



Innovation Metrics

Session VIII
August 2022
Alan Mumby

Measuring Innovation

Alan Mumby
Session VIII
August 2022

A REMINDER

innovation relates to something **NEW** and **VALUABLE**.

if it's just one or the other of these then it isn't an innovation

if it's just NEW

then it's probably core business..... interesting..... but not innovation

if its just VALUABLE

then it's only an optimisation of something you're already doing.....

.....interesting but still not innovation.

New

something you haven't done before,

it's uncertain, it's unpredictable.

Valuable

does it create value for the people you're creating value for?

by definition it has to create a gain, or reduce a pain.....

.....or possibly both

Innovation Project

unknown end goal

first time

totally unpredictable

approach? trial & error

probably start small

possible lack of internal know-how

need for people to be flexible

higher risk

Core Business Project

then that's a known

and the goal is understood

∴ repeatable, you've done it before

the predictability of success would be high

make use of your in-house experts

you'd invest high (*time & resource*) and with little caution

lowish risk

Measuring innovation - when looking at ourselves or when analysing

- our competitors
- our suppliers
- our potential or existing customers

The terms connected with measuring innovation:

Innovation performance

Innovation investment

Innovation output

Innovation capability

The terms connected with measuring innovation:

Innovation performance; the output of new products, services, processes and business models - and what are the financial impacts.

The terms connected with measuring innovation:

Innovation investment; the resources of an organisation that are directly and indirectly linked to the development of new products, services, process innovation and business models.

Typically, this will be

- financial investment,
- the time and effort of key employees,
- and the money spent on developing new markets.

The terms connected with measuring innovation:

Innovation output; is typically measured by the revenues generated from the products, services and business models...
but also the savings generated by any process innovations

If the financial figures are hard to obtain, then the numbers of innovations may be used as a proxy measure.

The main terms connected with measuring innovation:

Innovation capability; this is the sum of the underlying processes that enable innovation, from organisational culture and strategy, ideas generated, their selection and their implementation.

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Innovation
metrics

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Innovation
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Typical Measures of Innovation used in Economic Studies

R&D expenditure - as a percentage of sales revenue

Number of patents - per employee - or over time we consider the value of IP

Percentage of sales - from new products

Efficiency - output to input

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Measuring Innovation via an Economic Study

Innovation Management

Goffin, Keith. Innovation Management [pp 352]

Measure	Type of measure	Advantage of measure	Limitation of measure	Implications for managers
R&D expenditure as a percentage of sales revenue	An input measure	Data on investment levels are normally published in company's annual reports	This is an 'input' measure rather than a measure of R&D output	R&D expenditure (and intensity) of comparable competitors is a useful benchmark
Number of patents, per employee or over time	An output measure	- Data readily available and can be easily analysed by industrial sector or by country. - Useful (but not complete)_measure of performance in research labs	Patents are a measure of invention not innovation. - Some companies may choose not to file for a patent, it's time consuming, costly and not always a good protection for SMEs - Different patents are not of equal value, some can be valuable and others can be worthless	- It's useful to monitor the number and contents of patents filed by competitors. - Patent counts are also used as an indication of a knowledge base in mergers and acquisitions
Percentage of sales from new products	An output measure	- Is a measure of the output of R&D (but not strictly of innovation, unless product success is also considered.) - With some desk research, competitors' performances can be monitored.	The meaning of 'new product is equivocal. e.g. different degrees of product innovation which can lead to measurement problems. - Figures on the numbers of products made by competitors not easily available.	- Companies need to carefully define what 'counts as a new product. - Few companies use this measure to check the performance of their competitors
Efficiency: output to input	A ratio measure	- Easy to calculate - It should show the productivity of an 'innovation system'	Due to the lag between investment and output, ratio measures have limited	Assessing innovation capability is wider than just looking at inputs and outputs

A McKinsey survey recognised that of 1,075 companies the five most common measures being considered or implemented (in order of priority):

1. The revenue growth from new products and services;
2. Customer satisfaction with new products and services;
3. The number of ideas in the pipeline;
4. R&D as a percentage of sales;
5. Percentage of sales from new products or services in a given period.



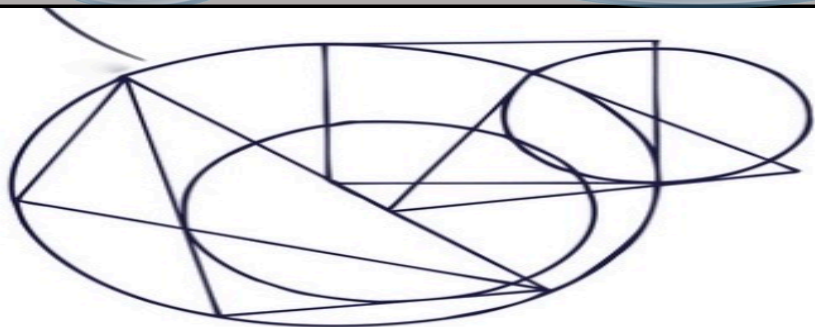
A semi useful Business insight app

<https://www.mckinsey.com/about-us/overview/mckinsey-insights-app>

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is there a preferred
equation that
could be useful...?

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$$|\sin \angle| = \sqrt{\frac{\operatorname{tg} \angle}{\operatorname{tg} \angle + \operatorname{ctg} \angle}}$$

$$\frac{\operatorname{tg} \angle}{\operatorname{tg} \angle + \operatorname{ctg} \angle} = \frac{\frac{\sin \angle}{\cos \angle}}{\frac{\sin \angle}{\cos \angle} + \frac{\cos \angle}{\sin \angle}} = \frac{\frac{\sin \angle}{\cos \angle}}{\frac{\sin^2 \angle + \cos^2 \angle}{\cos \angle \sin \angle}} =$$

$$= \frac{\frac{\sin \angle}{\cos \angle}}{1} = \sin^2 \angle \Rightarrow$$

$$\Rightarrow \sqrt{\frac{\operatorname{tg} \angle}{\operatorname{tg} \angle + \operatorname{ctg} \angle}} = \sqrt{\sin^2 \angle} = |\sin \angle|$$

$$(a+b)(a-b) = a^2 - b^2$$

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

$$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$$

$$(a-b)^3 = (a+b)(a^2 - ab + b^2)$$

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

$$\sin(3/2\pi + \angle) + \cos(\pi - \angle) = \cos(2\pi + \angle) - 3\sin(\pi/2 - \angle)$$

$$\sin(3/2\pi + \angle) + \cos(\pi - \angle) = -\cos \angle - \cos \angle = -2\cos \angle$$

$$\cos(2\pi + \angle) - 3\sin(\pi/2 - \angle) = \cos \angle - 3$$

$$\cos \angle = -2\cos \angle$$

$$\sin^4 \angle + \cos^4 \angle - 1 = -2\sin^2 \angle \cos^2 \angle$$

$$(\sin^4 \angle + \cos^4 \angle - 1) - (-2\sin^2 \angle \cos^2 \angle) =$$

$$= (\sin^4 \angle + 2\sin^2 \angle \cos^2 \angle + \cos^4 \angle) - 1 =$$

$$= (\sin^2 \angle + \cos^2 \angle)^2 - 1 = 1 - 1 = 0$$

$$a^m \cdot a^n = a^{m+n}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$(ab)^n = a^n \cdot b^n$$

$$(a^m)^n = a^{mn}$$

$$\log_e(MN) = \log_e M + \log_e N$$

$$\log_e\left(\frac{M}{N}\right) = \log_e M - \log_e N$$

$$\log_e(N^k) = k \cdot \log_e N$$

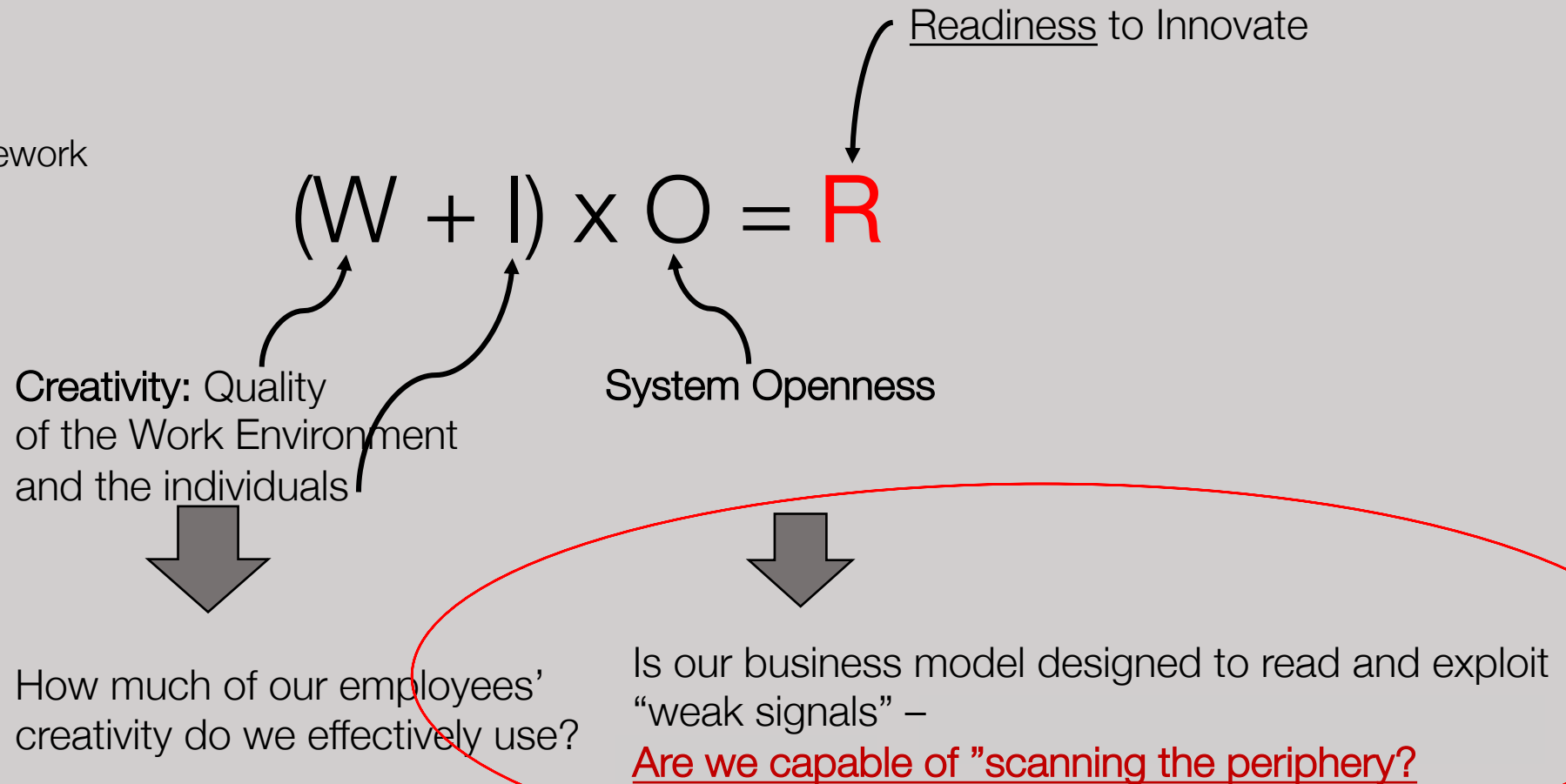
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Innovation Capacity
is there a preferred
equation that
could be useful...?

Innovation Management

Edoardo Monopoli,
Business Model Innovation
Adviser on the change
management..

Innovation Readiness Framework
Triz Journal 2008



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Points to Consider
in Choosing
Performance
Measures

Innovation
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	Aspect	Questions to ask about the measure
1	Strategy	Is it directly related to the intended innovation strategy?
2	Simplicity	Is it simple to understand and communicate?
3	Action ability	Can and will it be acted upon?
4	Appropriateness	Does it provide timely and appropriate feedback?
5	Validity	Does it reliably measure what it is meant to?
6	Reliability	Is it consistent, irrelevant of when or by whom the measurement was made?
7	Clarity	Is interpretation of the measurement unambiguous?
8	Behaviour	Will the introduction of the measure have any adverse behavioural affects?
9	Cost effectiveness	Is it worth the cost of collecting and analysing the data?

Robert Kaplan and David Norton (ex Harvard Business School) stressed the need for businesses to have a range of measures in addition to the classical financial ones.

They concluded that measures can help communicate management's vision and translate it into operational and individual goals.

Measures that cover four categories:

1. financial aspects
2. the customer perspective
3. the efficiency of internal business processes
4. an innovation and learning perspective.

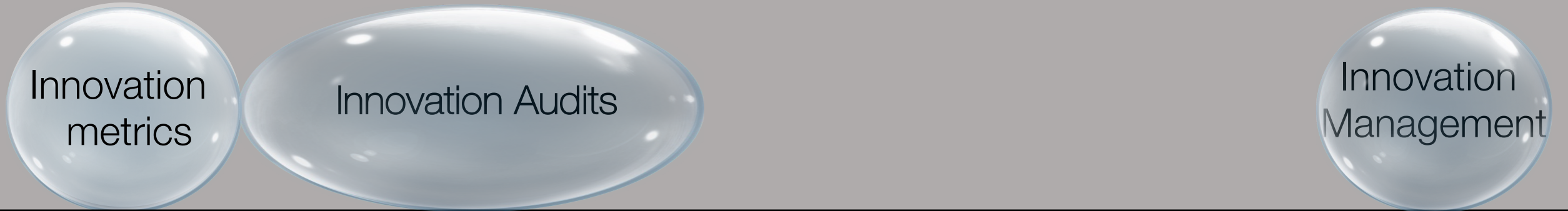
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AN INNOVATION AUDIT



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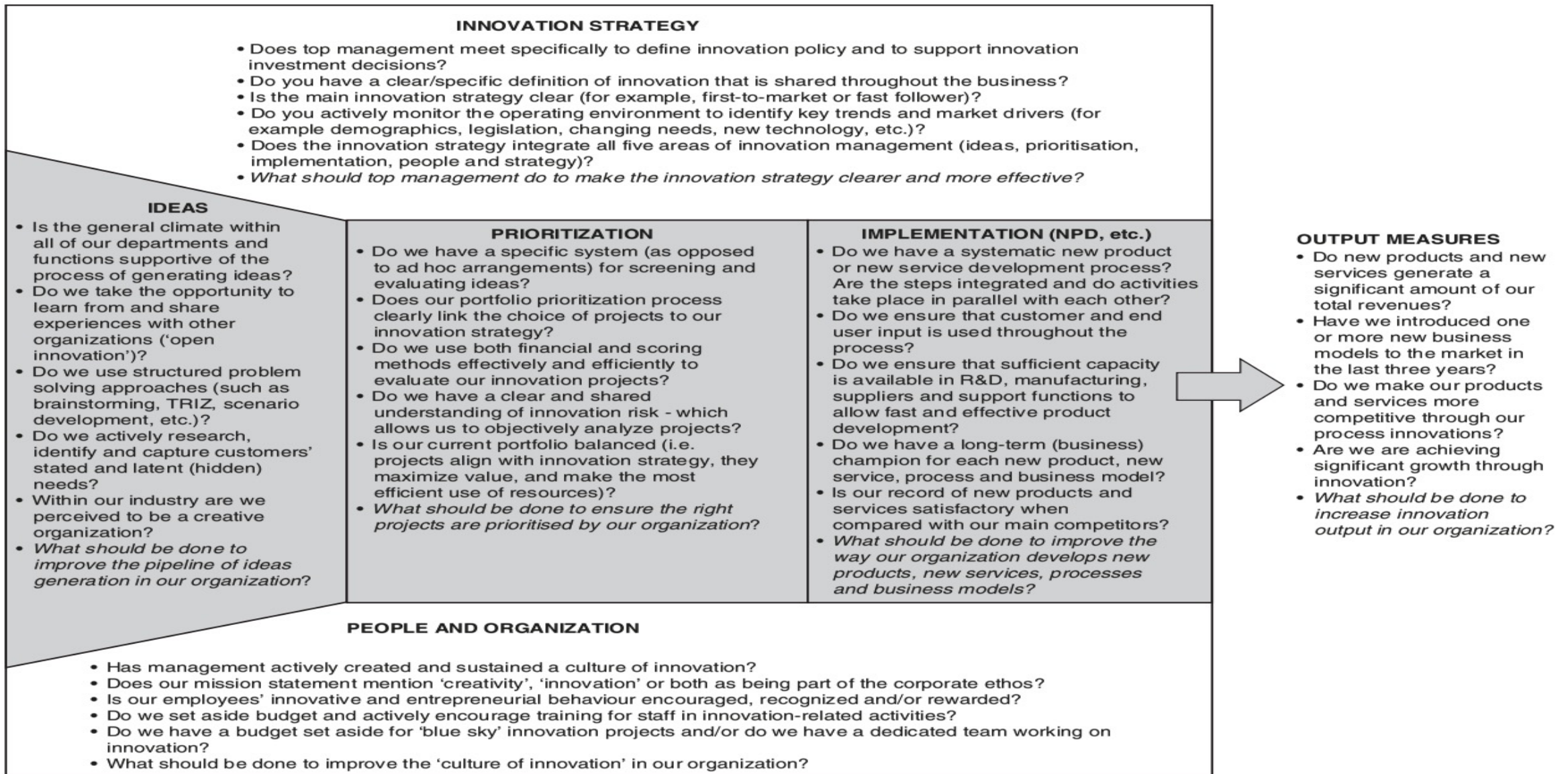
Innovation Audits

Innovation
Management

Conducting Innovation Audits

The aims of an audit are to:

- a. Identify an organisation's innovation capability – the strengths and weaknesses of its innovation processes – by gaining the views of a representative sample of managers and employees.
- b. Collect ideas on how to make improvements.



The Fast Innovation Audit

Innovation metrics

Innovation Audits

Innovation Management

IDEAS

- Is the general climate within all our departments supportive of generating ideas?
- Do we take the opportunity to learn from –and share experiences with other organisations - i.e. Open Innovation ?
- Do we use structured problem solving approaches (such as TRIZ brainstorming , scenario development etc) ?
- Do we actively research, identify and capture customers' stated and latent (hidden) needs?
- Within our industry, are we perceived to be a creative organisation?
- What should be done to improve the pipeline of ideas generation in our organisation?

INNOVATION STRATEGY

- Does top management meet specifically to define innovation policy and to support innovation investment decisions?
- Do you have a clear/specific definition of innovation that is shared throughout the business?
- Is the main innovation strategy clear (for example, first-to-market or fast follower)?
- Do you actively monitor the operating environment to identify key trends and market drivers (for example demographics, legislation, changing needs, new technology, etc.)?
- Does the innovation strategy integrate all five areas of innovation management (ideas, prioritisation, implementation, people and strategy)?
- What should top management do to make the innovation strategy clearer and more effective?

PRIORITISATION

- Do you have a specific system (as opposed to and ad-hoc arrangement for screening and evaluating ideas/ ?
- Does our portfolio prioritisation process clearly link the choice of projects to our innovation strategy?
- Do we use financial and scoring methods effectively to evaluate our innovation projects?
- Do we have a clear understanding of innovation risk - which allows us to objectively analyse projects?
- Is our current portfolio balanced – i.e. aligned with our strategy, maximise value and make the most of our resources?
- What should be done to ensure the right projects are prioritised by our organisation?

IMPLEMENTATION (e.g. - NPD)

- Do we have a new Product or Service Development systematic process?
- Does our portfolio prioritisation process clearly link the choice of projects to our innovation strategy?
- Do we ensure that sufficient capacity is available in R&D, Manufacturing, suppliers and other supportive functions to allow fast and effective product or service development?
- Do we have a long-term business champion for each new product, service, process or business model?
- Is our record of new product and services satisfactory when compared with our competitors?
- What should be done to improve the way our organisation develops new products, services, processes and business models?

PEOPLE AND ORGANIZATION

- Has management actively created and sustained a culture of innovation?
- Does our mission statement mention 'creativity', 'innovation' or both as being part of the corporate ethos?
- Is our employees' innovative and entrepreneurial behaviour encouraged, recognized and/or rewarded?
- Do we set aside budget and actively encourage training for staff in innovation-related activities?
- Do we have a budget set aside for 'blue sky' innovation projects and/or do we have a dedicated team working on innovation?
- What should be done to improve the 'culture of innovation' in our organization?

OUTPUT MEASURES

- Do new products and new services generate a significant amount of our total revenues?
- Have we introduced one or more new business models to the market in the last three years?
- Do we make our products and services more competitive through our process innovations?
- Are we achieving significant growth through innovation?
- What should be done to increase innovation output in our organization?

Innovation metrics

Innovation Audits

Innovation Management

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Innovation Strategy

Does top management meet specifically to define innovation policy and to support innovation investment decisions?

Do you have a clear/specific definition of 'innovation' that's shared throughout the business?

Is the main innovation strategy clear e.g. 'first to market' or fast followers' ?

Do you actively monitor to identify key trends and market drivers –e.g. demographic changes, legislation, changing needs, new technologies etc ?

Does the innovation strategy integrate in to all the main areas of innovation management; ideas, prioritisation, implementation, people and strategy ?

What should top management do to ensure innovation strategy is clearer and more effective ?

Innovation metrics

Innovation Management

INNOVATION STRATEGY

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- What should be done to increase innovation output in our organization?

INNOVATION STRATEGY

- Does your management team meet specifically to define innovation policy and to support innovation?
- Do you have a characteristic definition of innovation that is shared throughout the business?
- Is the main innovation strategy clear (for example, focus on market or non-market)?
- Do you actively monitor the operating environment to identify any trends and market drivers (for example, demographic, legislative, changing needs, new technology, etc.)?
- Does the innovation strategy integrate all business of innovation management (ideas, prioritisation, implementation, people and strategy)?

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People & Organisation

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What should be done to improve the culture of innovation in our organisation?

INNOVATION STRATEGY

- Does your management team explicitly define innovation policy and to support innovation?
- Do you have a clear, specific definition of innovation that is shared throughout the business?
- Is the main innovation strategy about the company, the business or the technology?
- Do you actively monitor the operating environment to identify any trends and market drivers (for example demographic, legislative, changing needs, new technology, etc.)?
- Does the innovation strategy integrate all business of innovation management (ideas, prioritisation, implementation, portfolio strategy)?

- Has management activity or ideas are assessed as a core or essential?
- Does our mission statement mention "creativity", "innovation" or both as being part of the corporate ethos?
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Innovation metrics

Innovation Management

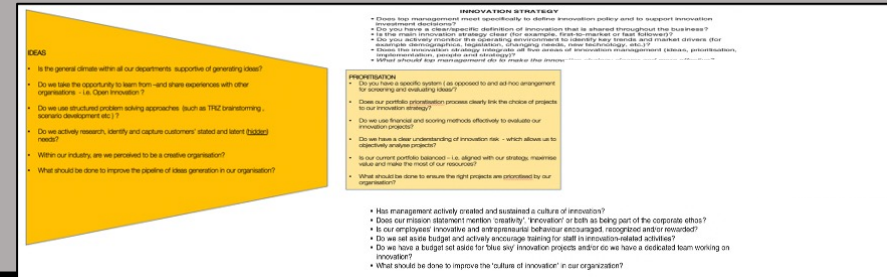


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Innovation metrics

Innovation Management

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PROCESSES	• Do you have a clear, specific definition of innovation that is shared throughout the business? • Do you have a clear, specific definition of innovation that is shared throughout the business? • Do you have a clear, specific definition of innovation that is shared throughout the business? • Do you have a clear, specific definition of innovation that is shared throughout the business?	
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RESULTS	• Do you have a clear, specific definition of innovation that is shared throughout the business? • Do you have a clear, specific definition of innovation that is shared throughout the business? • Do you have a clear, specific definition of innovation that is shared throughout the business? • Do you have a clear, specific definition of innovation that is shared throughout the business?	
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Output Measures

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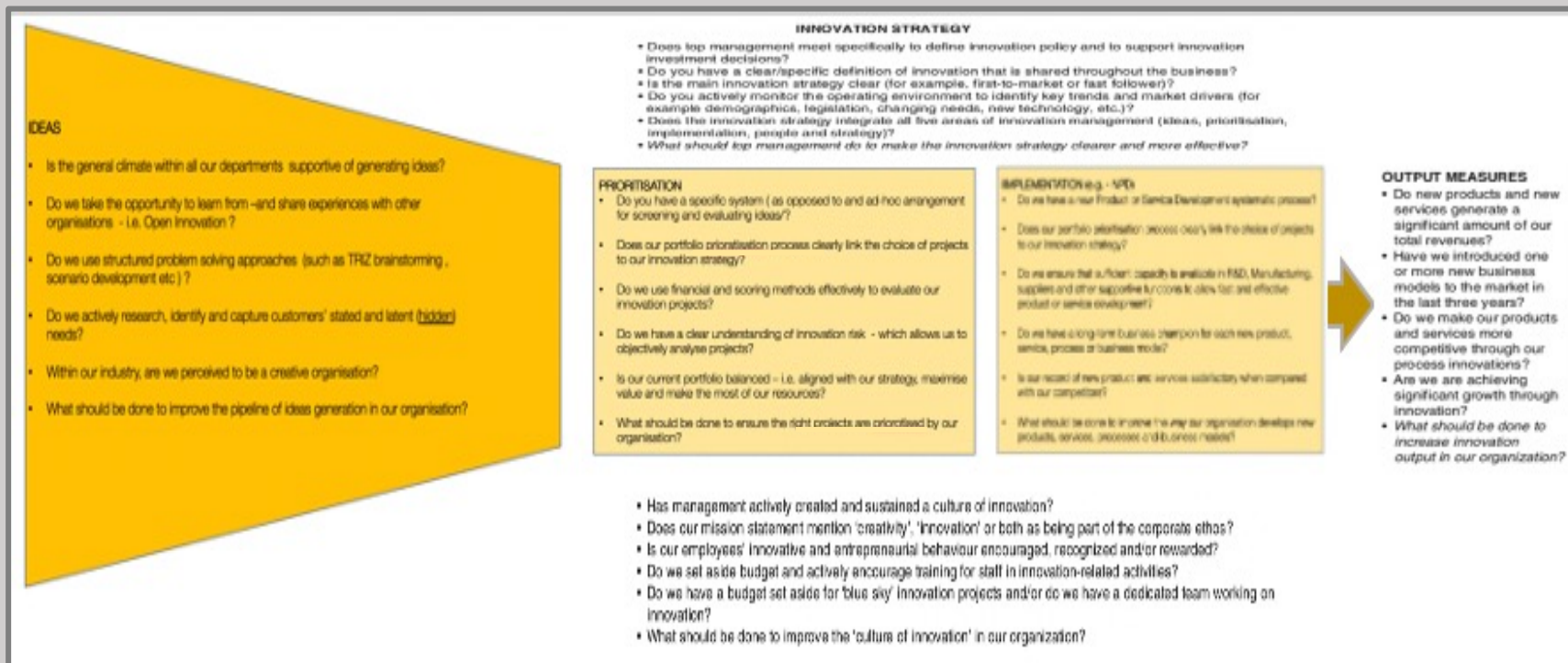
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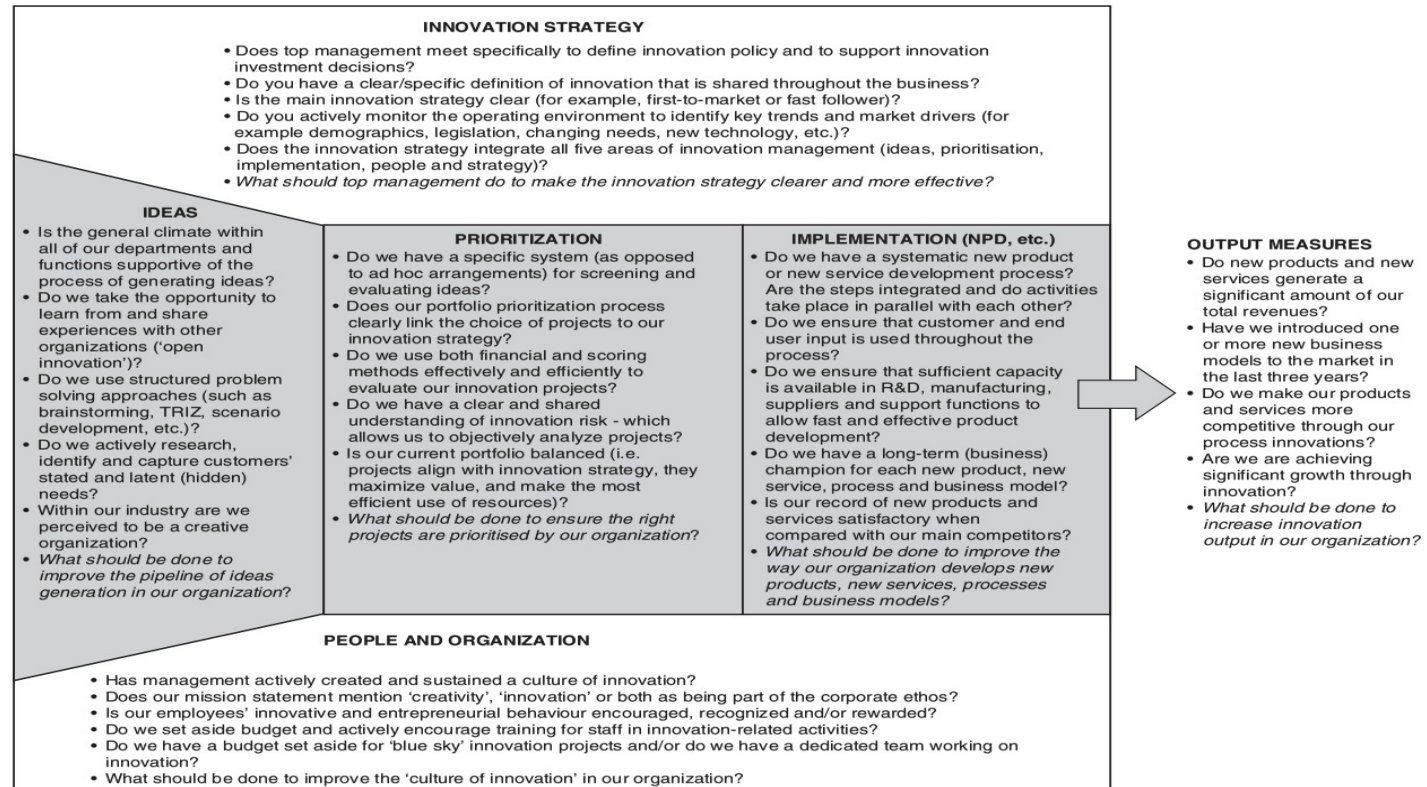
Are we achieving significant growth through innovation?

What should be done to increase innovation output in our organisation ?

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Conducting Innovation Audits
4 points to consider



Innovation
Management

-
1. Innovation audits collect a mix of quantitative and qualitative data through survey techniques. They are best conducted by outsiders (who are neutral), interviewing a representative sample of employees, managers and, possibly, customers (all of whom can remain anonymous).
 2. Interpreting the results of an audit requires experience, which is one reason for using an experienced outsider to conduct the audit.

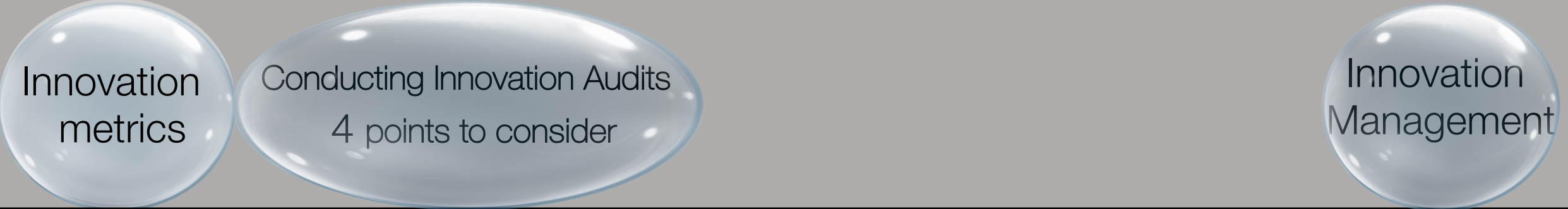
3. Other reasons for using an outsider are that they can persuade employees' to comment openly, and they can bring an informal manner of benchmarking, by being able to compare the results with those they have seen in other organisations.
4. That said, if outside resources are not available, innovation audits can be conducted by someone within the organisation who is perceived as being trustworthy and reliable – and someone who others are willing to share with.

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Conducting Innovation Audits
4 points to consider

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Conducting Innovation Audits
4 points to consider

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Quantitative data is defined as the value of data in the form of counts or numbers where each data-set has a numerical value associated with it etc etc.

Qualitative data describes qualities or characteristics. It is collected using questionnaires, interviews, or focus groups and appears in narrative form

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Further reading
Innovation
Management



5th Edition

MANAGING INNOVATION

Integrating Technological, Market and Organizational Change

JOE TIDD AND JOHN BESSANT

Innovation
metrics

Further reading

Innovation
Management



Chapter 13: Capturing Learning from Innovation



Sections

- 13.4 Tools to help Capture Learning
- 13.5 Innovation Auditing
- 13.6 Measuring Innovation Performance

Next week

CHALLENGES & BARRIERS

INTRODUCTION TO ASSESSMENT B