Climate Related Scenario Analysis
Strategies for Sustainable Business (S-Lab)

COLGATE-PALMOLIVE

MIT MANAGEMENT SLOAN SCHOOL

Purpose

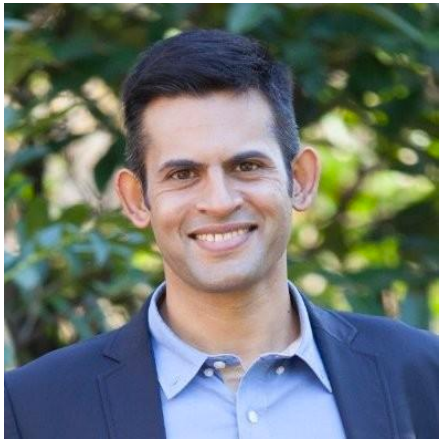
The intent of this presentation is to give an overview of Scenario Analysis as completed by the MIT Sustainability Lab Team from Spring 2018.

Agenda

- Understanding Scenario Analysis
- Categories of Climate-Related Risks & Opportunities
- Types of Risks Climate Change Poses to Businesses
- Case Study: Unilever
- Preliminary Interview Insights from Colgate Interviews
- Scenario Analysis Process
    - Scope and Stakeholders
    - Past Industry Trends
    - Future Trends: *2°C Scenario*
- Recommendations

For additional details and expansion on this deck please refer to the report provided by the S-Lab team

S-Lab Team



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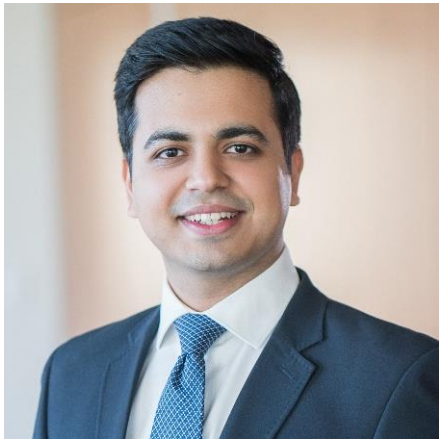

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Understanding Scenario Analysis

	CONTINGENCY PLANNING	SENSITIVITY ANALYSIS	UNCERTAINITY MODELING	SCENARIO ANALYSIS
Brief Description	Alternative actions in response to an exception in the base case projection.	Analysis of sensitivity of variance in input variable to strategy outcome.	A statistical framework to measure how likely uncertainty about a variable or set of variables is to influence outcomes	Exploration of alternative futures that are comprised of many uncertainties considered simultaneously resulting in a baseline strategy that is successful under many scenarios.
Typical Usage	Assessment of impact of sudden market changes or disruptions	To test profitability of an investment if one variable were to change. whether a capital	Decision under uncertainty modeling is an effective tool in geological assessment	Formulate business strategy to deal with various climate-related scenarios

Source: "a framework for 2 degrees scenario analysis - Ceres." https://www.ceres.org/sites/default/files/reports/2017-03/Framework_Jan%2010%2017.pdf. Accessed 13 May. 2018.

Source: "Dark Clouds or Silver Linings? Knightian Uncertainty ... - SSRN papers." 21 Jul. 2011, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1891835. Accessed 14 May. 2018.

Types of Risks Climate Change Poses to Businesses

There are many publicly-available scenarios that can be used by organizations as a platform on which to base their own evaluations of the impacts posed by climate change. These can be broadly assigned into two categories

Transition	Physical
Scenarios that articulate different pathways in the energy and economy system that would result in a certain level or trajectory of GHG emissions and resulting GHG concentrations in the atmosphere	Scenarios that articulate different pathways that account for physical changes arising from different levels of GHG concentrations
Publicly-Available Scenarios	
3.6°C: IEA New Policies Scenarios **2°C:** IEA 2DS/450 Scenarios, DDPP, IRENA, Greenpeace **1.5°C:** Forthcoming IEA 1.5DS scenario	**6°C:** IPCC RCP 8.5 **4°C:** IPCC RCP 6.0 **2.6°C:** IPCC RCP 4.5 **2°C:** IPCC RCP 2.6

Source: "CDP Technical Note on Scenario Analysis - Rackcdn.com." https://b8f65cb373b1b7b15feb-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/guidance _docs/pdfs/000/001/430/original/CDP-technical-note-scenario-analysis.pdf?1512736385. Accessed 14 May. 2018.

Categories of Climate-Related Risks & Opportunities

The business impacts related to climate change may vary significantly depending on the industry and economic sector(s)/sub-sector(s) in which an organization operates. Below are typical categories of climate-related risks and opportunities:

MARKETS AND TECHNOLOGY SHIFTS

Policies and investments to deliver a low carbon emissions economy
- Reduced market demand for higher carbon products
- Increased demand for energy-efficient, lower-carbon products
- New technologies disrupt markets

REPUTATION

Growing expectations for responsible conduct from stakeholders, including investors, lenders, and consumers
- Opportunity to enhance reputation and brand value
- Loss of trust and confidence in management

POLICY AND LEGAL

An evolving patchwork or requirements at international, national, and state level
- Increased input/operating costs for high carbon activities
- Threats to securing license to operate for high carbon activities
- Emerging concern about liabilities

PHYSICAL RISKS

Chronic changes and more frequent and severe extremes of climate
- Increased business interruption and damage across operations and supply chains with consequences for input costs, revenues, asset values, and insurance claims

Source: CDP, "Climate Change Questionnaire" 2016; Recommendations of the Task Force on Climate-related Financial Disclosures, December 2016

Case Study: Unilever

Unilever has integrated climate-related disclosures throughout the strategic report narrative and included risks and opportunities arising from climate change. The company has performed a high-level assessment of the impact of 2°C and 4°C global warming scenarios on its business.

SCENARIOS	ASSUMPTIONS	ANALYZED IMPACTS
2°C scenario	• Assumed that in the period to 2030 society acts rapidly to limit greenhouse gas emissions and puts in place measures to restrain deforestation and discourage emissions (for example implementing carbon pricing at $75- $100 per tonne, taken from the International Energy Agency's 450 scenario) • Assumed that there will be no significant impact to their business from the physical ramifications of climate change by 2030 – ie. from greater scarcity of water or increased impact of severe weather events • The scenario assesses the impact on Unilever's business from regulatory changes	• Carbon pricing is introduced in key countries and hence there are increases in both manufacturing costs and the costs of raw materials such as dairy ingredients and the metals used in packaging • Zero net deforestation requirements are introduced and a shift to sustainable agriculture puts pressure on agricultural production, raising the price of certain raw materials
4°C scenario	• Assumed climate policy is less ambitious and emissions remain high so the physical manifestations of climate change are increasingly apparent by 2030 • Did not include impacts from regulatory restrictions but focused on those resulting from the physical impacts.	• Chronic and acute water stress reduces agricultural productivity in some regions, raising prices of raw materials • Increased frequency of extreme weather (storms and floods) causes increased incidence of disruption to Unilever's manufacturing and distribution networks • Temperature increase and extreme weather events reduce economic activity, GDP growth and hence sales levels fall

The analysis shows that, without action, both scenarios present financial risks to Unilever by 2030, predominantly due to increased costs.

Source "Annual Report and Accounts 2017 (PDF | 3MB) - Unilever." 1 Jan. 2018, https://www.unilever.com/Images/unilever-annual-report-and-accounts-2017_tcm244-516456_en.pdf. Accessed 14 May. 2018.

Preliminary Interview Insights

From our conversations with executives at Colgate-Palmolive, it is clear climate change is an emerging risk and steps are required to actively consider and monitor its potential impact

Energy infrastructure reliability: Extreme weather (including heat waves) will likely impact energy infrastructure, including generators and transmission and distribution lines. This will affect energy reliability

Energy cost: The cost of refrigeration, heating, ventilation and air conditioning is expected to increase each year due to an increased number of unseasonably hot days.

Transportation cost: More sever and frequent extreme weather events might cause disruption on the logistic and distribution lines, due to damage on roads and buildings, potentially increasing the amount of time that is needed to reach products to the end-users.

Preliminary Interview Insights

Infrastructure damage: Extreme weather events could damage our physical assets such as warehouses, as well as transport infrastructure

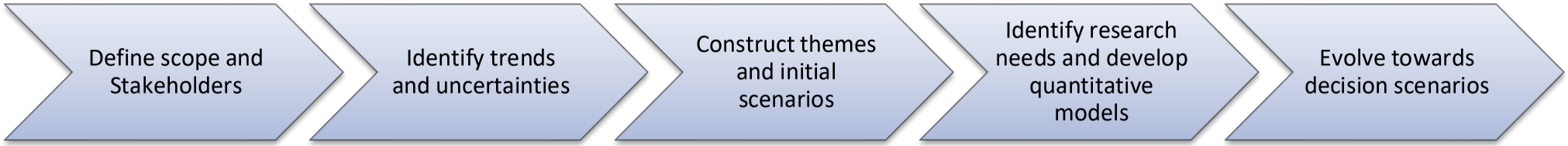
Commodity prices: Commodity prices which are required ingredients for Colgate-Palmolive products may rise

Regulatory risk: Significant shift in governments' attitudes to emissions regulation, setting ambitious targets and encouraging more global consistency in approach – trend is expected to continue which could have impact to Colgate-Palmolive's business

Reputational risk: In the context of more frequent severe weather events and shifting global attitudes, customers may have changing expectations of companies, including their operational efficiency, environmental transparency in their supply chain and product range

Competitive risks: Emerging business models that take advantage of climate change opportunities or are more resilient to climate change risks may become a threat

Scenario Analysis Process



Scope and Stakeholders

Time Horizon: 10-12 years

Geography: Global

Stakeholders

Consumers	Buying behavior, sustainability awareness
Shareholders	Investment choices, sustainability awareness
Employees	Sustainability awareness, future talent pool
Customers	Sustainability initiatives, qualification requirements
Environment	GHG emissions, materials, water, energy
Suppliers	Responsible suppliers
Government	Regulations, taxes
NGOs	Sustainability reporting, rankings

Colgate-Palmolive's strategy time horizon is 10-12 years. For sake of compatibility, time horizon for scenario analysis was chosen to be the same. Interviews with Colgate-Palmolive employees revealed that stakeholders of diverse nature are important to Colgate-Palmolive. Awareness of this list helped customize trends and uncertainties at later stages.

Past Industry Trends

PT1	Innovation in the industry has consistently increased SKUs.
PT2	Emerging markets have provided growth opportunities.
PT3	Globalization has expanded sourcing and manufacturing opportunities
PT4	eCommerce companies have gained significant market penetration.
PT5	Sustainability regulations have been become more stringent.
PT6	There is an increase in “sustainability pressure” from consumers and investors
PT7	Data analytics is enabling higher efficiency
PT9	Responsible sourcing concerns have changed the old model of long-term sourcing contracts resulting in price volatility.
PT10	Stronger hurricanes in the gulf have prompted many suppliers from Mexico to claim Force Majeure.
PT11	El Nino and La Nina impact supply of palm oil.

In this stage some key trends that have impacted Colgate Palmolive’s business in past were looked at. Dependencies on business environment and climate change were looked at in tandem (in the long-term view, both types of dependencies are interlinked). Knowledge of these trends was necessary to extrapolate known trends to the selected time horizon.

Future Trends: 2°C Scenario

U1	Will emerging markets impose carbon taxes?
U2	How quickly will the cost of green technologies be reduced?
U3	How will increased biofuel production impact tallow prices?
U4	Will the cost of responsible sourcing increase or decrease?
U5	How deforestation and sustainable production requirements impact raw materials prices?
U6	How much cost will CP be able to reduce due to conservation and recycling efforts?

These scenarios should be used to check the validity of these assumptions in relation to other uncertainties in the scenario. Such analysis will help formulate one scenario that makes realistic assumptions on each uncertainty that are valid for the whole scenario.

Recommendations

Scenario Analysis carries value beyond maintaining sustainability ratings. Scenario Analysis forces corporations to take a long-term view of the business and hence brings long-term business continuity into limelight that may be endangered by the pervasive short-termism.