THE INSTITUTE OF CHARTERED ACCOUNTANTS OF SRI LANKA

Innovate to Grow
34TH NATIONAL CONFERENCE OF CHARTERED ACCOUNTANTS

Synopsis

Session 2: Leading Innovation

Presented by

Main Speaker – Dr. Young-Tzung Shih

Panelist – Mr. Jayantha De Silva

Panelist – Mr. Deepal Sooriyaarachchi

Synopsis – Session 2: Leading Innovation

Innovation and leadership are closely related. Visionary leaders establish fertile grounds within organisations for innovative ideas to originate and flourish. They play a key role in getting rid of the innovation stifles - heavy bureaucracy and hurdles, risk averseness or loading people with so much work that they barely have time to think, let alone envisioning something new. Innovation springs from a culture that encourages everyone to come forth with new ideas. Effective leaders are able to inculcate trust amongst employees, enabling improvement in communication and acceleration of productivity, as attention is redirected towards team objectives. Trust would boost employee confidence enabling a culture to induce innovation. This session highlights the role of leadership in driving innovation.

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Session (2)

Leading Innovation

Presented by

Dr. Y.T. Shih

Senior Manager

3M Corporate Research Laboratory

Singapore and SEA

3M Innovation Story

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Our Vision

3M Technology Advancing Every Company

3M Products Enhancing Every Home

3M Innovation Improving Every Life

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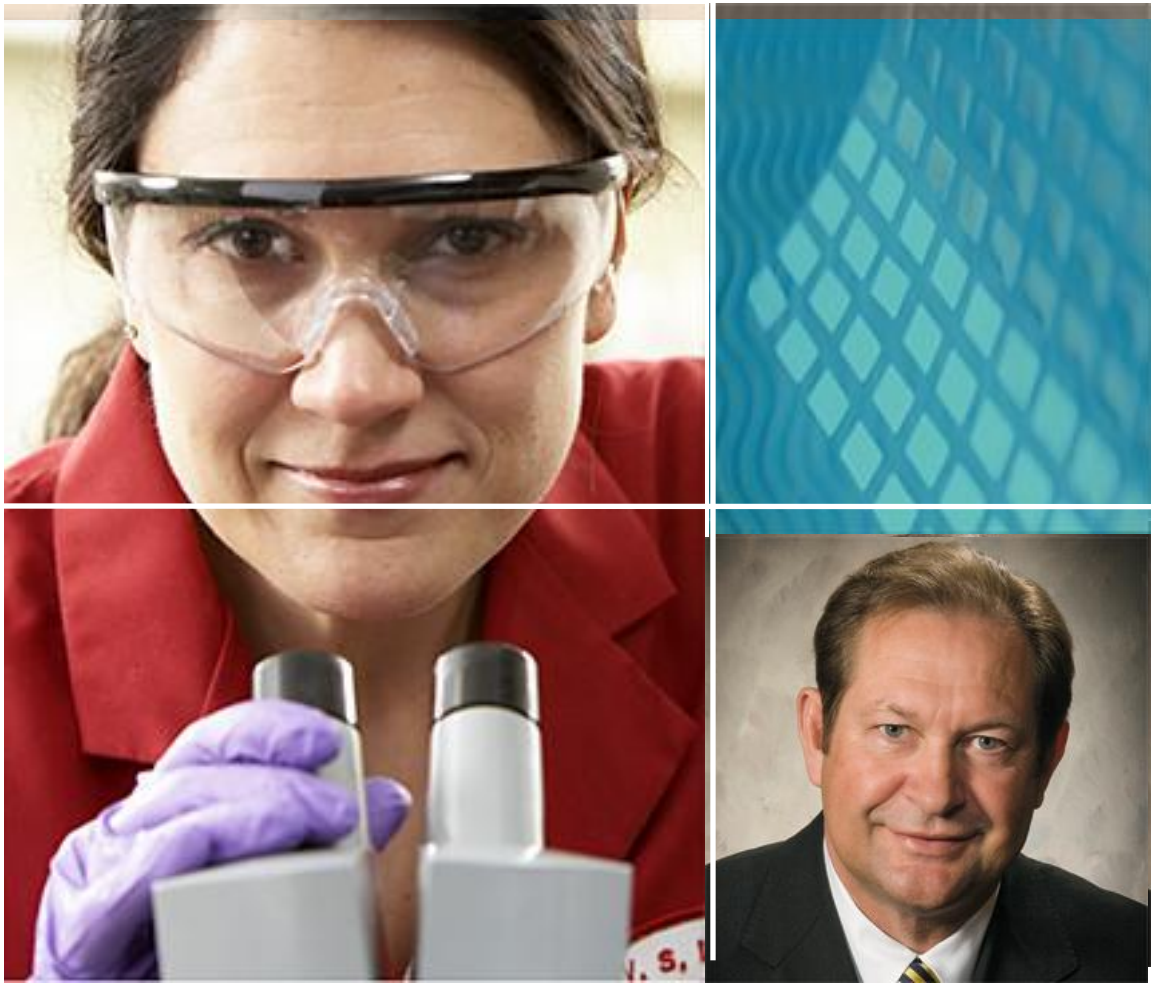
For More Than a Century



"Innovation is our biggest competitive advantage and the heart of 3M."

Inge Thulin, 2012

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Enabling Customer Success:

3M Five Market-Leading Business Groups

Industrial
From purification to aerospace – changing how industry works

Safety & Graphics
From protecting people & information to enhancing visual & design communication

Electronics & Energy
Enabling tomorrow's lifestyle today with power, communications and electronics

Consumer
From simplifying life at home to keeping you organized at work

Health Care
From preventing infections to making smiles brighter

- **Sales: $29.9 B**
- **Net income: $4.4 B**
- **R&D investment $1.6 B**
- **International sales $19.4 B (65% of company total)**
- **Companies in 71 countries**
- **Sales in nearly 200 countries**
- **~ 88,000 employees**
- **200+ factories**
- **55,000+ products**
- **3,100+ patents issued in 2012**
- **40,500+ issued & pending patents**

Culture of Innovation

- 11,000+ technical employees worldwide
- 85 laboratories globally
- 40 Customer Technical Centers
- R&D at 5.4% of sales
- 46 established technology platforms
- Technical depth & breadth
- Bring multiple technologies to each customer
- Entrepreneurial culture
- Individual initiative ~ 15% of time
- Legacy of boundaryless culture

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A Century of Innovation

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1921

3M patented and introduced Wetordry™ waterproof sandpaper -- the world's first water-resistant coated abrasive

1925

Scotch™ masking tape introduced

1927

Scotch™ Cellulose tape introduced

1931

3M began producing Colorquartz™ roofing granules

1939

First traffic sign featuring Scotchlite™ reflective sheeting erected in Minneapolis

1945

Scotch TM vinyl electrical tape introduced

1947

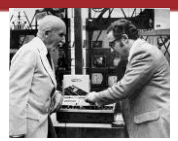
Scotch™ magnetic audiotape introduced

1948

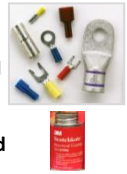
3M debuted its first surgical drape

3M's first non-woven product-decorative ribbon for gifts

1952



Scotchlok™ electrical connectors and Scotchkote™ insulation introduced



1954

RCA used Scotch™ magnetic tape to record TV programs for the first time

1960

Scotch™ Brand Magic transparent tape introduced

1967

3M developed the first disposable facemasks and respiratory protection products

1969

3M products were used in the first moon walk on July 20. Astronaut Neil Armstrong left a footprint in the lunar dust in boots made from Fluorel™ synthetic rubber from 3M

1979

Thinsulate™ thermal insulation introduced

1980

3M introduced Post-it® Notes, greatly enhancing office communication

1985

Academy of Motion Picture Arts and Sciences gave 3M a Scientific Engineering Award for magnetic film, improving audio capabilities of movie sound tracks

1991

3M introduced Scotchshield™ window film, shatter-resistant, heat-and cold resistant window protection.

1995

3M introduced the first metered dose asthma inhaler, free of ozone depleting chlorofluorocarbons.

1996

New products include flexible circuits for electronic products and HFEs (hydrofluoroethers), replacing ozone depleting chlorofluorocarbons

2000

3M introduced the Vikuiti™ brand for light management products that make electronic displays easier to read

2005

3M developed Aluminum Conductor Composite Reinforced (ACCR) as a solution to thermally constrained transmission bottlenecks

2009

3M™ MPro pocket-sized projector for mobile presentations and sharing photos on the go

2010

3M™ Cubitron™ II using precision shaped abrasive granules creating the future of the abrasives industry

2012

3M LED advanced light, most energy efficient, longest-lasting light bulb

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3M's First Customer-Inspired Innovation…

1925

Two-toned cars were in demand …

… but a clean paint line was very hard to achieve.

3Mer Dick Drew observed this dilemma in action while visiting customers to sell sandpaper …

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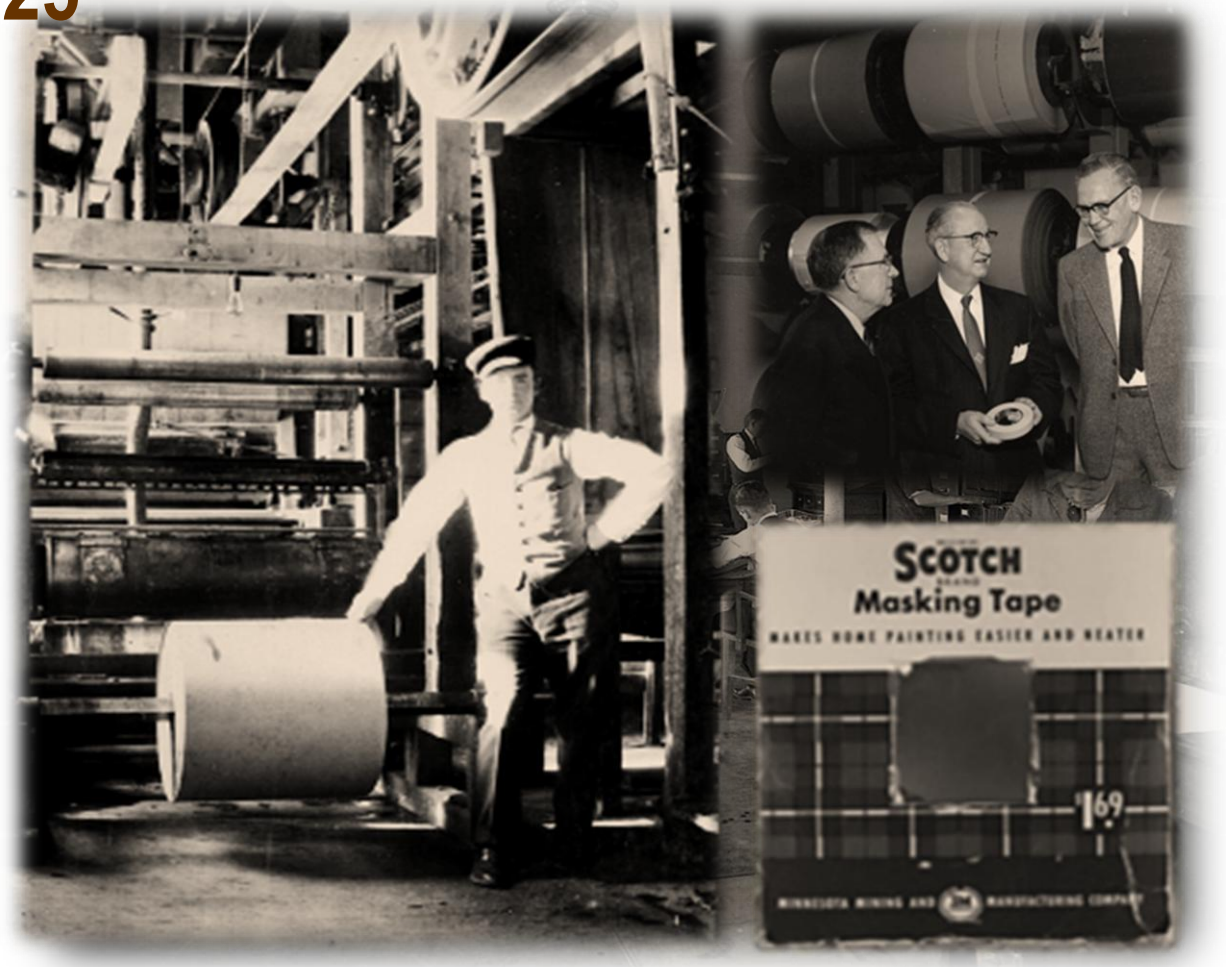
1925 3M's First Customer-Inspired Innovation…



… and he remembered some stuff he'd seen in the laboratory…

… and went on to invent 3M Scotch Masking Tape

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3M's 46 Core Technology Platforms

Successful New Product Growth Builds on Uncommon Connections

Materials	Processing	Capabilities	Applications
Ab Abrasives	**Mo** Molding	**An** Analytical	**Ac** Acoustic Control
Ad Adhesives	**Pe** Predictive Engineering & Modeling	**Fc** Flexible Converting & Packaging	**Bi** Biotech
Am Advanced Materials	**Rp** Radiation Processing	**Pr** Process Design & Control	**Dd** Drug Delivery
Ce Ceramics	**Mr** Micro-replication	**As** Application Software	**Di** Display
Co Advanced Composites	**Pm** Polymer Processing	**In** Inspection & Measurement	**Ec** Energy Components
Do Dental & Orthodontic Materials	**Su** Surface Modification	**Se** Sensors	**Fe** Flexible Electronics
Em Electronic Materials	**Pd** Particle & Dispersion Processing	**Es** Electronics & Software	**Fs** Filtration, Separation, Purification
Fi Films	**Pp** Precision Processing	**Is** Integrated Systems & Design	**Im** Imaging
Fl Fluoro-materials	**Vp** Vapor Processing	**We** Accelerated Weathering	**Lm** Light Management
Nt Nano-technology			**Md** Medical Data Management
Nw Nonwoven Materials			**Mf** Mechanical Fasteners
Po Porous Materials & Membranes			**Mi** Microbial Detection and Control
Sm Specialty Materials			**Op** Opto-electronics
			Tt Track and Trace
			Wo Wound Management

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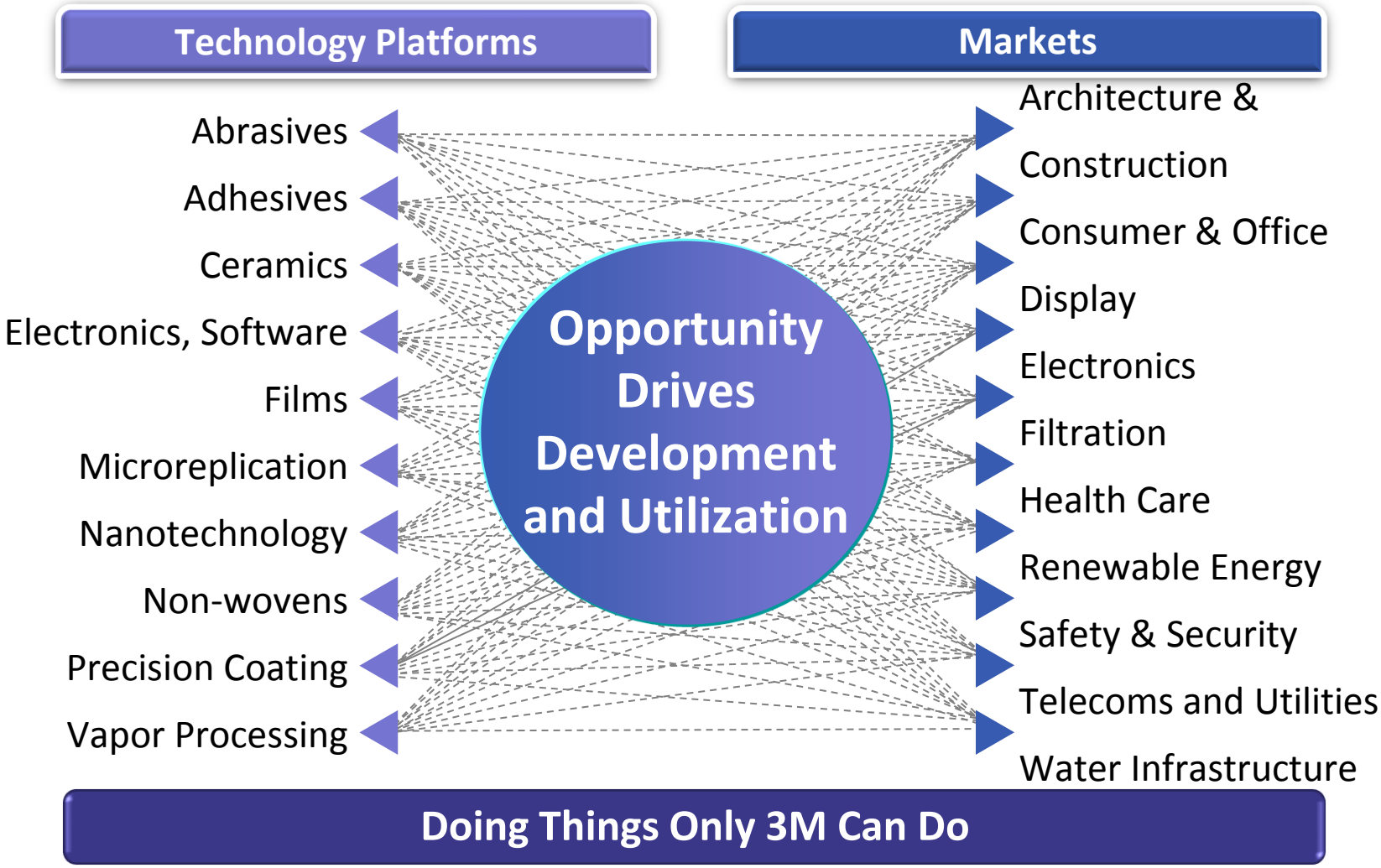
3M Innovation Model



Transforming Technology into Consumer Brands

- Pressure-Sensitive and Microsphere Adhesives
- Non-Wovens
- Abrasives
- Filtration
- Films
- Precision Coating
- Fluoropolymers
- Colloid Science

Technology is "Consumerized" into Brands

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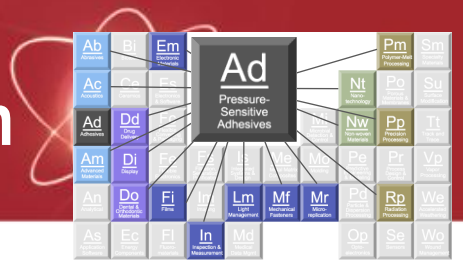
Product and Technology Migration



Pressure-Sensitive Adhesives

	1920	1940	1960	1980	2000	2010	
COMMUNICATION				**Post-it® Notes**	Pop-up Notes Post-it ™ Flags	Super Sticky Notes Easel Pad	
LIGHT MANAGEMENT				Solar Control Film		Brightness Enhancing Film DBEF / IR Film	
SIGNING	**Reflective Sheeting**	Highway Signs	Pavement Marking Tape	Control-Tac™	Hi-Intensity Sheeting	Control-Tac Plus™	
DRUG DELIVERY					Ioban™ Transdermal	Transmucosal	
HEALTH CARE	Surgical Drapes	Autoclave Tape	Micropore™ Steri-Drapes/Strips™	Transpore™ / Durapore™ Monitoring Electrodes	Tegaderm ™	Active-Strips™ Tattoos™	
CONDUCTIVITY	**Vinyl Electrical Tape**	Polyster Film Tape	Silicone Electrical Tape	Electrically Conductive	Z-Axis Conductive Tape	Anti-Static Tape	
SEALING	Filament Tape			Box Sealing Tape		Structural Sealing Tape	
ATTACHING		Label Stock	PSA Coated Fasteners Diaper Tape	Stick-it Abrasives ™	Filmic Label Laminate Diaper Tape	Command ™ Hooks	
BONDING				Isotac T.T. PU Foam Tapes	VHB™ Foam	VHB+™ Structural Bonding Tape	
ASSEMBLING	Cellophane Tapes	Double-Coated Repulpable	Fibered T.T. Magic Mending			Optically Clear Adhesives	
PROTECTING	Masking Tapes	Hi-Temp Masking	Filmic Masking		Transit Tape	Scotch-Blue Painter's Tape ScotchPrint ™ Vehicle Wrap Film	

From Adhesives to Notes

- **Art Fry used an adhesive developed earlier by Spencer Silver** to create one of 3M's most famous products, Post-it® notes.

"At 3M we're a bunch of ideas. We never throw an idea away because you never know when someone else may need it."

-Art Fry

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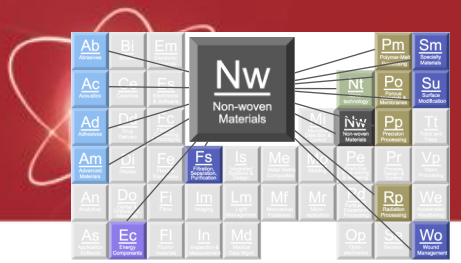
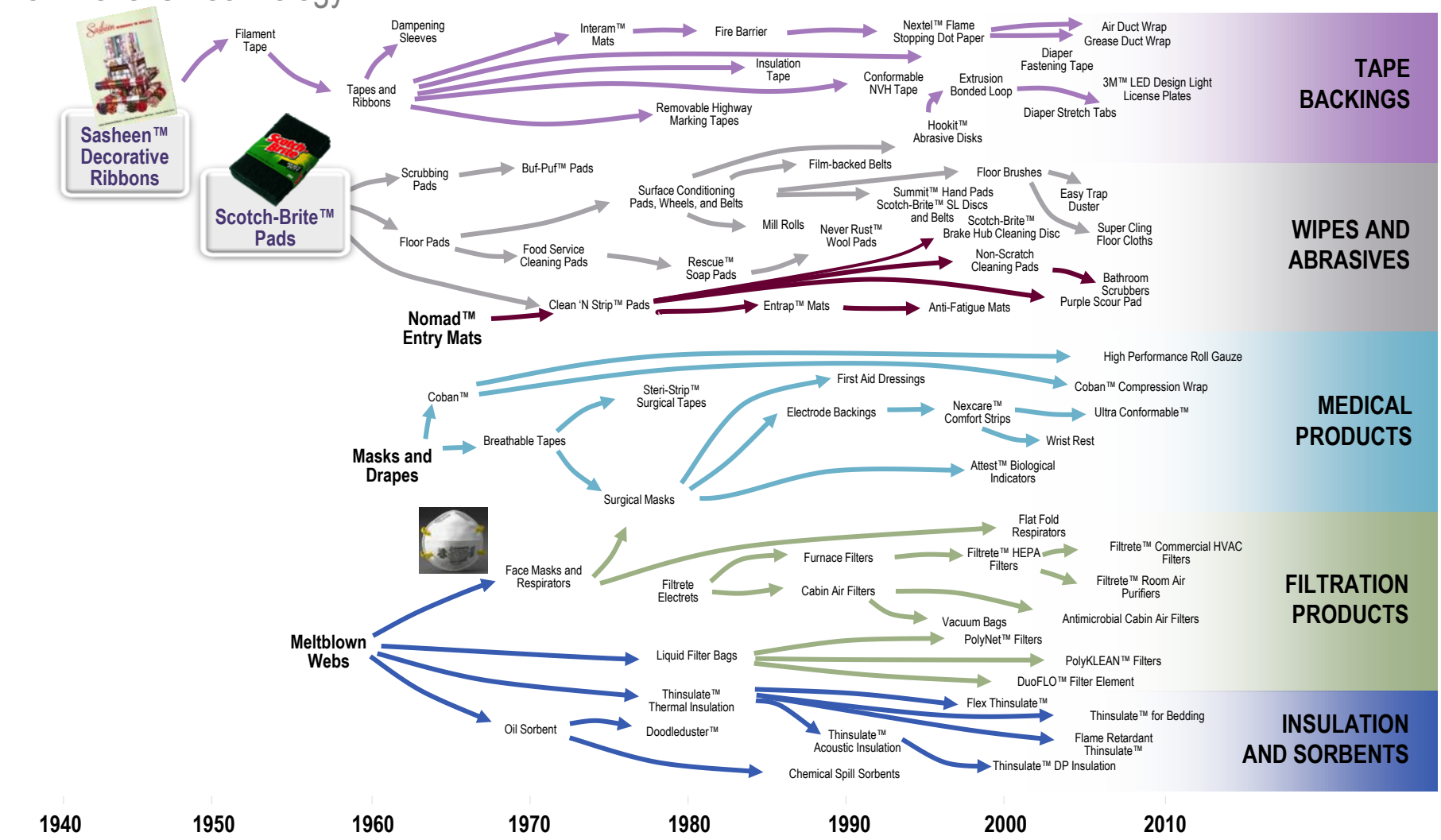
Product and Technology Migration



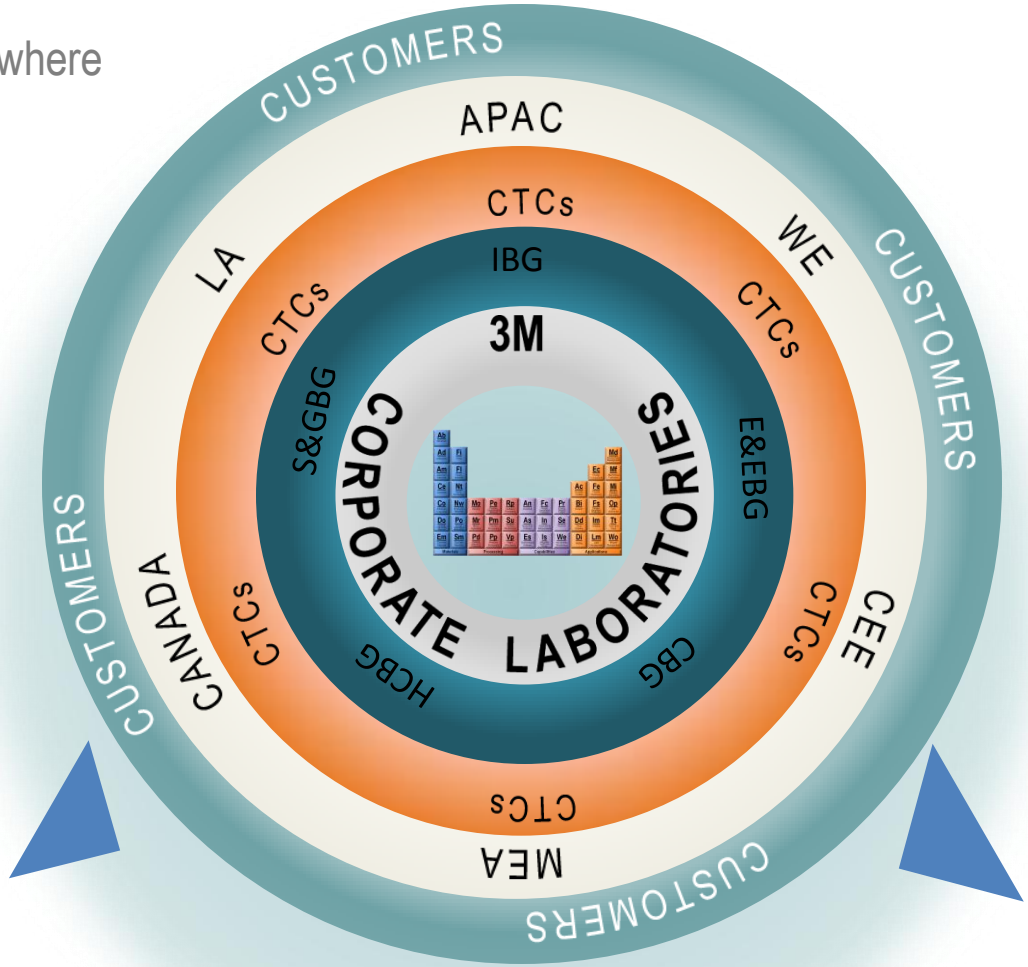
Non-wovens Technology



Connecting Technology to Customers…

Anywhere and Everywhere

Connecting to Customers



Developing Cutting-Edge Technology

Driving Growth Through Innovation

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Technology Drives Growth…

3M™ Brightness Enhancement Film

3M™ Confirm™ Laminate with Floating Image

3M™ Aluminum Conductor Composite Reinforced

Scotch ® Magic™ Tape

3M™ Cubitron II™ Abrasives

3M™ Scotchshield™ Film 17 Solar Panel backsheet

3M™ Prestige Series Solar Films

3M™ LED Light Bulb

…and Solves our Customer's Sustainability Challenges

Saves Energy

3M™ Brightness Enhancement Film

Enhanced Safety & Security

3M™ Confirm™ Laminate with Floating Image

VOC free Manufacturing Process

Prevents Disturbance of Environmentally Sensitive Areas

Reduces Waste

3M™ Cubitron II™ Abrasives

Promotes Renewable Energy

3M™ Scotchshield™ Film 17 Solar Panel backsheet

Saves Energy

3M™ Prestige Series Solar Films

Saves Energy

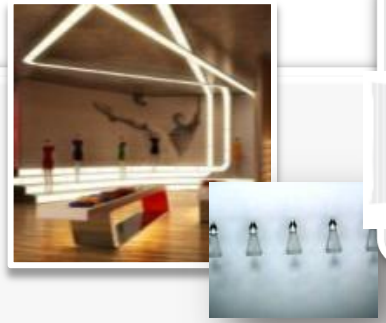
3M™ LED Light Bulb

Impact of 3M Platforms

Pressure-Sensitive Adhesives
75% of Company

Filtration
30% of Company

Films
40% of Company

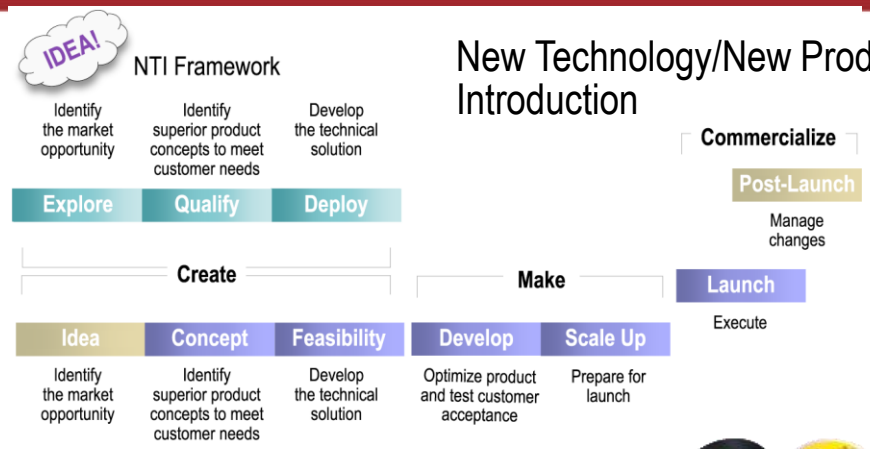


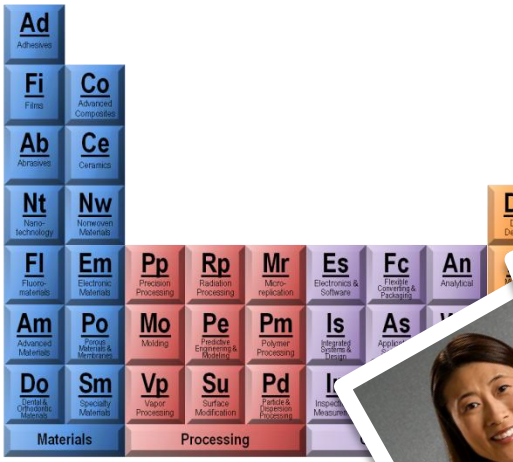
Microreplication
35% of Company

Non-wovens
70% of Company

Innovation model encourages sharing and combination of platforms

How does 3M deliver products that customers want?





3M Technology Platforms

Voice of Customer

Products Delivered to the Marketplace

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Innovative NPI

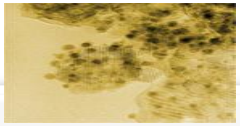
Transparent/Conductive Electrode & EMI Shield

Renewable Materials

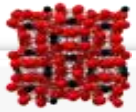
Submicron Replication for Microneedles and Light Management

ACCR

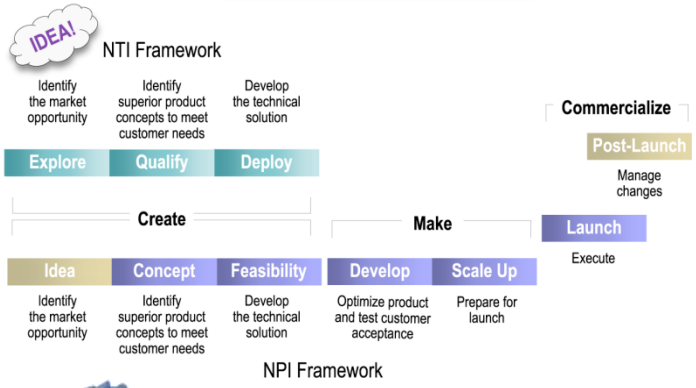
Auto-stereoscopic 3D Films



Nanogold Catalysts for Personal Protection



Li Ion Battery Components



Visual Attention Management

Ultra Vapor-Barrier Films for Solar/Display Screens

Membrane Adsorbers (biotherapeutic purification)

Digital Dentistry

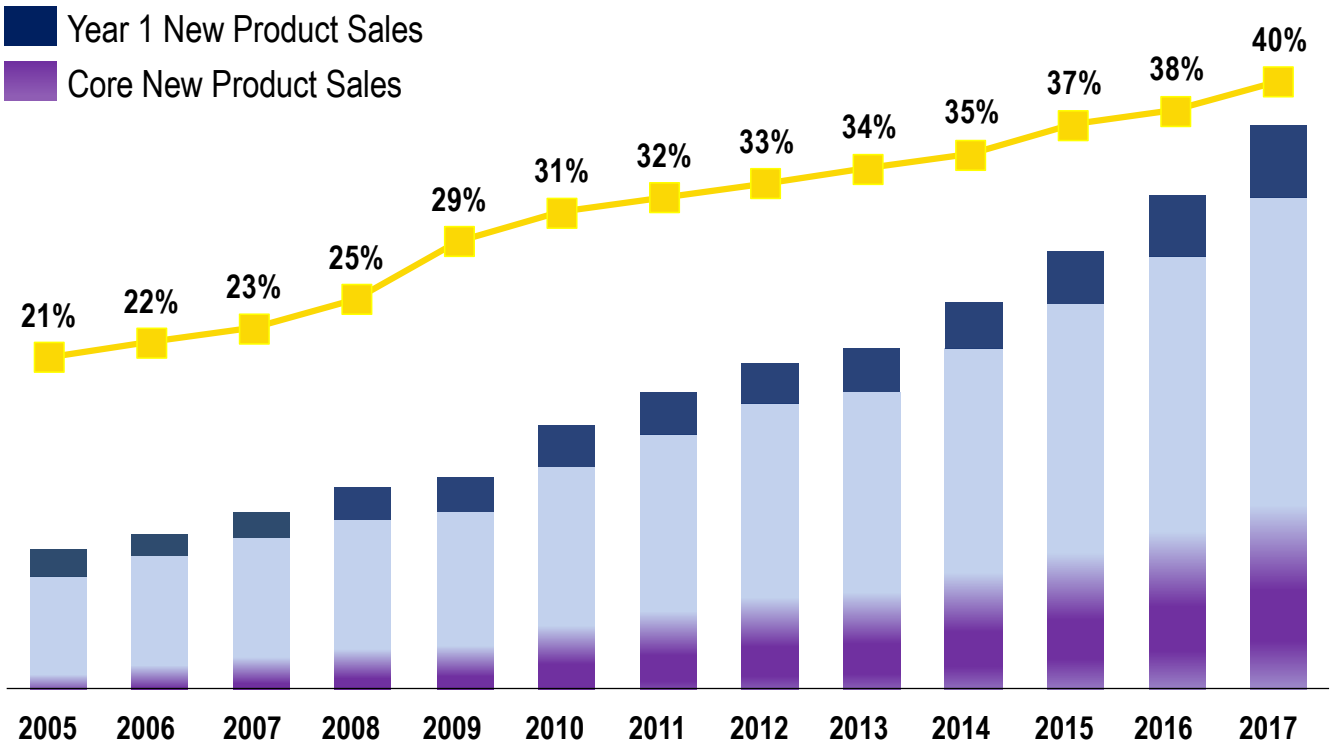
Mirror Films for Solar

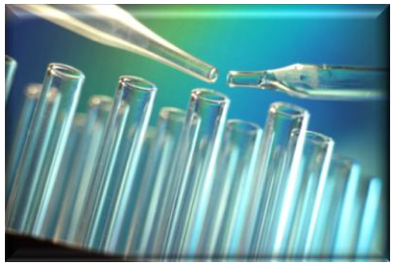
High-Performance Nanoparticle Composites

Acoustic Films

Our Primary Innovation Metric is NPVI

NPVI = New product vitality index (products introduced within the past five years, divided by total sales)





International new products now ~70% of total

Innovation Across the Globe

Diverse Solutions Meeting Local Needs

Technical capabilities around the globe identifying customer needs and developing solutions to meet articulated and unarticulated needs.

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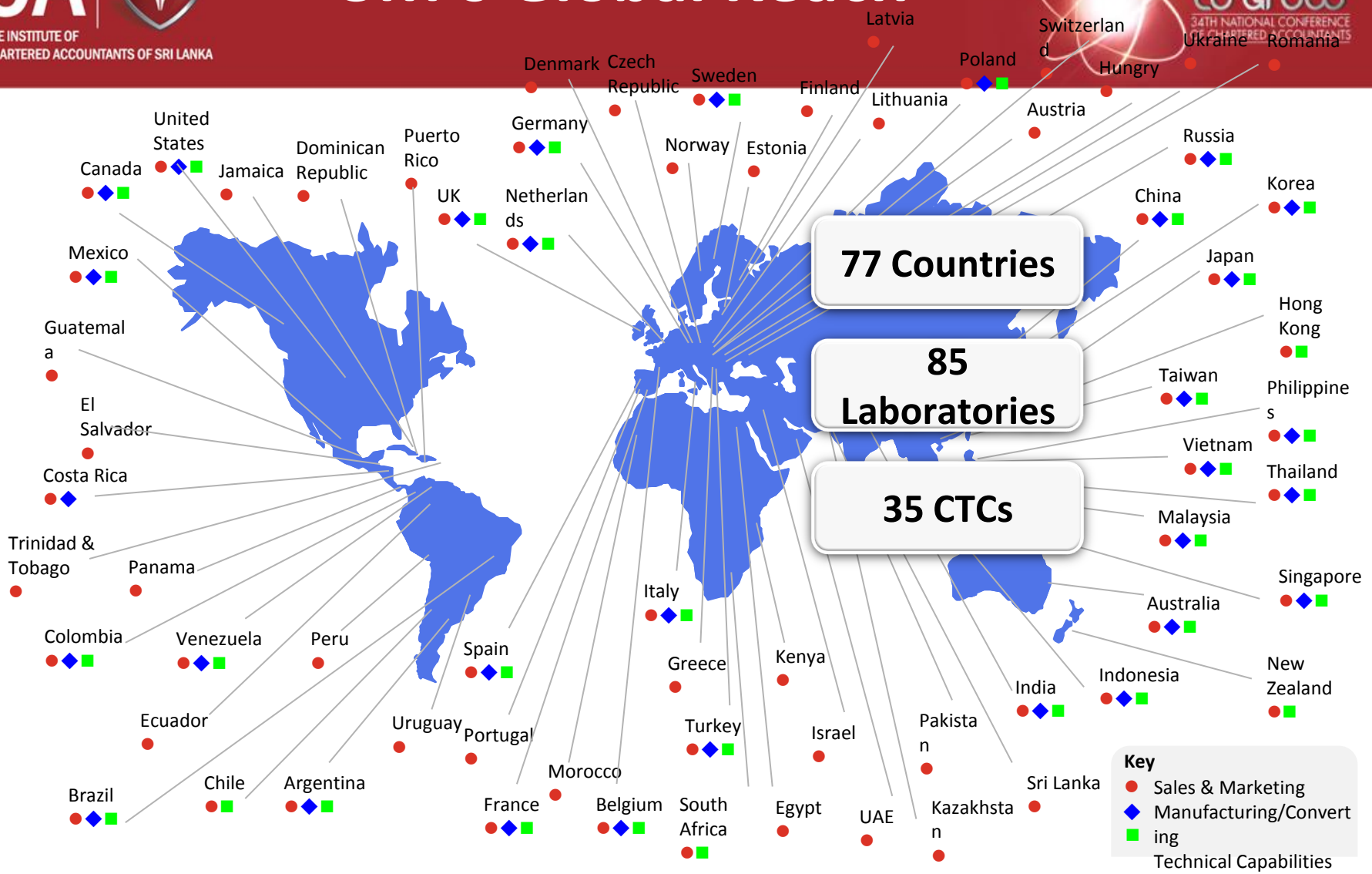
3M's Global Reach



Just around the corner. All around the world.

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Innovation is not just about R&D, new products

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3M Innovation is Planned, Purposeful and Global

3M Innovation

is driven by a system of principles, practices

and infrastructure

that harness the chain reaction of new ideas.

McKnight Principles

William McKnight (Former 3M CEO)

"As our business grows, it becomes increasingly necessary to **delegate responsibility** and to encourage men and women **to exercise their initiative**.

"This requires considerable tolerance. Those men and women are going to want to do their jobs **in their own way**."

"We encourage a health disrespect for our management in our employees."

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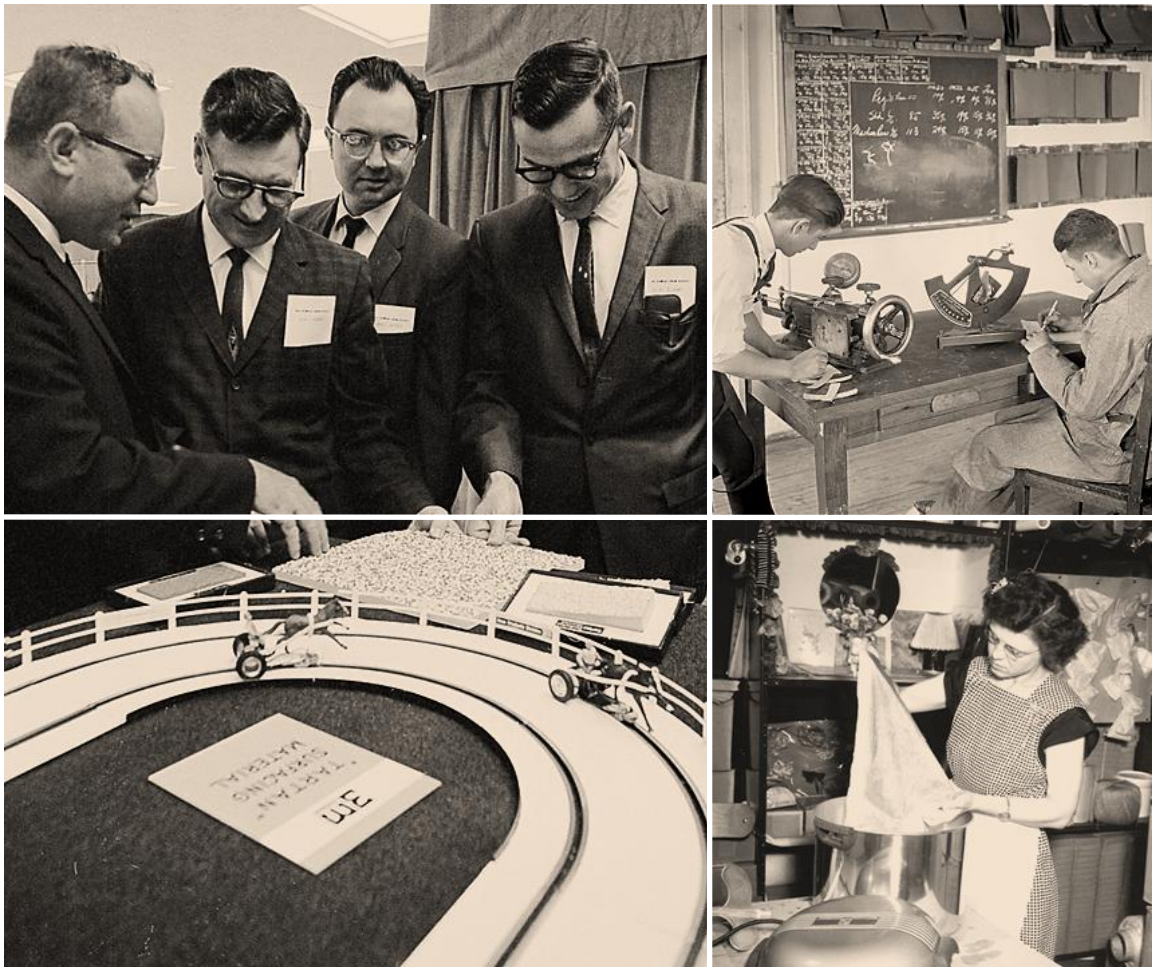
McKnight Principles



"**Mistakes will be made.** But if a person is essentially right, the mistakes he or she makes are not as serious **in the long run** as the mistakes management will make if it undertakes to tell those in authority exactly how they must do their jobs.

"Management that is destructively critical when mistakes are made kills initiative. **And it is essential that we have many people with initiative if we are to continue to grow.**"

William L. McKnight, 1948

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The ordinary manager has a craving for order.
The leader understands that innovation is
almost always an untidy process.

The ordinary manager wants proof for an idea
before taking action.
The leader understands the value and power of faith.

L. W. Lehr, former 3M CEO - 1980

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Creativity and Innovation

"Creativity and Imagination have to be managed differently than other aspects of the business."

Comments by George Buckley, former Chairman and CEO,
3M Open Publication to all 3M employees, June 2008

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A Connected Global Collaboration Community

TECH FORUM

11,000+ member **"grass roots"** technical organization

1,100+ Technical Forum Events Globally

3M's Annual Event – 3,300 participants

The Spring Technology Symposium
– 1,300 participants

Carlton Awards Symposium
– 500 participants

Inventor Recognition Ceremony
– 250 participants

Circle of Technical Excellence & Innovation
– 6,000 participants

Virtual Technology Information Exchange
– 1,700 participants

Hundreds of Chapter Events
– sometimes as few as half dozen experts meeting on specialized topics such as dynamic molecular modeling

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3M's Worldwide Technical Community

The 3M Tech Forum – Our Purpose and Mission

3M Tech Forum Activities & Events

30+ Active Special-Interest Chapters

- Adhesives
- Nanotechnology
- Laser Processing
- Radiation Curing
- Microreplication
- New Business Development
- Photochemistry
- Life Sciences
- And more…
- Biotechnology
- Inorganic Materials
- Polymer Processes
- Product Design

Events and Recognition

- The "Annual" Technology Event
- The Spring Technology Symposium
- Carlton Awards Symposium
- Inventor Recognition Ceremony
- Tech Forum Special Programs
- Circle of Technical Excellence & Innovation
- Tech Forum – Tech Council Meeting
- Tech Forum – Marketing Meeting
- New Technical Orientation Program
- New Technical Employee Poster Session
- Virtual Technology Information Exchange

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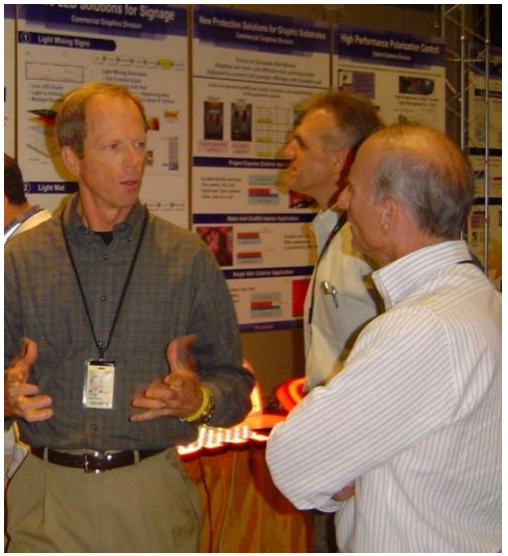
The Annual Event

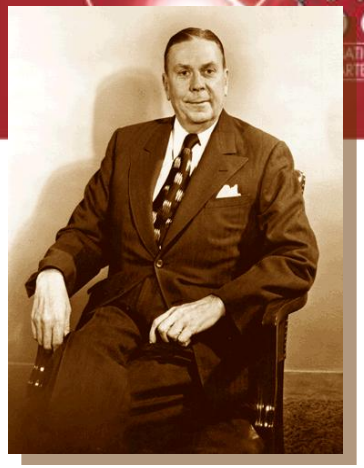
- Largest event; Everyone participates
- “Internal 3M Trade Show”
- Latest & greatest 3M technologies
- Opportunities to help solve problems
- Delivered electronically to Worldwide Labs



3M Circle of Technical Excellence and Innovation

- One of 3M's premier global recognition events
- Excellence and innovation in individual technical achievement
- Excellence and innovation for team-driven technical achievement
- Peer-driven Recognition Program

THE CARLTON SOCIETY



- The Nobel Prize for 3M scientists
- 3M's Hall of Fame for technical people
- Named after 3M's fifth president, Richard P. Carlton, who in 1921 became the company's first employee with a technical degree
- Honoring those who have made outstanding scientific and technical contributions to 3M
- Founded in 1963
- 173 members

3M 15% Culture

- It is a culture/philosophy not a time sheet measurement
- Enables employees to explore new technologies and/or new markets
  - Usually related to existing work
- Enables employees to leverage technical specialists
- Does not need management approval
- Teaches employees leadership and new skills
- Diversity in how employees utilize their 15% time

Many innovative 3M products were initially developed with 15% Time

Careers at 3M

Dual Ladder System

Specialist	↔	Supervisor
Senior Specialist	↔	Manager
Division Scientist	↔	Senior Manager
Corporate Scientist	↔	Technical Director

3M Innovation is Planned, Purposeful and Global

Global Labs

Technical Forums

Customer Tech Centers

Culture of Collaboration

15% Culture

e-Connectivity

No IP Barriers

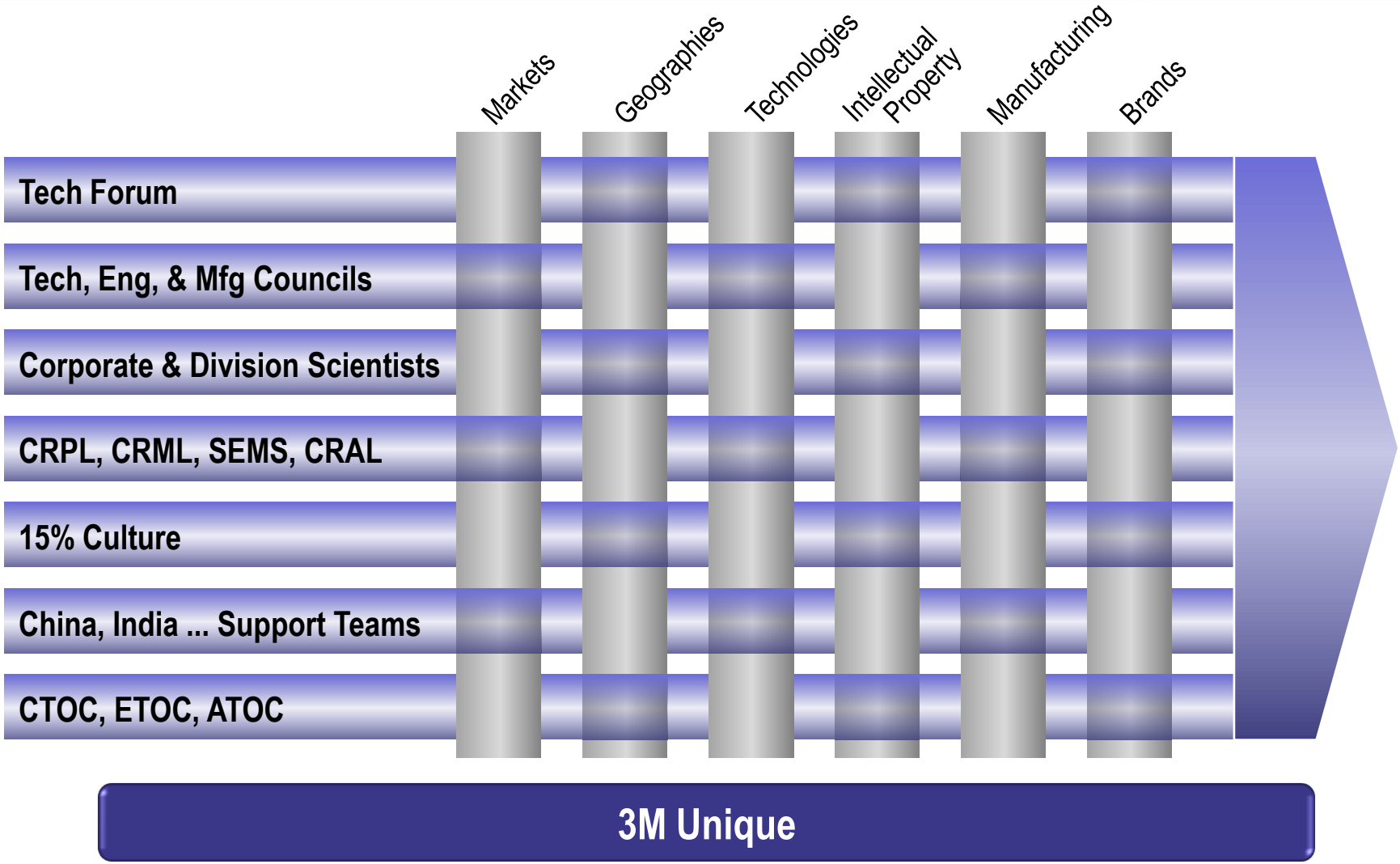
Genesis and Discovery Program

Leveraged Capabilities

Shared Technologies

3M Innovation is driven by a system of principles, practices and infrastructure that harness the chain reaction of new ideas.

3M's Shared, Leveraged Innovation Model



The Bottom Line

"***Research*** **is the transformation of money into knowledge.** "

"***Innovation*** **is the transformation of knowledge into money.** "

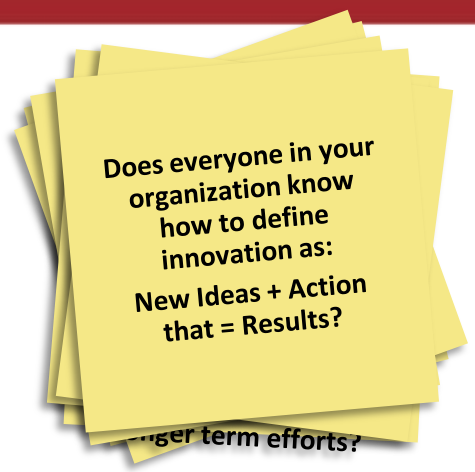
THANK YOU

Email: ytshih@mmm.com

Appendix

Questions to Ask about Innovation

Questions to Ask about Innovation



Does everyone in your organization know how to define innovation as:

New Ideas + Action that = Results?

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Questions to Ask about Innovation

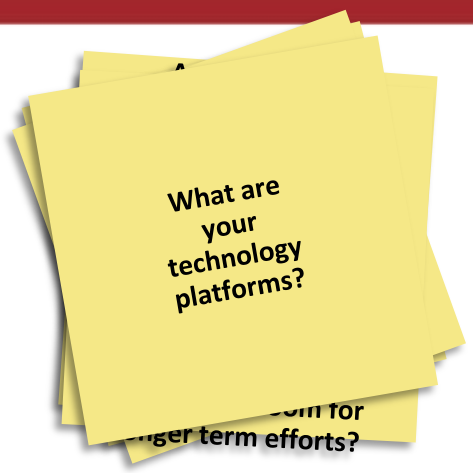
Who are the inventorpreneurs in your workplace?

How can you or your team do the work of an inventorpreneur or find ways to support such activities?

Questions to Ask about Innovation

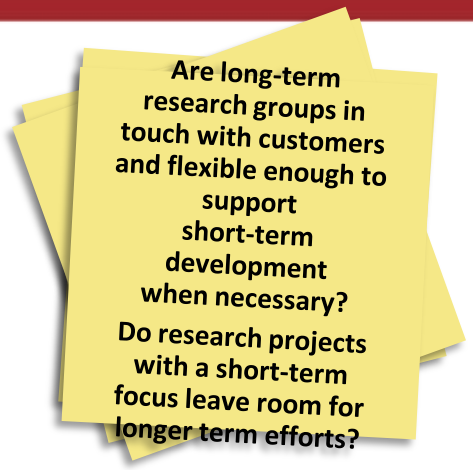
Does your organization have an oral history of stories that helps employees to learn about innovation?

Questions to Ask about Innovation



What are your technology platforms?

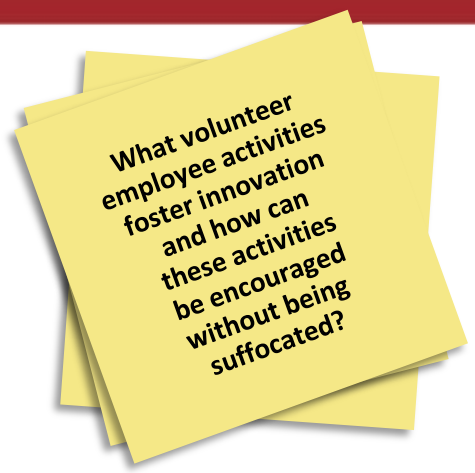
Questions to Ask about Innovation



Are long-term research groups in touch with customers and flexible enough to support short-term development when necessary?

Do research projects with a short-term focus leave room for longer term efforts?

Questions to Ask about Innovation



What volunteer employee activities foster innovation and how can these activities be encouraged without being suffocated?

Questions to Ask about Innovation

Does the company recognize innovative achievements in a meaningful way?

Questions to Ask about Innovation

Do you understand and continue to cultivate what you are good at, while simultaneously embracing new ideas and technologies?

Do you understand and continue to cultivate what you are good at, while simultaneously embracing new ideas and technologies?

Synopsis – Session 2: Leading Innovation

Main Speaker

Connecting uncommon connections is the underlying philosophy towards leading innovation. This creation of uncommon connections should be done internally with your organization and externally with your customers – this philosophy is echoed by 3M's vision statement and innovation is not just something 3M wants to do it has been in their 'blood' for over a century.

When examining the history of 3M it is important to note that 3M started in 1902 and close to five years later they were almost bankrupt because they weren't able to address the real need of their customers, in order to rectify this they spent USD 5,000 to start their first laboratory. Not until 1925 did the company initiate on a new product line (originally 3M was a sandpaper company), 3M encountered customers seeking to paint cars in two tone colors, in order to approach this need 3M sent employees to talk with business owners on this particular need in order to appreciate this market need, this resulted in the creation of 3M Scotch Masking Tape.

Synopsis – Session 2: Leading Innovation (Contd.)

When examining how a particular product can be further innovated over time to reach other customer bases, Dr. Young-Tzung Shih elaborated that one of the core strategies of 3M is to innovate on existing products in order to expand their potential customer bases and tap new markets. As highlighted in the scotch masking tape example, 3M team members were able to expand the potential scope of this adhesive product by iterating on the product in order to meet a specific stated or perceived demand from a customer segment, thus leading to the creation of Post-it Notes.

Success of new products built through innovation is measured through a statistic utilized by 3M called the New Product Vitality Sales. When examining the revenue of the company you find that the company generates approximately USD 30 million every year, and astounding 30% of that revenue is generated from products introduced in the past five years.

In order to ensure that innovation is encouraged throughout the company, 3M has established labs and research centers around the globe. Further, when examining innovation in 3M it's not just a core focus of the company to concentrate on solely product innovation but also on service, distribution, strategy, sales, etc. innovation. Leading innovation in 3M is purpose driven supported by the already enacted systems (principles, practices and infrastructure).

Synopsis – Session 2: Leading Innovation (Contd.)

One of the key principles of 3M is the McKnight (past Chairman of the Board of 3M) principle which states that responsibility should be delegated and men and women should be encouraged to exercise their initiatives, further it was emphasized that the employees should have a healthy disrespect towards the management. This principle may result in a high-level of mistakes, in emphasizing this point Dr. Young-Tzung Shih stated that in the 30 years he has been with 3M for every ten projects nine will be failures, however from those nine failures one project materialized that had commercial benefit.

Currently, 3M has approximately 11,000 employees, with each employee provided the opportunity to view monthly tech forums that can sign on any time and review trending technology from the company at technology shows (tech forums), and assistance can be provided through networking. Within 3M there are over 30 active special interest chapters that conduct several events every year with recognition being provided to contributing members, this can potentially be an area where innovation can be encouraged within outside firms as well.

Within 3M innovation is encouraged further through the use of a philosophy of 15% time, this allows an employee to have utilize time during the week to work towards the creation of new products/services or innovating existing products/services.

Synopsis – Session 2: Leading Innovation (Contd.)

In order to provide the necessary recognition towards their technical teams 3M has created a dual ladder system that provides a career path for technical personnel. This career path fosters communication and dialogue between key areas of the company and the technical teams thus allowing technical team members to work close with teams from the marketing division.

It is important however to note that research and development should be aimed at transforming knowledge/creativity into money. If no perceived value is coming out of research and development efforts the process should be revaluated to ensure prioritization is given towards projects that result in monetary value.

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2nd Session on 25th Oct. 2013

LEADING INNOVATION

Presented by

Jayantha De Silva

Vice President South Asia, MD IFS Sri Lanka

INNOVATION Vs. CHANGE

INNOVATION Vs. CHANGE

'Leadership'

'Innovation distinguishers between a Leader and a Follower' - Steve Jobs

LAYERS OF INNOVATIVE LEAD-INS

- International
- National
- Industrial
- Individual

DOERS

SUPPORTERS

BENEFICIARIES

PARTNERING INNOVATION

'The greatest danger for most of us is not that our aim is too high and we miss it, but that it is too low and we reach' - Michelangelo

THANK YOU

Speakers contact details
Email: jayantha.desilva@ifsworld.com
Mobile: 0777344446

Synopsis – Session 2: Leading Innovation (Contd.)

Panelist – Mr. Jayantha De Silva

Mr. Jayantha De Silva emphasized that while we all appreciate innovating we currently are lacking in our ability to drive that innovation or partner with that innovation to ensure its success. It was also discussed that change comes through innovation, however innovation may not come through change as change is not always supported by people.

The single most important attribute to facilitate innovation and change occurring at the same level is to foster excellent leadership within the organization. In examining the concepts of 'doer', 'supporter' and 'beneficiary', we all are at least a beneficiary of innovation; however, senior managers of the business world should strive to at achieve a supportive role as well towards innovation.

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Session 2

Leading Innovation

Presented by

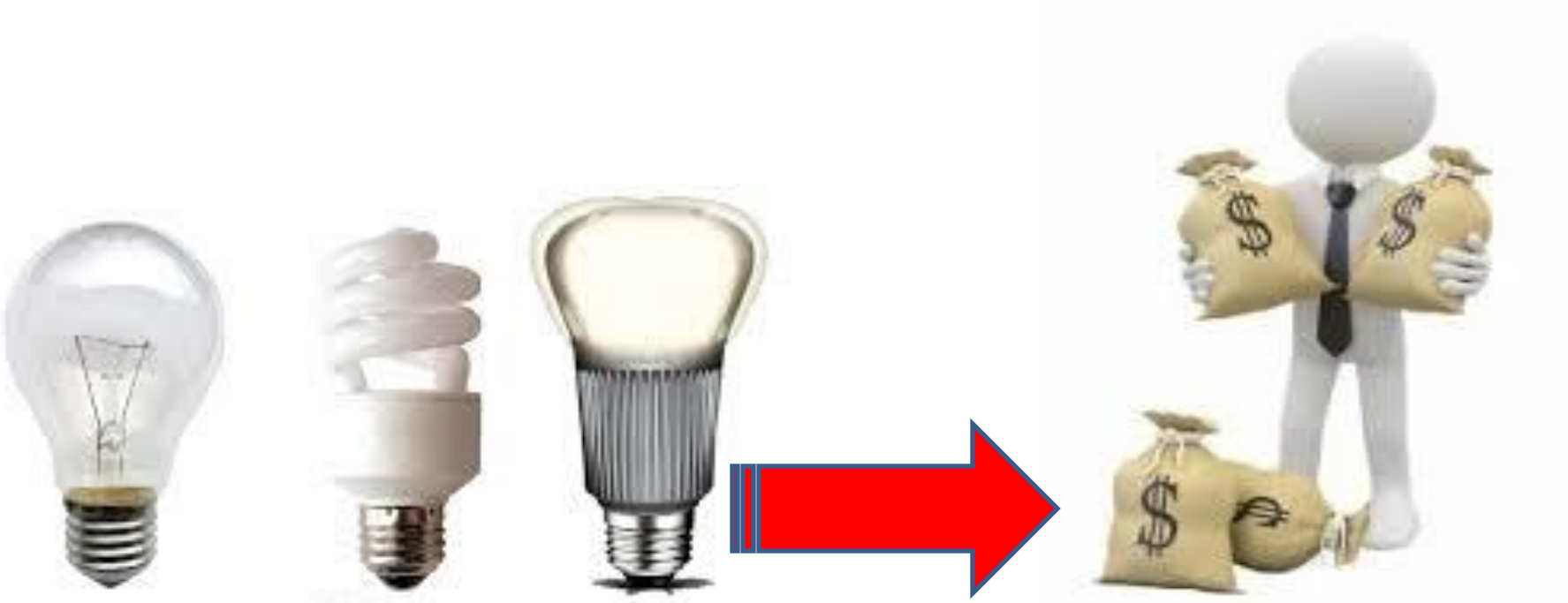
Deepal Sooriyaarachchi

Commissioner SLIC

"Invention"

- New
- Inventive Step
- Industrially Applicable

innovation



Observing

- Questioning

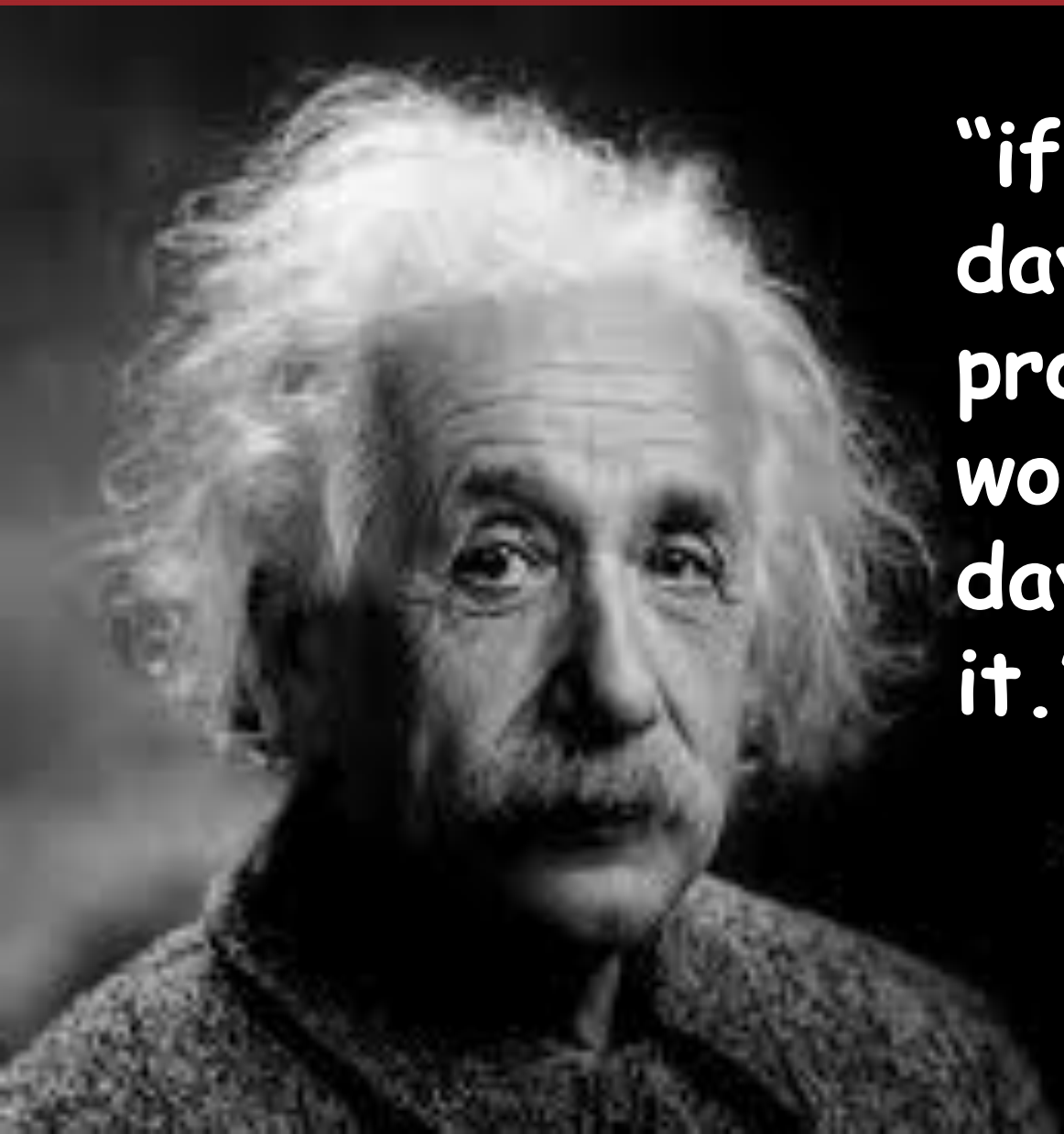
Experimenting

Networking

Associational Thinking

Velcro

George De Mestral 1948



"if I had 20 days to solve a problem, I would spend 19 days to define it."

Albert Einstein

Access To Water

Carrying

Q Drum

Discovery Competencies

Observing

- Questio ning

Experimenting

Networking

Associational Thinking

Innovator's – Prof Hal Gregorson- INSEAD

Delivery Competencies

•Analyzing

•Planning

•Detail Oriented Implementation

•Self Disciplined execution

Product Innovations

Process Innovations

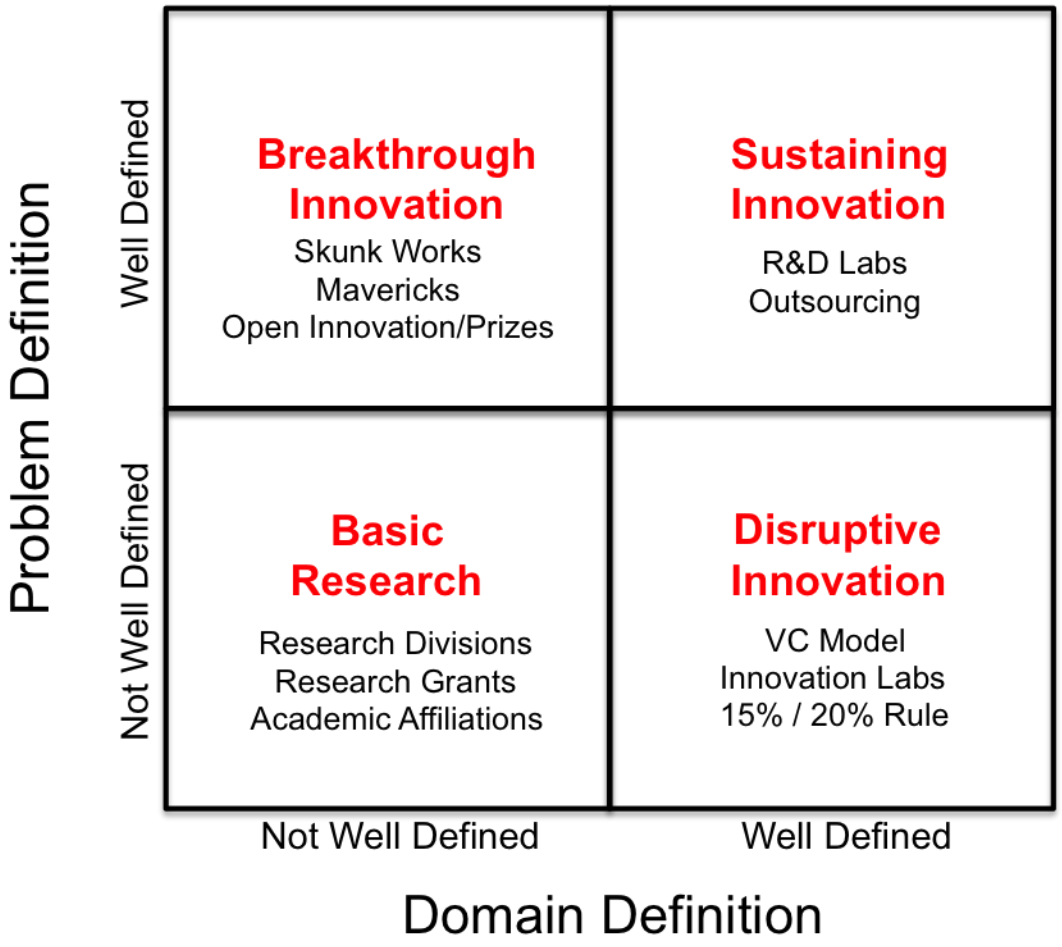
Technological Innovations

Business Model Innovations

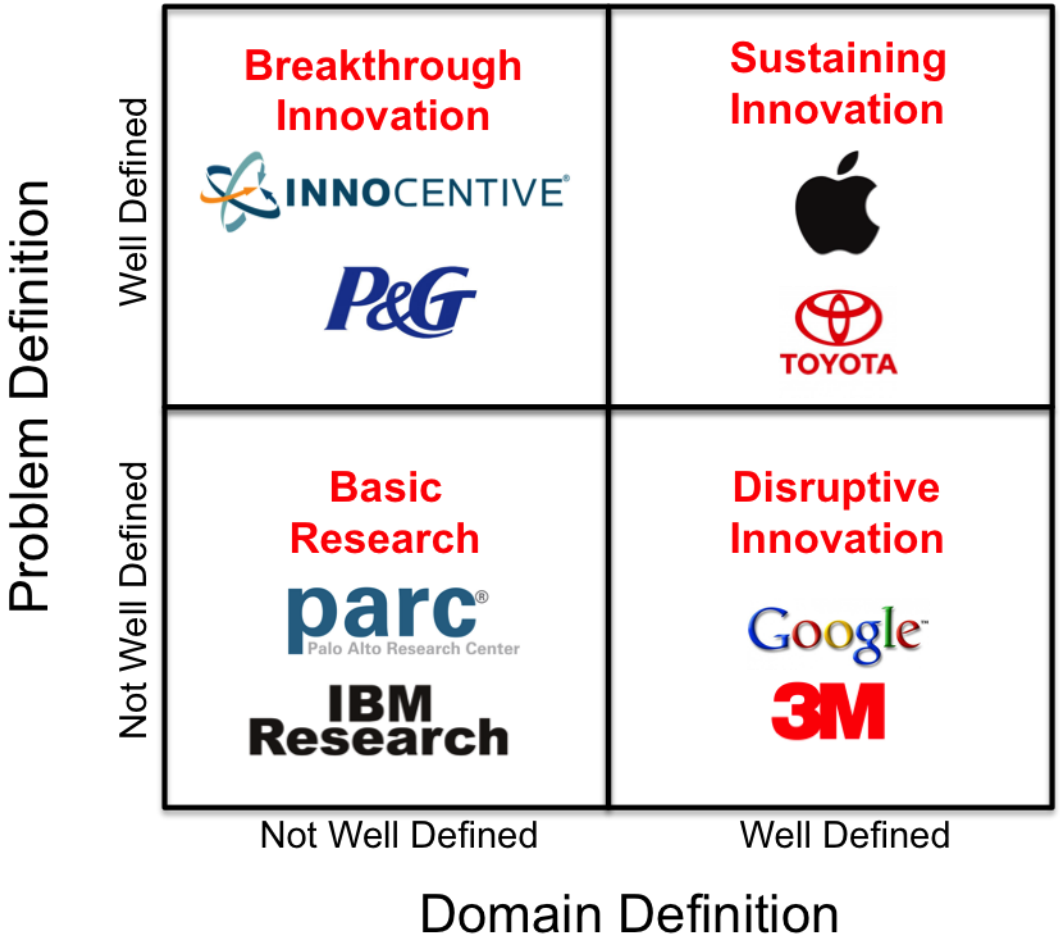
THANK YOU

deepalsmiles@gmail.com

Innovation Matrix



Innovation Matrix



Synopsis – Session 2: Leading Innovation (Contd.)

Panelist – Mr. Deepal Sooriyaarachchi

Invention is doing something new, which is useful and probably a machine that can be used. To patent an invention it must be new, take an inventive step and be industrially applicable. Innovation can only occur when an idea is created and converted to cash.
In examining the stages of innovation one can observer the following distinct steps: Observing; Questioning; Experimenting; Networking; and Associate thinking which is not connected.

In examining the observation step, it is important to be sensitive towards the environment where the observation is taking place in, in order to iterate on this point Mr Deepal Sooriyaarachchi highlighted the example of water carriers. When examining these water carriers certain individuals may link the creation of a well as the solution to their problem, however, if one was to speak with and understand the point of view of these water carriers one would understand that it might not be the distance that they had to travel but the way they transported water – this observation led to the creation of water tanks that could be rolled as opposed to carrying, thus providing a innovative solution to their problem.