

THURSDAY 16TH JULY 2015

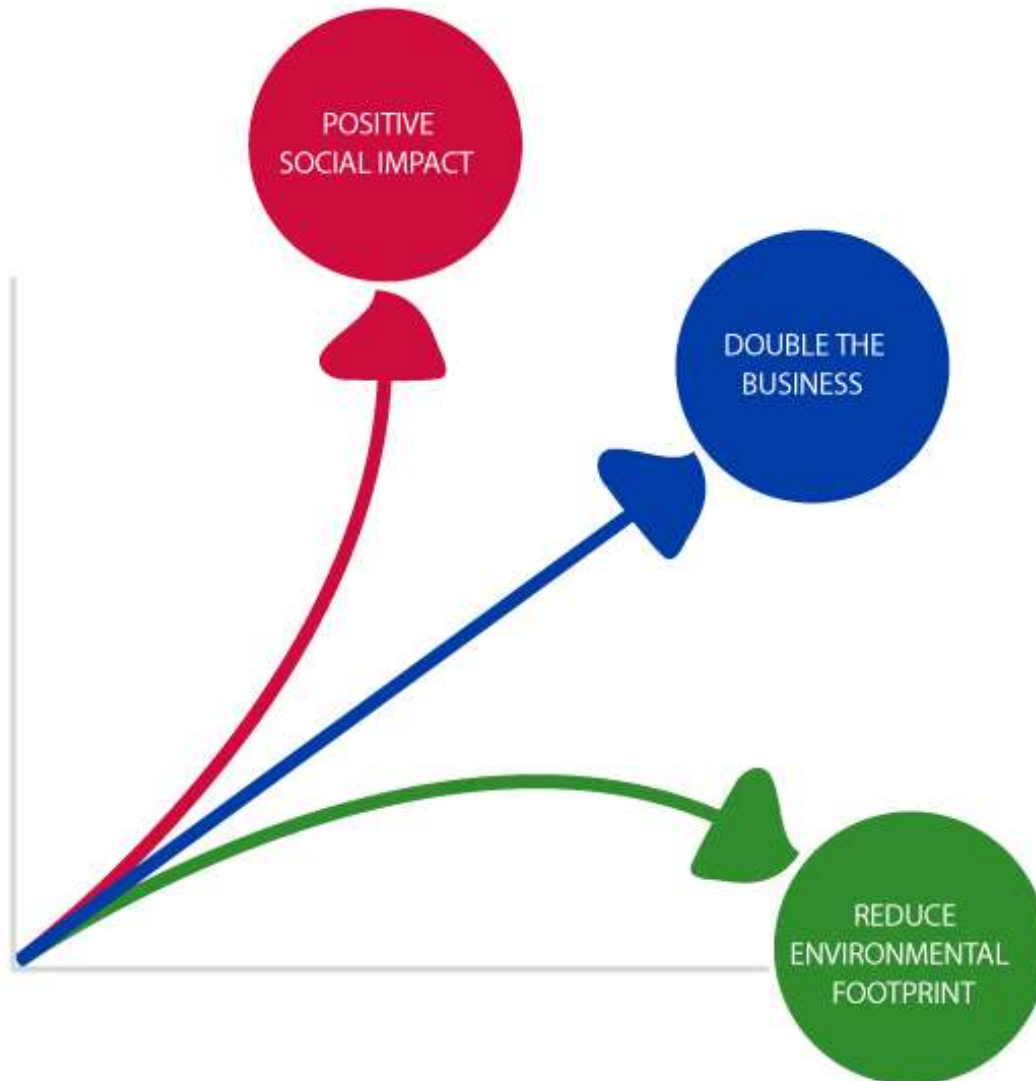


FMCG SECTOR: REINVENTING PRODUCT FORMULATION BY SIMULATION AND ENGINEERING DESIGN

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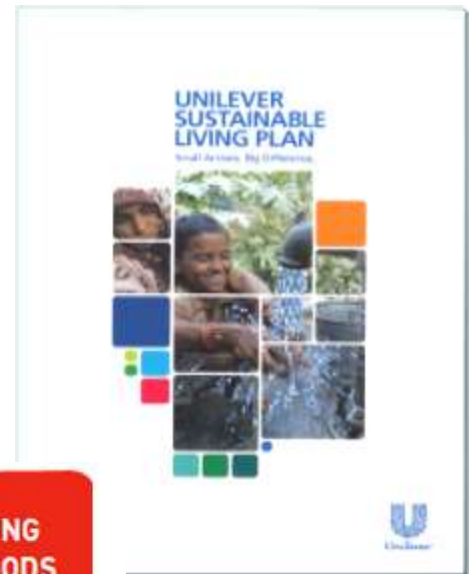


THE COMPASS STRATEGY



- Our vision is to double the size of the business, whilst reducing our environmental footprint and increasing our positive social impact.
- The Compass provides a blueprint for success by identifying what we must do to win share and grow volume in every category and country.

The Unilever Sustainable Living Plan



 **IMPROVING HEALTH AND WELL-BEING**

By 2020 we will help more than a billion people take action to improve their health and well-being.

 **REDUCING ENVIRONMENTAL IMPACT**

By 2020 our goal is to halve the environmental footprint of the making and use of our products as we grow our business.*

 **ENHANCING LIVELIHOODS**

By 2020 we will enhance the livelihoods of hundreds of thousands of people as we grow our business.

HEALTH & HYGIENE
>>

IMPROVING NUTRITION
>>

GREENHOUSE GASES
>>

WATER
>>

WASTE
>>

SUSTAINABLE SOURCING
>>

BETTER LIVELIHOODS
>>

<http://unilever.com/sustainable-living/index.aspx>

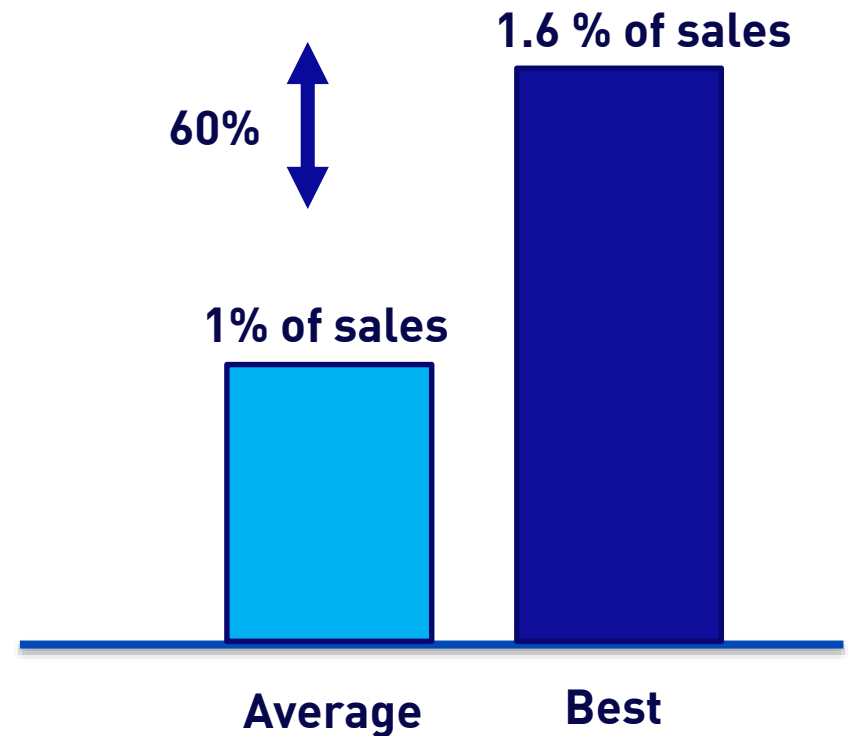
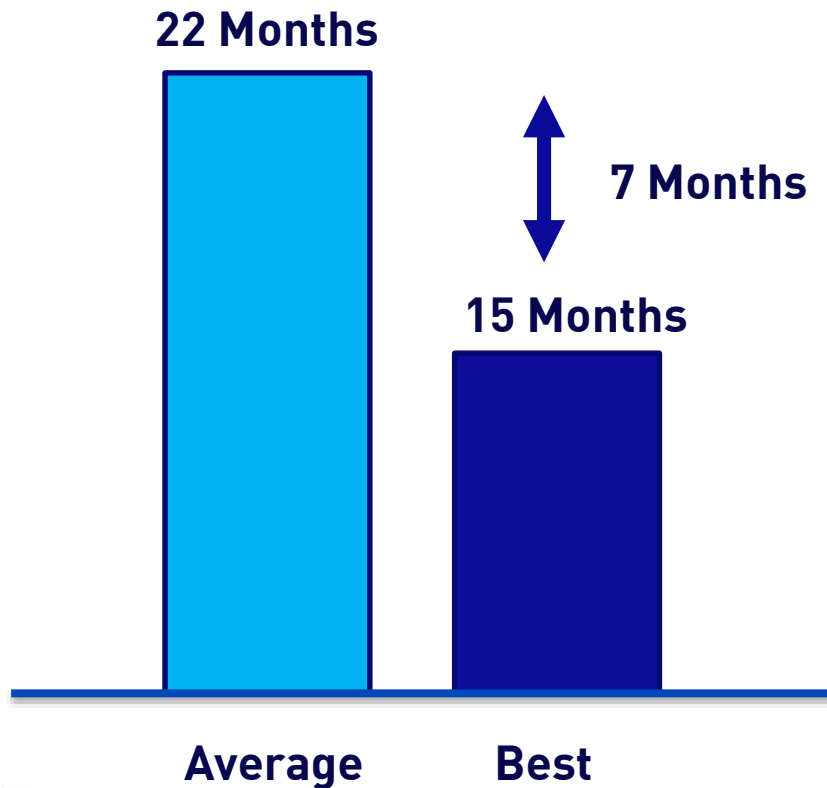


THE VALUE OF SPEED



Best in class FMCG Companies introduce Innovations seven months faster

Resulting in 60% higher sales in first year



*BCG Report Speed to Win April 2012

OUR FORMULATION JOURNEY

1 Litre FULL
Formulations
Per person per
day

In silico
1000's



Automated, 25



Manual, standardised, 5 - 7



Manual, non - standard 2 -3

WE ARE SPEEDING UP !!

UL resources focus solely on Polymer A In Port Sunlight

Q2 2013



Final scale pilot trial at Dow

Q2 2014



Unilever main plant trial Port Sunlight

Q2 2014



Q1 2013

Polymer A first synthesised in HT Campaign

Q3 2013

Polymer A transferred to Dow to scale up

Q4 2014

Dow first commercial batch

Q1 2015

Implement into Flagship liquid



1 gram

2 – 30 Kg

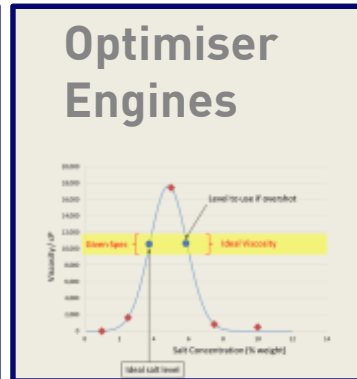
50,000 Kg

5,000 Tonnes

TO DRIVE SPEED TO MARKET FURTHER WE NEED TO LOOK END TO END



Computer Aided Formulation



Virtual Packaging Design

Factory Line Optimisation

Virtual Process Engineering

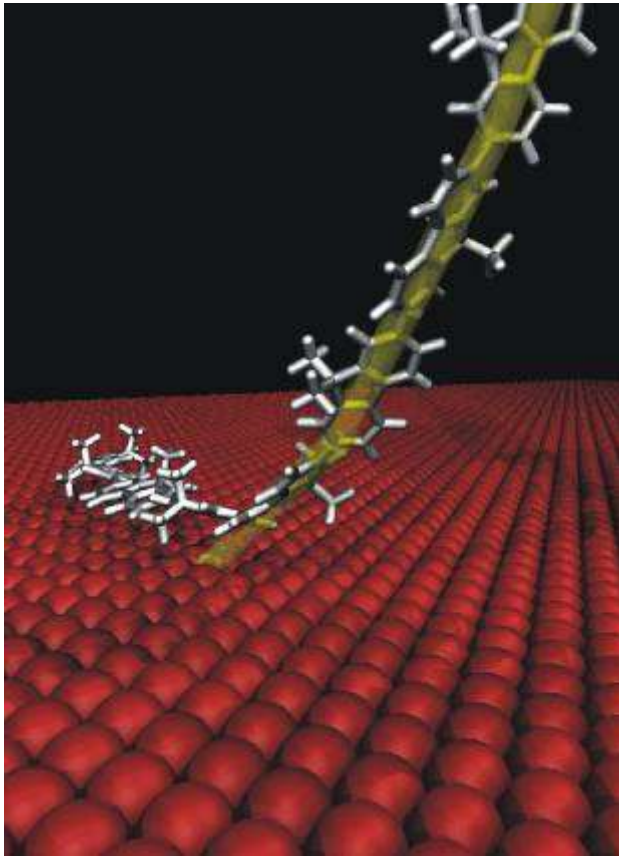


FULLY *IN SILICO* IS THE NEXT FRONTIER

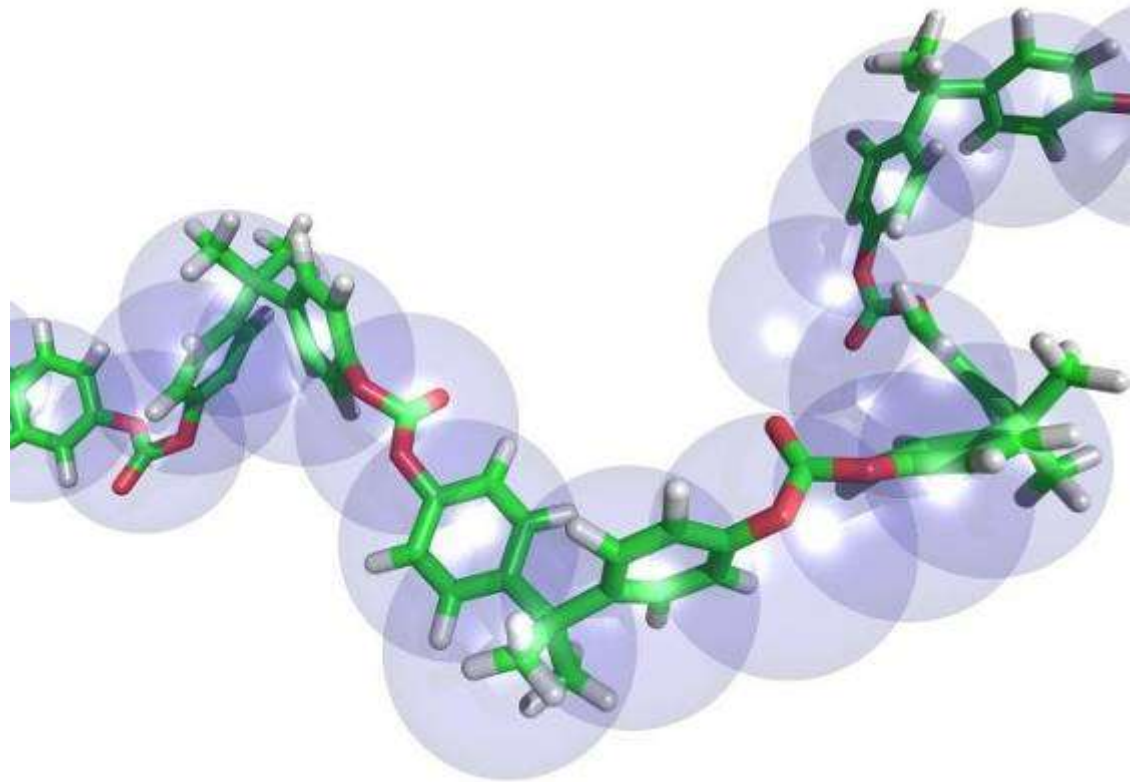
Atomistic



Mesoscale



One millionth of a second (10^{-6} s)

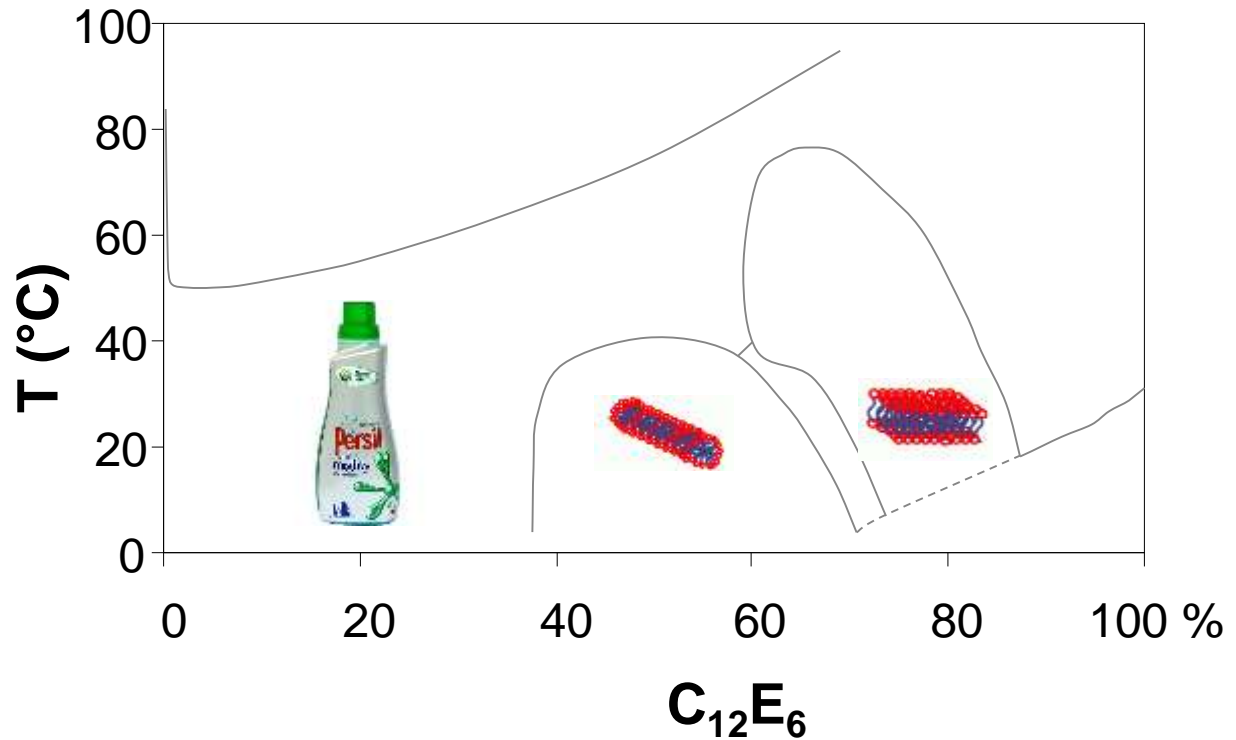


Seconds

MESOSCALE MODELLING ALREADY ACCELERATING NEW FORMULA DESIGN



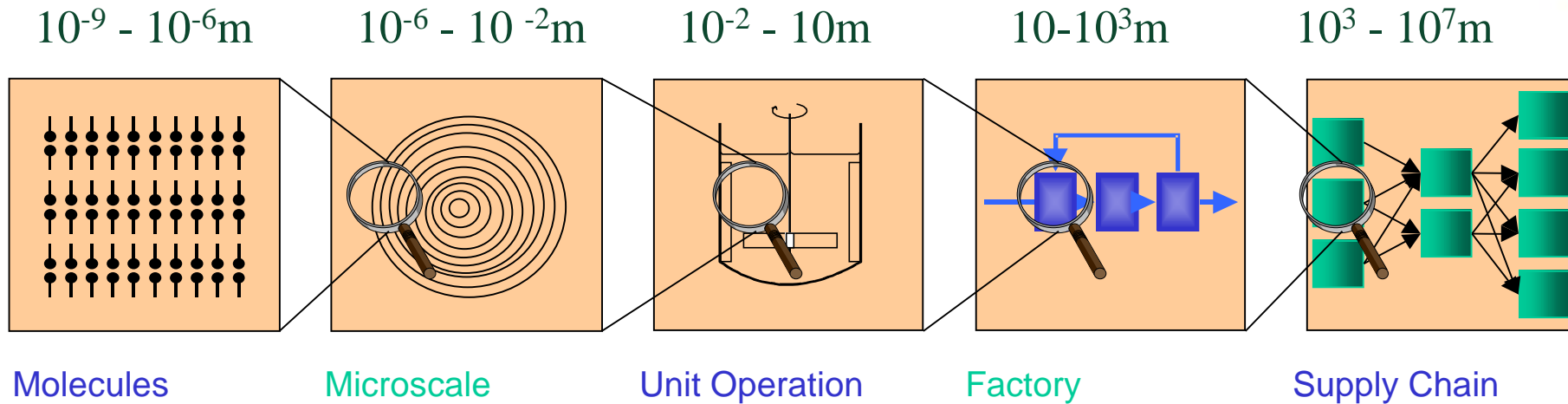
Manual
3 months



HPC Mesoscale
30 Minutes



VIRTUAL PROCESS ENGINEERING



Outstanding product innovation

- replicate products reliably on significant scale at practical costs
- enhance functionality and customer appeal & value

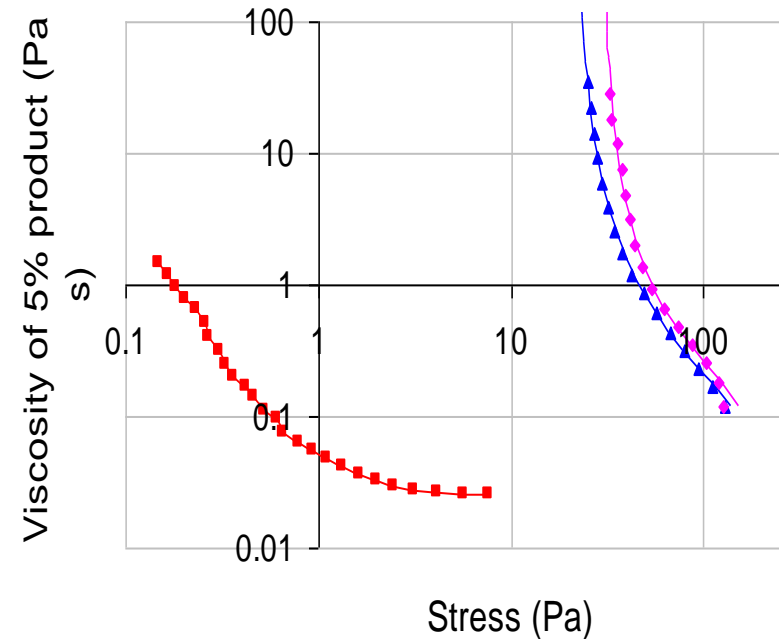
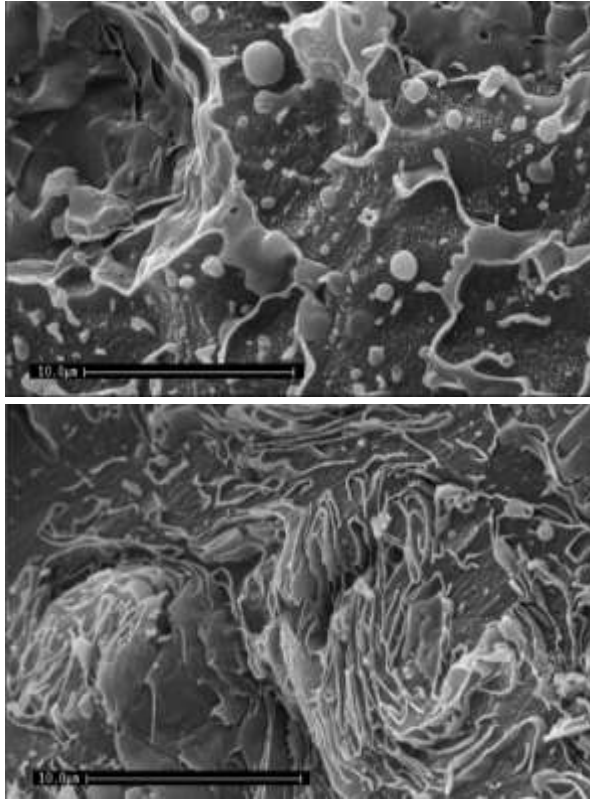
Manufacturing excellence

- difficult to imitate cost structures in a sustainable manner
- accelerated time to market & rapid global roll out

ROLE OF TECHNOLOGY IN BRANDS

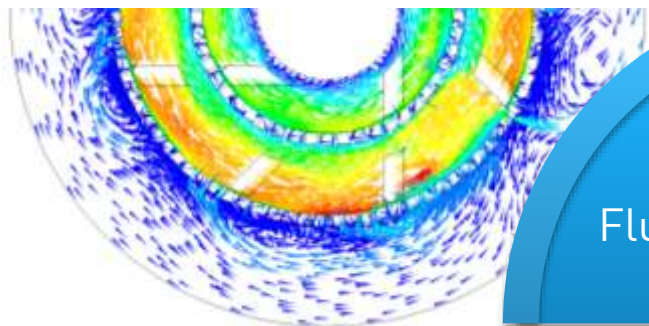


PROCESS INFLUENCES MICROSTRUCTURE



Same formulation but viscosity differs by order of magnitude
Process design cannot be ignored during product design

TOTAL PROPERTY & IN-USE PREDICTION



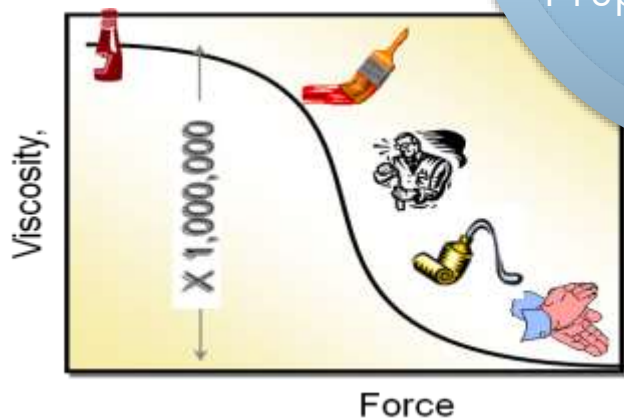
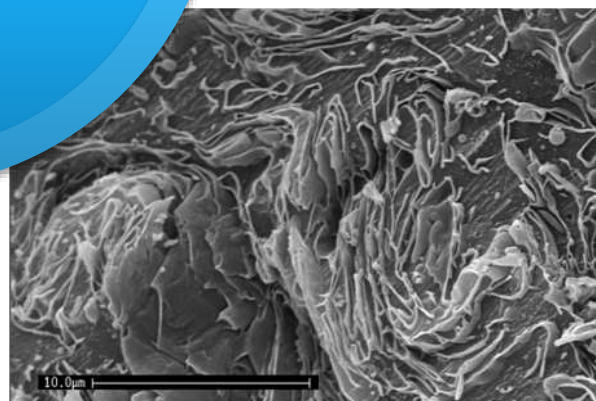
Fluid flow

Process & Equipment Design



Complex Fluid Properties

Product Structure



Viscosity,

X 1,000,000

Force