Innovation: Making Choices – Bringing the Innovation Strategy to life

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Curtin University - Perth Australia

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Our Core Values Are More Than Just Goals

They reflect the way we work and how we operate every day – with our customers, with our partners from around the world, and in the communities in which we operate.

Committed To Zero
Common challenges around Innovation

- Understanding how innovation is part of an overall business strategy
- Culture of innovation
- Focusing on the molecule or the resin rather than the customer
- Commercialization framework
- Governance process
- Open innovation
Agenda

- Linking Business and Innovation Strategies
- Driving Innovation at DuPont
- Innovation Processes and Governance
- Product Commercialization Framework
- Bringing Innovation Strategy to Life
- Q&A
Linking Business and Innovation Strategies
Our Purpose

DuPont Is A Science Company

We work collaboratively to find sustainable, innovative, market-driven solutions to solve some of the world’s biggest challenges, making lives better, safer, and healthier for people everywhere.
Achieving a Sustainable and Profitable Business

VALUE PROTECTION
- Risk management skills & behaviors
- Operational Risks Management
- Governance & Compliance
- Stakeholders engagement

RISK

VALUE EXTRACTION
- Value release, employee engagement, culture change
- Sustainable value chain
- Sustainable Capital
- Operational Excellence

EFFICIENCY

INNOVATION & VALUE CREATION
- Organizational Maturity
- Innovation in all business areas

VALUE

Return on Capital
- Reduce footprint, sustainable assets and value chain

Growth
- Design for sustainability, Build societal progress

Business portfolio
- Societal & environmental value
- New Markets
- Product Innovation
- Value release, employee engagement, culture change
DuPont Innovation Management Process

Our approach addresses three fundamental questions:

- Is the current managing processes and sufficient to support innovation ambitions?
- What value can be driven by innovation, which are the priority improvement areas?
- What needs to be done to enable sustainable and replicable innovation process?
Innovation is an Integral Part of Business Strategy

**Management Business Review**

**Financial Integration**

- Product Review
- Demand Review
- Supply Review

**Business Strategy**

- Sales Strategy
- Marketing Strategy
- Technology Strategy
- Supply Chain Strategy
  - Plan – Systems/Processes
  - Buy – Sourcing
  - Make – Asset & Mfg Tech
  - Deliver – SND & Logistics

**Business Results vs. Objectives**

- Triple Bottom Line Goals
  - People
  - Planet
  - Profit

**Current Capabilities & Performance Improvement Opportunities/alternatives**

**For each Core Business Process:**

- Core Technical Model, Capabilities, Culture, Performance Management

**Required Business Outcomes**
**Our Strategic Framework Is All About Choices**

**Strategic Aspirations**
To successfully **summit the tallest mountains** in the world

**Where To Play**
Top three **tallest mountains** in the world

**How To Compete**
Proper **training, teammates & equipment**

**Capabilities To Win**

**Management Systems**
DuPont Science Has Changed The World Over The Course Of Two Centuries…

EXPLOSIVES

1802 – E.I. DUPONT
1804 – FIRST POWDER MILL
1880 – FIRST DYNAMITE
1903 - EXPERIMENTAL STATION STARTUP
1915 – PLASTICS
1917 – MAKING DYES
1923 – DUCO® LACQUER

CHEMICALS & MATERIALS

1935 – NYLON®
1936 – LUCITE®
1941 – ORLON®
1923 – CELLOPHANE®
1924 – RAYON®
1924 – FILMS
1930 - NEOPRENE
1949 – ENGINEERING POLYMERS
1952 – MYLAR®

AG & NUTRITION

1966 – TYVEK®
1967 – NOMEX®
1972 – CROMALIN®
1976 - SILVERSTONE®
1999 – PIONEER HI-BRED INTERNATIONAL
2003 – SOLAE
2007 – BIO-PDO® PLANT
2000 – SORONA®
2012 – PLENISH®
2013 – HOWARU® PROTECT
2014 – LUMIGEN®
2015 – CELLULOSIC ETHANOL

BIOBASED INDUSTRIALS

1952 – MYLAR®
1961 – TEDLAR®
1962 – LYCRA®
1965 – KEVLAR®
1986 – CORIAN® & STAINMASTER®
1995 – COZAAR® & HYZAAR®
2009 – RYNAXYPYR®
2010 – ZYTEL® PLUS
2011 – OPTIMUM® ACREMEX®
2011 – DANISCO®

ADVANCED MATERIALS

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Our Areas of Focus

As the global population climbs up to 9 billion people in 2050, DuPont uses its science-powered innovation to help solve the challenges facing the world, with a focus on:

- **FOOD**
- **ENERGY**
- **PROTECTION**
Our Strategy Is To Build And Leverage World Leading Positions In Three Highly Attractive Strategic Focus Areas

Agriculture & Nutrition
Extend our leadership across the high-value, science-driven segments of the agriculture and food value chain

Bio-Based Industrials
Develop world-leading industrial biotechnology capabilities to create transformational new bio-based businesses

Advanced Materials
Strengthen and grow our leading position in differentiated high-value materials and leverage new sciences
Execute Differentially

**Strategy...**

- Strategic Aspirations
- Where To Play
- How To Compete
- Capabilities To Win
- Management Systems

**Choices...**

How should we allocate our resources? Have we balanced risk/time/reward within the portfolio?

- Transformational
- Adjacent
- Core

**Execution...**

What people, process, and structure do we need in place for each type of innovation?

- Extend Our Technology Into New Markets
- Step-Change Top-Line Growth
- Leverage Capabilities To Lower Risk
- Invest In Projects With High Rewards
- Maintain Our Value-Chain Relevance
- Drive Technology Disruptions
- Drive Productivity
- Invest In Extendable Technologies

**DuPont Sustainable Solutions**
We Must Re-Think Our Approach To Game-Changer Innovation

- Transformational, Game-Changer
- Regionally Inspired Innovation
- Application Development
- Customer Development

Business Impact & Uncertainty

Amount Of Resources & Time Required
Driving Innovation At DuPont
Science-Based Innovation Drives Growth And Creates Sustainable Competitive Advantage

The DuPont Innovation Platform:

- **Global Market Insights**
  - Market Intelligence
  - Customer Access
  - Value Chain Knowledge

- **Science**
  - Chemistry
  - Materials Science
  - Biology

- **Technical Capabilities**
  - Application Development
  - Process Technology
  - Engineering

All Businesses Draw On The Total System

Delivering Value:

- Top Line Growth
- Earnings & Revenue
- Market Share
- Pipeline Potential

Science-Based Innovation Drives Growth And Creates Sustainable Competitive Advantage

DuPont Sustainable Solutions
Science-Based Innovation Is Business-Centered

Business Portfolios
- Self-funded
- Driven by strategy
- Optimize time to market
- Customer intimacy

CR&D Portfolio
- Corporate strategic investments
- Broadens business strategies
- High challenge/high reward

Robust End To End Portfolio Management
Innovation Choices Are Strategically Aligned At All Levels

Strategic Priorities Inform Our Innovation Platforms And Pipeline Choices

DuPont Strategic Priorities

Agriculture & Nutrition
- Seeds
- Agricultural Chemicals
- Specialty Food Ingredients

Bio-Based Industrials
- Enzymes
- Biofuels
- Biomaterials

Advanced Materials
- Advanced Polymers
- Protective Materials
- Electronic Materials
- Alternative Energy

Science-Based Innovation Strategy

Business Context
- Addressable growth opportunity
- Innovation headroom
- Competitive environment
- Industry attractiveness
- Strategic fit

R&D Investment Choices
- Risk/time/reward balance

R&D Pipeline

Innovation Platforms (transformational, step change, portfolio renewal/growth)

Early Stage Discovery
Development
Launch & Sustain
### Advance Innovation Culture Through Organizational Health

#### Be Externally Orientated
- **Import ideas** and best practices from outside our organization
- **Understand and anticipate** our customers’ needs
- **Acquire and use** information about our competitors to inform our business decisions

#### Take Risks
- **Support innovation, creativity and initiative-taking** by rewarding the behavior that promotes thoughtful risk
- **Encourage** new ways of looking at things

#### Accelerate
- **Provide clear direction and strategy** for how we will win and translate it into specific goals and targets
- **Clarity** on roles
- **Clear decision-rights**
- **Share** what we have learned so that we can move quickly
Access To Leading Edge Science Brings Competitive Advantage

DuPont Science
World Class Scientists
Core Technologies
Enabling Technologies

Partners

Universities And National Labs

Customers

Start-ups
Focus on open innovation

- Ideation (Define)
- Concept Evaluation (Measure)
- Candidate Development (Analyze)
- Prototype Testing (Design)
- Customer Qualification (Verify)
- Launch & Validation (Realization)

- Contracts
- JDAs / Alliances / Venture Investments
- Licensing
- Joint Ventures
- Marketing Partnerships

- Universities
- Start-ups
- Government Contract Research
- Companies
- Technology Licensing
- Lead Users
- Toll Manufacturers
- Suppliers

DuPont Sustainable Solutions
Innovation Processes and Governance
DuPont Strategy To Deliver Higher Growth And Higher Value

Three Strategic Focus Areas…

**Agriculture & Nutrition**

*Extend our leadership across the high-value, science-driven segments of the agriculture and food value chain*

**Bio-Based Industrials**

*Develop world-leading industrial biotechnology capabilities to create transformational new bio-based businesses*

**Advanced Materials**

*Strengthen and grow our leading position in differentiated high-value materials and leverage new sciences*

…Delivered Through Strong Execution

- Leverage Innovation Platform To Deliver Above-Market Growth
- Increase Penetration In Developing Markets And Deliver Local Solutions
- Drive Operational Efficiency And Effectiveness
- Actively Manage The Portfolio
Our R&D Portfolio Has Multiple Types Of Projects

- **Top 100**
  - High growth potential, Significant investment

- **Growth Programs**
  - Growth potential, Sustain and renew portfolio

- **Incremental Investments**
  - Incremental product renewal, Maintain Right to Operate

All projects are aligned with the corporate and business strategies and require disciplined management to have the greatest impact.
Leadership Engagement

Leaders Are Aligned And Drive Bold Growth Goals And End-To-End Innovation Execution

- People
  - Engagement
  - Culture
  - Talent

- Governance
  - Strategic Innovation Choices

- Funding
  - Time, risk and reward balance
  - Business & cross-business balance

- Collaboration
  - Culture that fosters collaboration across businesses and functions
Governance & Execution Of Innovation Portfolio

**Strategy**

- **Office Of The Chief Executive**
  - Sets overall Company direction

- **Science & Technology Center Of Excellence**
  - Enable advancement and differential deployment of science-based innovation across DuPont

  - **S&T Strategy**
  - **CoE Operations**

- **Technology Directors Network**
  - Optimize Corporate strategy, portfolio, and common processes

**Execution**

- **Portfolio & Project Management**
- **Open Innovation & Globalization**

- **Business, Regional And Functional Teams**
  - Optimize competencies & portfolios; Execute on strategies
<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
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<tbody>
<tr>
<td>R&amp;D Spend</td>
<td>$2.0 B</td>
</tr>
<tr>
<td>R&amp;D Sales %</td>
<td>6.9%</td>
</tr>
<tr>
<td>U.S Patent Applications</td>
<td>&gt;1,550</td>
</tr>
<tr>
<td>U.S. Patents Granted</td>
<td>&gt;960</td>
</tr>
<tr>
<td>New Products Commercialized</td>
<td>&gt;1,550</td>
</tr>
<tr>
<td>New Products Revenue*</td>
<td>$9 B</td>
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<tr>
<td>New Products Sales %</td>
<td>32%</td>
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Return On Innovation Investment

- Return based on growth + sustain
- Return based on growth alone

- Top Line Growth from R&D Innovation programs
- Replacement Product Sales
- BU Fade
- Historical Total Sales
- Base Business Sales
Product Commercialization Framework
Stage-Gated R&D Project Management Ensures Alignment With Business Processes

Innovation Portfolio Management

Project Mix
- Impact
- Risk

Quantitative metrics inform...
- Where resources are allocated
- What and when investments deliver

Concept Definition

Governance & Execution

Opportunity and Fit?
Compelling Value Proposition?
Compelling Business Case?
Initial Customer Acceptance?
Demonstrated Commercial Capability?
... To Drive Effective Execution Of Marketing & Technology Plans And Create & Deliver Superior Customer Value

0. Ideation (Define)
1. Concept Evaluation (Measure)
2. Candidate Development (Analyze)
3. Prototype Testing (Design)
4. Customer Qualification (Verify)
5. Launch & Validation (Realization)

Customer Development

ideation  concept  candidate  prototype  qualification/scale  launch

DuPont Sustainable Solutions
Development & Commercialization
... Covering All Key Functional & Practice Areas To Support Data-Driven Decision

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<tbody>
<tr>
<td>Idea generation</td>
<td>Identify target segments</td>
<td>Develop product &amp; process candidates</td>
<td>Customer evaluation and results</td>
<td>Final market launch plan</td>
<td>Execute market launch</td>
</tr>
<tr>
<td>Define project &amp; scope</td>
<td>Quantify addressable market</td>
<td>IP Strategy: Optimized product &amp; process for scale-up</td>
<td>Product stewardship review</td>
<td>Make product in commercial facilities</td>
<td>Sales</td>
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<tr>
<td>High-level opportunity assessment</td>
<td>Competitive assessment</td>
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<td></td>
<td>Operations</td>
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<tr>
<td>Project Management</td>
<td></td>
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<td>Financial performance evaluation</td>
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<td>Competency fit assessment</td>
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<tr>
<td>Outline business case</td>
<td>Identify target customers</td>
<td>Price &amp; positioning strategy</td>
<td>Plan for commercial manufacturing</td>
<td>Customer qualification of commercial product</td>
<td></td>
</tr>
<tr>
<td>Define customer needs</td>
<td>Technical feasibility assessment</td>
<td>Product stewardship &amp; regulatory plan</td>
<td>Market entry &amp; launch plan</td>
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<td></td>
</tr>
<tr>
<td>Market assessment (opportunity, size and growth rate)</td>
<td>Value proposition</td>
<td>Customer sampling plan (for external evaluations)</td>
<td>Price optimization</td>
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<tr>
<td>Project proposal</td>
<td>Preliminary financials, risks, and project plan</td>
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**Operations**
- Transitions idea into line responsibility
- Financial performance evaluation

**Sales**
- Revenue acceleration plan
- Project closure & key learnings

**DUOPONT**

**IP Strategy**
- Patent and proprietary knowledge

**Make product in commercial facilities**
- Manufacturing scale-up

**Product stewardship review**
- Quality and regulatory compliance

**Legal**
- Legal and regulatory considerations

**Marketing**
- Customer priorities

**Marketing**
- Value proposition

**Marketing**
- Market entry & plan

**Supply Chain**
- Supply chain planning

**BU Managing Process**
- Business unit management

**Confirm robust supply chain**
- Supply chain optimization

**Initiate integration into business processes (DIBM)**
- Integration into business processes
... And Resourced In A Way That Is Consistent With The Nature Of The Stage

0. Ideation (Define)
1. Concept Evaluation (Measure)
2. Candidate Development (Analyze)
3. Prototype Testing (Design)
4. Customer Qualification (Verify)
5. Launch & Validation (Realization)

Marketing
Technical
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Bringing Innovation Strategy to Life
Two Early Pioneers In Modern Industrial Biotechnology

**Genencor**
- Genentech & Corning form Genencor
- New Joint owners Kodak & Cultor form Genencor Int’l
- 1982
- 1990
- 1995 - DuPont Genencor Collaboration on PDO initiated
- 2005
- 2011
- 2012 Construction begins on Nevada CE facility
- 2014 – DuPont and P&G recognized with Sustainable Bio Award for Bio-Based Product Innovation of the Year

**DuPont**
- 1982 - DuPont’s Investments in Biotechnology begin in earnest
- 1990
- 1991
- 1995 - DuPont Genencor JDA Established
- 2000
- 2001 - DuPont T&L JDA Established
- 2002 - DOE funds DuPont Integrated Corn Biorefinery Program
- 2004 - DuPont and BP JDA for biobutanol
- 2005
- 2006 – First sales of Sorona® biobased Polymer
- 2008 - DDCE formed
- 2009 – Butamax JV established for biobutanol
- 2011 – DuPont acquires Danisco® IB formed
Transformational Strategy – An Evergreen Process

Develop Strategy

- Aspirations Changed?
- Assumptions Valid?
- Enabling Choices?
- On Track to Win?

Execute and Test

Transformation comprised of many steps over a period of more than 20 years

Early 1990s

Greening of DuPont

Strategic Aspirations

- Create transformational new bio-based businesses with world-leading industrial biotechnology capabilities

Where To Play

Biomaterials in existing polymer value chains

- Bioactives, Biomaterials, and Biofuels across agriculture, nutrition, and advanced materials markets

How To Compete

Combine world-class engineering & materials science with growing biotech capability

- Partner for technical & commercial capabilities

Leverage core Industrial Biosciences business and end-to-end biotech capability

- Partner for market access and acceleration
Industrial Biotechnology Transformation – Success Factors

- Company culture of renewal and alignment with science company strategy
- Top management vision and long-term commitment
- Partnerships for key capabilities and resources
- Rapidly advancing field of biotechnology
- Increasing demand for sustainability
We Are On A Journey To Adopt Winning Behaviors

<table>
<thead>
<tr>
<th>How We Operate</th>
<th>How We Win</th>
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</thead>
<tbody>
<tr>
<td>Technology mindset for transformational innovation</td>
<td>Business mindset with full access to internal and external capabilities</td>
</tr>
<tr>
<td>Limited capabilities to advance, especially deep market context</td>
<td>Building market insights and capabilities to be relevant, differentiated, credible &amp; capture value</td>
</tr>
<tr>
<td>Invent</td>
<td>Build, Align, Collaborate</td>
</tr>
<tr>
<td>DuPont speed</td>
<td>Market speed</td>
</tr>
<tr>
<td>Doing what we know how to do</td>
<td>Doing what we need to do to win</td>
</tr>
<tr>
<td>Collegially working together</td>
<td>Collaborating intensely and effortlessly within the venture, DuPont and externally</td>
</tr>
<tr>
<td>Process and perfectionism</td>
<td>Calculated willingness to act</td>
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Stage “Zero” – Process And Major Deliverables

**Define Challenges**
- Identify key challenges in target markets
- Define problem and market opportunity size
- Prep meeting to share market and technical information

**Create Opportunities**
- Organized efforts to start trend analysis and generate ideas
- Diverse group of knowledge experts (includes external where needed)
- Enriched & Aggregated Ideas Describe in one page concept
- Expert sieve results in recommendations to Decision Board for go/no go to proceed to PCF and move to in-depth opportunity assessment

**Assess Opportunities**
- In depth market analysis and initial technical feasibility assessment
- Sustainability & Safety assessment
- Define value proposition and initial product CTQs
- Financial model with sensitivity analysis complete
- Final proposal presented to Decision Board

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**Domain Map**

**Business Concept & Case**
1. Objective
   - Idea and benefits
   - Goals & targets
2. Problem
   - Market & Applications
   - Customer Unmet Needs
3. Why Now
   - Market Trends/Changes
   - PESTE/3C’s /SWOT
4. Market Size
   - Attractiveness
   - Strategic Fit
5. Solution
   - Value Proposition
   - Design Concepts
6. Competitive Advantage
   - Sources of Advantages
   - IP Position & Strategy
7. Tech & Manufacturing
   - Mkt/Product Req’t’s
   - Capability Req’t’s
8. Business model
   - Revenue & Margin Model
   - RTM Model
9. Financials
   - Fin Model /w sensitivity
   - Demand, Drivers & Assumptions
10. Risk Management
    - Mkt Risk
    - Tech Risk

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**Major Deliverables**
- Natural Sugar Alternatives
- DuPont Sustainable Solutions
Create Opportunities – *Define Growth Domains*

**Lenses**

- **Orthodoxies**
- **Discontinuities**
- **Core Competencies**
- **Customer Insights**

**Opportunities for Us**

- Many, Smaller, Discrete
- Larger Potential Growth Areas

**Potential Growth Domains**

1. Growth Domains
2. Growth Domains
3. Growth Domain

**Synthesized Business Concepts**

- First Business Concepts in Each
- Deepened to Actionable Level

**Elaborated and Assessed**

- Corp. Oppty. One
- Corp. Oppty. Two
- Corp. Oppty. Three

**Design Process**

- Develop New Perspectives
- Create New Opportunities
- Build New Business Concepts

*DuPont Sustainable Solutions*
Assess Opportunities –
Build A Compelling Business Case

Is Opportunity Real?
- Is the market opportunity real?
- Is the product need real?
- Can we crystalize market concept – i.e., target segment and how the product can do a better job of meeting the customer needs?
- Market & Appln Map
- Customer unmet needs
- Minimum essential CTQs
- Competitive alternatives

Can We Win?
- Can we deliver the product in the required vol. at required cost?
- Can we create a sustainable competitive advantage?
- Initial Value Proposition
- Potential product concepts
- Capability requirements
- IP analysis & strategy

Is it Worth it?
- Will the product be profitable at an acceptable risk?
- Does launching the product make strategic sense?
- Market potential & assumptions
- Initial financial model w/ sensitivity
- Risk assessment – Tech & Mkt
- ...

Decision Board

Customer Needs ➔ Value Proposition ➔ Business Concept & Case

DuPont Sustainable Solutions

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Stage 1 Key Objectives

- Evaluate the market opportunity, competition and technical feasibility in enough detail to define the specific project objectives and measures of success toward a documented value proposition, in the presence of recognized uncertainties.
- Assess the potential financial impact of the project, including determining which variables in the financial model have the highest impact on program success.
- Develop an overall project plan, including identification of critical path elements.
- Identify the critical uncertainties in the project, with action plan to address.

Stage 1 Key Deliverables & Decisions

- Mkt Attractiveness & Fit – Technical Feasibility
- Customer VOC – Risk & Uncertainty
- Value Prop Concept – Financial Model
- CTQ Scorecard – Project Plan

- Market Attractiveness & Target Value Prop Concept
- Technical Feasibility & Technology Approach
- Project Timing & Resourcing
- Financial Projections
- Critical Uncertainties And Clear Action Plan To Address