



Introduction to Technology Forecasting

outline



1. Why do we need a reliable forecast?
2. Why is it difficult to forecast?
3. What are the existing approaches?

What is a Technology Forecast?

A FORECAST is a statement of **What** is expected to happen in the future with clear description **When** in time and **Where** in space.

Example:

IBM will bring **Watson** and other cognitive systems (What?)
in coming **10 years** (When?)
to **Africa** (Where?)*

* source: <http://www-03.ibm.com/press/us/en/pressrelease/43106.wss>

*...The **righter** we do the wrong thing,
the **wronger** we become...*

Russel Ackoff (2003)

what is the right way?

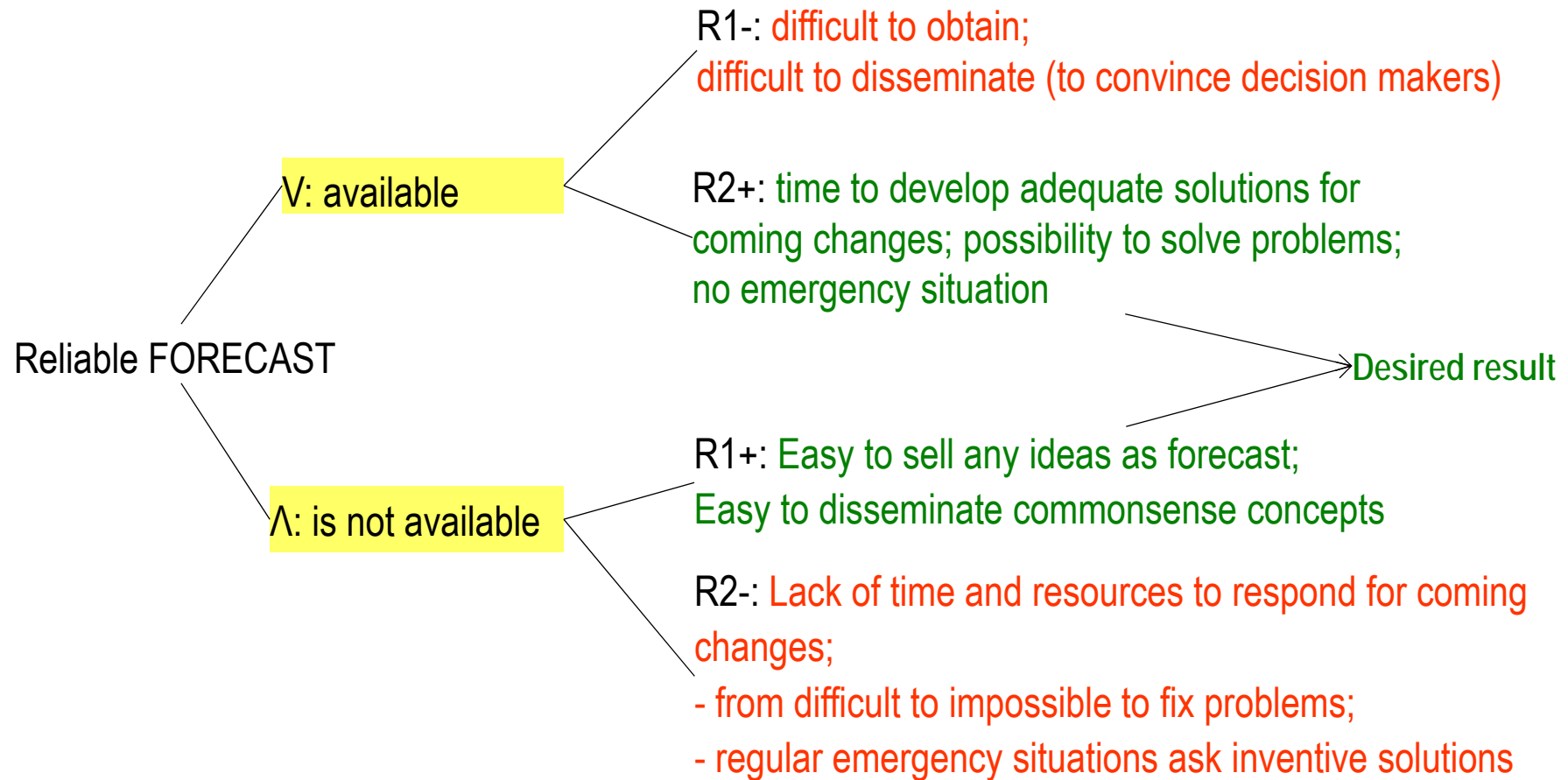


TWO GENTLEMEN'S STORY

Sir Christopher and Sir James are walking along the Thames. Suddenly they see a child in the water calling for help. Sir Christopher jumps into the river and saves the child. As soon as he gets back to the shore he hears another child crying for help. The gentleman jumps back into the river and keeps saving the children as the situation repeats itself several times.

Finally, Sir Christopher feels absolutely exhausted and asks Sir James why he doesn't help him save the children as he can barely keep on water having saved the children for some time. Sir James looks at him and replies that he thinks he'd better go up the current and see who is throwing children into the river.

forecasting and inventive problem solving



without forecasting



*Forecasting is not practiced by decision makers
when things are going well...
decision makers accomplish without it.*

*Forecasting is not practiced by decision makers
when things are going badly...
it is too late to predict (fast action is required)*

-M.Godet

without forecasting

- No forecast;
- Anything can happen;
 - There is no attempts to anticipate future
 - There are attempts to build as multiple **scenarios**
- Seduced by success (ignore the future);
- Future will be like the past (higher, faster, and father);
- Emergency service (waiting until the problem arrives)...

without forecasting

Haiti, January 2010



On 10 February the Haitian government reported the death toll to have reached 230,000* An investigation by Radio Netherlands has questioned the official death toll, reporting an estimate of **92,000** deaths as being a more realistic figure.**

* "Haiti quake death toll rises to 230,000". BBC News. 10 February 2010.

** Melissen, Hans Jaap (23 February 2010). "Haiti quake death toll well under 100,000". Radio Netherlands Worldwide. Retrieved 28 February 2010.

Chile, February 2010

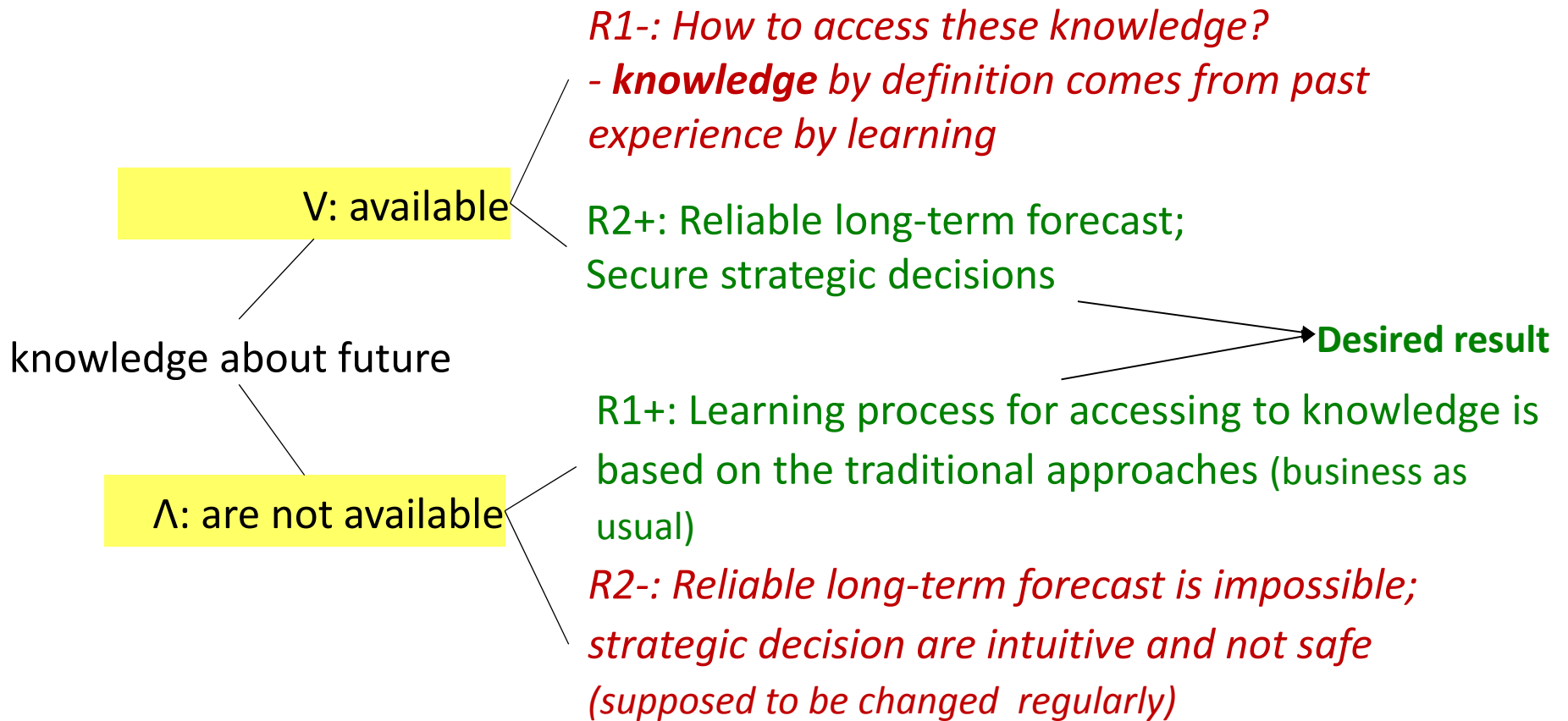
This was the strongest earthquake affecting Chile since the magnitude 9.5 1960 Valdivia earthquake (the most energetic earthquake ever measured in the world).
 ...as the **seventh strongest earthquake** ever measured, **five hundred times more forceful** than the 7.0 Mw earthquake in Haiti in January of 2010.

The latest death toll as of April 7, 2010 is **486 victims*****

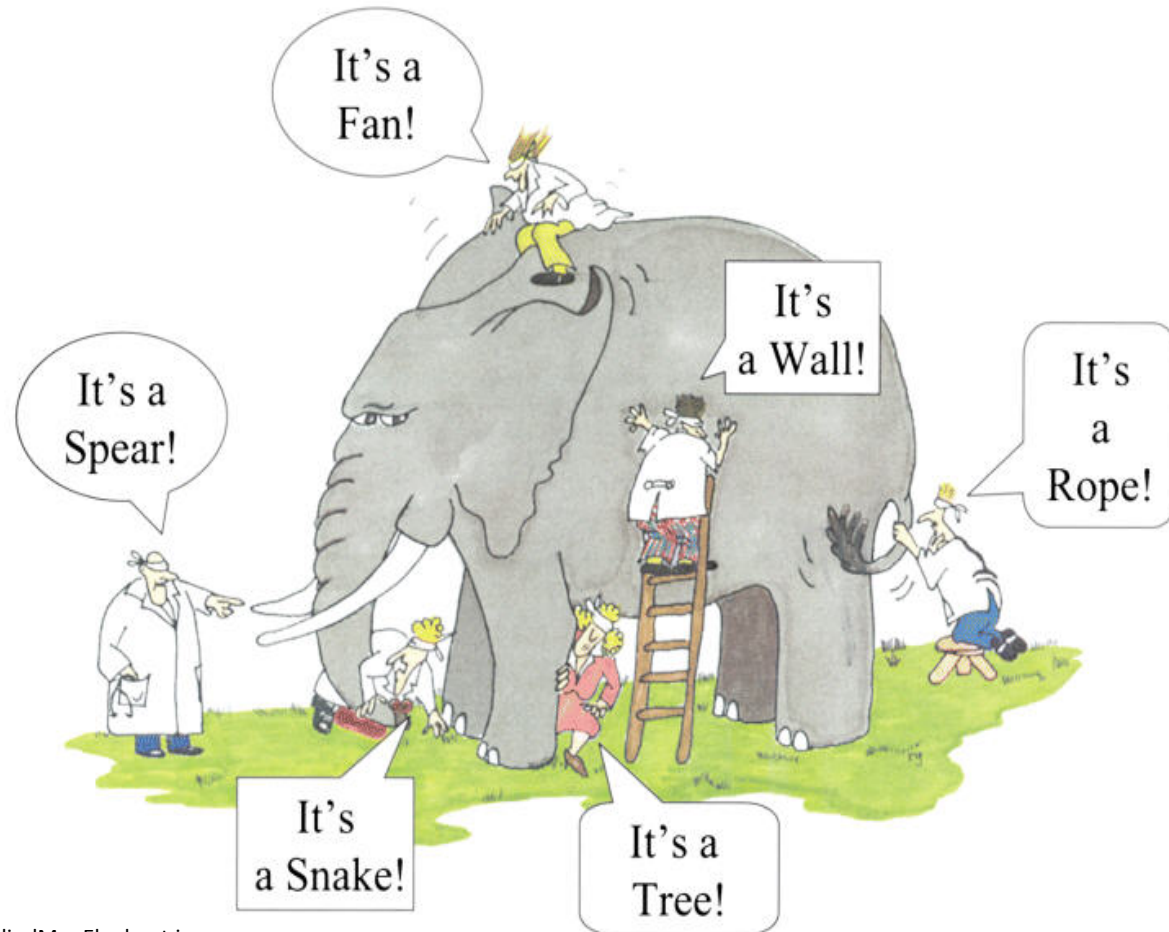
*** Gobierno aumenta a 486 los fallecidos por terremoto y posterior tsunami
http://www.latercera.com/contenido/680_240084_9.shtml



why is it difficult to forecast?



why is it difficult task?



Source: www.whattofix.com/images/BlindMenElephant.jpg

What are the existing approaches?



- Starting from the end of 1940s Technological forecasting studies and methods to forecast grew up exponentially.
- List of known forecasting tools collected from different sources in border of FORMAT project included 266 items*.
- When removing repetitions the final list includes 91 methods and techniques for supporting forecasting activities.

* M.Slupinski, Technology Forecasting – State of the art update, Deliverable 2.3 / FORMAT project, Jan. 2013. <http://www.format-project.eu/deliverables>

Hard and Soft methods:

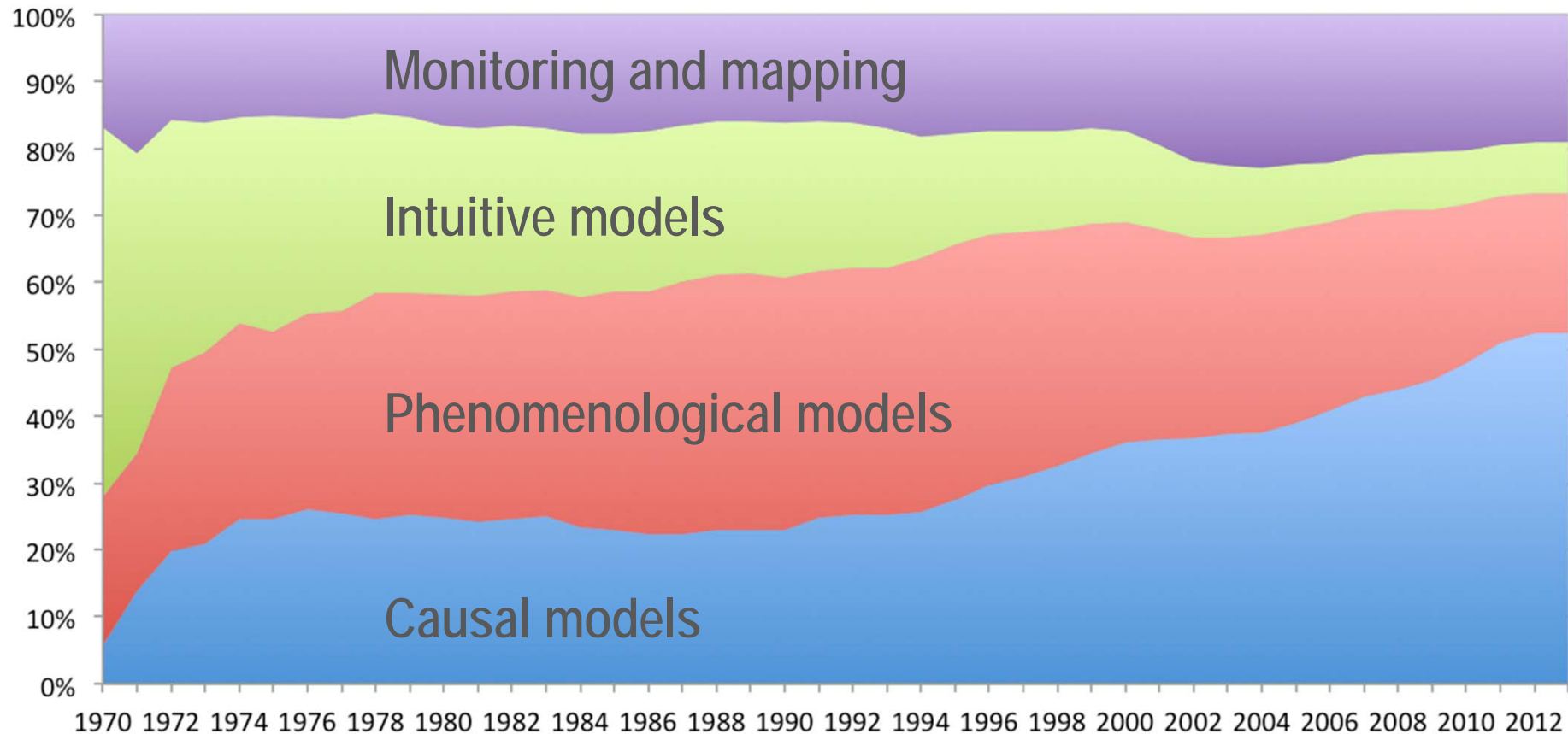


Advantages and limitation of qualitative and quantitative methods

Context	Qualitative methods (Soft)	Quantitative methods (Hard)
<i>Design of new systems and Inventive Problem Solving</i>	<p>Pro: Simple to perform. No necessity to collect and refine data.</p> <p>Con: Ambiguity of definitions. Results are incomplete & biased.</p>	<p>Pro: Clear definitions of features and values for improvement.</p> <p>Con: How to measure a new quality?</p>
<i>Decision making and Management of innovation</i>	<p>Pro: Low resistance for implementation.</p> <p>Con: How to position the innovations in time, in space, and in competitive environment?</p>	<p>Pro: Results seem plausible for decision making and strategic planning.</p> <p>Con: Efforts for data gathering, refining and meaningful interpretation of results.</p>
<i>Long-term forecast of technology change</i>	<p>Pro: Compatible with long-term forecast.</p> <p>Con: Inaccuracy of prediction in time (when?) and in space (where?). Results are highly biased. How to recognize the future rival technologies?</p>	<p>Pro: Results are measurable. Process is repeatable, adaptable, and cost effective.</p> <p>Con: Based on past data and trends. Indirect biases through computation models and assumptions on data.</p>

Cumulative appearances split into categories

Percentage of category's cumulative appearances in each year



M.Slupinski, Technology Forecasting – State of the art update, Deliverable 2.3 / FORMAT project, Jan. 2013. <http://www.format-project.eu/deliverables>

forecast = knowledge



*Those who have knowledge, don't predict.
Those who predict, don't have knowledge.*

-Lao Tzu

The goal of forecasting is not to predict the future but to tell you what you need to **know to take meaningful action** in the present.

-Paul Saffo