ever got fit by buying equipment - and yet the annual review slide almost always shows the equipment.

The definitions

An **output** is the thing you now have. A system, a report, a licence, a platform. You can point at it and photograph it. An **outcome** is what now happens differently because that thing exists. Faster decisions, lower cost, a customer who stays. You cannot photograph an outcome - you have to measure it.

The class worked one through live. A company replaces its monthly reports with a Power BI dashboard. What is the output and what is the outcome?

- **Output** - the dashboard itself. The platform. The report. The thing that got built.
- **Outcome** - the people who use it get to an insight faster and act on it. A decision that used to take a week is taken in a day.

The correction that examiners like
Somebody in class said the outcome was 'access to data'. The professor pushed back: the outcome is **access to insight**. Data is still an output - it is a thing you hold. Insight is what lets somebody act. The distance between those two words is exactly the distance between a project that pays for itself and one that does not.

OUTPUT - what we "HAVE"		OUTCOME - what we "DO" differently
• INR 20 cr spent on the S/4 HANA migration		• Transaction latency down; closing is seamless
• 200 Power BI licences bought		• A decision that took 2 hours now takes 10 minutes
• 1,000-seat Copilot subscription	THE GAP → where ROI dies	• Working capital cycle actually shortens
• 200 TB of cloud storage provisioned		• Cost leakage falls; top line moves
• Dashboard open 3 hours a day		• Insight is trusted enough to act on without a re-check
Nouns. Things purchased. Easy to count.		*Verbs. Behaviour changed. Hard to fake.*

We evaluate our digital journeys on the left column, then wonder why the right column never showed up.

Both columns come from real board decks. Only one of them is evidence of a transformation.

Two mistakes people make

First, assuming the outcome follows automatically from the output. It does not. Buying the dashboard does not buy the decision. **Second**, assuming every outcome is a good one. A change in behaviour can be a bad change. An outcome is simply the consequence; whether it was worth having is a separate question you answer with numbers.

1.4 Digitisation - Paper Becomes a Record

Go back twenty or thirty years, to any business at all - a footwear shop, a grocery store, a bank, a shipping line. How were transactions recorded? In a register. The shopkeeper wrote down what was sold and at what price, and at the end of the month somebody added it all up by hand.

Here is the part people miss. **The data always existed.** Businesses have never been short of data. The problem was that it was not in electronic form, so it could not scale. To answer one question you had to walk through ten registers. Bank ledgers were long enough that finding a single entry was a morning's work.

So what is digitisation, exactly?

Digitisation is converting records from a physical medium into an electronic one. Gathering and storing. Nothing more. The bank example makes the boundary visible: you stand in a queue, sign a withdrawal slip, the slip goes into a register, and then those registers become database entries. That is digitisation. The work has not changed at all - the same steps happen, on a different medium.

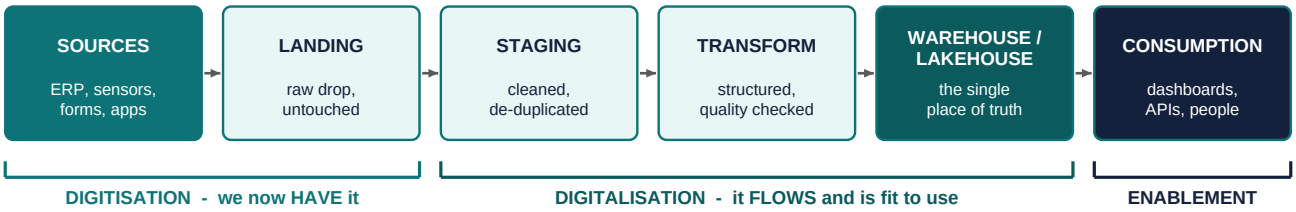
The building and the red register
Two examples from the professor's own campus. There is a building at IIM Calcutta that once held residences and is now stuck in renovation limbo, because it holds books of records nobody wants to touch - an entire building held hostage by paper. And in the same institute, with leave portals and email and a website and a social media presence, faculty payroll was historically kept in a lal kitab, a red register. Modern on the surface, paper underneath. Most large organisations have their own lal kitab somewhere.

Digitisation is not transformation
Scanning twenty years of registers into PDFs is a real achievement and changes nothing about how the business runs. If your programme charter stops here, you have bought storage. Most Indian enterprises finished this rung ten to fifteen years ago - which is why, when somebody says 'we are doing digitisation', the honest follow-up question is: *still?*

1.5 Digitalisation - Making the Data Flow

Now the same bank puts a cash machine outside the branch. Suddenly there is a system that *processes* the transaction rather than merely recording it. Then net banking. Then UPI. You are no longer storing a record of what a clerk did - the system is doing the thing.

Digitalisation is what happens after digitisation: the stored data is cleaned, structured, quality-checked and made to flow between systems and processes, so that it can be used. The class arrived at good words for it - processing, leveraging, equipping, extending. All of them point at the same shift: from holding data to moving and using it.



The professor's glacier: the glacier is your systems, the melt-water is the data flowing, and the clean glass you finally drink is the decision. Most organisations are proud of the glacier. Very few can hand you the glass.

How data actually travels inside a modern firm, mapped back to our vocabulary.

The glacier, the melt and the glass

The glacier is your stack of systems - solid, enormous, impressive, frozen. Having the glacier is digitisation. Digitalisation is the melt: water running down the mountain, filtered and carried in pipes. The final glass of clean drinking water - the decision somebody actually takes - is where value gets consumed. Plenty of organisations are extremely proud of their glacier. Far fewer can hand you the glass.

Two words worth taking to work with you

Data hygiene is whether the data is clean and trustworthy enough to be used at all. **Data liquidity** is how freely it moves between the places that need it. A firm can have enormous data volume and almost no liquidity, and it will feel exactly like a firm with no data.

1.6 Digital Enablement - the Grammar Test

This is the sharpest idea in Part 1, and it came from the professor teaching grammar to his daughter. Nouns are names of things. Verbs are actions. Apply that to a company's technology estate and the confusion clears up immediately.

The noun column - digital artefacts, what we HAVE

List what a typical firm owns: an ERP, several applications, spreadsheets, monthly reports, internet connectivity, servers and cloud, dashboards. All nouns. And like any noun, each has a common form and a proper form.

Common noun (the category)	Proper noun (the brand you actually bought)
ERP - the system that runs transactions	SAP S/4 HANA, Oracle
Dashboard or BI tool	Power BI, Qlik, Tableau
Spreadsheet	.xls, .csv
Cloud	Azure, AWS

The verb column - digital enablement, what we DO

The artefact (noun)	The action it enables (verb)	Who is on the other end
ERP	Transact	Customers and suppliers, connected to the firm
Applications	Onboard	Employees, customers, suppliers, buyers
Spreadsheets	Record, store, analyse	Whoever needs the working number
Monthly reports	Report	Management
Dashboards	Visualise and consume insight	Decision-makers

> **Digital enablement, defined**
> **Digital enablement is equipping people and processes - with the right tools, the right access and the right skills - so that the verbs can actually be performed.** It is not owning the artefact. It is being able to act with it.

Two clean examples from class. Rolling out Copilot training across the workforce is enablement, not procurement. Making sure a UPI QR code is physically present at every counter, including the vegetable vendor's, is enablement - the technology existed long before the enablement did.

What enablement is not

The professor was explicit about the boundaries, and they are worth memorising as a set.

- **Not digitisation.** Digitisation describes what technology has done to industries. Enablement describes what *managers* do with technology.
- **Not IT implementation.** That is a subset - the data and process conditions - not the whole.
- **Not digital transformation.** Transformation describes the destination; enablement describes the work of getting there.
- **Not AI adoption.** Adoption is one outcome on the people lever, not the full picture.

> **If a question asks you to distinguish enablement from transformation**
> Say this: **digital enablement is the means; digital transformation is the end.** Enablement puts people in a position to act differently. Transformation is the positive outcome that shows up in the numbers when they do. You can be fully enabled and still not transformed - and that is precisely where most programmes are stuck.

> *Digital enablement is what managers do so that technology produces impact rather than just activity. Outcomes are aspired to by business leaders; outputs are realised by technology leaders to complement the business teams.*

1.7 How Companies Wrongly Measure Success

Now watch what happens when a company evaluates its own digital journey. Here is the list that appears on the review slide, and every line of it is real, commonplace industry language.

- We have invested INR 20 crore migrating to S/4 HANA.
- We have bought 200 Power BI licences.
- We have an enterprise-wide 1,000-seat subscription to Copilot.
- We have provisioned 200 TB of cloud storage.
- Our dashboard utilisation rate is three hours per user per day.

Ask the question from Section 1.3: are these outputs or outcomes? **Every single one is an output.** They describe what was bought and how much it was used. Not one of them describes anything that got better.

The gap nobody puts on the slide

Push for the outcome and some of it is genuine. S/4 HANA is an in-memory system, so transaction response time improves and delay falls - that is a real, measurable outcome. But then comes the line everybody says: *and our decision-making will be more effective*. Ideally, yes. Practically, watch what actually happens.

> *A spike appears on my dashboard. I do not act on it. I wonder whether the spike is even correct. I email the back-end team. We check back and forth. Two hours later, I take the decision.*

That inertia is the gap. It is a short arrow on a whiteboard and an enormous distance in practice. If the reconciliation happens fast, the decision really is insight-driven. If it does not, you have a beautiful dashboard and a two-hour decision cycle - which is what you had before, with better colours.

The pattern the professor keeps seeing in consulting
Firms with a fully mature BI ecosystem. Twelve crore already spent. And: working capital ratios unchanged, cost leakage unchanged, top line broadly flat across the last eight quarters. The diagnosis is not that the tools are bad. It is that evaluation stopped at the output. People have adopted the system, but it is not integrated into how the work actually gets decided.

> **A ready answer for 'why do digital programmes fail to deliver returns?'**
> Because success is evaluated on outputs - spend, licences, storage, utilisation - rather than on outcomes - cycle time, cost leakage, working capital, revenue. The artefacts get delivered, the verbs never change, and the value is never realised.

1.8 Change Versus Transformation

A smaller question the class argued about, and it needs settling before the four transformations make sense. **Is every change a transformation?**

No. **Change** is any movement away from the current way of working. It can be positive or negative, small or drastic, temporary or lasting. **Transformation** is change that was intended to be positive, and that lasts. The word carries the intent inside it.

The class tested it honestly with a live example. Generative AI has changed how a whole generation works - enormous impact - and arguably it is also taking away some of their original thinking. Is that a transformation?

> **Intent defines it; measurement corrects it**
> When we plan, we plan only for positive change. Later we may discover side effects, and we plug those as we go. But a programme is called a transformation because of the positive outcomes it *intends and pursues*, not because every consequence turned out well. Technology is not automatically transformative - a change with negative consequences and no intended benefit does not earn the word.

And note the last piece of the definition, which links straight back to Section 1.3: a transformation is **judged on outcomes, not outputs**. Positive changes, sustained, measured on what actually got better. Whether the horizon is immediate, medium or long term is a separate design choice.

1.9 The Value Chain - Where Value Is Actually Made

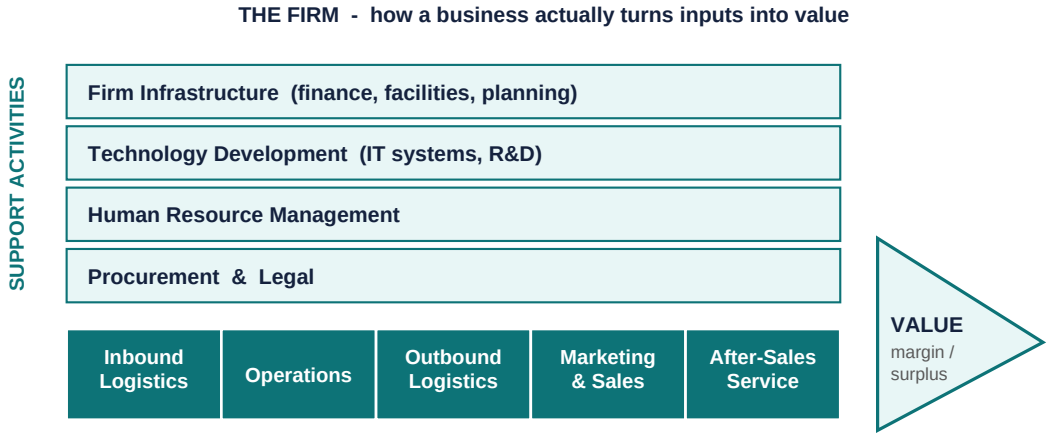
To say whether a digital investment created value, you first have to know where a business creates value at all. So the class built a firm from scratch on the whiteboard.

Picture a company - it makes smartphones, or bottled water, or electrical equipment. Work runs left to right in five steps, and a little value is added at every step.

Primary (core) activity	What happens	Bottled water, as an example
Inbound logistics	Raw material and inputs come in	Sourcing water and packaging
Operations	Inputs are processed and converted	Purification - now it is drinkable
Outbound logistics	The finished output leaves the gate	Warehousing and dispatch
Marketing and sales	It reaches the right customer, at a price	Distribution, brand, shelf placement
After-sales service	The relationship continues after the sale	Complaints, replacements, trade support

None of that happens by itself. Underneath sits a second set of activities - the **support** or secondary activities. They create no value on their own, and nothing runs without them.

Support activity	What sits here
Firm infrastructure	Plant, equipment, machinery, assembly lines, facilities, capital and operating spend, finance, planning. Also scientific technology - a better chemical composition for your product belongs here
Technology development	Information technology. IT systems, research and development, the digital estate. Note the distinction from scientific technology above - this is the IT layer
Human resource management	Everyone from the frontline manager to the C-suite, on payroll or outsourced. Coordination lives here
Procurement and legal	What ties the firm to every stakeholder: offer letters and codes of conduct for employees, bank guarantees from customers, supply contracts with vendors



Porter's value chain. Value = what the customer pays minus what the whole chain costs to run.
Everything a firm does sits in one of these boxes. Digital investments have to land in one of them too.

Porter's value chain. Value = what the customer pays minus what the whole chain costs to run.

Where the diagram shows its age

One place the 1985 picture has aged. Porter drew hard walls between the support verticals. In today's technology landscape those walls have largely dissolved - your ERP is pervasive across the whole firm. A large steel company does not negotiate a separate cloud deal for its cold rolling mills and another for wire products. It buys once, at scale, and every vertical runs inside the same ecosystem.

Why this diagram matters for the paper

Every rupee of digital spend lands in one of these boxes. **Where it lands is what determines whether you have done ITOT, PT, BT or DT** - which is Section 1.14. If you can draw this chain from memory and point to where an initiative sits, you can classify any transformation question you are given.

1.10 What 'Value' Actually Means

Ask a room of executives what value is and you get a dozen answers, all partly right: profit, revenue, goodwill and brand, customer satisfaction, efficiency and productivity, shareholder value. Each is a face of the same thing. Here is the thing itself.

Start with yourself, not the firm

You earn a salary. Suppose you earn INR 100 a month and spend INR 120. Does that work? No. Now suppose you earn INR 1,000 while the world around you earns 100 - and you spend 1,100. You are still failing. **The number is not the point. The gap is the point.**

Value is the delta

For an individual, value is the surplus left after spending. For a firm, that same surplus is called **profit**, and what is kept inside is retained earnings. Everything else people call value - goodwill, customer satisfaction, efficiency, shareholder wealth - is either a driver of that surplus or a consequence of it.

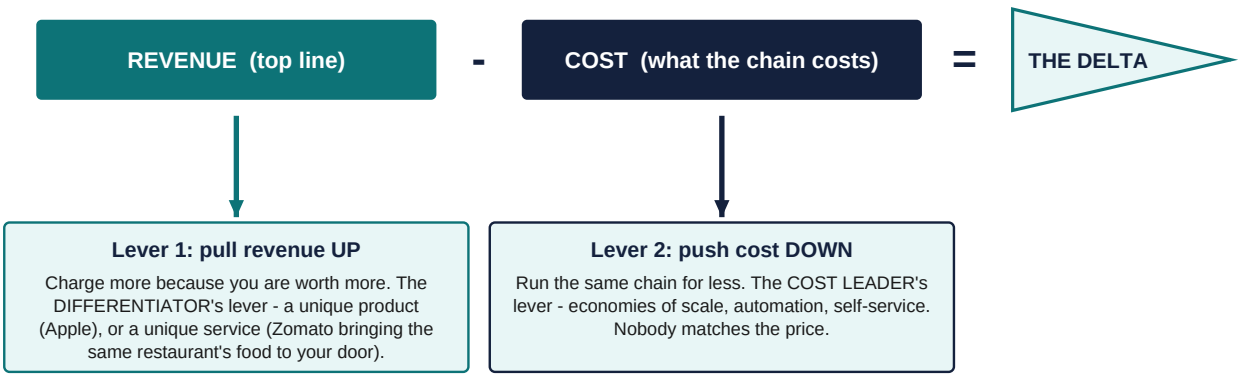
Governments are the exception that proves the rule: they can borrow, issue bonds, and ultimately print. Households and firms cannot. We have to earn our delta. Written down, value looks like this: **Value = Revenue minus Cost** - and seen from the customer's side, value is what they are willing to pay minus what the whole chain costs to run.

What people call value	How it feeds the delta
Revenue or turnover	The top line. What the sale is recorded as
Goodwill, brand equity	Sits on the balance sheet; lets you charge more later
Customer satisfaction	Satisfied customers stay, buy more, and cost less to serve. It is not an end in itself - it is a route to repeat revenue
Efficiency and productivity	Benefit divided by input. Which input you choose - people, machines, process time - changes the definition, so always say which one you mean
Shareholder value	The final scoreboard, covered in Section 1.12

Top line and bottom line
Because it caused genuine confusion in class, worth stating plainly. The **top line** is revenue or turnover - the first line of the statement. The **bottom line** is profit - what is left at the end. It has nothing to do with hierarchy, or with people at the top or bottom of an organisation.

1.11 Two Levers, and Only Two

If value is revenue minus cost, there are exactly two ways to widen it: pull the top line up, or push cost down. The obvious answer - do both - is where most executives stop, and it is the wrong answer.



Which lever you pull is NOT a free choice. Your dominant business strategy decides it for you.
Wanting both, always, with no trade-off, is the same as wanting equity returns at government-bond risk.

The delta, and the only two ways to widen it.

Why 'both levers, always' is not an answer
Think about where you can put your own money. Government securities are treated as risk-free and pay you six or seven per cent, because governments do not default. Want thirteen per cent? Then you are in equities, and you are being paid for carrying risk. Want four times your money in three years? Buy land somewhere the title is contestable - and accept that you might instead lose the plot entirely and spend three years in court. You cannot have the return of one and the risk of another.

Which lever is yours? Your business strategy has already decided

Position	What you are promising	Which lever you pull	Examples from class
Cost leader	Nobody gives you this value at this price	Push cost down; economies of scale	Large-scale manufacturing across electronics, apparel and durables
Differentiator	Nobody else gives you this particular thing	Pull revenue up; charge a premium	Paying five or six times for a laptop against comparable specifications. Or paying a delivery app twenty rupees extra for the same restaurant's food - same recipe, same menu, nothing changed but the way it reaches you

Why this matters for a technology investment
Suppose you deploy AI so that work done by two people in two hours is done in half an hour. That is a **cost lever**. Brilliant if you are a cost leader. But if your firm is actually a product innovator or a customer-centric differentiator, you have just spent your AI budget pulling the lever your strategy does not pay you for. Six months later, do not be surprised when the returns conversation goes badly. This is **strategic misalignment**, and it usually shows up as a gap between what top leadership says the company stands for and what frontline managers are actually executing.

The fixed-cost objection, and it is a fair one

A participant raised it honestly. He took an efficiency plan to his manager and was told that much of the cost base is fixed - freeing up bandwidth does not show up as a saving unless you scale and win more business on the same base. So the instruction came back: focus on the top line.

That is not a contradiction of the framework. It is the framework working. **Efficiency only converts into margin when the freed capacity is either absorbed by growth or genuinely removed.** Otherwise you have improved a ratio and changed no rupee. Before you promise a saving, always ask whether the cost you are attacking is variable or fixed, and who will absorb the freed capacity.

1.12 What Happens to the Surplus

So the firm generates a delta. Then what? There are only a few doors, and they run in a sensible order.

- **Reinvest inside the business.** Put it into people and capability, or into infrastructure and technology - a better assembly line, a stronger data estate. Which one you choose should follow the same strategy logic as Section 1.11.
- **Distribute it.** When further internal reinvestment stops earning incremental value, hand it back to shareholders as dividends. The market reads this as a firm keeping its commitments, and reacts.

- **Diversify.** When the existing system genuinely cannot absorb more, look outside it - which is the next section.

Why shareholders wait at all

A shareholder is not buying this year's profit. They are buying the belief that this year's profit becomes next year's profit plus something, and the year after that plus something more, continuing for as long as the firm exists. That whole expected stream, valued today, is what the market puts on your company. **Market capitalisation = number of shares outstanding x market price per share.**

Which is why both doors serve the shareholder. Reinvest well and the expected future stream rises, so the price rises. Pay dividends and you demonstrate reliability, so the price holds. What kills value is the third option - sitting on a surplus that earns nothing while telling shareholders to wait another two years.

> **Why a technology leader should care about this section**
> When you ask for budget, the honest question is not 'is this good technology'. It is: this money could have been a dividend, a new assembly line, or a hiring round. **What does it return, and by when, that those alternatives do not?**

1.13 From Value Chain to Value System

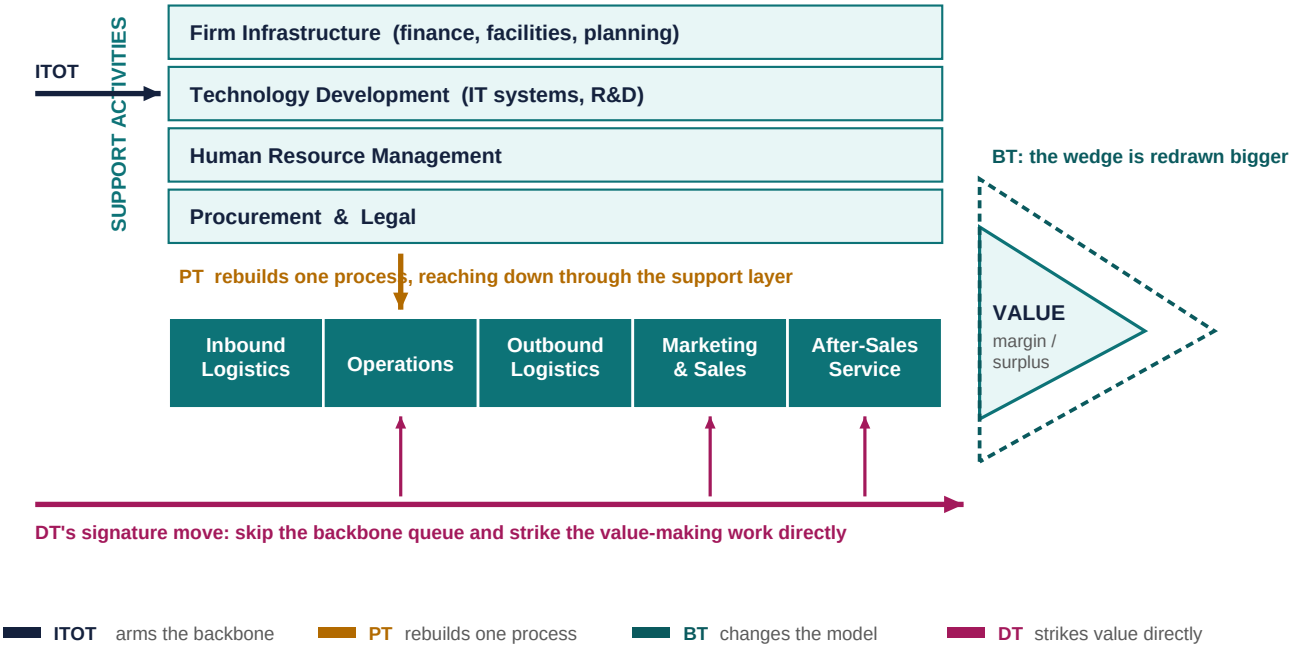
Suppose the firm has exhausted its internal options - good assembly lines, strong technology, a talented pool - and still has surplus. Now it looks outward, and there are four recognisable directions.

Direction	What it means	Example from class
Related diversification	Move into an adjacent business that shares something with yours	A smartphone maker starts building tablets and televisions
Unrelated diversification	Move into a genuinely different sector	The same firm enters hospitality or healthcare equipment
Forward integration	Move towards the customer, into the next layer of your own chain	The smartphone maker starts building the applications that run on its phones
Backward integration	Move towards the supplier, into your own inputs	The same firm starts making the semiconductor components it consumes

> **The definition to remember**
> Each of those new businesses has its own value chain. **Value chain = one firm's internal set of activities. Value system = the whole connected universe of chains** - your suppliers' chains, your channel's chain, your customers' chains. This distinction comes back in Part 3, so lock it down now.

1.14 The Four Transformations: ITOT, PT, BT, DT

Now the payoff. Four abbreviations get used interchangeably in industry, and once you have the value chain in front of you they become easy to separate. The question that separates them is always the same: **where does the technology land, and what does it touch?**



The same map, with the four transformations drawn on it. Follow the arrows, not the vocabulary.

	Full name	Where the technology lands	The test
ITOT	IT-enabled organisation transformation	Into the support layer - ERP, IT systems, cloud, an internal reporting tool. Support then helps the primary activities. The route is indirect	Is technology helping somebody else do the value-creating work?
PT	Process transformation	Into one horizontal - you pick a single process and rebuild it end to end	Am I optimising one process, not the whole picture?
BT	Business transformation	Into the model itself - what the business fundamentally is and how it earns	Has the dominant strategy moved, so the wedge is redrawn?
DT	Digital transformation	Directly onto the primary activities - the short circuit. No waiting for the backbone	Is technology creating value itself, with no human in between?

ITOT - arming the organisation

You deploy S/4 HANA, build data engineering on top, produce live reporting on inventory. People now consume better insight and take better decisions - and those people then buy raw material cheaper, produce more efficiently, target customers better. Follow the arrows: technology goes first into the secondary activities, and only through them reaches the primary ones. **That indirect route is the signature of ITOT.**

The class's own worked test

Somebody asked whether building software connections - APIs - counts. The answer depends on who they are for. Build applications for your marketing team to consume insight internally: that is an internal reporting tool, so it is ITOT. Hand the same capability directly to your customers or suppliers, so the interaction happens without your people in the middle: now it is DT. **Same technology, different landing point, different name.**

PT - rebuilding one process

Take procurement and reinforce that whole horizontal with technology. Or, with no technology at all, change a standard operating procedure so waste and lag are removed - process improvement does not require IT, though these days it usually uses it. The defining feature is the narrow scope: one entity, one flow, not the bigger picture.

The password-reset question, answered
A participant's example: my password stops working, I raise a ticket, and it is resolved automatically with no human involved. Impressive, and it sits entirely inside one internal support flow. That is a **process transformation**, not a digital transformation - nothing in the value-creating chain moved.

BT - changing what the business is

Business transformation is the deepest rung and it contains the others. It happens when your **dominant strategy moves** - from cost leader to customer-centric, or from customer-centric to product innovation. On the map, the value wedge is not merely widened; it is redrawn. New revenue models, new markets, new ways to serve.

DT - the short circuit

Here is the example the professor used. You place an order on a quick-commerce app - does it go to a person? No. You book a cab to the airport - is an executive sitting somewhere deciding your price, your arrival time and which car is allotted? No. An algorithm is doing the value-creating work itself. **That is the signature move: technology short-circuits the intermediary path and strikes the primary activities directly.**

Two honest caveats on DT
One. DT is used in two senses. Here it is drawn narrowly - the direct strike on primary activities. More broadly it is also used as the umbrella name for the whole install-to-model journey. In an exam, classify by where the technology lands and you will be right either way. **Two.** If an initiative delivers no intended outcome, it is none of these four. It is just a digital artefact. The label is earned by the outcome, not by the deployment.

1.15 Two Worked Examples: a Car Maker and a Bank

The same journey, in a product business and a service business. Read each column top to bottom and the four terms stop being abstract.

	A car maker (product)	A bank (service)
ITOT	Installs an ERP, factory sensors and cloud. The whole plant is now digital-ready - but cars are still built the same way	Rolls out core-banking software and cloud across every branch. The backbone is digital - customers still walk in to open an account
PT	Sensors predict a machine failure before it happens. The line shifts from 'fix when broken' to 'fix before broken'. Downtime drops sharply	Loan approval moves from fifteen days of paperwork to a two-day automated workflow. The process itself is redesigned end to end

	A car maker (product)	A bank (service)
BT	The car becomes a connected product - software updates, feature subscriptions, predictive service alerts sold to owners. The revenue model itself is new	A mobile-first bank - account opened in minutes with video verification, instant algorithmic loans, automated advice. Branches turn advisory. A new business model
DT	The whole journey, plus every point where technology touches the customer directly instead of through staff	The same. Every interaction the customer completes themselves, with no branch employee in the middle, is the short circuit at work
Value	**Cost down (less downtime, lower warranty) and revenue up (subscriptions, connected features)**	**Cost down (fewer branches, self-service) and revenue up (more customers, digital cross-sell)**

Buying the technology is only a cost. It becomes value when the margin grows - by charging more or by spending less. The test for every one of the four is the same: **did the wedge get bigger?**

1.16 Where Security Sits

Two questions came from the room, and they matter more each year. As we digitalise, are we not making ourselves more exposed? And where does security belong on that value chain?

Three words that are not the same thing

Term	What it protects	A breach of it looks like
Cyber security	The systems - applications, ERP, networks, devices - against intrusion and sabotage	Somebody gets into a system they should not be in
Data security	The data itself, wherever it sits or moves - its confidentiality and integrity	The data in pipelines and stores is read, altered or stolen
Data privacy	The individual behind the data, and the obligations that attach to personal information	Names attached to account numbers, salaries, identity details

Even senior leaders use these three interchangeably. They are handled separately, by different controls, and answering an exam question with the distinction intact is worth a mark on its own. The class also traced how a single incident moves through all three in sequence: entry through a neglected legacy system is a cyber security breach; reaching the data pipelines that stem out of it turns it into a data security breach; reaching payroll and account records, where numbers are attached to names, makes it a data privacy breach as well.

So where does it sit on the value chain?

As a control, security lives in the **support layer** - technology development and firm infrastructure. But that is not how a board discusses it, and rightly so. At board level it is about protecting the revenue line and the customer trust that produces it - which means it is protecting the value wedge itself.

The sharper point, and it is worth memorising
The more you pursue DT - the short circuit that puts technology directly in front of customers - the more of your value-creating activity is directly exposed. **The attack surface does not just grow; it moves to where the value is made.** That is precisely why security functions are increasingly being merged into digital transformation verticals rather than left in IT operations. Security is not a cost centre sitting under IT - it is the condition on which realised value stays realised.

1.17 The Digital Evolution, 1990s to Now

One last piece of Part 1, and it is the map the professor opened the module with. It is useful because it shows that the technology changes at every step and the underlying problem barely does.

1990s	ERP systems	Transactions get recorded. Structured data, operational efficiency. No analytics at all - just ledgers and records.
2000s	MIS reporting	Standard reports on a schedule. Historical view only, driven by IT. The business waits two weeks for a report.
2005+	ERP plus BI	Dashboards and data warehouses. The business finally gets visibility, but still needs IT for every new metric.
2012+	Self-service analytics	Business analysts query data themselves. Democratisation begins - and the first governance gaps appear.
2015+	Predictive AI and ML	Predicts what will happen. Churn models, demand forecasts, risk scoring. Data science teams appear.
2018+	IoT and real time	Streaming data, decisions at the edge. Manufacturing, supply chain, smart cities. Data volume explodes.
Now	Generative and prescriptive	Prescribes what to do. Language models over enterprise data, copilots everywhere. Governance becomes existential.

Most organisations skip a stage and pay for it later. Find out honestly which rung you are actually on before deciding where to go.
From the professor's own opening deck. Notice that the technology changes at every step and the problem barely does.

Seven rungs, roughly thirty years. Almost every organisation is standing on more than one of them at once.

How to use this in an answer
If a question asks where an organisation is on its digital journey, do not answer with a tool name. Answer with a rung, and then say what it can and cannot do as a result. 'They have dashboards but every new metric goes through IT' places a firm precisely, and it is a far better answer than 'they use Power BI'.

1.18 Day One - Practice Questions

Thirty questions. **The answer and a one-line reason sit immediately below each question**, so keep a sheet of paper over the teal strip while you attempt it, then slide the paper down to check. A cumulative set covering all three parts together is waiting at the end of the document.

Q1. Which of the following is the correct order of the four rungs?

A) Digitalisation, digitisation, digital enablement, digital transformation
B) Digitisation, digitalisation, digital enablement, digital transformation
C) Digital enablement, digitisation, digitalisation, digital transformation
D) Digitisation, digital enablement, digitalisation, digital transformation

Answer: B) Digitisation, digitalisation, digital enablement, digital transformation Each rung only stands on the one below it. You cannot make data flow before you have captured it, and you cannot equip people to act before the data flows. Section 1.1.

Q2. A company scans twenty years of paper registers into PDF files. This is:

A) Digital transformation
B) Digitalisation
C) Digitisation
D) Digital enablement

Answer: C) Digitisation Converting a physical record to an electronic one, and nothing else. The work has not changed - the same steps happen on a different medium. Section 1.4.

Q3. A bank launches UPI payments so that transactions process themselves end to end. This is best described as:

A) Digitisation
B) Digitalisation
C) A digital artefact
D) Process transformation only

Answer: B) Digitalisation The system is now processing the transaction, not merely recording what a clerk did. That is the shift from holding data to moving and using it. Section 1.5.

Q4. Which of these is an OUTPUT rather than an outcome?

A) A decision that used to take a week now takes a day
B) Working capital cycle shortens by four days
C) Two hundred Power BI licences have been purchased
D) Cost leakage falls by two per cent

Answer: C) Two hundred Power BI licences have been purchased A licence is a thing you now have - countable and photographable. The other three describe something that got measurably better, which makes them outcomes. Section 1.3.

Q5. The professor corrected a student who said the outcome of a new dashboard was 'access to data'. What was his correction?

A) The outcome is access to insight
B) The outcome is faster hardware
C) The outcome is higher licence utilisation
D) The outcome is better data storage

Answer: A) The outcome is access to insight Data is still an output - a thing you hold. Insight is what lets somebody act. The distance between those two words is the distance between a project that pays for itself and one that does not. Section 1.3.

Q6. 'We do not have digital, we do digital' is a restatement of which distinction?

A) Cost leader versus differentiator
B) Noun versus verb
C) Top line versus bottom line
D) Related versus unrelated diversification

Answer: B) Noun versus verb The noun view lists what a company owns; the verb view lists what it does. Only the second is evidence that anything changed. Section 1.2.

Q7. Which of the following belongs in the VERB column of the digital estate?

- **A)** The balance sheet
- **B)** Assembly lines
- **C)** Data servers
- **D)** Orchestrating and deciding

Answer: D) Orchestrating and deciding The first three are things that can be bought with a purchase order. Orchestrating and deciding are actions, and no purchase order buys them. Section 1.2.

Q8. Digital enablement is best defined as:

- **A)** Buying the right tools at the right price
- **B)** Equipping people and processes with tools, access and skills so the verbs can be performed
- **C)** Achieving a measurable improvement in margin
- **D)** Converting physical records to electronic ones

Answer: B) Equipping people and processes with tools, access and skills so the verbs can be performed Enablement is not owning the artefact - it is being able to act with it. Option C describes transformation, and option D describes digitisation. Section 1.6.

Q9. Which statement about digital enablement is FALSE according to the professor?

- **A)** It is not IT implementation
- **B)** It is not AI adoption
- **C)** It is the destination rather than the journey
- **D)** It is not digitisation

Answer: C) It is the destination rather than the journey That describes transformation, not enablement. Enablement is the work of getting there; transformation is where you end up. The other three are all things the professor said enablement is NOT. Section 1.6.

Q10. Data hygiene refers to:

- **A)** How freely data moves between systems
- **B)** Whether data is clean and trustworthy enough to use
- **C)** How much data is stored
- **D)** How often dashboards are refreshed

Answer: B) Whether data is clean and trustworthy enough to use Hygiene is about condition. Movement between systems is liquidity, which is the next question. Section 1.5.

Q11. Data liquidity refers to:

- **A)** The volume of data held
- **B)** How freely data moves between the places that need it
- **C)** The cost of cloud storage
- **D)** The accuracy of a single field

Answer: B) How freely data moves between the places that need it A firm can have enormous volume and almost no liquidity, and it will feel exactly like a firm with no data at all. Section 1.5.

Q12. In the glacier analogy, the glass of clean drinking water represents:

- **A)** The data warehouse
- **B)** The stack of systems
- **C)** The decision somebody actually takes
- **D)** The cleaning and structuring step

Answer: C) The decision somebody actually takes The glacier is the systems, the melt is the data flowing, and the glass is where value is finally consumed. Plenty of firms are proud of the glacier; few can hand you the glass. Section 1.5.

Q13. A change is called a transformation when it is:

- **A)** Large in scale
- **B)** Driven by new technology
- **C)** Intended to be positive and lasting, judged on outcomes
- **D)** Approved by the board

Answer: C) Intended to be positive and lasting, judged on outcomes Scale, technology and board approval are all irrelevant. The word carries the intent inside it, and the judgement is made on outcomes rather than outputs. Section 1.8.

Q14. Which of the following is a PRIMARY activity in Porter's value chain?

- **A)** Human resource management
- **B)** Procurement and legal
- **C)** Outbound logistics
- **D)** Technology development

Answer: C) Outbound logistics The five primary activities are inbound logistics, operations, outbound logistics, marketing and sales, and after-sales service. The other three options are support activities. Section 1.9.

Q15. In the value chain, information technology sits under:

- **A)** Operations
- **B)** Technology development, a support activity
- **C)** Marketing and sales
- **D)** Firm infrastructure only

Answer: B) Technology development, a support activity Note the distinction the professor drew: scientific technology - a better chemical composition for your product - sits under firm infrastructure. Information technology sits under technology development. Section 1.9.

Q16. Value, at its simplest, is:

- **A)** Revenue
- **B)** Revenue minus cost - the delta
- **C)** Market capitalisation
- **D)** Customer satisfaction

Answer: B) Revenue minus cost - the delta The size of the number is not the point; the size of the gap is. Everything else people call value is either a driver of that surplus or a consequence of it. Section 1.10.

Q17. The bottom line refers to:

- **A)** Senior management
- **B)** Revenue or turnover
- **C)** Profit - what is left at the end
- **D)** The lowest-paid employees

Answer: C) Profit - what is left at the end It has nothing to do with hierarchy or with people at the top or bottom of an organisation. The top line is revenue. Section 1.10.

Q18. There are only two generic business positions. They are:

- **A)** Product leader and market leader
- **B)** Cost leader and differentiator
- **C)** Cost leader and market follower
- **D)** Differentiator and customer-intimate only

Answer: B) Cost leader and differentiator Only two generic positions. A differentiator may compete on product or on customer closeness, but that is a split within one of the two, not a third position. Section 1.11.

Q19. A firm whose strategy is product differentiation spends its AI budget on cutting internal processing time. This is an example of:

- **A)** Good cost discipline
- **B)** Strategic misalignment
- **C)** Process transformation
- **D)** Backward integration

Answer: B) Strategic misalignment The cost lever is the right lever for a cost leader. For a differentiator, that money has been spent pulling the lever the strategy does not pay for. Section 1.11.

Q20. Efficiency converts into margin only when:

- **A)** The technology is best in class
- **B)** The freed capacity is absorbed by growth or genuinely removed
- **C)** The saving is reported to the board
- **D)** Utilisation of the tool is high

Answer: B) The freed capacity is absorbed by growth or genuinely removed Otherwise you have improved a ratio and changed no rupee. This is the fixed-cost objection raised in class, and it is the framework working rather than failing. Section 1.11.

Q21. Which is NOT one of the doors for a firm's surplus?

- **A)** Reinvest inside the business
- **B)** Distribute as dividends
- **C)** Diversify outside the current system
- **D)** Hold it indefinitely while telling shareholders to wait

Answer: D) Hold it indefinitely while telling shareholders to wait Reinvest, distribute, diversify are the three doors. Sitting on a surplus that earns nothing is what destroys value. Section 1.12.

Q22. Market capitalisation equals:

- **A)** Revenue multiplied by profit margin
- **B)** Shares outstanding multiplied by market price per share
- **C)** Retained earnings plus dividends
- **D)** Assets minus liabilities

Answer: B) Shares outstanding multiplied by market price per share The market price reflects the whole expected future stream of profit, valued today - which is why both reinvesting well and paying dividends serve the shareholder. Section 1.12.

Q23. A smartphone maker begins manufacturing the semiconductors it consumes. This is:

- **A)** Forward integration
- **B)** Backward integration
- **C)** Related diversification
- **D)** Unrelated diversification

Answer: B) Backward integration Backward means moving towards your suppliers, into your own inputs. Forward means moving towards the customer, into the next layer of your chain. Section 1.13.

Q24. The value SYSTEM is:

- **A)** One firm's internal activities
- **B)** The support layer of the value chain
- **C)** Your chain plus every connected chain - suppliers, channels, customers
- **D)** The primary activities only

Answer: C) Your chain plus every connected chain - suppliers, channels, customers One firm's internal activities is the value chain. This distinction returns in Part 3 with the Viacom value system. Section 1.13.

Q25. A company deploys an ERP and internal reporting so its staff make better buying decisions. This is:

A) DT
B) BT
C) PT
D) ITOT

Answer: D) ITOT The technology landed in the support layer and reached the value-creating work only indirectly, through people. That indirect route is the signature. Section 1.14.

Q26. A cab-hailing algorithm sets your price and allots your car with no human involved. This is the signature of:

A) ITOT
B) PT
C) DT
D) BT

Answer: C) DT The algorithm is doing the value-creating work itself, with no human intermediary. That is the short circuit onto primary activities. Section 1.14.

Q27. An automated password-reset workflow inside the IT service desk is best classified as:

A) Digital transformation
B) Process transformation
C) Business transformation
D) IT-enabled organisation transformation

Answer: B) Process transformation It sits entirely inside one internal support flow. Impressive, but nothing in the value-creating chain moved. Section 1.14.

Q28. Business transformation is distinguished by the fact that:

A) It always uses artificial intelligence
B) It is the most expensive of the four
C) The dominant strategy moves and the business model changes
D) It touches only one process end to end

Answer: C) The dominant strategy moves and the business model changes Cost is not the test, and neither is the technology used. On the value chain map, the wedge is not merely widened - it is redrawn. Section 1.14.

Q29. Which pairing is correct?

A) Cyber security protects the individual behind the data
B) Data privacy protects networks and devices from intrusion
C) Data security protects the data itself, wherever it sits or moves
D) Cyber security and data privacy are the same control

Answer: C) Data security protects the data itself, wherever it sits or moves Cyber security protects the systems; data privacy protects the individual behind the data. All three are handled by different controls. Section 1.16.

Q30. Why does pursuing DT change a firm's risk profile more than pursuing ITOT?

A) Because DT costs more
B) Because the attack surface moves to where value is actually created
C) Because DT requires cloud by definition
D) Because ITOT has no security implications

Answer: B) Because the attack surface moves to where value is actually created ITOT puts technology behind your own staff. DT puts it directly in front of customers, so the exposure sits on the value-creating activity itself. Section 1.16.

PART 2

Day Two - Proving It Worked

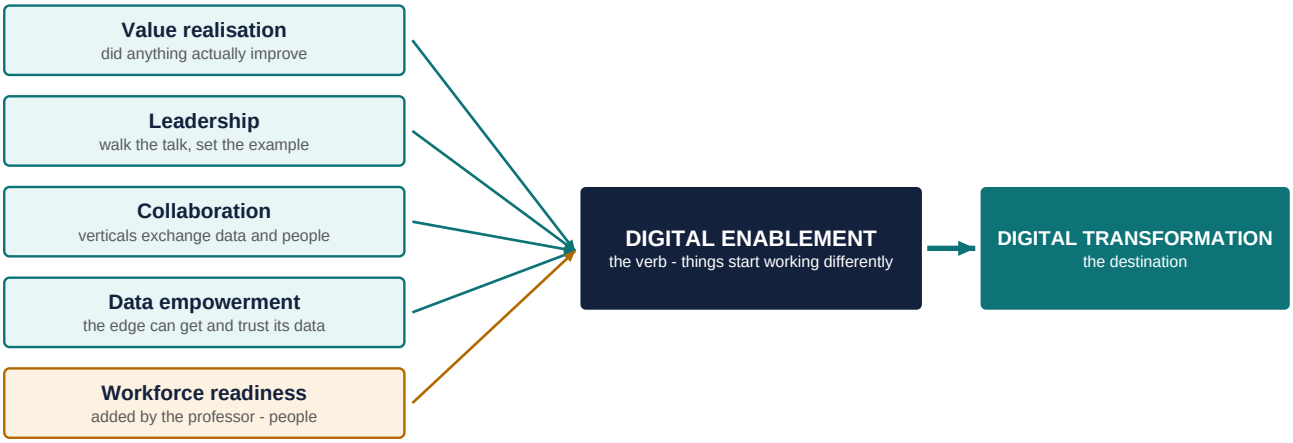
Two clients, one diagnostic, and the fifth building block

Part 1 ended with a promise: value is only real if you can show what changed. This part makes good on it. It hands you a diagnostic that tells you exactly where a digital investment stopped producing value, and it does it through two real client stories that fail in completely different places. In the first, a logistics company has a dashboard nobody believes. In the second, a card company has a working model that people log into every day and that still delivers nothing. The second is the interesting one, because it forces a fifth building block into the picture that the assigned reading never mentions: people.

2.1 The Five Building Blocks

The module is anchored on a reading that lists four building blocks of a data-driven organisation: **leadership, collaboration, data empowerment and value realisation**. Part 1 took the fourth one apart. This part asks the harder question. You have a value proposition. How do you know whether it is actually being realised?

Before any of that, one correction the professor made early and repeated: these blocks do not sit in silos. Whether your business departments share data with each other is a **culture** question. Culture is set, raised or flattened by **leadership**. So a collaboration problem is very often a leadership problem wearing a different shirt. Diagnose them together, or you will fix the wrong one.



The HBR reading gives four blocks. The fifth - workforce - is the professor's own addition, and it is the one the ABC Cards caselet exists to prove.

None of these five sits in a silo - each bends the others.

Four blocks come from the reading. The fifth is the professor's addition, and Section 2.6 is the reason it exists.

Building block	What it means in one line	Where it is covered here
Leadership	Somebody senior owns the outcome, not just the budget	Sections 2.1, 3.12
Collaboration	Data crosses departmental walls instead of being hoarded	Sections 2.14, 3.17
Value realisation	Being able to show what actually got better because of the spend	The whole of Part 1 and Part 2

Building block	What it means in one line	Where it is covered here
Data empowerment	People at the edge can get, trust and use data without asking permission	Sections 3.15 to 3.18
Workforce	**Will people actually accept what the machine tells them?**	**Sections 2.10, 3.13**

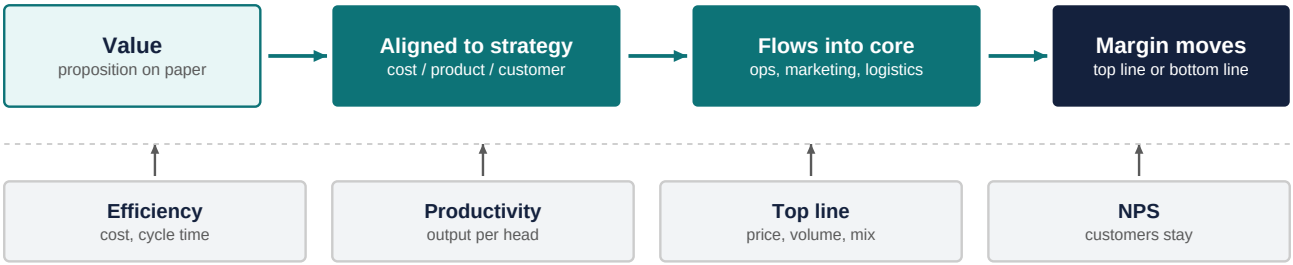
> *Enablement is not the noun. It is the verb. The dashboard is not the enablement - what people now do differently is.*

2.2 What 'Value Realised' Looks Like

Think of a firm as a set of departments and support functions working together. Out of that comes value. But value is only worth the name if it is **aligned to the business strategy**. Part 1 gave the value disciplines: you are a cost leader, or a differentiator, or you compete on being close to the customer. Differentiation itself splits - some firms differentiate on the product, others on the process or on customer closeness.

Cost leader, differentiator, customer closeness - on one street
Three shops on the same street. The first survives on volume and the lowest price in the lane, so for that shop value means a rupee saved on every transaction. The second stocks something nobody else has, so value means a price nobody argues with. The third knows every regular by name and what their family eats, so value means the customer never walks past to the next lane. Same street, three completely different definitions of a good day. Ask which of the three your company is, and then ask whether your dashboard is measuring that one.

Real companies rarely sit at a corner. Most sell a blend of product and service, so their dominant strategy sits somewhere between. That is fine. What is not fine is not knowing which lever you are pulling, because that decides what 'value' should even mean for you.



Every one of these four has to land somewhere on the P&L. If it does not, it was an output, not an outcome.

Value has potential only when it is flowing into core activities. Everything else is a slide.

The one line to carry out of this section
Impact assessment is not a post-mortem you run at the end. It is the tool that tells a leader, mid-flight, whether the money already spent is turning into anything - and if not, exactly which link in the chain to go and repair.

2.3 Caselet One: the Dashboard Nobody Trusts

A real client of the professor's, anonymised. A global third-party logistics provider - freight forwarding and multimodal transport across port, road and air. The engagement was to build a roadmap for better decision-making. Their reporting tool was Qlik.

What happens in that company every week

A senior sales leader opens the dashboard. Three numbers, some spikes, some trends. And then something odd happens: they read it, but they do not decide from it. The number looks wrong. Wastage could not have been that high. Order volumes cannot have moved like that - and if they have, more freight carriers need to be booked today, because an unloaded shipment is lost business.

So what does the leader do? Not go into the data pipeline - no business leader does that. They ring or message their own team. Analysts, data engineers, data scientists. 'This spike looks off, please check.' And the answer comes back in two days. Sometimes a week. On one request - a link between month and customer booking patterns, to see whether there was a seasonal effect - it had been two and a half months and the number had still not reached the dashboard. The team kept handing over patchwork figures pulled from here and there. Consumable, but not decidable.

The comparison that makes this bite
The same pattern turns up in the Viacom story later in this part. There the wait was four, six, eight weeks, and in extreme cases a couple of months. Two very different industries, one identical failure. That is your clue that this is structural, not a bad hire.

2.4 The Three Qualities: Data, Service, System

The class produced three distinct diagnoses for that one story, and the professor kept all three, because they are three different boxes in the model that follows.

Data quality, or information quality

The obvious one. Data arrives from vehicle tracking, from the ERP, from warehouse systems, from half a dozen other places. Different owners, different versions, no single source of truth. It is fragmented, inconsistent, untidied. Because of that the manager does not trust it, and because they do not trust it they will not act on it. Note the professor's move here: **park it**. Make your peace with the data quality you have for now, because if you stop here you will miss the other two.

Service quality - and this is the one people miss

Here is the reframe worth carrying into your own organisation. The manager who asks for a number is senior. When they raise a query, your internal data team treats it exactly the way your sales team treats a paying customer. The reconciliation, the checking, the re-pull, the explanation - all of that is a **service being delivered**. If it comes back in two days when the decision needed it in two hours, that is not a data problem. That is a service quality failure.

Service quality in one picture
Think of the data team as an internal restaurant kitchen. The ingredients might be fine and the stove might be working. But if the order takes two days to arrive, the guest has already left and eaten somewhere else. That is service quality, and it is measured in responsiveness, not accuracy.

System quality - the artefact itself

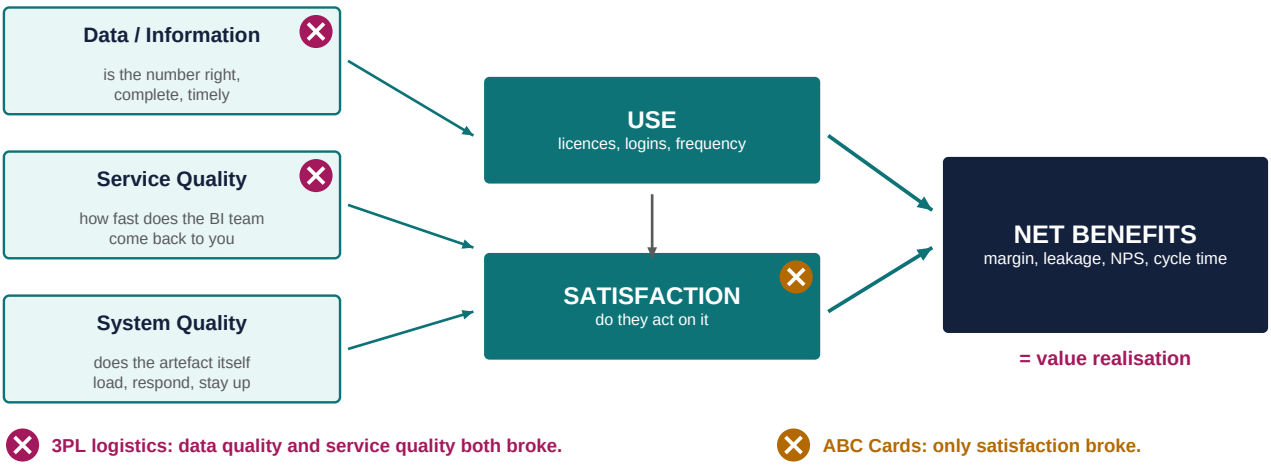
This is the reporting environment as a thing. Does it launch? Does it stay up? Does it respond? The everyday corporate version: you log in at four in the afternoon and it is fine. Monday morning at ten, when seventy people open it at once, the interface takes two minutes to launch instead of two seconds. That is system quality, and it quietly destroys credibility the same way bad data does.

System quality, from personal experience
Two examples from the professor's own life made this clearer than a definition could. He had to teach one session from two devices at once, because the video software, his tablet and his laptop would not behave together the week before - that is a system misbehaving, not a support desk failing. And during his doctorate, before any of today's tools existed, his statistical session crashed on day three of writing a program from scratch, with the workspace unsaved. An hour of work gone, and it happened more than once.

Do not collapse these three
The most common exam error here is treating 'the system is bad' as one idea. **Data quality is about the number. Service quality is about the humans who fix the number. System quality is about the software that displays the number.** Three separate diagnoses, three completely different and differently priced fixes.

2.5 The IS Success Model - the Circuit

Put those three qualities on the left, and what they feed on the right, and you have arrived at the framework the whole part was walking towards: the **DeLone and McLean Information Systems Success Model**. The original is from 1992; the widely used revision from 2003 adds service quality as a separate dimension. It is popular because it is not a scorecard - it is a diagnostic path that runs from technology, through behaviour, to strategic outcome.



DeLone & McLean IS Success Model (1992; revised 2003 to add service quality).
The whole point is that it is a circuit. Break it anywhere and no value comes out the right-hand side.
So a flat result is not a reason to buy a new tool - it is a reason to walk back and find the broken box.

Three qualities drive use and satisfaction. Those drive net benefits. Net benefits is another name for value realisation.

Box in the model	The question it asks	What breaking looks like in the logistics caselet
Data or information quality	Is the number right, complete, timely?	Numbers arrive fragmented from several systems, so the spike is never believed
Service quality	How responsive are the people who fix it?	Two days to a week for a re-pull; two and a half months for a new measure
System quality	Does the artefact itself load, respond, stay up?	Present rather than acute here, but never zero - the interface drags under load
Use, or intention to use	Do they actually open it and mean to?	They open it. That was never the problem
User satisfaction	Do they trust it enough to act on it?	No. They read the dashboard and then decide from a patchwork spreadsheet
Net benefits	**Did anything measurably improve?**	**No. Pricing and service decisions stayed on gut feel**

Why this is a strategic tool and not a technical one
Three inputs, two behaviours, one outcome. Alone, in pairs, or all together, the three qualities decide whether people use the thing and whether they are satisfied with it. **And if any part of that circuit is broken anywhere, no value comes out the other end.** That is why 'let us buy a better reporting tool' is almost always the wrong first answer. It fixes one box out of six.

2.6 Caselet Two: Where Everything Worked

The second story is shorter. Another real client, a large Indian card company, anonymised here as ABC Cards. They had built a model to support underwriting decisions - deciding whether an applicant should be given a card.

Now run the same three checks. Data quality? Fine. Model accuracy? Standard, proficient. Service quality - were the checks and the back-and-forth in good shape? Yes. System quality - was the model or the

interface misbehaving? Nothing serious was reported.

> *Whatever remains the two or three most common pain points for most organisations in India, this case has none of them. And it still fails.*

So where is the circuit breaking?

Look at the usage numbers and everything is green. Three hundred licences distributed. Two hundred and fifty people registered and logging in. Frequency per day, time per session - all healthy. If you ran a health check on this deployment, every measure would be at the top.

The failure sits one box further right. Roughly two thirds of final underwriting decisions were being made on the officer's own judgement, with the model's recommendation overridden. And the reasons for those overrides were never recorded anywhere. The purpose of the model was to prevent losses - not issuing a card to somebody without the financial strength to repay. That purpose was not being served.

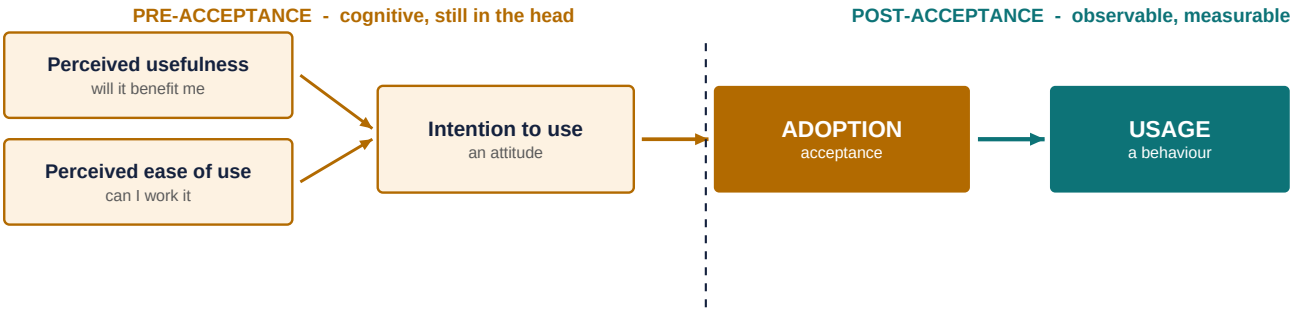
	Logistics caselet	Card company caselet
Data quality	Broken - fragmented, distrusted	Fine
Service quality	Broken - two days to two months	Fine
System quality	Present, not acute	Fine
Use	High - they open it daily	High - licences, logins, frequency all strong
Satisfaction	**Broken**	**Broken - they use it and override it**
Value realised	No	No

The point of running two caselets
Two organisations, two completely different broken boxes, one identical bottom line: no value. This is exactly why you do not start a diagnosis by guessing. **You walk the chain.**

2.7 Adoption Is Not Usage

Before going further the professor stopped the class on a distinction several people were collapsing. Somebody had answered the card-company question with 'it is an adoption problem'. It is not, and the difference matters.

Take a familiar example. A company has a home-grown ERP. Nobody has the source code any more, so it cannot be modified, and the decision is taken to replace it with SAP. People hate the move. They keep going back to the old system, or they record things in a spreadsheet, or a register, or on paper. That is an **attitude** problem. It is an intention-to-use problem. In plain terms it is individual inertia, and it happens *before* anybody has used anything.



Theory of Reasoned Action -> Technology Acceptance Model (Davis, 1989) -> UTAUT (Venkatesh, Morris, Davis & Davis, 2003). **Adoption is attitudinal.**
Everything is 'perceived' on the left of the dashed line because nobody has used the thing yet. Beliefs, not evidence. **Usage is behavioural.**

Everything to the left of the dashed line is belief. Everything to the right is observable behaviour.

What sits behind adoption

Two beliefs, and only two, in the classical model. **Perceived ease of use** - can I actually work this thing? Training exists precisely to move this one. And **perceived usefulness** - will this benefit me? Both are 'perceived' because at this stage nobody has touched it. We are still in the thinking phase, not the doing phase. This is the **Technology Acceptance Model**, which comes down from the theory of reasoned action in psychology, and it has spawned two decades of variants, UTAUT being the best known.

Ease of use, seven years apart
Democratisation of AI is the cleanest example of perceived ease of use moving. Seven years ago using a machine learning model meant writing code. Today it means typing a sentence in English. Nothing about the usefulness changed. The ease of use changed, and adoption followed.

Memorise this pairing
Adoption is attitudinal. Usage is behavioural. Adoption comes first and lives in the head. Usage comes later and shows up in the logs. After usage begins you get continued intention to use - the same idea marketing calls repurchase intention, except here your employees are the customers.

2.8 Why Usage Metrics Flatter You

If somebody asks how usage is measured in a company like the card issuer, the answers come easily, and that is the problem. They are easy to collect, they are always high, and they tell you almost nothing about value.

Usage metric	What it genuinely proves	What it does not prove
Licences issued	Procurement happened	That anybody wanted them
Registered and active users	The login works	That the tool influenced a decision
Frequency per day	It is part of the routine	That the output is believed
Time per session	They spent time in it	That the time produced anything

The sentence to use in a review meeting
'These are adoption numbers. What is the override rate?' Adoption numbers measure the tool. Override rate measures whether the tool changed a decision. Only the second one is on the road to margin.

2.9 The Fix That Cost Nothing

What did the card company actually do? No new model. No new platform. No retraining programme. One change-management intervention, and it is almost embarrassingly simple.

> *Override it if you want. We are not forcing it down your throat. But write down why.*

That single requirement does three things at once. It makes the human's reasoning visible, so the model can eventually be improved by the very people rejecting it. It removes the effortlessness of the override, which was the real reason gut feel was winning. And it converts an invisible behavioural failure into a measurable stream of data.

The right challenge, from the room

How do you know the shift in behaviour is real? Maybe they are accepting the model's output only to avoid the chore of writing a justification. That is a fair challenge, and the honest answer is that you cannot tell from usage logs. You find out by **surveying** - and a sharper version offered in class was to check how often the system was right on the occasions it was overridden. If the model was right and got overridden, the problem is genuinely behavioural. If it was wrong, the officers were doing their job.

A leadership-level version of the same question
The professor pushed back on the sharper version too. Checking override accuracy is a project manager's move - correct, but small. Somebody being trained for a senior seat has to ask the bigger one: **is my workforce equipped for this at all, and if not, should I be designing the workflow around that reality instead of blaming individuals?**

2.10 The Fifth Building Block: Workforce

Now go back to the four blocks from the reading. Value realisation - covered. Leadership - covered. Collaboration - covered. Data empowerment - coming in Part 3. Where in those four does the card company fit?

Nowhere. The reading has nothing about people and their willingness to accept what the machine says. So the professor adds a fifth block on top of the article: **workforce, and its adoption**. That is not decoration. It is the block that decides whether the other four ever produce anything.

Psychological safety, which is where this gets uncomfortable

A participant raised the objection that matters. Why would somebody help build the automation that replaces them next year? They will contribute right up to the point where it reaches their own neck, and no further. That is a **psychological safety** problem, and no amount of training fixes it. What fixes it is leadership giving credible comfort that this is an enabler, not a replacement - and then behaving consistently with that.

Why people hoard what they know
This is the same reason a confident shop owner's staff will happily point out which items are slow-moving, and a nervous one's staff will not. People share information freely only when sharing it cannot be used against them. Every data culture initiative eventually runs into this wall.

2.11 Readiness: the Five Buckets

If workforce willingness decides everything, you have to be able to measure it before you commit budget. That is what a **readiness assessment** is, and it is a standard consultant's instrument. The logic is simple: before building a model, find out whether your people will use one.

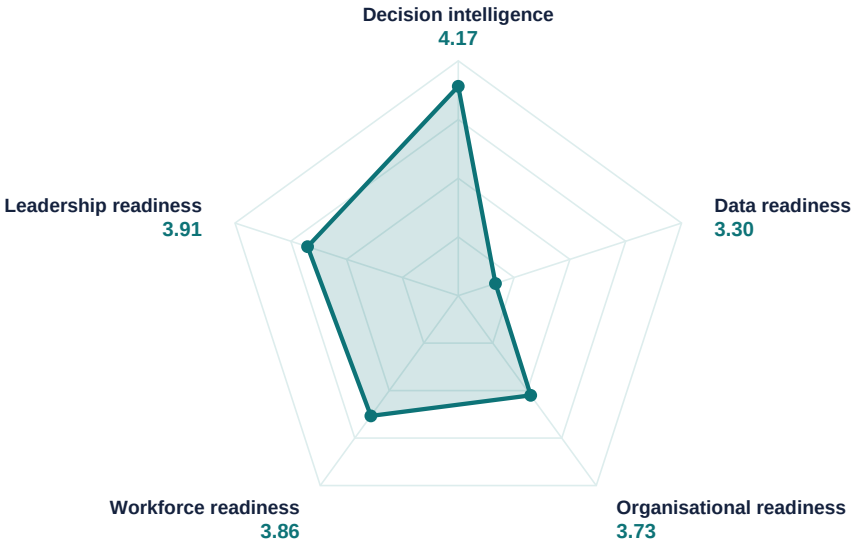
The professor ran a live cut-down version on the class itself. The full instrument he uses on client engagements runs to roughly a hundred and fifty questions. The classroom version was short, but the structure is identical - **five buckets, one combined readiness score**.

Bucket	What it is actually asking
Leadership readiness	Are the seniors championing this, aligning it, modelling it?
Organisational readiness	Does the structure and culture let this spread across departments?
Data readiness	Is data unified, trusted, accessible - are we data empowered or not?
Current decision intelligence	What head start already exists - dashboards, data products, a reporting culture?
Workforce readiness	Are people skilled, confident and comfortable with digital tools?

What the combined score is for
The five bucket scores roll up into a single digital maturity or readiness index for the organisation. Four of the five map straight back to the building blocks in Section 2.1. The fifth - workforce - is the professor's addition, injected precisely because of the card-company case.

2.12 Reading the Spider Chart

Forty-nine of roughly seventy-four people in the room responded. Here is what came back, and more importantly, here is how a diagnosis is read off it.



How to read it

Further from the centre = more ready. The two innermost axes are where the money should go. Spending on the outer ones buys almost nothing, because the inner ones will still block the value from coming out.

Live class survey, 49 responses of roughly 74 present. Five buckets, Likert-scaled items, sub-scores averaged then plotted. Figures as called out in the session. The ranking, not the second decimal, is what the diagnosis rests on.

A cohort, not a company - so treat this as a method demonstration. The reading technique is the transferable part.

Working from the outside in

Decision intelligence is the strongest. In plain terms: the dashboard culture is doing fine. People can open a report and read a number. That is a genuine head start and you should not throw it away, which is exactly what people do when they declare the dashboards useless and demand self-service reporting on day one.

Leadership is comfortable. Anything at 3.8 and above is not bad. Above 4.2 is rare enough that you should be suspicious of it. So this cohort cannot complain that its leaders are not on board or not modelling the behaviour.

Workforce sits on the margin, and it is outshining organisational readiness. That gap is the finding. It says people are skilled and personally fine with using these systems - so this is not an ability problem. But when several people have to run a workflow together, it stalls. Less about capability, more about willingness at the collective level. That is cultural resistance, and it needs change management and leadership, not another training programme.

Data readiness is the innermost and the real diagnosis. Which closes the loop neatly, because low data readiness is precisely why the number on the screen is mistrusted - and the word is mistrust, not distrust. Distrust is a judgement you have formed. Mistrust is a doubt you cannot resolve, which is what bad data leaves you with.

The four spending questions, and the answer

The professor then put four practical options to the room. Should I buy another reporting tool? Should I book alignment workshops for my leadership? Should I run data literacy training for my people? Or should I invest in unifying the data, in-house or through a partner?

Only the fourth, and possibly organisational work alongside it
The first three all target axes that are already strong. Spending there is money into a strength that is not the constraint. **Everything routes through the innermost axis** - fix data readiness first, and address the organisational and cultural gap alongside it. Every other rupee goes in vain until those two move.

2.13 Survey Craft: How Many, and Who Asks

Two practical questions came from the room, and both have real answers worth keeping.

How many responses do you actually need?

It depends on what kind of survey you are running. A **quantitative** instrument like the readiness index needs numbers behind it. The rule of thumb from the standard reference on multivariate analysis, Hair and Black, is roughly **ten responses per question** - and note, per individual question, not per bucket. With thirty-odd questions in the classroom version, forty-nine responses is thin but workable for a demonstration.

A **qualitative** survey plays by different rules. Interviews, semi-structured conversations, workshops. Here you are hunting for pain points, not measuring a distribution, and you stop when the same problems start repeating. In the professor's experience that saturation shows up after seven or eight interviews, which is why five well-chosen respondents can be enough. A real engagement runs both: a semi-structured pass to surface pain points, then targeted workshops with the stakeholders identified from the organisation chart.

Symptom versus root cause
A rating-scale survey gives you the symptom - a temperature reading. It will not tell you whether it is viral, bacterial or something else. That is what the open question 'name your top three pain points' is for. Most people happily tick 4 or 5 all the way down and never volunteer the pain point unless you ask for it explicitly.

Participation is a leadership problem, not a survey problem

A participant noted that in industry, twenty-five to thirty per cent participation is considered good - and that the people who respond skew positive, so the silent majority may be the more important sample. The professor's answer was about **who is doing the asking**. A technology chief requesting participation lands differently from a chief executive requesting it. And a chief executive sending one email to everybody lands differently from the same person holding three sessions on the same day with the same agenda. Same request, three very different response rates.

2.14 Where Should the Data Team Report?

If organisational readiness is the constraint, at some point you have to touch organisational design. Two stories from the session make the point better than any theory.

The Goldman Sachs global capability centre story

The problem was siloing. So step one: pull the data engineers, architects and analysts out of the individual business departments and put them into a single central data function with its own chief data officer. Step two, some years later, they noticed the data chief was reporting to the information technology chief - and the technology chief, who owns the systems landscape and works very closely with the business, kept winning. So step three: the reporting line was moved out and taken directly to the chief executive.

Read that as signalling. Data went from being an enabling function to being treated as a value-creating one. But watch what happened next. When a business department asked for four extra fields to be brought into the pipelines, the now chief-executive-reporting data engineers were less willing to listen: your contribution to our team is small, we have our own value to create, we answer to the data chief. **The fix created its own problem.**

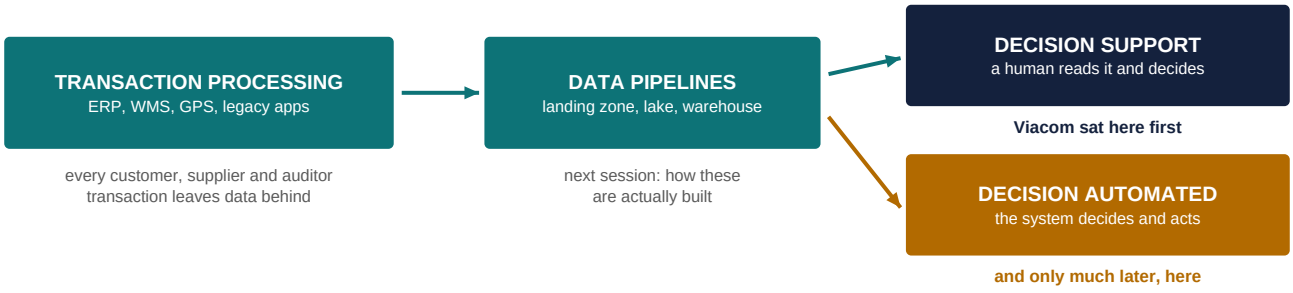
The Thoughtworks version

A senior vice president at the technology consultancy Thoughtworks described the same restlessness differently - their organisation design has been changed twice in fourteen years. Not because either design was wrong, but because each one solves something and breaks something else.

> **There is no correct organisation chart**
> Every structure carries its own set of advantages and costs. Ask the professor for the right answer and you get seventy different structures for seventy different people in the room. What a leader is accountable for is not picking the perfect design - **it is knowing where the current design is leaking, and whether that leak runs with or against the strategy.**

2.15 The Information Systems Triangle

A structure worth committing to memory, because it is the whole of information systems on one page. Recall the value chain from Part 1, with technology sitting as a support layer and people sitting alongside it.



How a decision-automated system is actually earned: keep a human in the loop for two or three years, watch how often the human and the model disagree, and only when the chance of the model going wrong is negligible do you take the human out.

Redeploying that person is what gets called capability building. Nothing resides outside this triangle - it is the whole of information systems.

Transaction processing feeds pipelines. Pipelines feed either a human decision or a machine one. Nothing sits outside this.

Start at the left. Every ERP, legacy system, warehouse system and small application is a **transaction processing system**. Every time a customer, supplier, buyer, regulator or auditor transacts with you, data falls out. Those flow through **data pipelines** - landing zone, warehouse, lakehouse, whatever your architecture is - and reach people.

From there the path forks. A **decision support system** hands the insight to a human, and the human decides. A **decision automated system** cuts the human out and executes.

How automation is actually earned
You do not start with a decision automated system. You keep a human deciding for two or three years, you track how often the model and the human disagree, and when the chance of the model going wrong is negligible you remove the human and redeploy them elsewhere. The professor's name for that redeployment is **capability building**. Companies today are not building people capability so much as AI capability.

Which world are you in?
A useful test in an exam or a meeting: ask who or what consumes the model's output. If a person reads it and then decides, you are in decision support. If the output triggers an action with nobody in between, you are in decision automation. Two different worlds, two different risk profiles, and mixing them up is a common error.

2.16 The Viacom Story: the Need

Viacom - the media group behind MTV, Comedy Central and Paramount - is not an invented teaching case. It is real, and its digital transformation is a matter of public record. It runs through the rest of this document, so meet it properly here.

Start where the framework says to start: with the **need**. Why does a company embark on this at all? The room's first answers were operational. The data team was flooded with work. Requests took weeks. People could not get their own numbers. All true, and all insufficient - because a digital transformation is not signed off by a technology chief. They lead it. The approval comes from the managing director and the chief executive, and that means the justification has to be financial.

Viacom, financial years ended 30 September	FY2014	FY2015	FY2016
Revenue (US$ bn)	13.78	13.27	12.49
Change in revenue	flat	down 4%	down about 6%
Adjusted net earnings from continuing operations (US$ bn)	about 2.4	-	about 1.5

Roughly a ten per cent fall in the top line over three years. Profit falling far faster - on the order of forty per cent. That combination is the alarm. A shrinking top line means subscribers are going elsewhere. A bottom line eroding four times as fast means the processes in between have become wasteful - the spend is no longer converting into business.

The chain of reasoning that gets a chief executive's signature
Promotional campaigns were running hard and subscriptions were not following. Those campaigns were not being decided on gut feel - they were data driven. So the data was pointing the wrong way. Customer expectations had shifted and the company could not see it. **That is not an IT problem escalated upwards. That is a business case for transformation, expressed in the only two lines a board reads.**

2.17 What Viacom Actually Fixed

Three takeaways came out of the room, and each one attaches to a box you already know.

Self-service scales; analyst-driven reporting does not

The scarce resource was never the technology. It was the analyst. The case records a technology chief describing his team as swamped, with people wanting more insight and simply not getting it - four weeks, six weeks, eight weeks. Read that against the model and it is a **service quality** failure, identical in shape to the logistics caselet. Self-service was the answer because it removes the queue, not because it is fashionable.

> *The idea was to bring requests that took two days to a week down to something immediate.*

The workforce was never the problem

This is the detail that makes Viacom useful for the readiness framework. The case is explicit that the team was deeply skilled, comfortable with large-scale data, comfortable in each other's code, movable between teams without friction. On the five-bucket chart, their workforce readiness would have been high. What was broken was the culture and the plumbing around them. Engineers receiving a data request had to work out where the data would come from and in what format, ask around, and repeat that discovery every single time.

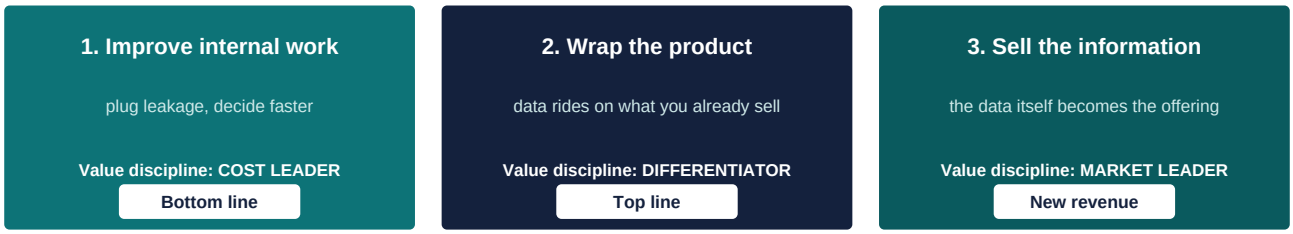
Human in the loop

The third takeaway was that model output had to be combined with human judgement rather than trusted blind. In the triangle from Section 2.15, that is the upper path - decision support, not decision automation. Automation did arrive later, once the systems matured, but it was earned rather than assumed.

What 'data culture' meant here, precisely
Not posters and town halls. The professor's own definition, and he is deliberate about not calling it data culture: **data has to be treated as another product line**. You already obsess over whether you are making a stylus, a bottle of water, a data centre or electrical machinery. Data is one more product on that list, nurtured the same way. The consequence is that no business leader gets to look at it in their own private fragmented way.

2.18 Data as a Product, Not a By-Product

If data is a product, it can be turned into money, and there are three known routes. The class pulled all three straight off the first page of a short reading.



Inside a company that does not sell data, the third leg disappears. You are left with the first two - and those two map exactly onto the value disciplines from the last session.

Wixom, B. H. & Ross, J. W. (2017). How to Monetize Your Data. MIT Sloan Management Review, January 2017.

The test for a data product: pull the data out and does the machine still run? For Uber it does not. That is a core activity, not a support one.

Three routes. Inside a company that does not sell data externally, only the first two apply.

Route one - improve the internal work

Data helps you improve processes and decide faster. Work completes quicker, wasted time and cost overruns get plugged. Which value discipline does that serve? The **cost leader**.

Route two - wrap the offering

Data rides along on what you already sell, and makes it unique. This is **differentiation**, and for service businesses it becomes the extra service you can charge a premium for. The example from the professor's current work: a company making sensor-enabled industrial equipment, with a sensor-enabled assembly line of its own. Vast volumes of real-time data, and all they were doing with it was internal dashboards. The proposal is to build the model internally and then **put it into the equipment they ship**, so their customers get real-time predictions along with the hardware. Same product, same customers, now with foresight attached - which nobody else in that market offers.

Route three - sell the information itself

Competitor data, economic data, exchange data - somebody's core product is your third-party feed. Strategically you go here when you want a near-monopoly position: your data becomes so useful inside your competitors' businesses that you rule the category. There is a gentler and more common version too, and it comes up constantly in supply chain conversations.

The supply chain version of selling data

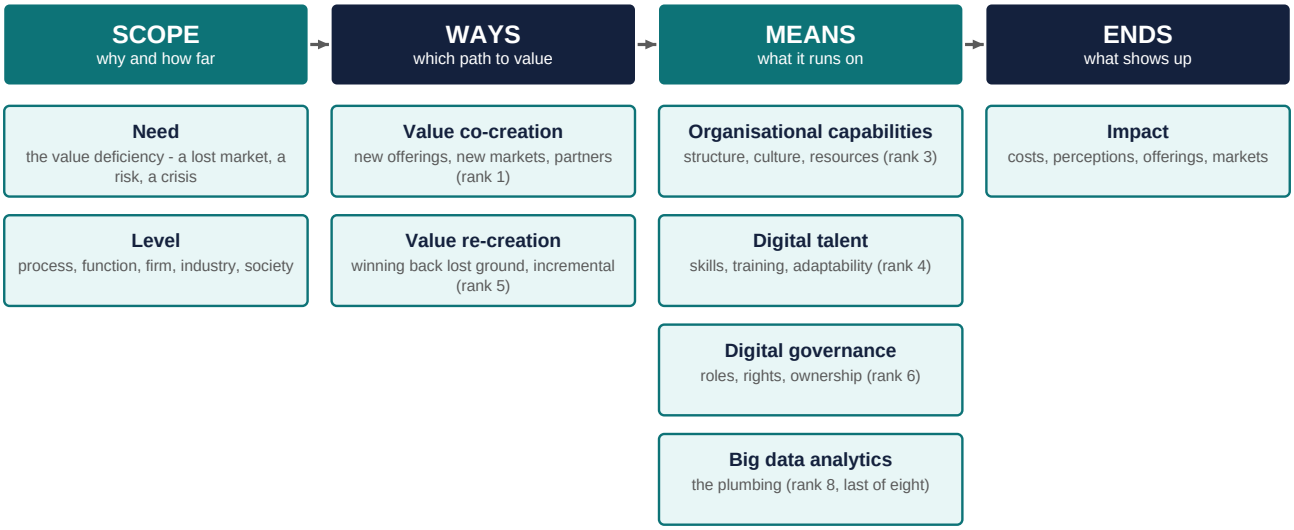
Take a large vehicle manufacturer with five hundred parts suppliers. Today the manufacturer raises an order, the supplier takes seven to nine days to produce, and the supply chain suffers. Now the manufacturer builds a data product on its own servers giving suppliers visibility of its assembly line and forward demand. Suppliers can plan inventory instead of waiting. That is **data visibility over the supply chain**, and it frees up working capital that was otherwise locked in inventory - which is exactly why a supplier would pay for it.

Why it is called a product and not an asset

Because it goes straight into value-creating activities, not support ones. It is not helping you with procurement; it is helping you with operations, marketing, sales and delivery. **The test: pull the data out and does the business still run?** Take data out of a cab-hailing app and no cab gets booked and no price gets set. When data stops being an enabler and becomes part of the core, it has become a product.

2.19 Scope, Ways, Means and Ends

Everything so far has been individual building blocks. This is the frame they hang on, and it is meant for leaders rather than practitioners. It comes from the professor's own research, published in 2024 in the Australasian Journal of Information Systems, and it is grounded in enterprise transformation theory. It was tested against two real cases - General Electric and Siemens - which is unusual and useful, because one of them failed.



Ranks are how prominent each element is across the DT literature, not how important it is on your programme.

Big data analytics ranks last because it behaves like a hygiene factor in Herzberg's sense - its presence earns no credit, its absence stops everything. 'Ways' is the new dimension the paper adds to Rouse's enterprise transformation theory.

Kumar, R. & Thakurta, R. (2024). Digital Transformation: An Enterprise Transformation Perspective. Australasian Journal of Information Systems, Vol 28.

Four foundational elements. 'Ways' is the addition this paper makes to the older frame.

Scope is why you are doing this at all and how far it reaches - the need, and the level (a process, a function, the whole firm, an industry). **Ways** is which path to value you take, and it is unpacked fully in Part 3. **Means** is what the journey runs on, also in Part 3. **Ends** is the impact - costs, perceptions, offerings, markets - which is the same 'net benefits' box from the IS Success Model wearing a strategic hat.

> **Why the technology ranks last, and why that is not a mistake**
> In the paper's ranking of how prominent each element is across the literature, big data analytics - the technology itself - comes last of eight. The explanation is Herzberg's motivation-hygiene idea: **analytics behaves like a hygiene factor. Having it earns you nothing; not having it stops everything.** It is the vehicle, not the destination - which is the same argument the professor opened the module with.

	General Electric - what went wrong	Siemens - what went right
Scope	No value assessment of the platform; existing shortcomings not considered	Clear goals from the outset, including a stated cost reduction target and a customer loyalty target
Ways	No strategic emphasis; the digital unit and the business units wanted different things	Initiatives built to strengthen each division's contribution, anchored on customer closeness

	General Electric - what went wrong	Siemens - what went right
Means	A centralised programme dropped into a decentralised company; leadership overconfident; culture suppressed bad news	Divisions structured around customer groups, ownership pushed down to them, a committee of divisional chief executives overseeing it
Ends	Short-term focus; customers did not understand or value the proposition	Cost benefits realised, image consolidated, growth opportunities taken

2.20 Where the Quality Ideas Come From

Three supporting frameworks were named in passing, and they are worth knowing because they are where the boxes in the IS Success Model actually came from.

SERVQUAL - the source of 'service quality'

The service quality dimension is borrowed from SERVQUAL, and its five criteria are easy to remember as **RATER**: Reliability, Assurance, Tangibles, Empathy, Responsiveness. Read those five against your own internal data team and you will find that most complaints about them are actually about responsiveness and assurance rather than accuracy.

Garvin's eight dimensions - the product parallel

For products rather than services, the parallel list is Garvin's eight dimensions of quality: performance, features, reliability, conformance, durability, serviceability, aesthetics and perceived quality. Useful when somebody asks you to define quality for a physical product and you want more than 'it works'.

The Balanced Scorecard - where all the loose ends go

The framework that ties this whole part together comes from Kaplan and Norton. It links four perspectives - **financial, customer, internal process, and learning and growth** - and shows the chain by which people capability produces better processes, which produce satisfied customers, which produce financial performance.

Perspective	What sits here	The scattered answers it absorbs
Learning and growth	People, skills, culture, knowledge	Training, knowledge, patents, capability building
Internal process	How the work actually gets done	Efficiency, productivity, operational excellence, cycle time
Customer	How the outside world experiences you	Customer satisfaction, loyalty, brand, retention
Financial	The scoreboard	Revenue, margin, working capital, shareholder value

> **Why this matters for a non-financial argument**
> Every scattered answer the class gave about value - customer satisfaction, productivity, operational excellence, knowledge, patents - has a home in one of those four perspectives, and each perspective feeds the one below it. **All roads lead to Rome. And your Rome is either a top line or a bottom line.** That sentence is how you connect a soft benefit to a hard number in front of a board.

2.21 Day Two - Practice Questions

Thirty questions. **The answer and a one-line reason sit immediately below each question**, so keep a sheet of paper over the teal strip while you attempt it, then slide the paper down to check. A cumulative set covering all three parts together is waiting at the end of the document.

Q31. The four building blocks in the anchoring reading are:

- **A)** Leadership, collaboration, data empowerment, value realisation
- **B)** Leadership, workforce, technology, governance
- **C)** Data, service, system, satisfaction
- **D)** Scope, ways, means, ends

Answer: A) Leadership, collaboration, data empowerment, value realisation These four come from the anchoring reading. Scope, ways, means and ends is the separate strategic framework from Section 2.19.

Q32. Which building block did the professor add to the four in the reading?

- **A)** Governance
- **B)** Workforce and its adoption
- **C)** Cybersecurity
- **D)** Analytics maturity

Answer: B) Workforce and its adoption The reading has nothing about people's willingness to accept what the machine says, which is exactly the gap the card-company caselet exposes. Section 2.10.

Q33. A collaboration problem between departments is very often, in disguise:

- **A)** A budget problem
- **B)** A leadership problem
- **C)** A tooling problem
- **D)** A regulatory problem

Answer: B) A leadership problem Whether departments share data is a culture question, and culture is set, raised or flattened by leadership. Diagnose them together or you fix the wrong one. Section 2.1.

Q34. In the logistics caselet, which TWO boxes of the IS Success Model were broken?

- **A)** System quality and use
- **B)** Data quality and service quality
- **C)** Use and satisfaction
- **D)** Service quality and system quality

Answer: B) Data quality and service quality Data arrived fragmented from several systems and was never believed; re-pulls took two days to two and a half months. System quality was present but not acute. Section 2.5.

Q35. Service quality, in the IS Success Model, is about:

- **A)** Whether the number is accurate
- **B)** How responsive the internal team is when somebody queries a number
- **C)** Whether the software loads quickly
- **D)** Whether the vendor contract is well written

Answer: B) How responsive the internal team is when somebody queries a number The reconciliation and re-pull your data team performs is a service being delivered to an internal customer. Two days for a two-hour decision is a service failure, not a data failure. Section 2.4.

Q36. The reporting interface takes two minutes to launch on a Monday morning. This is a failure of:

A) Data quality
B) Service quality
C) System quality
D) User satisfaction

Answer: C) System quality This is the artefact itself - does it load, respond and stay up. It destroys credibility just as effectively as a wrong number. Section 2.4.

Q37. The DeLone and McLean model added service quality as a separate dimension in:

A) The original 1992 version
B) The 2003 revision
C) The 2015 revision
D) It was never added

Answer: B) The 2003 revision The original model is from 1992. Service quality was added as a separate dimension in the widely used 2003 revision. Section 2.5.

Q38. In the card-company caselet, which box was broken?

A) Data quality
B) System quality
C) Use
D) Satisfaction

Answer: D) Satisfaction Everything to the left was fine and usage was high. What failed was trust - they used it and then overrode it. Section 2.6.

Q39. Two thirds of underwriting decisions being overridden with no reason recorded is evidence that:

A) The model is inaccurate
B) The users do not trust the output enough to act on it
C) The licences were never issued
D) The system is too slow

Answer: B) The users do not trust the output enough to act on it The model was accurate and the system was working. An override with no reason recorded is a satisfaction failure, which is why the fix was behavioural rather than technical. Section 2.6.

Q40. Which statement is correct?

A) Adoption is behavioural; usage is attitudinal
B) Adoption is attitudinal; usage is behavioural
C) Adoption and usage are the same thing measured differently
D) Usage always precedes adoption

Answer: B) Adoption is attitudinal; usage is behavioural Adoption comes first and lives in the head. Usage comes later and shows up in the logs. Getting this backwards is the most common error in this part. Section 2.7.

Q41. The Technology Acceptance Model rests on which two beliefs?

A) Perceived cost and perceived risk
B) Perceived usefulness and perceived ease of use
C) Perceived speed and perceived accuracy
D) Perceived support and perceived training

Answer: B) Perceived usefulness and perceived ease of use Two beliefs, and only two, in the classical model. Training exists to move the second one. Section 2.7.

Q42. Everything to the left of adoption is described as 'perceived' because:

- **A)** The measures are unreliable
- **B)** Nobody has used the thing yet, so these are beliefs not evidence
- **C)** The survey is anonymous
- **D)** Managers exaggerate

Answer: B) Nobody has used the thing yet, so these are beliefs not evidence We are still in the thinking phase rather than the doing phase, which is exactly why the dashed line on the diagram sits where it does. Section 2.7.

Q43. 'Continued intention to use' is the workplace equivalent of which marketing idea?

- **A)** Brand recall
- **B)** Repurchase intention
- **C)** Net promoter score
- **D)** Customer acquisition cost

Answer: B) Repurchase intention Continued intention to use is the same idea, except that here your employees are the customers. Section 2.7.

Q44. Which of these is NOT a usage metric?

- **A)** Licences issued
- **B)** Frequency of logins per day
- **C)** Override rate
- **D)** Time per session

Answer: C) Override rate The other three measure the tool. Override rate measures whether the tool changed a decision, which is the only one on the road to margin. Section 2.8.

Q45. The single intervention that fixed the card-company problem was:

- **A)** A new model with higher accuracy
- **B)** Mandatory retraining for all underwriters
- **C)** Requiring a written justification for every override
- **D)** Removing the override option entirely

Answer: C) Requiring a written justification for every override No new model, no new platform, no retraining. One change-management intervention. Section 2.9.

Q46. Why does requiring a justification work?

- **A)** It punishes the user
- **B)** It makes reasoning visible, removes the effortlessness of overriding, and creates measurable data
- **C)** It reduces the number of decisions taken
- **D)** It shifts accountability to the model

Answer: B) It makes reasoning visible, removes the effortlessness of overriding, and creates measurable data Three effects at once. Note that it does not remove the override - the professor was explicit that nothing was being forced down anybody's throat. Section 2.9.

Q47. An employee refuses to help improve an automation tool that could replace their role. This is best described as:

- **A)** A skills gap
- **B)** A psychological safety issue
- **C)** A data quality issue
- **D)** A licensing issue

Answer: B) A psychological safety issue No amount of training fixes it. What fixes it is leadership giving credible comfort that this is an enabler rather than a replacement, and then behaving consistently. Section 2.10.

Q48. The five readiness buckets are leadership, organisational, data, workforce and:

- **A)** Financial readiness
- **B)** Current decision intelligence
- **C)** Vendor readiness
- **D)** Regulatory readiness

Answer: B) Current decision intelligence It measures the head start that already exists - dashboards, data products, a reporting culture. Section 2.11.

Q49. On the readiness chart, an axis closer to the centre means:

- **A)** Higher readiness
- **B)** Lower readiness
- **C)** More budget already spent
- **D)** Better governance

Answer: B) Lower readiness Further from the centre means more ready. The innermost axes are where the constraint sits, and therefore where the money should go. Section 2.12.

Q50. If data readiness is the innermost axis and decision intelligence the outermost, where should the money go?

- **A)** Into a better reporting tool
- **B)** Into leadership alignment workshops
- **C)** Into unifying the data
- **D)** Into data literacy training

Answer: C) Into unifying the data The first three all target axes that are already strong. Spending on a strength that is not the constraint buys almost nothing, because the inner axis still blocks the value. Section 2.12.

Q51. Workforce readiness scoring higher than organisational readiness suggests:

- **A)** People lack skills
- **B)** People are capable but the collective culture stalls the workflow
- **C)** Leadership is disengaged
- **D)** The data is unreliable

Answer: B) People are capable but the collective culture stalls the workflow Individually skilled, collectively stuck. That is cultural resistance, and it needs change management, not another training programme. Section 2.12.

Q52. The professor distinguished mistrust from distrust. Mistrust is:

- **A)** A judgement you have formed about something
- **B)** A doubt you cannot resolve
- **C)** A refusal to use a system
- **D)** A synonym for distrust

Answer: B) A doubt you cannot resolve Distrust is a judgement you have formed about something. Mistrust is what bad data leaves you with - you simply cannot settle whether the number is right. Section 2.12.

Q53. For a quantitative survey, the Hair and Black rule of thumb is roughly:

- **A)** Ten responses per bucket
- **B)** Ten responses per question
- **C)** One hundred responses regardless
- **D)** Thirty per cent of the population

Answer: B) Ten responses per question Per individual question, not per bucket. With thirty-odd questions, forty-nine responses is thin but workable for a demonstration. Section 2.13.

Q54. In a qualitative study, you stop interviewing when:

- **A)** You reach thirty interviews
- **B)** The same pain points start repeating - saturation
- **C)** The budget runs out
- **D)** Half the organisation has been covered

Answer: B) The same pain points start repeating - saturation In the professor's experience that shows up after seven or eight interviews, which is why five well-chosen respondents can be enough. Section 2.13.

Q55. Survey participation rates depend most on:

- **A)** The length of the questionnaire
- **B)** Who asks and how they ask
- **C)** Whether it is anonymous
- **D)** The software used

Answer: B) Who asks and how they ask A chief executive asking lands differently from a technology chief asking, and three live sessions land differently from one email. Same request, very different response rates. Section 2.13.

Q56. The story of moving the data chief's reporting line to the chief executive shows that:

- **A)** Centralisation always wins
- **B)** Every organisation design fixes something and breaks something else
- **C)** Data teams should report to technology
- **D)** Structure has no effect on outcomes

Answer: B) Every organisation design fixes something and breaks something else Moving the reporting line solved the influence problem and created a new one, where the data team stopped listening to the business. There is no correct chart. Section 2.14.

Q57. In the information systems triangle, a decision SUPPORT system is one where:

- **A)** The system decides and acts alone
- **B)** A human reads the output and decides
- **C)** There is no data pipeline
- **D)** Only transaction processing happens

Answer: B) A human reads the output and decides If the output triggers an action with nobody in between, you are in decision automation - a different world with a different risk profile. Section 2.15.

Q58. How is decision automation properly earned?

- **A)** By buying a more accurate model
- **B)** By keeping a human in the loop for years, tracking disagreement, and removing the human only when error is negligible
- **C)** By regulatory approval
- **D)** By retiring the legacy system

Answer: B) By keeping a human in the loop for years, tracking disagreement, and removing the human only when error is negligible Redeploying that person afterwards is what the professor calls capability building. Section 2.15.

Q59. Which of the three data monetisation routes disappears inside a company that does not sell data externally?

- **A)** Improving internal work
- **B)** Wrapping the offering
- **C)** Selling the information itself
- **D)** None of them disappear

Answer: C) Selling the information itself Inside a company that does not sell data externally, the third leg disappears and you are left with the first two - which map onto cost leadership and differentiation. Section 2.18.

Q60. In the published framework, big data analytics ranks last of eight themes because:

- **A)** It is unimportant
- **B)** It behaves like a hygiene factor - presence earns nothing, absence stops everything
- **C)** It was added late to the paper
- **D)** The authors dislike technology

Answer: B) It behaves like a hygiene factor - presence earns nothing, absence stops everything Herzberg's idea, applied to technology. It is the vehicle, not the destination, which is the argument the whole module opened with. Section 2.19.

PART 3 — Day Three - Choosing the Path and Building It

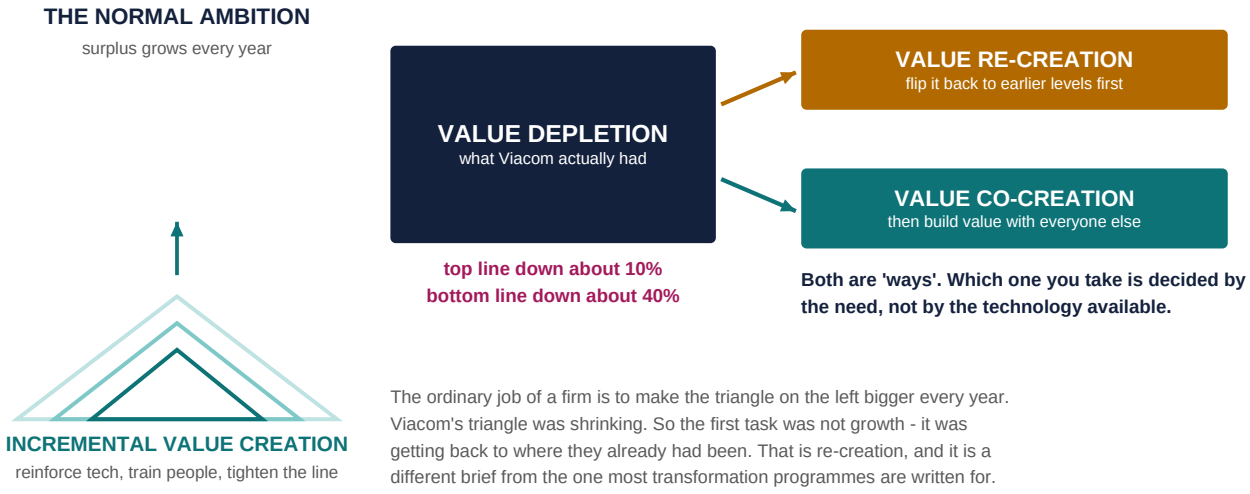
Re-creation, co-creation, the ingredients, and data products

Part 2 closed the question of how you prove a transformation worked. This part closes the two halves of the framework that were still open. First the ways: when a company's value is shrinking rather than growing, the job is not growth - it is getting back to where you already were, and that is a different brief. Then the means: the five ingredients any transformation actually runs on, and a long, practical walk through the one that gets skipped most often, which is data products. It ends where the module has been pointing since day one, at data governance.

3.1 Value Depletion, and the Two Ways Back

Start with the Viacom recap. Revenue falling year on year, somewhere in the ten to fifteen per cent range across the window discussed in class, and the bottom line falling far faster - roughly forty per cent. The reading of those two numbers together is what matters. A shrinking top line says market share is going. A bottom line falling four times faster says the money being spent to hold customers is not converting, so every retention effort has become pure operating cost, cooling the profit line further.

Now put that against what a healthy firm is normally trying to do. The ordinary ambition is not just to create value but to **magnify it every year**. More applications, more training, a more streamlined production line, and the surplus grows. That is **incremental value creation**, and it is what most transformation programmes are written for.



Two different briefs. Growing an existing surplus is one job; reversing a shrinking one is another.

Why the distinction is not academic
If your value is already growing, you are asking how to grow it faster. If your value is shrinking, the first question is how to get back to where you were - and only after that do you start building up again. **Confuse the two and you will fund a growth programme for a company that needs a repair programme**, which is roughly what happened at General Electric in Section 2.19.

3.2 Business Transformation, and What It Is Not

A definition worth fixing, because the class had been using one term for three different things. You met the four transformations in Section 1.14; this is the same distinction pressed harder.

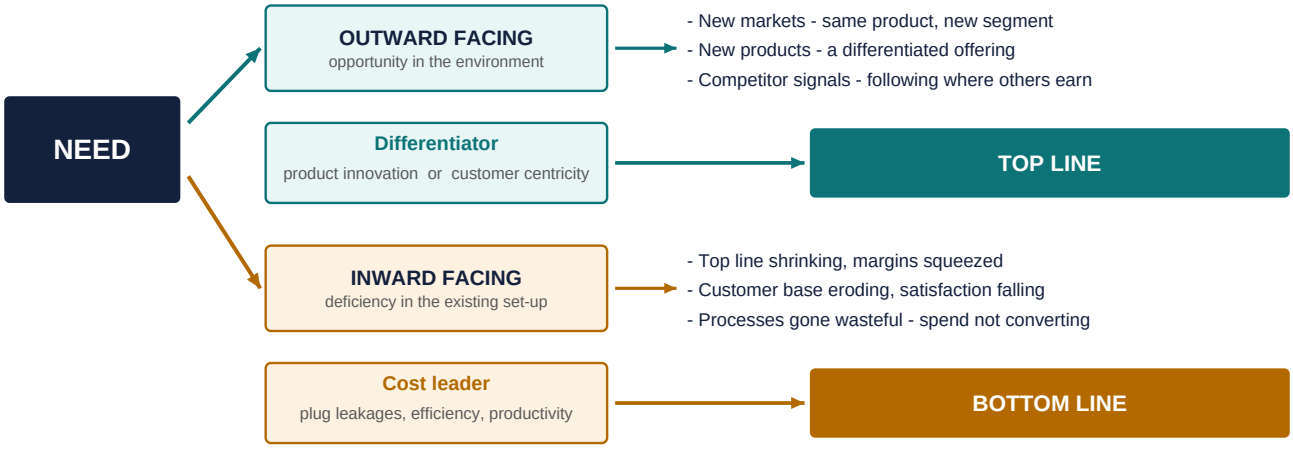
Term	What it actually is	Everyday tell
IT-enabled organisation transformation	You roll out a couple of applications. Onboarding gets easier, some manpower time is saved, efficiency and productivity move a little	The work is the same work, done faster
Business transformation	**The business drivers themselves change - new markets, new segments, a different way of operating the business**	**You are somewhere you were not before**
Digital transformation	A business transformation where digital technology is what makes the new position possible	Remove the data and the new model collapses

The test the professor kept coming back to: **going from point A to point B with a positive outcome**. Migrating from an in-house ERP to SAP does not pass it. The transactions are the same, the approvals are the same, the invoices and audit trails are the same. Those systems sit in the support activities of the value chain and feed the primary ones. Useful, expensive, necessary - but not business transformation.

A question that will come back
'We have launched fourteen applications in six years, we are on a digital transformation journey.' No. Fourteen applications means your ecosystem can now capture transactions. That is worth doing and it is a precondition for everything else, but it is not the thing itself.

3.3 The Need Tree

Every transformation starts from a need, and needs come from exactly two directions.



Viacom sits on the lower branch. Not an opportunity spotted - a deficiency that could no longer be ignored.

Thumb rule only, and not always true. Plenty of programmes carry both branches at once.

Outward-facing needs are opportunistic and chase the top line. Inward-facing needs are about shortcomings and chase the bottom line.

Outward facing - you sense an opportunity

Something in the external environment looks like it can be taken. It could be a **new market** - the same product going to a different customer segment. It could be a **new product** - the professor's example was a digital stylus reworked into a tool for sophisticated digital art rather than plain writing. Or it can come from watching competitors, where you see where a rival is earning and move onto that ground. That last route makes you a follower rather than a leader, but it is a real and common trigger.

Inward facing - you identify a shortcoming

Nothing outside looks especially attractive. What has happened is that the top line is going, margins are shrinking, the customer base is eroding and customers are not satisfied. You will still transform, but the purpose is completely different, and so is the value discipline you end up pulling on. Shortcomings push you towards plugging leakages, reinforcing efficiency and productivity - which is cost leadership, aimed at the bottom line.

How to answer a need question

Name the direction first, then the value discipline, then the line it targets. **Outward, opportunistic, differentiator, top line. Inward, shortcoming, cost leader, bottom line.** Viacom is the second one throughout - the need was not an opportunity spotted, it was a set of numbers that had become unmanageable.

3.4 Two Flavours of Differentiation

If you are a differentiator, there are two quite different ways to be one, and the class worked through both with the same example.

Product-based innovation

Take any Indian car manufacturer. A well-known Japanese brand already owns the quality association, so you need a distinction of your own. You put in sensors, your safety features go to a gold standard, your car becomes a five-star vehicle at the same price. Everything else stays as it is. **The uniqueness is in the product**, and customers may reward it with a premium.

Customer closeness

Same car, same production line, nothing changed about the product. What changes is the nature of the annual maintenance contract, roadside assistance free for life, possibly a forward agreement with a buyback attached. You buy this car and pay a premium because you will not have to worry about it for as long as you own it. **The uniqueness is in the relationship, not the metal.**

The quick commerce question, answered
A participant asked whether the shift in consumer goods from the corner shop to supermarkets to self-service formats and now to ten-minute delivery counts as customer closeness. It does, and the reasoning is clean: the biscuits and the soap have not changed. What changed is how they reach you - no travel, no waiting, pre-delivery, discounts, loyalty. Every one of those is a customer-centric intervention layered on an unchanged product.

3.5 Who Is Driving It Changes How It Runs

A short section, and one of the more useful things in the module, because it is about reading a situation rather than a framework.

If the need was **sensed by the chief executive or the board** - somebody who saw the opportunity or the erosion early - then leadership is championing the transformation from the start. When leaders are genuinely on board, the way the thing gets steered, driven and executed is fundamentally different.

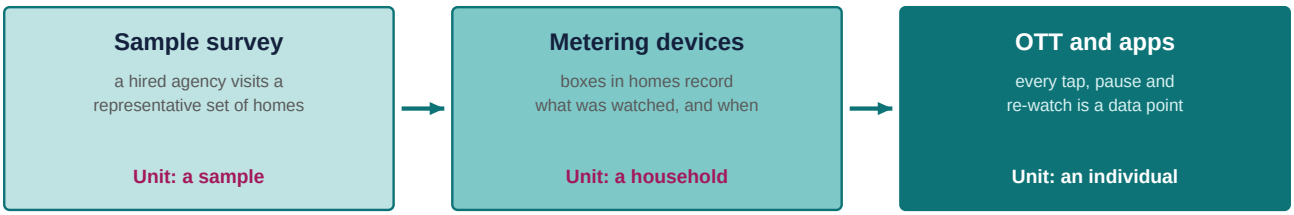
If instead the need arrived **from the bottom up** - the operations team or the business development team complaining after bad results, then proposing a fix - the leader may never have full commitment to it. Same framework, same technology, a completely different implementation.

The question to ask on day one
Not just 'what is driving this digital transformation' but '**who** is driving it'. That answer is one of the key ingredients of the blueprint, and it will tell you more about the programme's odds than the technology stack will.

3.6 Viacom's Long Walk to the Individual Viewer

To understand what Viacom was trying to do, the professor took the class back several decades - to black and white television sets, Sunday morning programmes and the mythology serials in the nine to ten slot. How did anybody know those slots worked?

Not by gut feel. A third-party agency was hired to understand viewership, and it ran a **sample survey** - not a full count of everybody. Representative, spread across regions and time slots. And that is where the first ceiling appears.



What improved at every step: generalisability.

What was still missing until the last step: personalisation.

A sample of three thousand viewers can tell you the pattern. It cannot tell you about the three hundred thousand, and it certainly cannot tell you about you. The metering boxes fixed the first problem and created a second one: with grandparents, parents and children all watching the same set, the finest unit available was still the household.

Only when viewing moved to individual devices did the unit of analysis become one person - and that is when the data problem exploded.

Three eras, three units of measurement. Each step buys generalisability; only the last one buys personalisation.

The two ceilings

First ceiling: generalisability. An analysis run on three thousand viewers cannot be confirmed for three hundred thousand. The pattern more or less matches, but in the pursuit of generalising, personalisation was compromised entirely. No customer closeness was possible.

Second ceiling: the household. So they invested from their surplus into technology, working with vendors who deployed metering devices in homes that recorded durations, hours and timelines. Better - except that a decade ago families were larger. Grandparents, parents, children, all in front of one set. The unit of measurement was still the family, and family-level viewing is scattered and varied. Still generalised, just at a finer grain.

Then streaming arrived, and with it individual devices and individual logins. The unit of measurement finally became one person. And that is exactly when their appetite for data started increasing, their questions multiplied, and - the professor's phrase - their **decision making got paralysed**. They were capturing far more than they could use.

Where the pain moved to

Notice what actually happened. The early problem was not analysis, it was capture and storage - which is **digitisation**, the rung from Section 1.4, and an antecedent of transformation rather than a substitute for it. Once metering did the capturing automatically, Viacom stopped investing in collection at all and that money moved into building data pipelines. They now had transactions and data points. What they had a shortage of was **insight** - the analysis was either not comprehensive, or not accurate, or too late, so decisions were not actionable.

3.7 Dashboards Look Backwards

A short but sharp idea, and one worth using in your own organisation. **A dashboard culture is retrospective analysis.** Not sometimes - always.

Open a dashboard at four in the afternoon. The last update might be two o'clock, or nine in the morning, or yesterday's close, depending on your delay. Even with sensors and near real-time reporting, at 4:18 pm you are reading data from 4:05. Whatever you are looking at has already happened. Write it as **T minus K**, where T is now and K is your delay. K can be squeezed. It cannot be made zero, and it can never be

made negative.

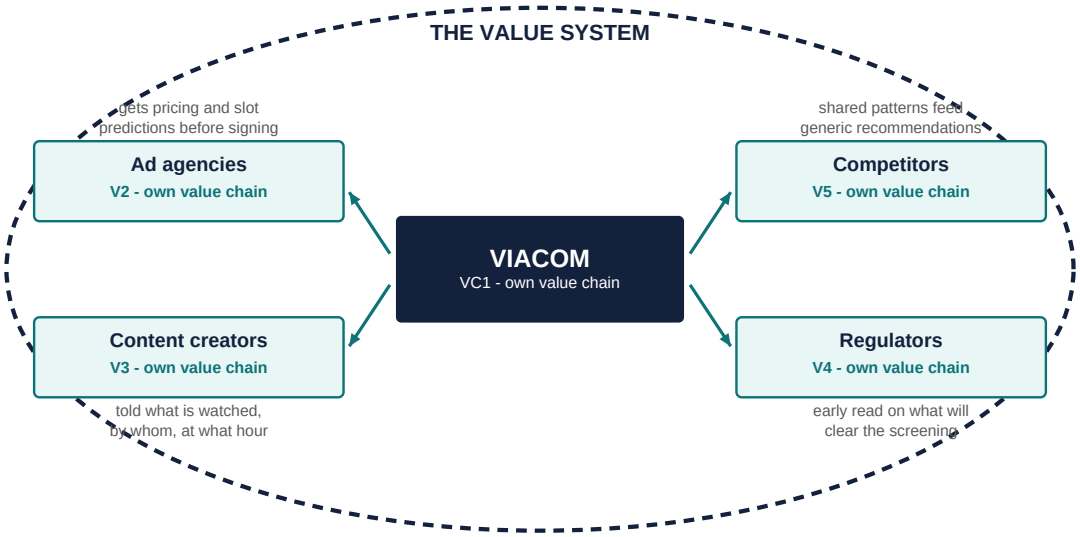
> *The whole Viacom case was about business intelligence. What they then did was extend it - from measures of what happened into predictions of what is going to happen.*

That extension is the hinge of the case. Self-service reporting removed the dependency on analysts, which was a re-creation move. Moving the same ecosystem from backward-looking measures to forward-looking insight is what opened the door to everything in the next section.

3.8 Five Value Chains, One Value System

So what is **value co-creation**? Several people in the room answered 'working together with internal teams towards a common goal'. That is collaboration, and it is a fine thing, but it is not co-creation - because a value chain, as established in Part 1, is drawn from the point of view of a single firm.

Co-creation happens when **separate firms, each with their own value chain, all end up better off**. Viacom is the clean example, and it has five chains in it.



Five independent value chains. Viacom does the heavy lifting on data and every one of the other four ends up better off.
That is what value co-creation means - not a project team collaborating internally, but separate firms whose value propositions all rise together. Swap the recreation industry for e-commerce and the shape holds: platform, tech vendors, sellers, delivery partners, customers.

Viacom does the heavy lifting on prediction. Four other kinds of firm get value out of it, and the whole system rises.

Stakeholder	What Viacom relays to them	Why they take it
Advertising agencies	This advertisement, at this hour, in this location, should carry this price	Viacom's ability to predict is more mature than theirs, so they trust its judgement over their own - and both sides negotiate faster
Content creators	What kind of content is being watched, at what time, by whom	Producers and directors start commissioning against the insight rather than instinct
Regulatory bodies	An early read on which titles are likely to clear screening	Fewer surprises for them; Viacom avoids signing contracts that will not pass

Stakeholder	What Viacom relays to them	Why they take it
Competitors	Aggregate patterns of what is popular across a region	It is what makes the generic half of a recommendation engine work

Why your feed has two personalities
Log into a streaming service from your tablet and it shows you mythology and cartoons. Log into the same account from your phone and it shows you food videos. That is the personalised half of the recommendation engine. But the first item in your feed may still be cricket highlights everybody in your region is watching, which you personally do not follow. That is the generic half, and it runs on exactly the kind of shared, aggregate pattern data described above.

3.9 Co-opetition, and What It Is Not

Sharing pattern data with competitors has a name. **Co-opetition** is a blend of cooperation and competition: rivals collaborating in a defined space where everybody gains, while still competing everywhere else. Common payment systems in financial services are the standard example - all participants collect data, share it under agreed rules, and each makes money from the shared analysis. It is fundamentally a game-theory idea. One player defects and everybody is worse off.

The correction the professor made in class
A participant described competitors joining together to push a government not to enforce a rule. That is **lobbying**, not co-opetition. Co-opetition is a strategy for creating value that none of the participants could create alone. Lobbying is collective pressure applied to a third party. Different mechanism, different intent, different literature.

3.10 The Means: Five Ingredients

Ways are done. Now the means - what the transformation actually runs on. The professor's framing for practitioners: if digital transformation is the finished dish, these are the ingredients, and the question is how much salt, sugar and spice each situation needs.

MEANS - the ingredients of a digital transformation

1	**Organisational capabilities** culture | structure and design | decision making
2	**Leadership** pulled out on its own after the paper was published
3	**Workforce** ability, and attitude - the two are different problems
4	**Data governance** printed as digital governance in the 2024 paper
5	**Big data analytics** or decision intelligence, as the umbrella

If digital transformation is the finished dish, these are the salt, the sugar and the spices. The recipe changes by firm; the ingredient list does not.

Impact - the fourth block of the framework - was already covered through the IS Success Model in the previous session.

Leadership sat inside organisational capabilities in the 2024 paper. Practice since then has convinced the professor it deserves its own line.

Four of these come straight from the published framework. Leadership was pulled out separately afterwards, on the strength of practice.

One honest note. In the 2024 paper, leadership sits inside organisational capabilities. Since publishing, working on the practitioner side has convinced the professor that leadership carries enough weight to be a separate ingredient. That is a live revision, not a settled one, and it is worth knowing which version you are quoting.

3.11 Organisational Capabilities

Three things sit under this heading, and the third one is contested even by the professor.

Culture

The broadest of the three and the one that absorbs most other answers. When the class offered 'processes' and 'innovation' as separate capabilities, both were folded back into culture. Innovativeness is a cultural question - how much does this place foster it, and are you allowed to be wrong? Culture is also extremely sticky. It does not change over quarters. It changes over decades.

Structure, or organisational design

The one that interacts most closely with culture. You will know it from organisational behaviour as the mechanistic-versus-organic distinction, or in plainer terms as flat versus hierarchical. In an organic setup you can walk in with a new product idea and be allowed to run with it, including the freedom to be wrong - no justification of returns demanded for a trial. In a mechanistic one you cannot.

Decision making

The professor keeps this separate even though many would file it under culture, because the module is about decision intelligence. Two things matter. First, **how long a decision takes**: a model produces an output, it escalates to a senior manager, then a vice president, then a senior vice president, and three days are gone. Second, and more important, **what kind of decision making is ingrained**.

Objective versus discretionary, and why it predicts resistance
If your organisation habitually decides objectively - from numbers on a dashboard - people will naturally accept outputs coming from models, because it is the same habit. If your history is subjective, discretionary and expert-based, **expect real resistance** to letting a model decide. It may fade with time, but the first few months or years will be a fight. This is why the professor treats existing decision intelligence as a **head start** rather than a capability - it tells you how fast you will be able to move before you start.

3.12 Leadership and Culture: Which Shapes Which?

The professor put this question to the room and then admitted he cannot answer it either. Most of the class said leadership shapes culture. A few said both. Both is right, and he made the point with two stories rather than a citation.

The instruction that worked because of how it was said

Mid-session he needed the recording paused, and he gave the instruction in Bengali rather than English - and it was obeyed immediately. His reading of his own behaviour: that had nothing to do with the authority of the chair. Whoever sits in that chair might get compliance or might not. What worked was a cultural trigger, in this case a very nuanced one - a shared language.

The meeting that lasted two minutes

He chairs the students' affairs committee at the institute, which puts him opposite the administration on hostel infrastructure, sports facilities and the rest. Ahead of the annual inter-institute sports meet he raised that facilities were not improving, and a meeting was convened. His single ask was not equipment or budget. It was that **people reply to his emails**, with start dates and end dates. The meeting took two minutes.

The point he drew from it: this has been perennial across directors and administrators, all of them capable. It is a sixty-year-old legacy in which email simply does not get answered, and minutes of meetings do not move things - a leader calling people into a room does. So here the organisational culture is shaping how leaders behave, not the other way round.

How to use this rather than argue about it
The relationship is two-way. Leadership can scale a culture up or down, and culture quietly constrains what any individual leader can do. In a diagnosis, do not try to separate them - ask instead which one is currently the binding constraint on the behaviour you want to change.

3.13 Workforce: Nothing In It for the User

A participant from a large retail group described migrating from Oracle to SAP, and answered 'don't ask' when asked how the workforce was finding it. That case is worth working through, because it is not a leadership failure and it is not really a culture failure either.

Run the acceptance logic on it honestly. Is SAP useful? Yes. Was the Oracle system useful? Also yes. Is SAP easy to use? Possibly, but their comfort is already sitting with the old system, so ease of use is going backwards for them personally.

Now ask the question almost nobody asks
What is in it for the individual? Same transactions recorded, same approvals, same attachments, same invoices, same clearance times, same audit trails. The organisation gets scale and a supported platform. **The user gets nothing measurable and loses what they were comfortable with.** Perceived usefulness, at the individual level, is close to zero. That is the whole explanation for the inertia.

Ability and attitude are two different fixes

The professor separates these deliberately. With an ERP migration, people usually have the ability - the problem is attitude, and it flows from the individual, not from the organisation chart. With a model it flips: you get an output and you are clueless about how it was produced, and now the issue is less cultural and more about individual capability. Are they trained? Have they been made confident? And beyond ability, is there a psychological safety issue sitting underneath, where helping the system get better is helping it replace you?

A clean diagnostic sentence
Ability gaps are fixed with training and exposure. Attitude gaps are fixed with change management, communication and something genuinely in it for the user. Spending training money on an attitude problem is the most common and most expensive mix-up in this space.

3.14 Grassroots or Big Bang

The last stretch of the module went to data products, anchored on a short reading. The article opens with two real companies that got it wrong in opposite directions.

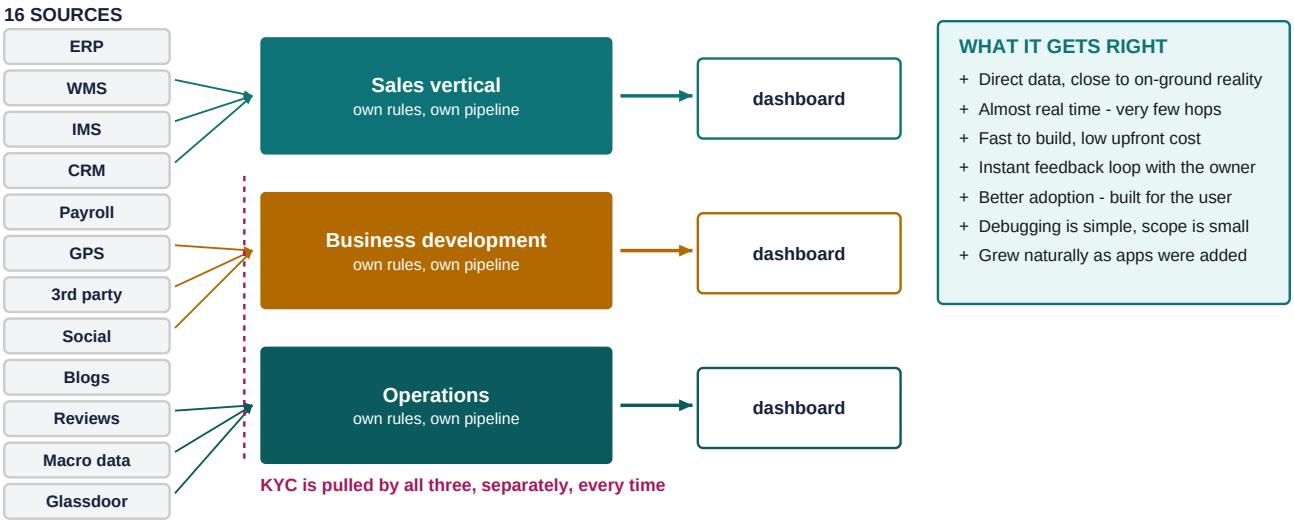
Approach	What they did	How it failed
The big bang a large Asia-Pacific bank	One massive programme to extract all data, clean it and dump it into a cloud data lake, without first aligning to any business use case	Three years later, only occasional analysts wanting historical data could use it. Real-time needs like personalised customer offers were never in scope. Very little value generated
The grassroots the opposite extreme	Every team assembles the data and technology it needs, for the use case in front of it	One-off pipelines that cannot be reused, and a tangle of custom architectures that are expensive to build, manage and maintain

Big bang, grassroots, and the base gravy
The professor's kitchen version, which is easier to carry into a meeting than the article is. The big bang is cooking every dish on the menu before anybody has ordered, and then finding out nobody wanted what you made because you never asked. The grassroots is a fast-food kiosk chopping onions from scratch for every single order - nothing is reusable, everything is repeated. A good restaurant does neither. **It makes one base gravy in the morning, and from that one base it produces paneer butter masala, and the rest of the menu.**

That base gravy is the whole idea. The article's own version is a car maker with one standard base model and customisable options - different seats, different trim, for different buyers. One base, many users, improved over time on the strength of feedback, while components get reused for efficiency.

3.15 Inside the Grassroots Architecture

The class was split in two and asked to argue the advantages and costs of each structure. Here is the grassroots picture the professor then drew, with the group's answers mapped onto it.



This is not a design anybody chose. It is what an organisation becomes when an ERP arrives in 2006, a warehouse system in 2008, an inventory system in 2011, and then applications every year after that - each one wiring its own pipeline the week it goes live.

The brown workers in each pipeline are real people. Six pipelines mean roughly nine of them, doing the same cleaning nine times.

Sixteen sources, three departments, three pipelines, three dashboards. Nobody designed this. It accumulated.

What it gets right

The advantages the group found are real and worth defending. The data is **direct** and close to actual on-ground conditions, because it is very few hops from source to screen. It is close to real time for the same reason. **Adoption is better**, because whoever built it built it for that specific business owner. The feedback loop is instant - the same person who wrote the rules handles it when something breaks. It is faster to build, cheaper up front, and simple to debug because the scope of any one pipeline is small.

What it costs you

Problem	What it looks like in practice
Duplication	Customer verification data is pulled by three departments separately. So is the customer master, so is the product master. Same cleaning done three times
Redundancy and cost	At company level you are burning the same computing resource repeatedly for no new information. It is a recurring running cost, not a one-off
Lack of standardisation	The business team reports revenue in units, accounts in rupees, operations in tonnes. All three are in the chief executive's room debating one number, and the first fifteen minutes go to reconciling it
No single source of truth	There is no consistency or reliability for leadership, because there is no one place the number comes from
Scalability	Sixteen sources works. Add years of applications, free-floating spreadsheets, and reports downloaded from dashboards that then become somebody's data source, and it does not
No complete customer view	The same customer transacts in three places - investments, insurance, credit - and no department knows it is the same person
Ungoverned flow	Sensitive data moves between departments with nothing governing it, which is the classic route to unapproved tools appearing across the business

3.16 Inside the Monolithic Architecture

Now the other structure. Everything from every source is staged in one place - the landing zone, whatever your vocabulary. The professor's analogy: all flights coming into the same airport.



Two skilled people - data architects and engineers - maintain the whole thing, against roughly nine in the grassroots version. That is the operating cost advantage. But building it is capital heavy, and it takes three to five months at best, six to nine on a larger estate.

Control buys you symmetry. It also installs guardrails. Pulling data straight off a server needs skills a business user does not have, and access they usually are not given - so the very flexibility the grassroots model had is now a barrier.

One route in, one transformation, one version of the truth - and a set of guardrails on the way out.

The sentence that separates staging from usefulness
Once everything is staged, it is **accessible but not usable**. Text, sensor streams and half-structured third-party feeds do not behave like your ERP. They have to be transformed and structured before they become facts and dimensions - customer, product, supplier on one side; attributes, reviews, quality checks, location, age and value on the other.

The trade the group identified

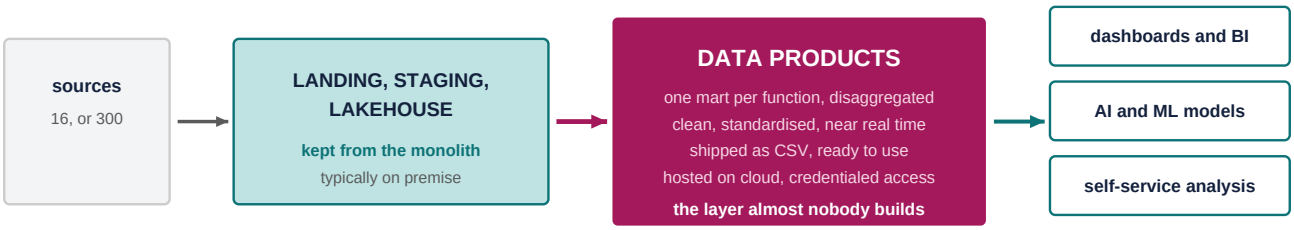
	Monolithic	Grassroots
Single source of truth	Yes	No
Duplication	Removed	Everywhere
Governance and security	Easier - one place to control	Hard - data is spread out
Capital cost	Heavy up front	Low
Running cost	Low - two skilled people run it	High - roughly nine doing the same work
Time to build	Three to five months at best, six to nine on a large estate	Days to weeks
Business user can self-serve	Not really - skills and access both missing	Yes, that was the point
Failure mode	Single point of failure	One pipeline breaks, the rest survive

Gold at home, or gold in the bank locker
On the security question, a participant put it well: a hundred households each keeping gold at home is easy pickings for a hundred small thefts, and moving all of it into one bank locker is far more regulated and far less likely to leak. But the bank is now a single, very attractive target, and the risk concentrates. Neither is safe by default - what changes is the shape of the risk you are managing.

On the single point of failure the professor was relaxed, and for a specific reason. If the central store goes down for a few hours, the layer described in the next section acts as the backup. What gets compromised is not availability but **delay** - you were getting twenty-minute-old data, now you are getting two-hour-old data.

3.17 The Hybrid, and the Data Product Layer

Asked which structure is better, the room converged on a hybrid, and the professor agreed - but the fusion has a precise shape. **It is not a blend. It is a cut.**



The fusion is a cut, not a compromise. Keep the monolith up to the lakehouse, because that is where its uniformity comes from. Then restore grassroots freedom on the other side by handing each function its own ready-made, governed data set.

Think of what a public dataset gives you: comprehensive, clean, uniform, documented, ready. That is the standard a data product has to meet internally.

The computation then rests here rather than inside Qlik, Tableau or Power BI - which means a business user can build a model on a whim without justifying the return on investment of a proof of concept, because the data reached them at low cost or no cost.

Desai, V., Fountaine, T. & Rowshankish, K. (2022). A Better Way to Put Your Data to Work. Harvard Business Review, July-August 2022.

Keep the monolith up to the lakehouse. Then insert a layer almost nobody builds, and give the freedom back.

Keep everything up to the lakehouse, because that is where the monolith's uniformity and single version of the truth come from. Then, before the dashboards and the models, insert a new layer: **data marts, split by function**. Each department gets its own tables and files - comprehensive, clean, uniform, standardised, good quality, close to real time. **Those are your data products.**

Why CSV and not a spreadsheet

A small detail the class worked out together, and a good one to be able to explain. Data products are shipped as CSV rather than XLSX because CSV is lightweight, plainly machine readable, supported natively by every reporting tool, and free of the encoding complications and the row ceiling a spreadsheet format carries. If your user base grows and your format caps out at around a million rows, your product is obsolete. CSV keeps the flexibility.

What the layer actually unlocks

- **Self-service without a business case.** A business user can pick up the data and build a model without justifying the return on a trial, because the data reached them at low cost or no cost.
- **Future uses you have not thought of yet.** You built the mart in consultation with the business users, and it sits at their disposal for whenever they want it.
- **Computation moves off the reporting tool.** The heavy lifting rests in this layer rather than inside Qlik, Tableau or Power BI, which is both cheaper and more comprehensive.
- **Collaboration between departments becomes possible.** When leadership asks departments to work together, what they now share is data products - and models built on several of them together are more powerful than anything one department could build alone.

The answer to 'is data an asset or a product?'
A product, because it goes straight into value-creating activities. It is not helping with procurement; it is helping with operations, marketing, sales and delivery. It has stopped being a support activity and become part of the core.

3.18 Data Governance

Build that layer and a set of questions arrives immediately. What rules are you writing here? How is the data being structured and transformed? Who monitors the quality checks? How is each field defined? Who can access what, who can share it, and who can share it without removing names from it?

Answer all of those and you have made data cataloguing easier, description-of-data management easier, and lifecycle management easier. Security gets tighter. Taken together, that is **data governance**.

Data governance is not data quality
Ask most clients about data governance and you get an answer about data quality. That is not the case. **Data governance subsumes data quality.** Quality is one important building block inside it, alongside ownership, rights, stewardship, classification, access and accountability. The regulatory push in India through the Digital Personal Data Protection Act is doing to Indian firms what GDPR did in Europe - forcing the conversation whether or not anyone wanted it.

Digital governance, data governance, and an honest footnote

The framework in the 2024 paper prints this ingredient as **digital governance**. The professor's actual argument, then and now, is **data governance**. When the paper was written the construct was not considered mature enough, and the reviewers' line was that a paper on digital transformation discussing analytics - customer expressions from blogs, emails, reviews, social feeds - had to bundle it under digital governance. He agreed and published. **If you are quoting the paper, say digital governance. If you are building a blueprint, it is data governance.**

A common deployment pattern

The staging and lakehouse area sits **on premise**, while the data products sit on **cloud** servers. Users hold credentials, log in, and fetch what they need - into a dashboard, or into a hosted analysis environment rather than onto their own desktop, which is usually locked down anyway.

> **Why governance is not paperwork**
> Ungoverned data flowing between departments leads to unapproved tools appearing across the business - people using whatever gets the job done, outside any oversight. That is the grassroots structure's real cost, expressed in security terms. **Governance is not something laid on top of the architecture; it is what makes one architecture safer than the other.**

Finally, three words the module insists are not synonyms, and which you first met in Section 1.16. **Data governance** is about ownership, definitions, quality, access and sharing. **Data security** is about protecting the data itself. **Cyber security** is about protecting the systems and applications. Data teams generally assume the technology team owns the third - which is exactly why the reporting lines discussed in Section 2.14 matter.

3.19 What the Module Could Not Fit

The professor was straightforward about what three weekends could not cover, and named it so the batch knows where the edges are. None of it is examinable, but all of it is the natural next step if this subject

becomes part of your working life.

Left open	Why it matters, and what it actually contains
Data governance in depth	He teaches this as a separate module of roughly six hours, including building a data catalogue in class. Everything in Section 3.18 above is the surface of it - the full version covers stewardship, classification, access models, lifecycle rules and the catalogue itself
Change management for digital transformation	Distinct from generic change management. It is specifically about **how the relationships get realigned**: how your data team interacts with your technology team, how it interacts with business users, and how it interacts with processes - all of it rebuilt in phases and stages rather than in one move. It is the missing ingredient in most of the failures described in this document
Responsible AI and AI governance	A separate basket again, and the subject of his current research, including recent work on responsible AI in healthcare. As models start deciding rather than advising - the lower path of the triangle in Section 2.15 - this stops being optional

The one of those three you will meet first
Change management. Look back at the failures in this document and count how many were technical: almost none. The card company's overrides, the retail group's inertia, the reconciliation queue at the logistics firm, General Electric's centralised programme dropped into a decentralised company - every one of them is a relationship that was never realigned. The technology was fine in all four cases.

3.20 Day Three - Practice Questions

Thirty questions. **The answer and a one-line reason sit immediately below each question**, so keep a sheet of paper over the teal strip while you attempt it, then slide the paper down to check. A cumulative set covering all three parts together is waiting at the end of the document.

Q61. Incremental value creation describes:

- **A)** Recovering value that has been lost
- **B)** Growing an already positive surplus year on year
- **C)** Selling data to competitors
- **D)** Cutting the workforce to protect margin

Answer: B) Growing an already positive surplus year on year The ordinary ambition of a healthy firm - reinforce technology, train people, tighten the line, and the triangle gets bigger. Section 3.1.

Q62. Value re-creation is the correct response when:

- **A)** The company has spotted a new market
- **B)** The company's value is shrinking and must be recovered
- **C)** The company wants to diversify
- **D)** The company is already the cost leader

Answer: B) The company's value is shrinking and must be recovered A different brief from growth. Fund a growth programme for a company that needs a repair programme and you get General Electric. Section 3.1.

Q63. Viacom's top line fell roughly ten per cent while profit fell roughly forty per cent. The correct reading is:

- **A)** The company overpaid for technology
- **B)** Market share is going AND the spend to hold customers is not converting
- **C)** The auditors changed the accounting policy
- **D)** Costs were fixed and could not be cut

Answer: B) Market share is going AND the spend to hold customers is not converting You have to read both lines together. A bottom line falling four times faster than the top line means the retention effort has become pure operating cost. Section 3.1.

Q64. Migrating from an in-house ERP to SAP is best classified as:

- **A)** Business transformation
- **B)** Digital transformation
- **C)** IT-enabled organisation transformation
- **D)** Value co-creation

Answer: C) IT-enabled organisation transformation Same transactions, same approvals, same invoices, same audit trails. The system sits in the support activities. Useful and expensive, but the business is not somewhere new. Section 3.2.

Q65. An outward-facing need typically leads to which value discipline and which line?

- **A)** Cost leader, bottom line
- **B)** Differentiator, top line
- **C)** Cost leader, top line
- **D)** Differentiator, bottom line

Answer: B) Differentiator, top line Outward-facing needs are opportunistic. You are chasing a new market or a new product, so you differentiate and you aim at revenue. Section 3.3.

Q66. An inward-facing need is characterised by:

- **A)** An untapped opportunity
- **B)** A shortcoming in the existing set-up
- **C)** A competitor entering your market
- **D)** A new regulation

Answer: B) A shortcoming in the existing set-up Top line going, margins squeezed, customers leaving. You still transform, but towards plugging leakages and efficiency - cost leadership, aimed at the bottom line. Section 3.3.

Q67. Adding sensors so a car achieves a five-star safety rating at the same price is an example of:

- **A)** Customer closeness
- **B)** Product-based innovation
- **C)** Cost leadership
- **D)** Backward integration

Answer: B) Product-based innovation The uniqueness sits in the product itself, and everything else stays as it is. Section 3.4.

Q68. Free lifetime roadside assistance and a buyback agreement on an unchanged car is an example of:

- **A)** Product-based innovation
- **B)** Customer closeness
- **C)** Cost leadership
- **D)** Co-opetition

Answer: B) Customer closeness Same car, same production line. What changed is the relationship around the product, not the metal. Section 3.4.

Q69. The shift from corner shops to ten-minute delivery for the same packet of biscuits is:

- **A)** Product innovation
- **B)** Customer closeness
- **C)** Value co-creation
- **D)** Digitisation

Answer: B) Customer closeness The biscuits have not changed. No travel, no waiting, pre-delivery and loyalty are all customer-centric interventions layered on an unchanged product. Section 3.4.

Q70. Why does it matter WHO is driving a transformation?

- **A)** Because budgets differ by department
- **B)** Because a leader-championed programme is steered and executed very differently from a bottom-up one
- **C)** Because regulators require a named owner
- **D)** Because it changes the technology stack

Answer: B) Because a leader-championed programme is steered and executed very differently from a bottom-up one When the need was sensed at the top, leadership is committed from the start. When it arrives as a complaint after bad results, the leader may never fully commit. Section 3.5.

Q71. In the Viacom data journey, the metering devices in homes solved which problem and created which?

- **A)** Solved personalisation, created cost
- **B)** Solved generalisability, but the unit of measurement was still the household
- **C)** Solved data quality, created a privacy breach
- **D)** Solved latency, created duplication

Answer: B) Solved generalisability, but the unit of measurement was still the household Grandparents, parents and children all watched the same set, so family-level viewing stayed scattered and varied. Still generalised, just at a finer grain. Section 3.6.

Q72. The unit of measurement finally became one person when:

- **A)** The metering devices were upgraded
- **B)** Streaming and individual logins arrived
- **C)** The sample size was increased
- **D)** The agency changed its method

Answer: B) Streaming and individual logins arrived And that is exactly when the appetite for data exploded and decision-making got paralysed - they were capturing far more than they could use. Section 3.6.

Q73. 'T minus K' expresses the idea that:

- **A)** Dashboards can predict the future
- **B)** Every dashboard shows data that has already happened, K being the delay
- **C)** Data must be refreshed every K minutes
- **D)** Latency can be reduced to zero with sensors

Answer: B) Every dashboard shows data that has already happened, K being the delay K can be squeezed but never made zero, and never negative. Which is why moving from measures of what happened to predictions of what will happen is the hinge of the Viacom case. Section 3.7.

Q74. Value co-creation means:

- **A)** Internal departments collaborating on a project
- **B)** Separate firms, each with their own value chain, all ending up better off
- **C)** Merging with a competitor
- **D)** Selling data to a third party

Answer: B) Separate firms, each with their own value chain, all ending up better off Internal departments collaborating is collaboration, not co-creation. A value chain is drawn from the point of view of a single firm. Section 3.8.

Q75. In the Viacom value system, what do advertising agencies receive?

- **A)** Free advertising slots
- **B)** Pricing and slot predictions before signing
- **C)** Ownership of the content
- **D)** Access to the raw customer database

Answer: B) Pricing and slot predictions before signing Viacom's ability to predict was more mature than theirs, so they trusted its judgement over their own - and both sides negotiated faster as a result. Section 3.8.

Q76. Co-opetition is best described as:

- **A)** Competitors lobbying a government together
- **B)** Rivals cooperating in a defined space where all gain, while competing elsewhere
- **C)** A merger between two rivals
- **D)** Buying a competitor's data

Answer: B) Rivals cooperating in a defined space where all gain, while competing elsewhere Option A is lobbying - collective pressure applied to a third party. Co-opetition creates value none of the participants could create alone. Section 3.9.

Q77. Which of the following is NOT one of the five ingredients (means)?

- **A)** Organisational capabilities
- **B)** Leadership
- **C)** Workforce
- **D)** Market share

Answer: D) Market share The five are organisational capabilities, leadership, workforce, data governance and analytics. Market share is an outcome, not an ingredient. Section 3.10.

Q78. In the 2024 paper, leadership originally sat:

- **A)** As its own separate ingredient
- **B)** Inside organisational capabilities
- **C)** Under digital governance
- **D)** Outside the framework

Answer: B) Inside organisational capabilities It was pulled out as a separate ingredient afterwards, on the strength of practitioner work rather than the paper. Know which version you are quoting. Section 3.10.

Q79. Which three things sit under organisational capabilities?

- **A)** Culture, structure and design, decision making
- **B)** People, process, technology
- **C)** Strategy, structure, systems
- **D)** Leadership, governance, analytics

Answer: A) Culture, structure and design, decision making Processes and innovation were both folded back into culture when the class offered them separately. Section 3.11.

Q80. An organisation with a long history of subjective, expert-based decisions is likely to:

- **A)** Adopt model-driven decisions quickly
- **B)** Resist model-driven decision autonomy at first
- **C)** Have excellent data quality
- **D)** Have no need for governance

Answer: B) Resist model-driven decision autonomy at first It is the opposite habit. Objective decision cultures accept model outputs naturally; discretionary ones fight it, at least for the first months or years. Section 3.11.

Q81. The professor's conclusion on leadership and culture is that the relationship is:

- **A)** Leadership always shapes culture
- **B)** Culture always shapes leadership
- **C)** Two-way - each constrains and scales the other
- **D)** Unrelated

Answer: C) Two-way - each constrains and scales the other The Bengali instruction shows culture doing the work rather than authority. The email story shows a sixty-year-old culture shaping how every leader behaves. Section 3.12.

Q82. In the Oracle-to-SAP migration example, the root cause of the inertia was:

- **A)** The new system was technically inferior
- **B)** Training was never provided
- **C)** Perceived usefulness at the individual level was close to zero
- **D)** The leadership did not communicate

Answer: C) Perceived usefulness at the individual level was close to zero Same transactions, same approvals, same audit trails. The organisation gained scale; the user gained nothing and lost their comfort. Section 3.13.

Q83. Which pairing of problem and fix is correct?

- **A)** Attitude gap - fixed with training
- **B)** Ability gap - fixed with change management
- **C)** Ability gap - fixed with training and exposure
- **D)** Attitude gap - fixed with better software

Answer: C) Ability gap - fixed with training and exposure Attitude gaps need change management, communication and something genuinely in it for the user. Spending training money on an attitude problem is the classic and expensive mix-up. Section 3.13.

Q84. The big bang data strategy failed at the Asia-Pacific bank mainly because:

- **A)** The cloud provider was unreliable
- **B)** It was never aligned to a business use case before starting
- **C)** The data was too small
- **D)** Regulators blocked it

Answer: B) It was never aligned to a business use case before starting Three years later only occasional analysts wanting historical data could use it, and real-time needs were never in scope. Section 3.14.

Q85. In the kitchen analogy, the correct approach is:

- **A)** Cook the whole menu in advance
- **B)** Chop onions fresh for every order
- **C)** Make one base gravy in the morning and build dishes from it
- **D)** Buy ready meals

Answer: C) Make one base gravy in the morning and build dishes from it One base, many users, improved over time, components reused. That base gravy is the data product idea in one image. Section 3.14.

Q86. Which is a disadvantage of the grassroots architecture?

- **A)** Slow to build
- **B)** Poor adoption by business users
- **C)** Revenue defined three different ways by three departments
- **D)** High capital cost up front

Answer: C) Revenue defined three different ways by three departments Lack of standardisation is a grassroots problem. Slow builds and heavy capital cost belong to the monolith, and adoption is one of grassroots' genuine strengths. Section 3.15.

Q87. Which is a disadvantage of the monolithic architecture?

- **A)** Duplication of effort
- **B)** Business users cannot easily self-serve
- **C)** No single source of truth
- **D)** Governance is harder

Answer: B) Business users cannot easily self-serve Control buys symmetry and installs guardrails. Pulling data off a server needs skills and access a business user usually does not have. Section 3.16.

Q88. In the hybrid design, where exactly is the cut made?

- **A)** Before the landing zone
- **B)** After the lakehouse, inserting a data product layer
- **C)** After the dashboards
- **D)** Between the sources and staging

Answer: B) After the lakehouse, inserting a data product layer Keep the monolith up to that point, because that is where its uniformity comes from. Then restore grassroots freedom on the other side. Section 3.17.

Q89. Data products are typically shipped as CSV rather than XLSX because CSV:

- **A)** Looks better in presentations
- **B)** Is lightweight, machine readable and has no row ceiling
- **C)** Supports formulas
- **D)** Is more secure

Answer: B) Is lightweight, machine readable and has no row ceiling If your user base grows and the format caps out at around a million rows, your product is obsolete. CSV also avoids the encoding complications of a spreadsheet format. Section 3.17.

Q90. Which statement about data governance is correct?

- **A)** Data governance and data quality are the same thing
- **B)** Data governance subsumes data quality
- **C)** Data quality subsumes data governance
- **D)** Data governance is a subset of cyber security

Answer: B) Data governance subsumes data quality Quality is one building block inside it, alongside ownership, rights, stewardship, classification, access and accountability. Section 3.18.

PART 4 Everything on One Page

The whole module, compressed

If you only have twenty minutes before the paper, read this section and nothing else. Every line here points back to a section number, so if a line does not make sense you know exactly where to go and look.

4.1 The Lines That Carry the Module

Idea	The version to remember	Where
Digitisation	Paper becomes an electronic record. Storing and gathering. Nothing about the work changed	1.4
Digitalisation	That data is now clean, structured, flowing and usable by other processes	1.5
Digital artefacts	The nouns - what we HAVE. ERP, dashboards, cloud, spreadsheets	1.6

Idea	The version to remember	Where
Digital enablement	The verbs - what we can now DO. People and processes equipped to act. The means, not the end	1.6
Output	The thing you now have. Countable. Photographable	1.3
Outcome	What now happens differently because of it. Measurable, not countable	1.3
Transformation	Intended positive change, lasting, judged on outcomes rather than outputs	1.8
Value	The delta. Revenue minus cost. Not the size of the number - the size of the gap	1.10
Value chain	One firm's primary activities plus the support layer beneath them	1.9
Value system	Your chain plus every connected chain - suppliers, channels, customers	1.13, 3.8
Two levers	Pull revenue up or push cost down. Your dominant strategy decides which one you are paid for	1.11
ITOT	Technology lands in the support layer and reaches value indirectly, through people	1.14
PT	One horizontal process rebuilt end to end. Narrow scope by design	1.14
BT	The dominant strategy moves. The business model itself changes	1.14
DT	The short circuit - technology strikes the value-creating activities directly	1.14
The digital evolution	ERP, reporting, business intelligence, self-service, prediction, real time, generative. Know which rung you are really on	1.17
The three qualities	Data quality is the number. Service quality is the people who fix the number. System quality is the software that shows it	2.4
IS Success Model	Three qualities feed use and satisfaction; those feed net benefits. Break the circuit anywhere and no value comes out	2.5
Adoption vs usage	Adoption is attitudinal and comes first. Usage is behavioural and comes after	2.7
Flattering metrics	Licences, logins, frequency and time are all usage. Ask for the override rate instead	2.8
The fifth block	Workforce and its adoption - added on top of the four in the reading	2.10
Readiness diagnosis	Five buckets. Spend on the innermost axes only. Money into an existing strength goes in vain	2.11, 2.12
Survey rules	Quantitative: roughly ten responses per question. Qualitative: stop at saturation, seven or eight interviews	2.13
IS triangle	Transaction processing to pipelines to either decision support (a human decides) or decision automation (the system decides)	2.15
Data as a product	Three routes: improve internal work, wrap the offering, sell the information. Routes one and two map to the value disciplines	2.18
The DT framework	Scope (need, level), Ways (co-creation, re-creation), Means (five ingredients), Ends (impact)	2.19

Idea	The version to remember	Where
RATER and Garvin	Where service quality and product quality definitions come from	2.20
Balanced Scorecard	Learning and growth feeds process, feeds customer, feeds financial. How a soft benefit reaches a hard number	2.20
Value re-creation	What you do when value is shrinking. Flip it back first, then build	3.1
Value co-creation	Separate firms, each with their own chain, all better off	3.8
The need tree	Outward means opportunity, differentiator, top line. Inward means shortcoming, cost leader, bottom line	3.3
The five ingredients	Organisational capabilities, leadership, workforce, data governance, analytics - with analytics last, as a hygiene factor	3.10
Big bang vs grassroots	Cooking the whole menu before anybody orders, versus chopping onions fresh every time. Make the base gravy instead	3.14
The hybrid	Keep the monolith up to the lakehouse. Then insert function-level data marts. Those marts are the data products	3.17
Data governance	Definitions, quality, access, sharing, cataloguing, lifecycle. It subsumes data quality	3.18
Change management	The realignment of every relationship around the data - and the missing ingredient in almost every failure in this document	3.19

If you remember only one sentence from the whole module
It is not about what we have. It is about what we do. Digitisation against digitalisation, output against outcome, enablement against transformation, artefact against value - every one of those is the same sentence wearing a different costume.

4.2 Five Questions Worth Rehearsing

- **Distinguish digitisation, digitalisation and digital transformation with an example.** Use the bank - ledger to database, then cash machines and UPI, then a mobile-first bank whose cost per account and revenue model have both changed. Close with the output-versus-outcome line.
- **Why do digital programmes fail to show returns?** Because evaluation stops at outputs. Name the output list, name the outcome list, name the gap, and cite the mature reporting estate whose working capital and cost leakage did not move.
- **Differentiate ITOT, PT, BT and DT.** Draw the value chain, then classify by where the technology lands. One example each - internal reporting tool, predictive maintenance on one line, connected-car subscriptions, a cab-hailing algorithm.
- **How would you know whether a digital initiative succeeded?** Acceptance model for adoption, then DeLone and McLean for net benefits, then the Balanced Scorecard to show how a non-financial gain reaches the financial line.
- **What are the ways and means of a digital transformation?** Ways: value re-creation and value co-creation, chosen by the need. Means: organisational capabilities, leadership, workforce, data

governance, analytics - with analytics last, because it is a hygiene factor.

PART 5 The Cumulative Set

Forty more questions, all three days mixed together

The questions inside each part tested one part at a time. These do not. They jump across all three days, and several of them are scenarios where you have to join two ideas that were taught three weeks apart - which is what a real question, and a real job, actually looks like. Same format: cover the teal strip, attempt, then slide the paper down.

5.1 Questions 91 to 130

Q91. A firm has a mature reporting estate, twelve crore already spent, high dashboard usage - and working capital, cost leakage and the top line have all been flat for eight quarters. What is the correct first move?

- **A)** Replace the reporting tool with a better one
- **B)** Walk back up the IS Success chain and find which box is broken
- **C)** Increase the training budget
- **D)** Escalate to the board for more investment

Answer: B) Walk back up the IS Success chain and find which box is broken Everything to the left may look fine while satisfaction or service quality is quietly failing. Buying a new tool fixes one box out of six. Sections 1.7 and 2.5.

Q92. Which pairing of monetisation route and value discipline is correct?

- **A)** Improve internal work - differentiator
- **B)** Wrap the offering - cost leader
- **C)** Improve internal work - cost leader
- **D)** Sell the information - cost leader

Answer: C) Improve internal work - cost leader Plugging leakage and deciding faster serves the cost leader. Wrapping data around what you already sell serves the differentiator. Section 2.18.

Q93. A company's need is inward facing - shrinking margins and eroding customers - but its transformation programme is built around launching a premium connected product. What is the problem?

- **A)** The technology is immature
- **B)** The need and the chosen value discipline do not match
- **C)** The budget is too small
- **D)** There is nothing wrong; both branches are always valid

Answer: B) The need and the chosen value discipline do not match Inward-facing needs point to cost leadership and the bottom line. Building a premium offering pulls the lever the situation does not pay for. Sections 1.11 and 3.3.

Q94. Put these in the order a company must actually achieve them:

- **A)** Data products, digitisation, digitalisation
- **B)** Digitisation, digitalisation, data products
- **C)** Digitalisation, data products, digitisation
- **D)** Digitisation, data products, digitalisation

Answer: B) Digitisation, digitalisation, data products You cannot make data flow before you have captured it, and you cannot package a clean, reusable mart before the data flows. Sections 1.4, 1.5 and 3.17.

Q95. Rolling out training on a new assistant tool across the whole workforce is best described as:

- **A)** Procurement
- **B)** Digital enablement
- **C)** Digitisation
- **D)** Business transformation

Answer: B) Digital enablement Buying the licences would be procurement, a noun. Equipping people so the verb can actually be performed is enablement. Section 1.6.

Q96. A readiness chart shows leadership at 4.2 and data readiness at 3.2. The company buys a new reporting tool. What should you predict?

- **A)** A significant improvement, since leadership is behind it
- **B)** Little or no improvement, because the constraint was never the tool
- **C)** Improvement in year two once training completes
- **D)** Improvement only in the finance function

Answer: B) Little or no improvement, because the constraint was never the tool Money into an existing strength buys almost nothing. The innermost axis still blocks the value from coming out. Section 2.12.

Q97. Which sequence of frameworks answers the two questions 'will they use it?' and 'did using it change anything?'

- **A)** Balanced Scorecard, then SERVQUAL
- **B)** The acceptance model, then the IS Success Model
- **C)** The IS Success Model, then the acceptance model
- **D)** SERVQUAL, then Garvin

Answer: B) The acceptance model, then the IS Success Model Acceptance tells you whether they will adopt. The IS Success Model tells you whether adoption produced any net benefit. Sections 2.5 and 2.7.

Q98. In which of the four transformations is the value wedge redrawn rather than merely widened?

- **A)** ITOT
- **B)** PT
- **C)** BT
- **D)** DT

Answer: C) BT Business transformation is where the dominant strategy moves and the model itself changes. The others widen the wedge without redrawing it. Section 1.14.

Q99. A vehicle manufacturer gives its five hundred suppliers visibility of forward demand, and charges for it. This is:

- **A)** Improving internal work
- **B)** Wrapping the offering
- **C)** Selling the information itself
- **D)** Backward integration

Answer: C) Selling the information itself The data has become the offering. Suppliers pay because it frees working capital that was locked in inventory. Section 2.18.

Q100. In the Viacom value system, how many independent value chains are involved?

- **A)** One - Viacom's own
- **B)** Two - Viacom and its advertisers
- **C)** Five - Viacom plus advertisers, content creators, regulators and competitors
- **D)** Five, but only Viacom's value rises

Answer: C) Five - Viacom plus advertisers, content creators, regulators and competitors And the whole point is that every one of the five ends up better off - which is what separates co-creation from collaboration. Section 3.8.

Q101. You install more sensors and increase refresh frequency on a dashboard. What happens to T minus K?

A) K becomes zero
B) K becomes negative
C) K gets smaller but never reaches zero
D) K is unaffected by refresh rate

Answer: C) K gets smaller but never reaches zero A dashboard is always retrospective. Squeezing the delay is worth doing, but if you want to see forward you have to move from measures to predictions. Section 3.7.

Q102. In the hybrid architecture the professor recommends, what typically sits on premise and what on cloud?

A) Everything on premise
B) Everything on cloud
C) The lakehouse on premise, the data products on cloud
D) The data products on premise, the lakehouse on cloud

Answer: C) The lakehouse on premise, the data products on cloud Users hold credentials and fetch the product they need into a dashboard or a hosted analysis environment. Section 3.18.

Q103. A team shows high login frequency and a high override rate. Which diagnosis is correct?

A) Adoption has failed
B) Use is fine; satisfaction has failed
C) System quality has failed
D) Data quality has failed

Answer: B) Use is fine; satisfaction has failed They open it and they mean to - that is use. They do not trust it enough to act on it - that is satisfaction. Sections 2.6 and 2.8.

Q104. Which element of the framework behaves like a hygiene factor?

A) Organisational capabilities
B) Value co-creation
C) Big data analytics
D) Digital talent

Answer: C) Big data analytics Having it earns you nothing; not having it stops everything. It is the vehicle, not the destination. Section 2.19.

Q105. Which of these does NOT sit under organisational capabilities?

A) Culture
B) Structure and design
C) Decision making
D) Workforce ability and attitude

Answer: D) Workforce ability and attitude Workforce is its own ingredient in the list of five, precisely because ability and attitude behave differently from culture and structure. Sections 3.10 and 3.11.

Q106. The professor's own definition of data culture is:

A) Everybody has access to a dashboard
B) Data is treated as another product line, nurtured like any other product
C) Every decision must be justified with numbers
D) The chief data officer reports to the chief executive

Answer: B) Data is treated as another product line, nurtured like any other product He is deliberate about not calling it data culture. Once data is a product line, no leader gets to look at it in their own private fragmented way. Section 2.17.

Q107. Why does the grassroots architecture usually show better adoption than the monolith?

A) It uses better technology
B) Whoever built the pipeline built it for that specific business owner
C) It is centrally governed
D) It has a single source of truth

Answer: B) Whoever built the pipeline built it for that specific business owner Few hops, instant feedback loop, and the same person who wrote the rules fixes it when it breaks. Section 3.15.

Q108. Which statement correctly pairs each failure with its cause?

A) Big bang failed on reusability; grassroots failed on alignment to use cases
B) Big bang failed on alignment to use cases; grassroots failed on reusability
C) Both failed on cost
D) Both failed on governance

Answer: B) Big bang failed on alignment to use cases; grassroots failed on reusability The bank cleaned and dumped everything without asking what anybody needed. The grassroots teams built one-off pipelines nobody else could use. Section 3.14.

Q109. Three departments walk into the chief executive's room with three different revenue figures and spend fifteen minutes reconciling them. The root cause is:

A) Poor system quality
B) Lack of standardisation and no single source of truth
C) Insufficient training
D) A licensing shortfall

Answer: B) Lack of standardisation and no single source of truth One team counts units, one counts rupees, one counts tonnes. This is the classic grassroots cost. Section 3.15.

Q110. 'Who may share this data without first removing the names from it?' is a question belonging to:

A) Cyber security
B) Data security
C) Data governance
D) System quality

Answer: C) Data governance Governance covers ownership, definitions, quality protocols, access, sharing and anonymisation. Security protects; governance decides. Sections 1.16 and 3.18.

Q111. A bank moves loan approval from fifteen days of paperwork to a two-day automated workflow. This is:

A) ITOT
B) PT
C) BT
D) DT

Answer: B) PT One horizontal process rebuilt end to end, narrow by design. The business model has not moved. Sections 1.14 and 1.15.

Q112. The same bank then launches a mobile-first proposition - accounts opened in minutes, instant algorithmic lending, branches turned advisory. This is:

A) ITOT
B) PT
C) BT
D) Digitisation

Answer: C) BT The dominant strategy has moved and the revenue model is new. The wedge is redrawn, not widened. Section 1.15.

Q113. Which sequence is correct?

- **A)** Use, adoption, intention, satisfaction
- **B)** Intention, adoption, use, satisfaction, continued intention
- **C)** Adoption, intention, satisfaction, use
- **D)** Satisfaction, use, adoption, intention

Answer: B) Intention, adoption, use, satisfaction, continued intention Everything before adoption is belief. Everything after it is observable. Continued intention is the repeat-purchase equivalent. Section 2.7.

Q114. Which sequence describes the IS Success Model correctly?

- **A)** Net benefits, then the three qualities, then use
- **B)** The three qualities, then use and satisfaction, then net benefits
- **C)** Use, then the three qualities, then satisfaction
- **D)** Satisfaction, then net benefits, then the three qualities

Answer: B) The three qualities, then use and satisfaction, then net benefits Technology, then behaviour, then strategic outcome. That order is what makes it a diagnostic path rather than a scorecard. Section 2.5.

Q115. Data readiness is the weakest axis on a readiness chart. A vendor proposes a new self-service analytics platform. The best response is:

- **A)** Buy it - self-service will solve the queue
- **B)** Decline for now and unify the data first, because the platform will surface the same distrusted numbers faster
- **C)** Buy it but delay the rollout by a year
- **D)** Buy it only for the finance team

Answer: B) Decline for now and unify the data first, because the platform will surface the same distrusted numbers faster A faster route to a number nobody believes does not produce a decision. Fix the innermost axis first. Section 2.12.

Q116. An AI deployment frees two hours of work per person per day, but the cost base is fixed and nobody is redeployed. The honest claim to make is:

- **A)** Cost has fallen by the value of two hours per person
- **B)** A ratio has improved but no rupee has changed
- **C)** Revenue will rise automatically
- **D)** The deployment has failed

Answer: B) A ratio has improved but no rupee has changed Efficiency converts into margin only when the freed capacity is absorbed by growth or genuinely removed. This is the fixed-cost objection from class. Section 1.11.

Q117. In the Balanced Scorecard, training, knowledge and capability building sit under which perspective?

- **A)** Financial
- **B)** Customer
- **C)** Internal process
- **D)** Learning and growth

Answer: D) Learning and growth And learning and growth feeds internal process, which feeds customer, which feeds financial. That chain is how a soft benefit reaches a hard number. Section 2.20.

Q118. RATER stands for:

- **A)** Reliability, Accuracy, Timeliness, Efficiency, Responsiveness
- **B)** Reliability, Assurance, Tangibles, Empathy, Responsiveness
- **C)** Relevance, Access, Trust, Ease, Reach
- **D)** Reliability, Availability, Traceability, Effectiveness, Resilience

Answer: B) Reliability, Assurance, Tangibles, Empathy, Responsiveness The five criteria of SERVQUAL, which is where the service quality dimension of the IS Success Model comes from. Section 2.20.

Q119. Garvin's eight dimensions of quality apply primarily to:

- **A)** Services
- **B)** Products
- **C)** Data pipelines
- **D)** Organisational culture

Answer: B) Products Performance, features, reliability, conformance, durability, serviceability, aesthetics and perceived quality. SERVQUAL is the services parallel. Section 2.20.

Q120. Which stakeholder in the Viacom value system receives an early read on what is likely to clear screening?

- **A)** Advertising agencies
- **B)** Content creators
- **C)** Regulatory bodies
- **D)** Competitors

Answer: C) Regulatory bodies Fewer surprises for them, and Viacom avoids signing contracts that will not pass. Section 3.8.

Q121. Two rival payment providers pool transaction data under agreed rules and each earns from the shared analysis. Two other rivals jointly petition a regulator not to enforce a rule. These are, respectively:

- **A)** Lobbying and co-opetition
- **B)** Co-opetition and lobbying
- **C)** Both co-opetition
- **D)** Both lobbying

Answer: B) Co-opetition and lobbying Co-opetition creates value none of them could create alone. Lobbying applies collective pressure to a third party. Section 3.9.

Q122. A company runs three hundred systems and every department builds its own pipeline. Which cost appears first and keeps recurring?

- **A)** Capital expenditure on the data platform
- **B)** Operating cost from doing the same cleaning several times over
- **C)** Licensing cost for the reporting tool
- **D)** The cost of hiring a chief data officer

Answer: B) Operating cost from doing the same cleaning several times over You burn the same computing resource repeatedly for no new information. That is a recurring running cost, not a one-off. Section 3.15.

Q123. The cleanest test of whether something is genuinely a data product is:

- **A)** Is it stored in the cloud?
- **B)** Pull the data out - does the business still run?
- **C)** Does more than one department use it?
- **D)** Is it refreshed daily?

Answer: B) Pull the data out - does the business still run? Take data out of a cab-hailing app and no cab gets booked and no price gets set. At that point data is core, not support. Section 2.18.

Q124. Which is NOT a reason data products are shipped as CSV rather than as a spreadsheet file?

- **A)** It is lightweight and machine readable
- **B)** It is supported natively by reporting tools
- **C)** It supports formulas and formatting
- **D)** It has no practical row ceiling

Answer: C) It supports formulas and formatting Formulas and formatting are exactly what you do not want in a data product - it is a clean, reusable dataset, not a working document. Section 3.17.

Q125. The fifth building block - workforce - was added to the reading's four because of which case?

- **A)** The logistics company with the distrusted dashboard
- **B)** The card company where everything worked and value still did not appear
- **C)** Viacom
- **D)** General Electric

Answer: B) The card company where everything worked and value still did not appear Data, service and system quality were all fine there. The only thing broken was people's willingness to act on the output. Section 2.10.

Q126. What does the T minus K idea imply about a company that wants to become predictive?

- **A)** It should buy faster hardware
- **B)** It must move from measures of what happened to forecasts of what will happen
- **C)** It should reduce the number of dashboards
- **D)** It should centralise its data team

Answer: B) It must move from measures of what happened to forecasts of what will happen Squeezing the delay makes a backward-looking view fresher. It never makes it forward-looking. That extension is the hinge of the Viacom case. Section 3.7.

Q127. A transformation is proposed. Which pair of questions should you ask first?

- **A)** Which vendor, and at what price?
- **B)** What is the need, and who is driving it?
- **C)** How many licences, and for whom?
- **D)** What is the cloud strategy, and who owns it?

Answer: B) What is the need, and who is driving it? The need tells you which value discipline you are pulling on. Who is driving it tells you more about the odds than the technology stack ever will. Sections 3.3 and 3.5.

Q128. Which statement about digitisation in the Viacom story is correct?

- **A)** It was the transformation itself
- **B)** Once capture became automatic, the money moved from collection into building data pipelines
- **C)** It was skipped entirely
- **D)** It happened only after streaming arrived

Answer: B) Once capture became automatic, the money moved from collection into building data pipelines Same budget line, completely different purpose - and a good illustration that digitisation is an antecedent, not a substitute. Sections 1.4 and 3.6.

Q129. Change management for digital transformation is specifically about:

- **A)** Communicating the vision to employees
- **B)** Realigning how data teams interact with technology teams, business users and processes, in phases
- **C)** Managing the vendor contract
- **D)** Retraining the workforce on a new tool

Answer: B) Realigning how data teams interact with technology teams, business users and processes, in phases Look back at the failures in this document and count how many were technical. Almost none were. Section 3.19.

Q130. Which single sentence best captures the module?

- **A)** Buy the best technology you can afford
- **B)** It is not about what we have; it is about what we do
- **C)** Data is the new oil
- **D)** Automate everything a human currently decides

Answer: B) It is not about what we have; it is about what we do Every distinction in this document - output against outcome, artefact against enablement, adoption against usage - is that one sentence in a different costume. Section 1.2.

6 A Note on the Exam, and a Note to the Batch

What the professor said about the paper

Asked directly in the final session, he said the questions will be conceptual and comfortably answerable from what was taught. Not more than ten, likely in the range of six to ten, multiple choice, and with **no negative marking**. That last detail matters for your strategy: with no penalty for a wrong answer, there is never a reason to leave one blank.

How to use the hundred and thirty questions in this document
Do the thirty at the end of each part as soon as you finish that part, while it is fresh. Save the forty in Part 5 for the night before, because those are the ones that jump between days and will show you what has not stuck. Every answer names a section - go to it, read it once, move on. That loop is worth far more than re-reading the whole document front to back.

Why this document exists

Three weekends go by quickly, and the notes any of us take in the moment are never as good as the discussion that produced them. What is in here is not a summary - it is the whole thing, including the asides, the corrections and the arguments from the room, because in this subject those turned out to be where the real teaching was.

The module was ultimately about one idea, and it is an idea that outlives any exam. Technology is the easy part. Whether anything actually changes because of it depends on leadership, on people and on culture - and those are learned in rooms like the ones we sat in, not from a tool's documentation. Whatever each of us goes on to do next, whether that is running a business, leading a function or building something of our own, that question is going to keep turning up.

> *It is not about what we have. It is about what we do.*

Good luck on Sunday, all of you. It has been a genuine pleasure learning alongside this batch.

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