



MACQUARIE
University

Business Forecasting

Exploratory Methods



Judgmental Methods

Two major categories:

Subjective assessment methods (Short to medium term)

1. Sales Force Composite Forecasting

2. Jury of Executive Opinion

3. Subjective Probability assessments

Exploratory methods (more medium to longer term)

1. Scenario Analysis

2. Delphi Method

Exploratory Methods

Exploratory methods are less rigorous and less formal approaches to forecasting

Typically used for medium to longer term forecasts or when there is an absence of other information (particularly quantitative)

They typically consider multiple potential outcomes and future branching

Consider multiple outcomes for environmental or impact variables.

May consider information from a wide variety of sources

Exploratory Methods

These methods seek to explore the multiple potential outcomes using multiple potential environments in a quasi systematic way

Scenario Analysis can be useful in identifying plausible ranges of forecast outcomes

It can help identify different possible futures and the consequences of those different futures

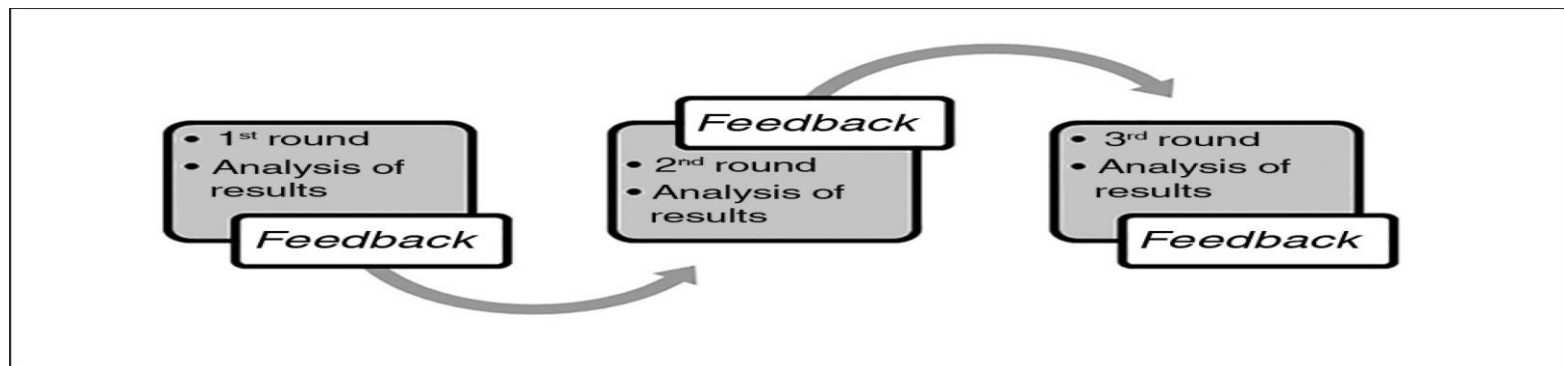
Delphi is more useful in identifying consensus about likely future outcomes. Focus is then on the outcomes the consensus identifies as more likely

Delphi

The Delphi approach is a commonly used qualitative forecasting method

Originally developed at the Rand Corporation in USA it is essentially a method for obtaining a consensus from a group

Systematic in use of individual assessments and feedback for group consensus; can be for forecasts of specific variables or for an estimate of general future environments



Delphi Objective

The objective of the Delphi approach is to obtain a reliable census of opinion from a group of experts while at the same time minimising the undesirable aspects of group interaction

Delphi also provides a more systematic approach than a jury of executive opinion or other group consensus techniques

The technique eliminates committee activity altogether thus further reducing the influence of psychological factors such as:

1. Specious persuasion
2. The unwillingness to abandon publicly expressed opinions
3. The band-wagon effect of majority opinion

Delphi Technique

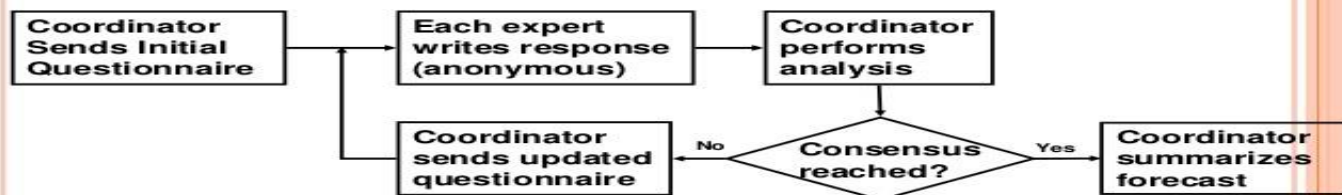
There is a **designed program** of **sequential individual interrogations**, interspersed with **information, opinion and feedback from consensus** of earlier interrogations

Respondents may be required to provide **“reasons”** for previously expressed opinions

A collection of reasons is presented to each respondent in the group, with an **invitation to reconsider and possibly revise his/her earlier estimates.**

DELPHI METHOD

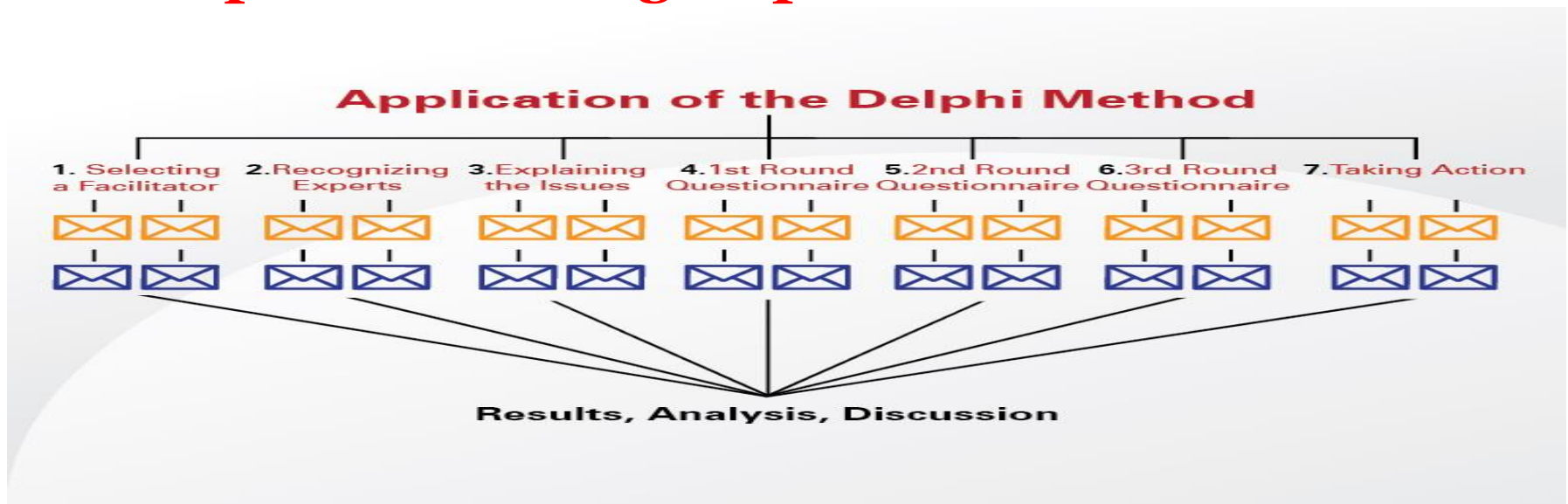
□ Approach



Application of Delphi

Requires a **group of experts** who are willing to answer specific questions relating to the issue under investigation
eg **specific forecasts** or **future technological processes**

Experts **do not meet** but are kept apart from one another so that their judgment will not be influenced by **social pressure or other aspects of small-group behaviour**



Delphi – Relative Merits

ADVANTAGES

Anonymity - reduce the effects of the 'socially dominant individuals

Controlled feedback reduces redundant or irrelevant noise

Conformity to a majority opinion is avoided through presentation of statistical group response of feedback

Permits spread of opinion so uncertainties surrounding situations can be reflected



DISADVANTAGES

Low level of reliability

Oversensitivity of results to questionnaire ambiguity

Moderator effect



Length of time to complete Delphi phases

Panel dropouts

Panel Issues – Expert panels taken from same people and panel dropouts

Delphi Example

Phase 1.

Experts asked in a letter to name future inventions and scientific breakthroughs. Responses sent to coordinator. List compiled.

Phase 2.

Experts sent the entire list of items for categorisation based on a probability distribution of 50-50. Responses sent to coordinator. No contact between experts.

Phase 3.

Experts receive letters detailing items on which there was a general consensus. Asked to state reasons for any widely divergent estimates they had made. Some reassessment invited. Responses sent to moderator.

Phase 4.

To narrow range of estimates further, phase 3 repeated. Results assessed. A number of the original items on the list grouped together as likely breakthroughs

Selection Of Delphi Panel

In a corporate setting, the experts in the group generally come from **both within and outside the company** depending on what is being forecast

An important aspect of such a group is that **each expert need not be well qualified in exactly the same part of the area of interest.**

In this way **information can be processed about the entire problem area**

Delphi panel:
68 experts recruited
(12 Policy, 15 Scientific, 24 Market, 17 Public)

Belgium <ul style="list-style-type: none"> • 8 recruited • (2 Policy, 3 Market, 1 Scientific, 2 Public) 	Latvia <ul style="list-style-type: none"> • 5 recruited • (1 Policy, 2 Market, 1 Scientific, 1 Public) 	Serbia <ul style="list-style-type: none"> • 6 recruited • (1 Policy, 3 Market, 2 Scientific)
Denmark <ul style="list-style-type: none"> • 15 invited • None recruited yet. 	Netherlands <ul style="list-style-type: none"> • 10 recruited • (1 Policy, 3 Market, 2 Scientific, 4 Public) 	Spain <ul style="list-style-type: none"> • 10 recruited • (3 Policy, 2 Market, 2 Scientific, 3 Public)
France <ul style="list-style-type: none"> • 8 recruited • (1 Policy, 2 Market, 2 Scientific, 3 Public) 	Peru <ul style="list-style-type: none"> • 2 recruited • (1 Public, 1 Market) 	Switzerland <ul style="list-style-type: none"> • 4 recruited • (1 Policy, 2 Market, 1 Scientific)
Italy <ul style="list-style-type: none"> • 7 recruited • (2 Policy, 3 Market, 2 Public) 	Senegal <ul style="list-style-type: none"> • 1 recruited • (Scientific) 	UK <ul style="list-style-type: none"> • 7 recruited • (3 Market, 3 Scientific, 1 Public)

Scenarios - What are Scenarios?

Term 'scenario' is from theatre and film, and refers to a **brief synopsis of the plot of a play or a movie**. In a planning context, scenarios can be described as **"stories of possible futures that the organisation might encounter"**

They are **graphic and dynamic** revealing the **flow of an evolving future**

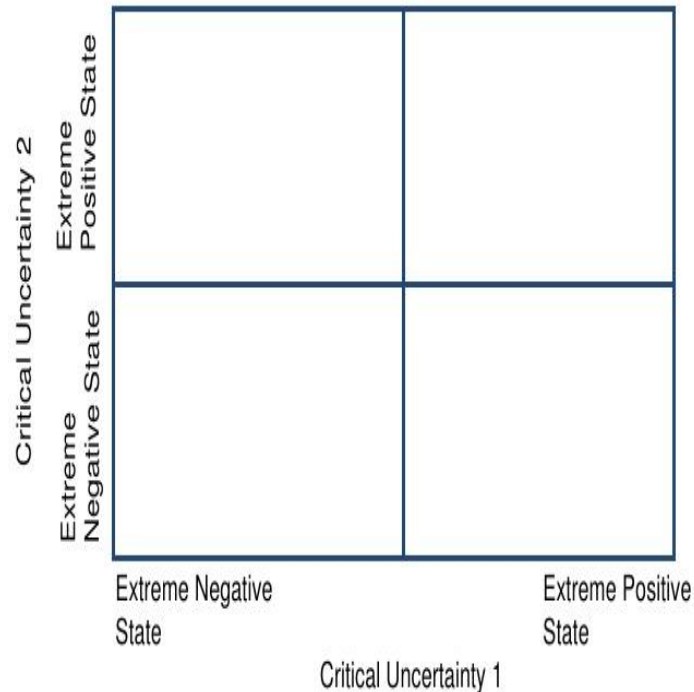
They are **holistic**, combining **social, technological, economic, environmental and political trends, events and other data**

They focus on the **'branching points'** of the future, the **potential contingencies and discontinuities**

Scenarios allow us to **better prepare for uncertainty**

Why are Scenarios Needed?

Scenario Analysis Gives us a View of
Multiple Possible Futures



For decisions about the future of an organisation, we must first know the kind of future environment the organisation will be operating

Scenarios steer us on a middle course between a misguided reliance on prediction only and a despairing belief that we cannot envision the future

They can also help us develop flexible and adaptable strategies to deal with multiple potential future outcomes



How do You Develop Scenarios?

Use an approach that is a structured blending of rationality and intuition. Decision-makers develop their own scenarios and reason the consequences of each scenario on relevant outcomes

Additionally, assessment of the likely probability of each scenario is useful

There are seven recommended steps in building scenarios;

A Scenario Planning Process

Step 1. State the focal issue or decision facing the enterprise.

Step 2. List the key factors that influence this decision.

Step 3. List the driving forces that influence these key factors.

Step 4. Rank the key factors and driving forces by importance and uncertainty.

Step 5. Compose plots for alternative futures that could impact the decision.

Step 6. Evaluate the decision in each of the postulated scenarios.

Step 7. Select indicators and signposts for each scenario.

Seven Steps to Scenarios - Step #1

Step 1: Focal Issue

Clarify the strategic decisions (the decision focus) scenarios should help address.

Must be ground in the organisation's specific planning needs.

Scenarios not an end in themselves: they are a means of making better strategic decisions

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Seven Steps to Scenarios - Step #2

Step 2: Key Factors

Identify the key decision factors

What are the **main things** that we would like to know about the future in order to help make our strategic decision?

For a business these factors could be Sales, Market Share, Costs or other Key Performance Indicators

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Seven Steps to Scenarios - Step #3

Step 3: Driving Forces

Identify and assess key forces which shape the future of the 'key decision factors'

Narrow-based trends impact most **directly and specifically** such as changes to the labour skill requirements, consumer preferences, competitive environment etc.

Broad-based trends such as shifting **demographic patterns, economic, legal, political, technological factors**
Work out **potential outcomes** for these trends

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Driving Forces – Health Example

Technical issues	Social issues	Technology management requirements
<ul style="list-style-type: none">• Role of technologies for e-health provision.• Electronic Health Records (EHRs) allowing data and information to be more accessible.• Ease of use of healthcare IT systems in addition to levels of standardisation across the industry.• Personalised medicine approaches for disease control and wellness.• Requirements for 'Big Data', e.g. from genomic sequencing.	<ul style="list-style-type: none">• Patient motivations to adopt technologies.• The need for lifestyle changes for patients, arising from greater levels of information provision and informed judgement.• Availability of technology according to socio-economic position and geographical location.• Need for health advocacy by primary care practitioners.	<ul style="list-style-type: none">• Management of 'Big Data' and 'Big Analytics', including integration of different data streams to provide practical benefits for healthcare.• Development of business models to support new forms of technology adoption – answering the question, who pays for the technology?• Addressing the social implications of the increasing use of technology within healthcare.• Continuing need for technology standards, e.g. to support adoption of electronic health records.• Need for inter-operability and integration between different IT systems adopted across healthcare.

Seven Steps to Scenarios - Step #4

Step 4: Rank Factors

Develop a **high-medium-low scoring system** and construct a **matrix of impact and occurrence likelihood for the trend outcomes**

High impact/low uncertainty forces- certainties in our future for which or planning must prepare

High impact /high uncertainty forces –potential shapers of **different futures (scenarios)** for which our planning should prepare

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Impact/Uncertainty Matrix

Level of Impact		Degree of Uncertainty		
		Low	Medium	High
High	High Impact/ Low Uncertainty		High Impact/ High Uncertainty	
Medium				
Low	Low Impact/ Low Uncertainty		Low Impact/ High Uncertainty	

Seven Steps to Scenarios - Step #5

Step 5: Compose Plots (Build Scenarios)

This step is the heart of the process and establishes the basic structure of the various scenarios

‘High impact/high uncertainty’ forces can mainly be grouped among two or three ‘axes of uncertainty’

Each of these axes presents two opposite ‘logics’ – different views/theories of ‘the way the world might work’ in the future

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Seven Steps to Scenarios - Step #5 - Example

Step 5: Compose Plots (Build Scenarios) Example : Higher Education

One axis might pose alternative views, that higher education will continue to be primarily a public sector responsibility or become a private good

Another axis may suggest extremes of international demand for places or even relevant technology developments

The interplay of these axes and their alternative logics presents the basis for selecting three or four scenarios that we believe are the 'envelope of uncertainty'

A Scenario Planning Process

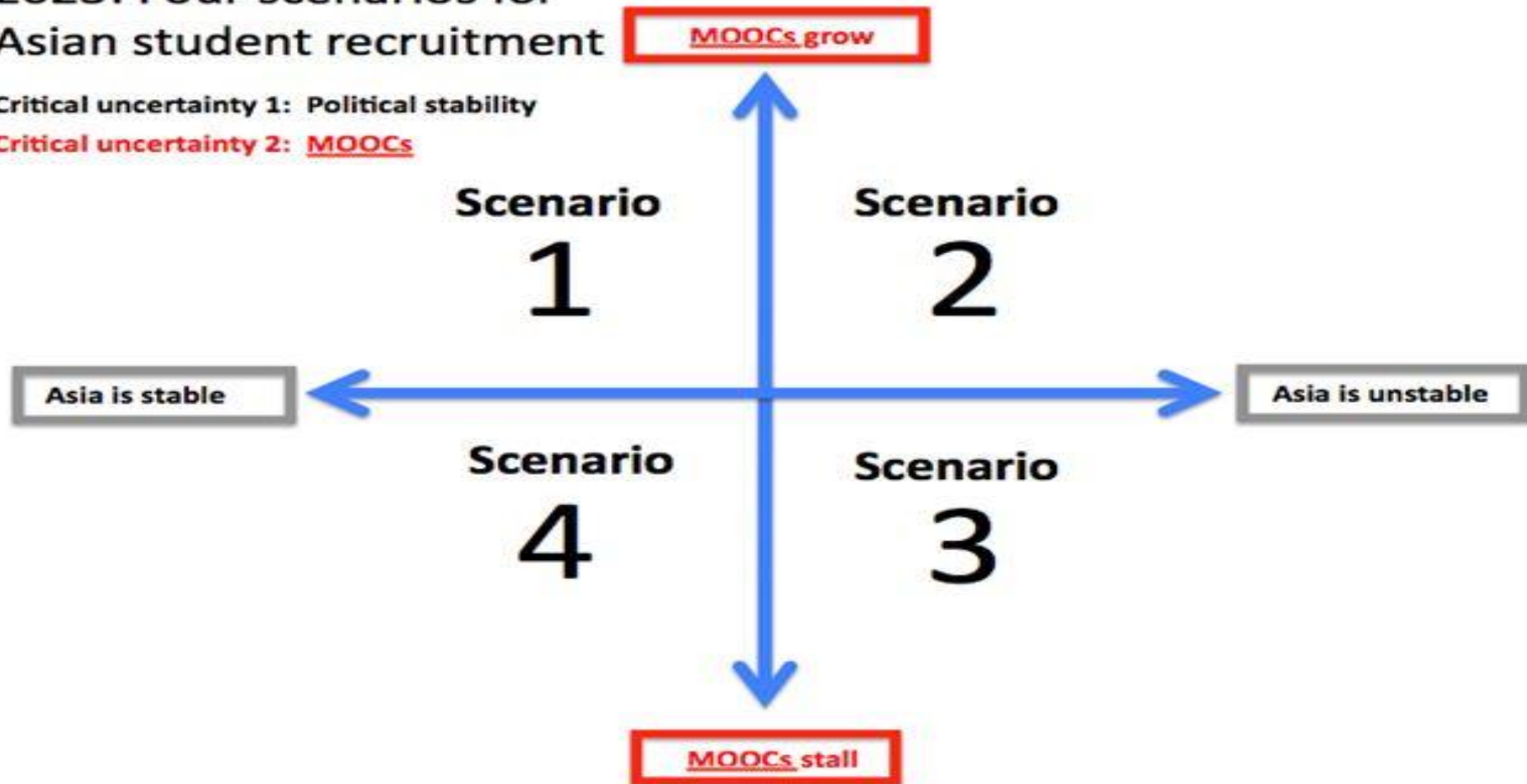
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Higher Education Scenario Example

2023: Four scenarios for Asian student recruitment

Critical uncertainty 1: Political stability

Critical uncertainty 2: MOOCs



Seven Steps to Scenarios - Step #5 – (Cont)

Step 5 : Compose Plots (Build Scenarios)

Two relevant features:

1. Highly descriptive titles

Memorable titles conveying the essence of what is happening in each of the different scenarios

2. Table of comparative descriptions

How the scenarios differ along given **dimensions, factors and likelihood of occurrence**

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Scenario Comparison Table

Scenario Blueprint

Uncertainty	Scenario One Business as Usual	Scenario Two Financial Issues	Scenario Three New Markets	Scenario Four Change, Change, Change
Regulatory Environment	Unchanged	Burdensome	Unchanged	Burdensome
Economic Shift	Incremental	Incremental	Significant	Significant
Globalization	Highly globalized and integrated	Some pockets of protection	Highly globalized and integrated	Return of protectionism
Type and Degree of Competition	Limited new entrants	Non-traditional, but selective in attractive niches	Competition from emerging market institutions	Non-traditional and widespread
Financial Crises	No financial crises	Massive with widespread impact	Low and constrained impact	Massive with impact on developed world
Lender of Last Resort	In place	In place	None in place	None in place
Debt Situation	Manageable	Manageable	Moderate collapse	Significant collapse
Securitization Market	Recovered	Constrained	Somewhat constrained	Somewhat recovered
Retirement Environment	Stretched, but manageable	Stretched, but manageable	System collapse in developed world	System collapse in developed world

Seven Steps to Scenarios - Step #6

Step 6 : Evaluate the Decision (Strategic Implications)

Link back to the strategic decision(s)
in **Step 1**

Simplest approach is to answer two
questions:

1. What are the main
opportunities and threats that
each scenario poses?
2. How well prepared is the
organisation to seize these
opportunities and counter or
minimise the threats?

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Seven Steps to Scenarios - Step #7

Step 7 : Indicators and Signposts

Provide Compelling Scenario ‘Story Lines’

Scenarios are not end-points but are narratives of how events might unfold from now to the future point

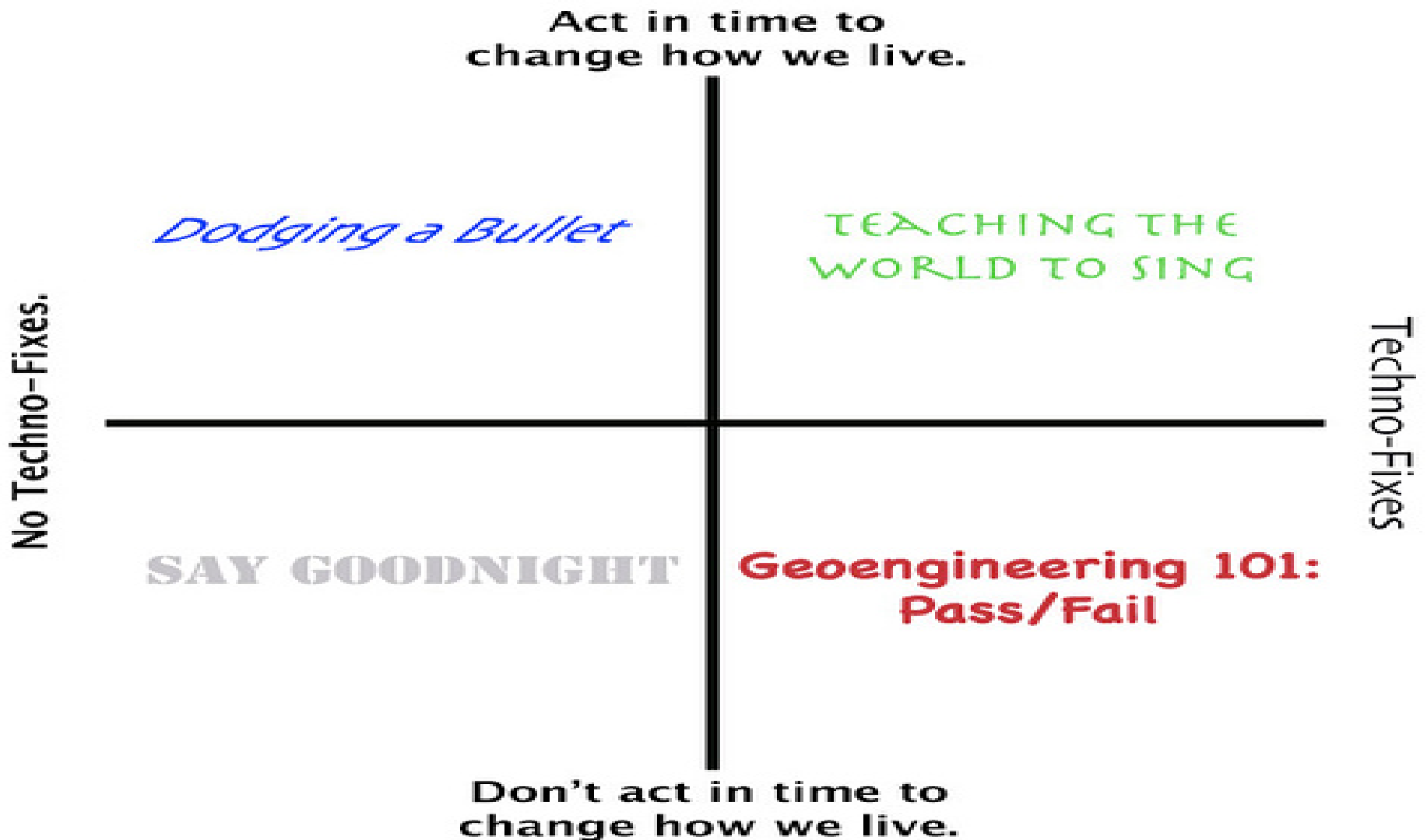
Should be dramatic, compelling, logical and plausible

Provide markers and likely key branching points on the dynamic path

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Climate Change Scenario Example





Scenario Examples - Business

Scenario Planning by Matrix

Competitive Pressures

Increasing modestly

Increasing Strongly

Economic Environment

Economy
Expands

Growth Plan

Deliberative or "Offensive"
Strategy

Flat
Economy

Defensive Plan

Potential
Doomsday Scenario

The Interplay of Critical Uncertainties Will Define Possible Alternative Futures

Universal Service Fund Policy

USF Available
for Wireless

USF Limited to
Fixed Line

4G Goes Rural

- Incumbent wireless carriers compete w/RLECs
- Wired voice & broadband becomes the exception

A Hundred Flowers Bloom

- Competition between licensed and unlicensed broadband
- Significant 4G build out

RLEC's Dream

- Broadband remains very expensive, limited market penetration
- High ROC for RLECs for fixed-line

BYO Broadband

- Many rural markets ceded to unlicensed providers
- Municipal fiber in larger rural communities

License Regime

Unlicensed Use
for WAN

Availability of "White Space" Spectrum

How can you use Scenarios?

1. **Employ scenarios as ‘test beds’ for the organisation’s current strategy**

Judgemental assessment by planning committee as to how well (or badly) the organisation’s strategy ‘plays out’ in each scenario.

The assessment is done by evaluating each scenario and identifying Opportunities / Threats

The following questions are relevant:

Are we satisfied with the resilience of our current strategy, its flexibility to deal with different possible conditions?

Are there contingency plans we should put in place to help move in a different direction, should that be necessary?

Uses of Scenarios (2)

2. Scenarios stimulate us to explore new strategy options

Scenarios portray different futures and these different futures would obviously require different strategies

The difficulty is **not knowing which future will evolve**

Judgemental assessment by planning committee as to how well different organisational strategies 'play out' in each scenario

Flexible strategy may be determined allowing for quick adaptation to new circumstances and different threats and opportunities as they appear on the horizon

Arguments for Scenario Planning

In an age of incremental change, it is safe to say that incremental changes in our strategies will suffice.

However, an age of discontinuities and massive uncertainties requires discontinuous strategies, sometimes radical changes from past practices

The powerful feature of scenarios is that they stretch the envelope of our thinking both about the future and about our strategies

They provide managers with a powerful forecasting tool to evaluate strategies while considering uncertain future outcomes

Scenarios – Final Advice

THE **DOs** AND **DON'Ts** OF SCENARIO PLANNING

1
Fight the urge to make decisions based on what you already know

What to do
Review all trends likely to affect your company's business, especially interconnections between issues and markets

What to avoid
Relying on readily accessible information or evaluating trends only within the same geography or industry context

Availability bias

2
Beware giving too much weight to unlikely events

What to do
Evaluate and prioritize trends using first qualitative, then quantitative approaches

What to avoid
Focusing on numerical precision early in the process

Probability neglect

3
Don't assume the future will look like the past

What to do
Build scenarios around critical uncertainties, engaging top executives through experiential techniques

What to avoid
Outsourcing or delegating the creation of scenarios to junior team members

Stability bias

4
Combat overconfidence and excessive optimism

What to do
Assess the impact of each scenario and develop strategic alternatives for each

What to avoid
Planning for a scenario deemed most likely, to the exclusion of all others

Optimism, over-confidence biases

5
Encourage free and open debate

What to do
Instill the discipline of scenario-based thinking with systems, processes, and capabilities that sustain it

What to avoid
Using scenario planning as a one-off exercise or ignoring social dynamics such as groupthink

Social biases