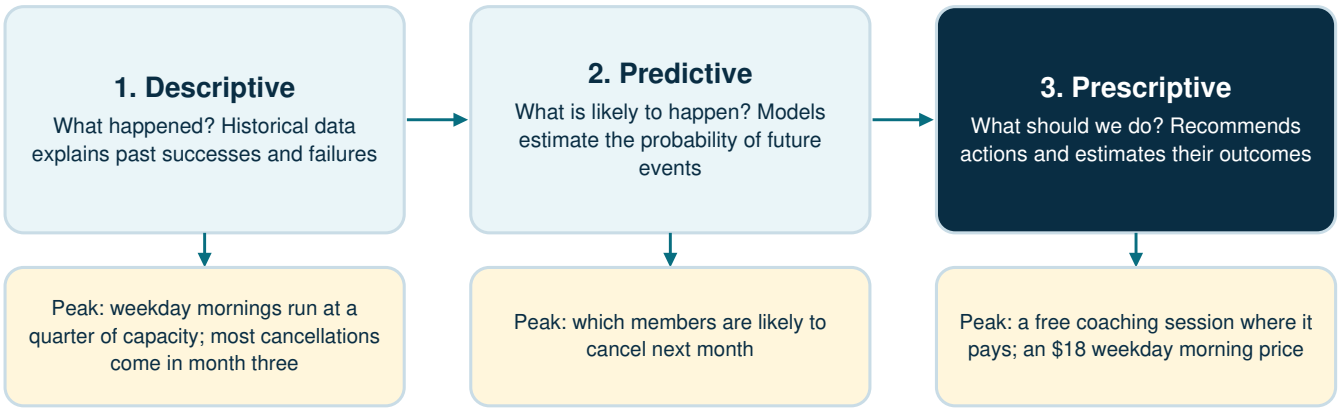
Evaluating options with business analytics

MODULE 5 | 5.3.2 | STUDENT COMPANION

Business analytics finds patterns in data and communicates what they mean. Data comes from inside and outside the organisation: sales records, customer and staff surveys, research on rivals and the industry, economic statistics and financial results. Statistical models reveal patterns and estimate the probability of outcomes, testing qualitative judgements against hard numbers.

Three types of business analytics



A prescriptive pricing test: a typical weekday morning

Now: 50 climbers x $25	$1,250
Model's price: 90 climbers x $18	$1,620
Extra revenue per weekday morning	**$370**

The walls were standing idle, so most of the extra revenue is profit

Customer lifetime value at Peak

Average monthly fee	$90
Contribution per month at a 70% gross margin	$63
Average membership length	20 months
Customer lifetime value: $63 x 20	**$1,260**
Cost of a free coaching session (retention offer)	$20
Extra margin if members stay 2 more months: $63 x 2	$126
Net gain per member: $126 - $20	**$106**

Numbers turn 'look after our members' into an option that can be compared with others

Other common uses: measuring how well an advertising campaign works, and predicting how likely customers are to switch to a competitor if a product changes.

Analytics before buying a rival gym (imagined)

Traditionally a buyer relied on the target opening its books. Today buyers also form their own view from external and internal data before they negotiate.

Question	Data Peak could use
How many members does the rival have?	Public reviews, social media activity, class timetables
How do its prices and hours compare?	Its published prices and opening hours against Peak's
What would the site cost to run?	Peak's own cost data, applied to the rival's site
What will its walls and equipment cost?	Age and condition; maintenance and replacement costs
The result	A sharper negotiating position, and a better plan for combining the businesses

Data lake or data swamp?

A well-governed data lake	A data swamp
• Stores raw data, structured and unstructured • Transforms copies for each analysis; originals stay intact • Labelled, owned and quality-checked • Collected with consent and protected under privacy law	• Vast and chaotic, with no organisation • No labels or descriptions • No rules about quality • Nobody can find anything useful in it

Peak's lake: booking records, app activity, online reviews, coaching notes, wall sensors

Governance, ethics and law

- Collect customer data with consent, and protect it under privacy law.
- Check models for bias: a model trained on a narrow group of past customers may make poor or unfair predictions about new ones.
- Give data clear owners and descriptions, so the lake doesn't become a swamp. CPAs, with professional obligations of their own, should raise these risks early.

Case note: Zillow Offers

Zillow, the US property website, launched **Zillow Offers** in Phoenix in April 2018, using its pricing algorithms to buy homes directly, renovate them and resell them. By 2021 its Zestimate valuation served as the opening cash offer on some homes, and in the third quarter of 2021 it bought 9,680 homes. But its models misjudged where prices were heading. On 2 November 2021 Zillow announced it would close Zillow Offers and cut about a quarter of its staff, after a write-down of about US$304 million on homes it had paid too much for; the home-buying business lost US$881 million before tax in 2021. Chief executive Rich Barton said the unpredictability in forecasting home prices 'far exceeds what we anticipated'.

Sources: Zillow Group third-quarter 2021 release and shareholder letter (2 November 2021); fourth-quarter 2021 results (10 February 2022); Zillow release, 12 April 2018.

Judgement over models

Leaders need to know what a model assumes, how accurate it has been and how badly things go wrong when it errs. A model that is right on average can be ruinous if its errors all point the same way at once. If Peak's model recommends closing its oldest gym because it earns the lowest margin per square metre, judgement adds what the model can't see: it is where Peak began, and it hosts the competitions that attract new members to all three sites. **Questions a CPA should ask:** what is the error rate, what happens in a downturn, and how much could we lose if the model is wrong?

Practice questions

MODULE 5 | 5.3.2 | TRY THESE BEFORE THE WORKED ANSWERS

Question 1 - Classify the analyses

Analysis	Descriptive, predictive or prescriptive?
(a) A chart of last year's sales by month	
(b) A model estimating which customers will switch to a rival next quarter	
(c) A system that sets tomorrow's hotel room prices to maximise revenue	
(d) A report comparing this year's staff turnover with last year's	
(e) A forecast of demand for flu vaccines next winter	
(f) A tool that recommends which stores should receive extra stock, and how much	

Question 2 - Customer lifetime value

(a) Calculate customer lifetime value. (b) Calculate the net gain from the offer per customer. (c) If only 40% of customers who receive the offer actually stay a month longer, is it still worthwhile?

Item	FreshCrate (imagined meal kits)
Average monthly spend	$260
Gross margin	30%
Average subscription	8 months
Retention offer	A $25 discounted box that keeps the average customer one month longer

Question 3 - When the model says 'buy'

A model at an imagined hardware chain recommends buying a rival chain for $40 million, predicting $6 million a year in extra profit. How should the board respond?

Worked answers

MODULE 5 | 5.3.2 | WORKED ANSWERS - ATTEMPT THE QUESTIONS FIRST

Question 1

Analysis	Type
(a) Last year's sales by month	Descriptive: what happened
(b) Customers likely to switch	Predictive: what is likely to happen
(c) Tomorrow's room prices	Prescriptive: recommends an action
(d) Staff turnover comparison	Descriptive
(e) Flu vaccine demand forecast	Predictive
(f) Stock allocation tool	Prescriptive

Question 2 - FreshCrate

(a) Contribution per month: $260 x 30%	$78
Lifetime value: $78 x 8	**$624**
(b) Extra margin: one more month	$78
Net gain: $78 - $25	**$53**
(c) Expected extra margin: 40% x $78	$31.20
Expected net gain: $31.20 - $25	**$6.20**

Still worthwhile, but only just: the result is very sensitive to the assumptions

Question 3 - The board's response

- Treat the recommendation as a **starting point**, not a decision.
- Ask what the model assumes: customer retention after the deal, synergies, prices and costs.
- Ask how accurate the model has been, and how good the data on the rival is (much of it external).
- Test the downside: a downturn, lost customers, integration problems, culture clashes.
- Commission due diligence, and have a CPA test the $6 million against the $40 million price, for example with net present value and a range of scenarios.