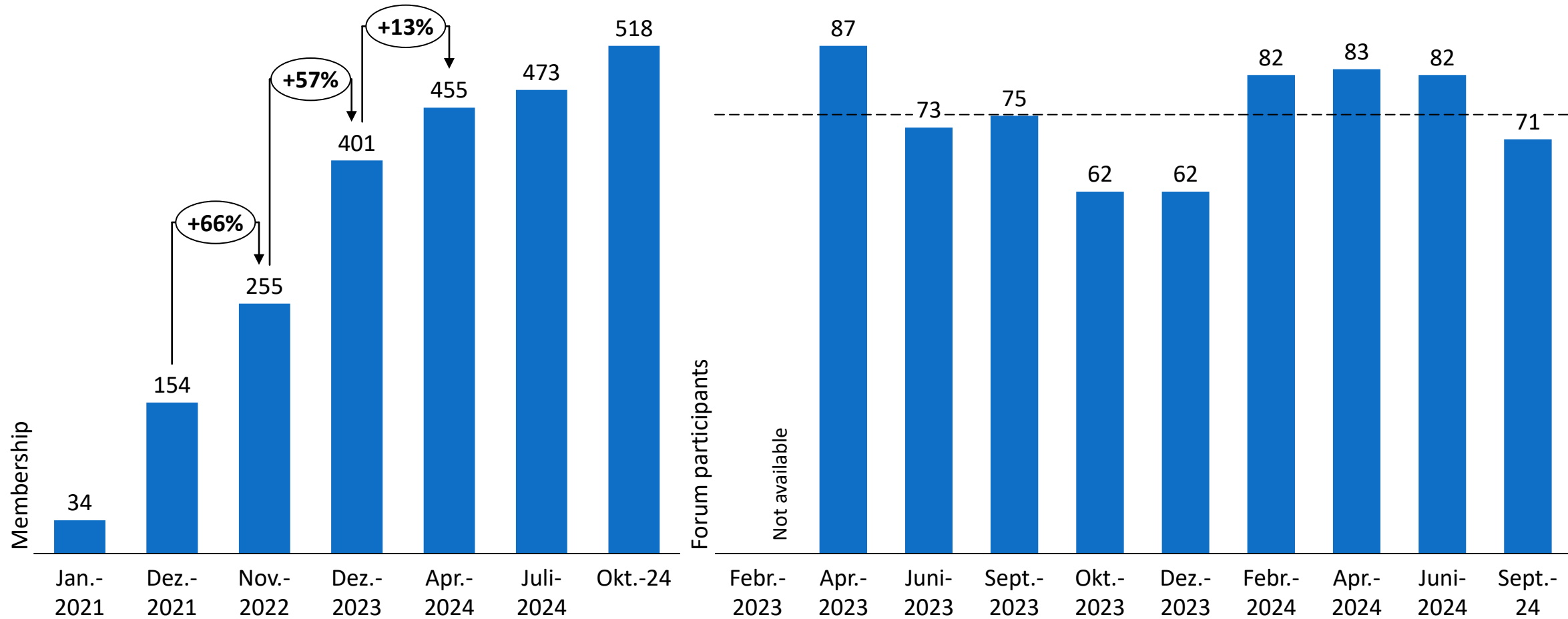




New Product Planning Network Group

Valuation Modeling, Sensitivity Analysis & Scenario Planning

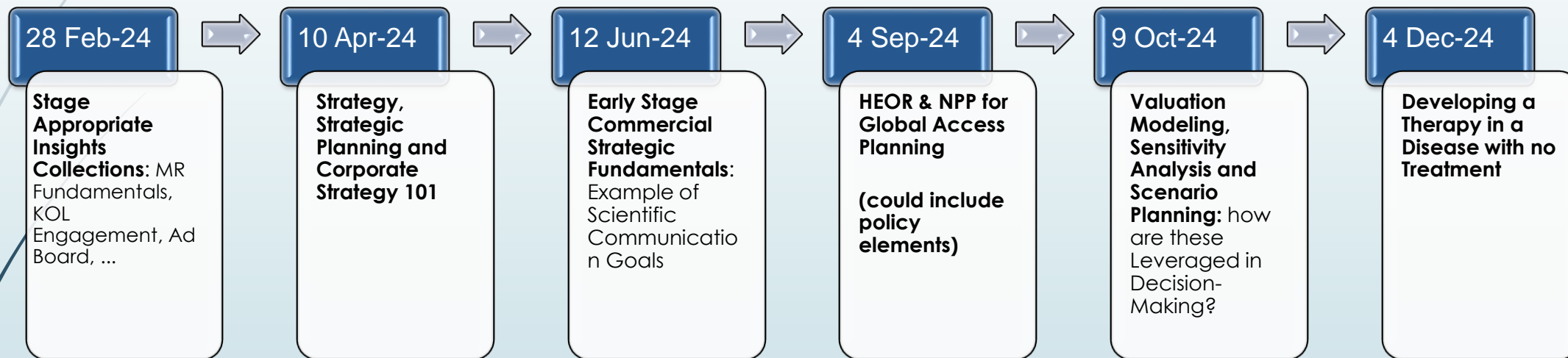
NPP Network membership and Forums attendance





2024 plan of NPP Forums

Status of upcoming events





Objectives for Today

- Review basic principles of valuation modeling, scenario planning and sensitivity analysis
- Understand the utility and limitations of valuation figures in terms of executive decision-making



Agenda

- Welcome and Introductions
- Valuation Principles – Valay Desai
- Fireside Chat
 - Tony Colasin, CVCO
 - Olena Stadnyuk, Biomarin
- Questions and Wrap-Up

Introduction to Valuation



Definition

- Valuation can be defined as what one is willing to pay for an asset, company or program
- The ability to create value is the core tenant of our industry
- Biopharma does this through research and development and commercialization of therapies
- Biopharma can also do this via licensing, M&A and other creative financing instruments

The Basics

- What is the future cash flow worth now?
- With inflation, the cost of capital and the inherent riskiness of our business, future cash flows are worth less than the equivalent cash flows today
- Key questions include:
 - How much less?
 - What will it cost to obtain these future cash flows (e.g., clinical trial costs)?
 - How do we quantify this risk?
 - What is the risk inherent in the future cash flows (competitive landscape, pricing potential and erosion, reimbursement)?

The DCF Methodology is Primarily Used to Value Assets in the Biopharma Industry

- Although numerous methodologies value pharmaceutical and biotechnology companies, the discounted cash flow (DCF) method is preferred by the industry. Healthcare investment bankers, venture capitalists, finance executives in Pharma and Biotech companies all value a project, an R&D portfolio or an entire company with the DCF method
- The term “cash flows” describes the money flowing in and out of a Biopharma company. All transactions affecting cash flows fall into three major categories: 1) operations; 2) investing; and 3) financing
- Estimating free cash flow requires an experienced expert/team to anticipate all the development and operating costs that are specific to the asset. Sometimes, this is done with analogs or generally applied guidelines. Sometimes, this step is completely uniquely for each asset based on the specific product attributes and future market characteristics. These are the major buckets to consider:

Input	Primary Source	Other Sources
Gross Sales	Manufacturer forecast model	N/A
Rebates	Manufacturer Market Access Org.	Analogs (IQVIA, SSR Health, etc.)
Co-Pay Redemptions	Manufacturer Market Access Org.	Analogs (IQVIA, SSR Health, etc.)
Other Sales Discounts	Manufacturer Market Access Org.	Analogs
Wholesaler Fees	Manufacturer Market Access Org.	Analogs
Cost of Goods Sold	Manufacturer Supply Chain Org.	Analogs
Royalty Payments	Manufacturer BD Org.	N/A
Development Costs	Manufacturer R&D Org.	Analogs (IQVIA, Syneos Health)
Salesforce Costs	Manufacturer Marketing Org.	Analogs (PharmaForce, IQVIA)
DTC Advertising Costs	Manufacturer Marketing Org.	Analogs (IQVIA, creative agencies)
Phase IV Spend	Manufacturer Medical Affairs Org.	Internal Analogs
G&A Spend	Manufacturer Finance Org.	Internal Analogs
PTS	Manufacturer R&D Org.	Analogs (Citeline, Adis R&D Insight)
PRS	Manufacturer R&D Org.	Analogs (Citeline, Adis R&D Insight)
Discount Rate	Manufacturer Finance Org.	N/A

Comparables (Multiples) Analysis is Another Valuation Technique

- The DCF valuation method is a form of absolute valuation, since it uses no information regarding relative values of similar Biopharma companies
- In contrast, the central aim of comparables analysis is the evaluation of market opinion about a Biopharma company by providing a benchmark against which analysts establish valuation for a private Biopharma company or analyze the value of a public Biopharma company at a given point of time
- Comparables analysis has a broad range of applications, including M&A, IPOs and restructurings. Trading of comparables is founded upon the premise that similar Biopharma companies provide relevant reference points for valuing a given company based on shared financial and business characteristics, as well as performance drivers and risks



Comparable Biopharma Company Selection

Examine the essential characteristics of the target Biopharma company for comparative purposes



Identification of Relevant Financial Info

The most common sources for public Biopharma company financial information are SEC filings, equity research reports and press releases



Ratios & Multiples Calculation

Common ratios and multiple include: 1) enterprise value; 2) EBIT; 3) EBITDA; 4) gross profit margin; 5) RoE; 6) RoA; 7) dividend yield and others*



Benchmarking the Comparable Companies

Determine the Biopharma target company's relative ranking



Valuing Biopharma Company Using Multiples

Apply the trading multiples for comparable companies to derive an appropriate valuation range for the target company

* leverage, debt to capitalization ratio, credit ratings, price to earnings ratio, price to book ratio, enterprise value to employees ratio, enterprise value to EBITDA

NPV Model for Fictitious Aledramab for Colorectal Cancer (1)

Year	1	2	3	4	5	6	7	8	9	10	11	12	13
Phases	I	II	II	III	III	III	FDA	FDA	Market	Market	Market	Market	Market
Top Sales	\$750	\$750	\$750	\$750	\$750	\$750	\$750	\$750	\$750	\$750	\$750	\$750	\$750
Market Penetr.	-	-	-	-	-	-	-	-	30%	50%	80%	80%	100%
Sales Revenue	-	-	-	-	-	-	-	-	\$225	\$375	\$600	\$600	\$750M
Operating Exp.	-	-	-	-	-	-	-	-	(\$67.5)	(\$112.5)	(\$180)	(\$180)	(\$225)
R&D Exp.	(\$5)	(\$10)	(\$10)	(\$30)	(\$20)	(\$20)	(\$5)	(\$10)	(\$10)	(\$10)	-	-	-
CF	(\$5)	(\$10)	(\$10)	(\$30)	(\$20)	(\$20)	(\$5)	(\$10)	\$148	\$253	\$420	\$420	\$525
Success Rate	62%	100%	31%	100%	100%	58%	100%	95%	100%	100%	100%	100%	100%
Probability	100%	62%	62%	19%	19%	19%	11.15%	11.15%	10.6%	10.6%	10.6%	10.6%	10.6%
rCF	(\$5)	(\$6)	(\$6)	(\$6)	(\$4)	(\$4)	(\$1)	(\$1)	\$16	\$27	\$44	\$44	\$56
Discount Factor	1	0.83	0.69	0.58	0.48	0.40	0.34	0.28	0.23	0.19	0.16	0.13	0.11
PV	(\$5)	(\$5)	(\$4)	(\$3)	(\$2)	(\$2)	(\$1)	(\$1)	\$16	\$27	\$44	\$44	\$56
rNPV	\$7												

NPV Model for Fictitious Aledramab for Colorectal Cancer (2)

	Cost (million)	Success Rate (%)	Length (years)
Phase I	\$5	62%	1
Phase II	\$20	31%	2
Phase III	\$70	58%	3
FDA Approval	\$5	95%	2

Top Sales (millions)	\$750
Discount Rate	20%
Growth Rate	0%
Launch Costs (millions)	\$30
Operating Margin	70%

An NPV and eNPV Calculation is Only the Start of a Decision-Making Journey

BUSINESS CASE

What are the risks of making this investment? What are the risks of not making this investment? Etc.

THRESHOLDS

Does this program meet internal thresholds for investment?

TRADEOFFS

What are the opportunity costs of making this investment?

SENSITIVITY ANALYSIS

Where is the greatest uncertainty with respect to this investment and how does it impact valuation?

ORGANIZATIONAL SUPPORT

Is this program / acquisition backed by key leaders / functions within the organization?

STRATEGY

Does this investment fit into our organizational, portfolio and/or disease strategy?

SCENARIO PLANNING

What other scenarios could come to pass? Pre-mortem analysis



Shell was a Pioneering Organization With Respect to Scenario Planning

Forecasts alone are often not sufficient

Scenarios are alternative stories about the future

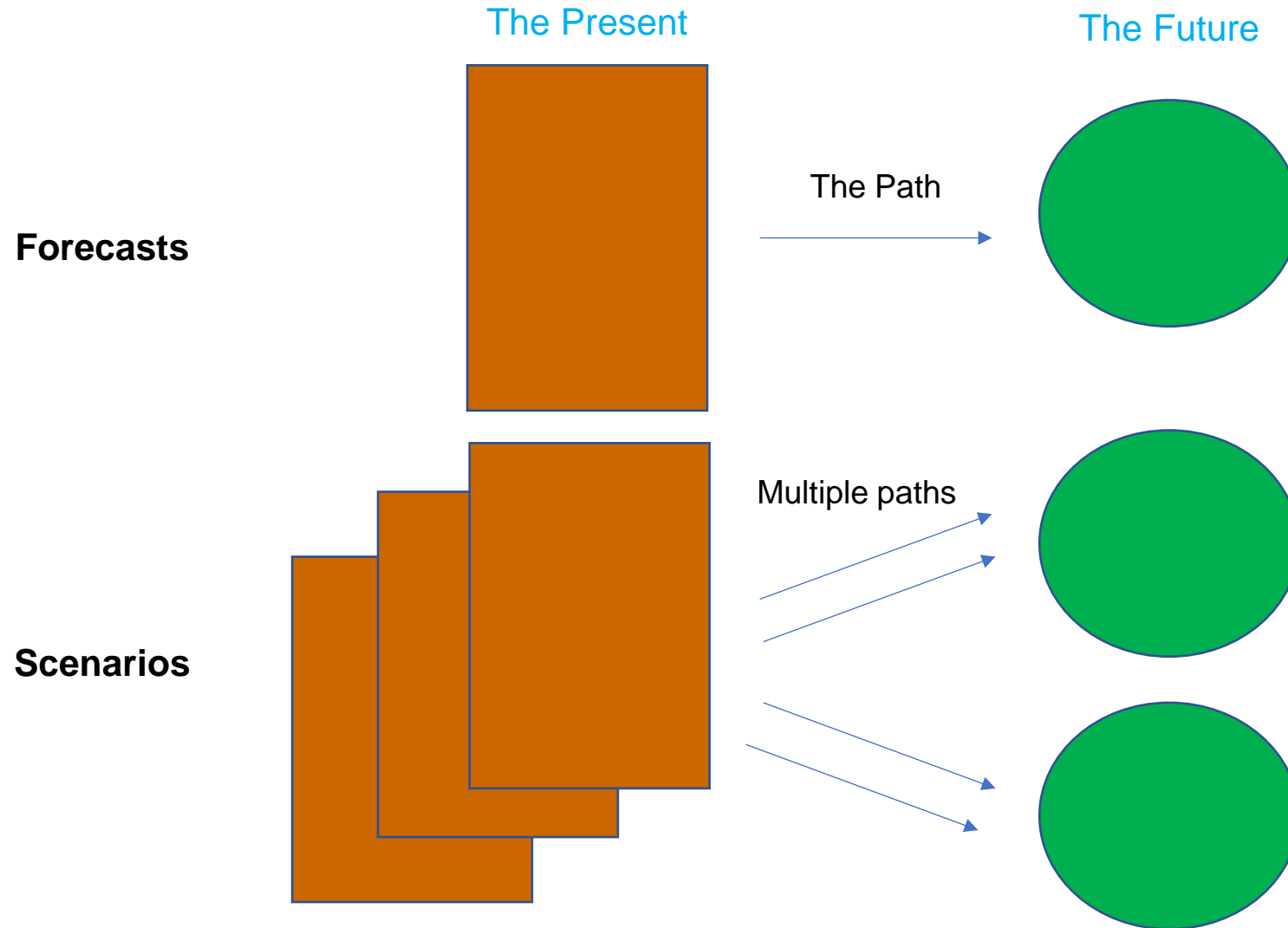
Scenarios are an integral part of organizations' strategy process at all decision levels

Scenarios can be combined with real option analysis

Scenarios

- Forecasts, which are usually constructed on the assumption that tomorrow's world will be much like today's, provide an inappropriate tool to anticipate shifts in the business environment. In fact, forecasts may even be dangerous, as they are typically wrong when they are needed most
- Scenarios are not projections, predictions or preferences; rather, they are coherent and credible alternative stories about the future. They are designed to help companies challenge their assumptions, develop their strategies and test their plans
- At Shell, scenarios played a particularly important role in anticipating shifts in the global energy mix and hence in determining the organization's upstream and downstream investments. Combined with other tools such as market and competitive analyses, scenarios represent an integral part of the organization's strategy process at all decision levels
- The value of many projects is contingent on earlier investments. Thus, once a company has decided to invest, it relinquishes the possibility of new information that might affect the desirability or timing of the expenditure. Given the irreversible nature of most investments, scenario planning can usefully be combined with real option analysis, an approach that emphasizes that many investments create important follow-on opportunities for a company

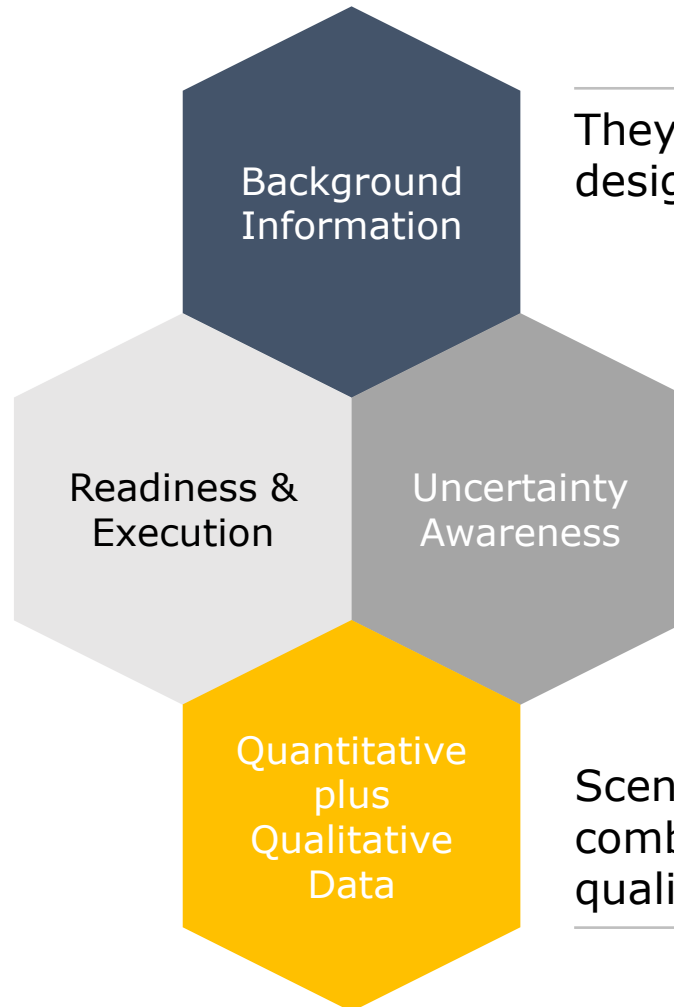
Forecasts are Not the Same as Scenarios



- Scenario planning differs fundamentally from forecasting in that it accepts uncertainty, tries to understand it and makes it part of the reasoning
- Scenarios help prepare for a range of alternative and different futures
- Scenarios are not projections, predictions or preferences. Rather, they are coherent and credible stories, describing different paths that lead to alternative futures

Scenarios Serve Multiple Functions

Scenarios can help an organization to act upon or react to future developments



They present a background for the design and selection of strategies

Scenarios help make managers aware of environmental uncertainties

Scenarios offer the possibility to combine quantitative data with qualitative input

Sensitivity Analysis for Fictitious Product

- Sensitivity analysis is a method of testing how sensitive the NPV/eNPV of a project is to changes in one or more variables. By varying these variables within a certain range, you can see how the NPV/eNPV changes and identify the most critical factors that affect the project's value
- To conduct sensitivity analysis, you should first identify the base case scenario, which is the set of assumptions used to calculate the NPV/eNPV of the project. Then, choose the variables to test and the range of values to apply to them. After that, calculate the NPV/eNPV for each combination of values and compare them with the base case NPV, using a table or a tornado chart (below) to display the results
- The results of sensitivity analysis can help you determine the robustness of the project, as well as identify which variables have the greatest impact on the NPV/eNPV calculation. Additionally, you can identify break-even points and ranges of acceptability for the variables by looking at where the NPV/eNPV curve crosses the x-axis or the horizontal line at zero

eNPV Sensitivity

