The gauntlet is thrown

The Dow-DuPont merger
1. A BIG DEAL

The Dow-DuPont merger and breakup creates three stronger, focused and aligned businesses with leading scale and product portfolios.

Page 5

2. BUT ONLY THE FIRST STEP

It leaves most of Dow and DuPont unchanged in Material Sciences and Specialty Products with the same historical portfolio mix and organizational issues.

Page 8

3. COMPETITIVE RESPONSE EXPECTED

Chemicals players will be pressured to accelerate their own transformations to remain attractive to financial markets and competitive vs. stronger and focused Dow-DuPont businesses.

Page 11
The Dow-DuPont transaction: a joint response to activist pressures and years of struggling to create value for shareholders.

On December 11, 2015, The Dow Chemical Company (Dow) and E. I. Du Pont De Nemours and Company (DuPont), the two most prominent American chemical companies, announced that they would merge, creating an industrial behemoth with over USD 120 billion in market capitalization and over USD 80 billion in combined revenue (according to 2014 figures). Within 18-24 months, the merged entity is expected to spin off into three independent, publicly-traded companies focused on Agriculture, Material Sciences and Specialty Products. A For both companies, this merger is the response to the culmination of years of portfolio management activity, under pressure from activist investors Trian (DuPont) and Third Point (Dow) to improve returns by separating out downstream assets from upstream businesses for Dow, and commodity and specialty businesses for DuPont. Both activists have welcomed the announcement and called the deal a “game changer” as it largely addresses their portfolio recommendations. The investor community has also responded favorably with Dow and DuPont stocks shooting up on announcement. The product and market reach of this transaction touches nearly every corner of the chemicals industry.

Our global chemicals practice examined this deal in detail to address two key questions:

1. Does this deal make sense and is it a game changer for Dow and DuPont?
2. Does it fundamentally change the chemicals industry and what kinds of opportunities and challenges does the deal create for chemicals industry participants?
A

**DOW-DUPONT TRANSACTION**

Merger and subsequent breakup into three segments

2015 segment revenues [USD bn][1]

<table>
<thead>
<tr>
<th>Segment</th>
<th>Dow</th>
<th>DuPont</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>Material Sciences</td>
<td>45</td>
<td>12</td>
</tr>
<tr>
<td>Specialty Products</td>
<td>18</td>
<td>7</td>
</tr>
<tr>
<td>Performance Plastics</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Performance Materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infrastructure Solutions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>48</td>
</tr>
</tbody>
</table>

**Source:** Capital IQ, Form 10K and other company documents, Roland Berger

---

1) Discrepancies in totals due to rounding errors;
2) Consumer Solutions is split between Materials Sciences (consumer care and auto) and Specialty Products (electronics)
The deal makes sense but carries execution risk and, by itself, falls short of fully addressing Dow's and DuPont's issues.

THE MERGER AND SUBSEQUENT BREAKUP WILL RESULT IN IMPROVED STRATEGIC COHERENCE

At the core, this transaction is logical and makes sense, which is why investors have responded favorably: Dow and DuPont stocks each went up by 11% on the day the merger was announced and have since performed better than the peer group. Both Dow and DuPont have struggled in the last few years to create value for their shareholders. While their portfolios primarily consist of leadership positions (i.e., with a top 3 global market share), it is perceived that neither firm has maximized its potential partially due to their highly complex portfolios. As a result, both companies have been targeted by activist investors: Trian took a stake in DuPont in 2013 and has pushed, amongst other recommendations, for a review of opportunities to unlock value through separation of commodity and specialty businesses in DuPont’s portfolio. Third Point invested in Dow in early 2014 and has heavily challenged Dow’s integrated model, in particular its ability to create value with its downstream, solutions-oriented assets. As a consequence, DuPont spun off its Performance Chemicals business as Chemours in 2015, while Dow sold its Angus business to Golden Gate Capital in 2014 and its Chlorine business to Olin in 2015. In a sense, if it closes, the merger and subsequent breakup will be the culmination of these recent actions: the three future independent segments will focus on 1) agricultural seeds and chemicals (Agriculture segment), 2) commodities and upstream-focused businesses (Material Sciences segment), and 3) higher growth and profitability specialties (Specialty Products segment). → B As we described in our 2014 newsletter “Portfolio Management in Chemicals,” these types of actions make perfect sense, as the resulting portfolios have greater strategic
The Winners' analysis is a strategy diagnostic tool in which we examine the ability of firms to generate profitable growth. Companies that generate above average return on invested capital (ROIC) over the weighted average cost of capital and above average growth in the capital base deliver the highest shareholder returns.
DIFFERENT PROFITABLE GROWTH PROFILES ACROSS NEW SEGMENTS

The Winners' analysis: chemicals industry profitable growth performance over 2009-2014

1) Includes 148 companies with financials for Dec 31, 2009-Dec 31, 2014; Dow-DuPont business pro-forma does not include announced synergies;

2) Real growth adjusted by historical rate of inflation: 1.7% p.a

Source: Capital IQ, Roland Berger
THE DEAL CREATES A LEADER IN AGRICULTURE

The industrial logic of the combination of Dow Agro with DuPont’s Agriculture business in particular is very strong given the industry thesis that there is synergy between seeds and crop protection chemicals. Indeed, Dow and DuPont’s agriculture businesses have complementary offerings: Dow is focused mainly on crop protection (more than three quarters of its agriculture revenue), while DuPont has a leading presence in seeds and traits (more than two thirds of agriculture revenue). For this reason, antitrust scrutiny of the transaction is expected to be limited and the combination is expected to create the top agriculture player, with a broad portfolio to better address customer needs, and with the ability to extract significant R&D efficiencies, in line with what Monsanto was attempting to achieve with its now failed acquisition of Syngenta. Dow’s strong trait and crop chemicals pipeline can benefit from DuPont’s channels to market and revitalize DuPont’s eroding share of key markets like US corn. The separation of this new entity from the rest of Dow and DuPont, enables better visibility and proper resourcing of the company, against the agriculture industry’s current growth challenges.

MATERIAL SCIENCES IS ESSENTIALLY A MORE FOCUSED DOW, BUT WILL FACE ITS LEGACY PRODUCT VS. MARKET CHALLENGES

The Material Sciences segment still looks like Dow: it encompasses over 80% of legacy Dow’s revenues, which will represent almost 90% of the new segment. It is a stronger Dow though, as DuPont’s Performance Chemicals business adds attractive product businesses, many of which complement Dow’s portfolio or provide channels for Dow’s products (e.g. packaging). The segment’s advantaged raw material positions will benefit from greater focus, and optimized capital allocation compared to the current situation where, in a diversified portfolio, downstream and AgroSciences received a significant share of management attention. However, given the importance of Dow businesses in the Material Sciences segment, it is likely to face the same issues Dow has had since its acquisition of Rohm and Haas, absent any additional portfolio management: how to successfully manage the legacy Rohm and Haas market-focused, application development-intensive businesses with Dow’s capital-intensive, commodity manufacturing businesses?

In our view, Dow’s performance challenges have been driven by the conflict between its integrated asset footprint and product-centric culture on the one hand, and its market orientation aspirations on the other hand. Its 2010 decision to reorganize along end-markets never achieved the expected level of commercial synergies, in large part due to the fact that buying influencers and specifiers in the markets of interest to Dow are dispersed and reside in different supply chains. In the automotive industry, foams for seat cushions, performance plastics for under hood applications, and paints/coatings for body work all enter the automotive supply chain at different points. For these reasons, Dow struggled to extract – and even maintain – value from the Rohm and Haas assets. As an example, Infrastructure Solutions and Consumer Solutions, the two solutions businesses in the Material Sciences portfolio, clearly stand out as poor performers with higher capital-intensity than Dow’s product-businesses. This means that in order to improve its financial performance, the Material Sciences will likely need additional restructuring and organizational alignment across the portfolio to successfully operate product- and market-oriented businesses side by side. This may require adding missing product lines through M&A to fully enable solutions-based models, unbundling businesses serving different value chains, and divesting small businesses not synergistic with leadership positions.

SPECIALTY PRODUCTS IS A SMALLER DUPONT COMBINING ATTRACTIVE BUT UNRELATED BUSINESSES

With USD 13 billion in revenues based on 2015 figures, the Specialty Products segment will be the largest “true” specialty chemicals company. As such it will benefit from corporate scale: better access to capital than its specialty competitors, and the potential to extract significant savings through economies of scale in support functions. Dow’s electronics business will broaden DuPont’s portfolio in Electronics & Communications, and so will the addition of Dow’s cellulosics to DuPont Health & Nutrition. Overall, the segment will be comprised of four businesses, mostly originating coherence: they are easier to manage and provide clearer risk-reward value propositions to investors.
DOW’S SOLUTIONS-ORIENTED BUSINESSES MORE CAPITAL-INTENSIVE THAN ITS COMMODITY SEGMENTS

Asset turnover\(^1\) of Dow businesses to be included in Material Sciences segment

<table>
<thead>
<tr>
<th>Performance plastics</th>
<th>Performance materials and chemicals</th>
<th>Infrastructure solutions</th>
<th>Consumer solutions (and electronic materials)(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td>1.3</td>
<td>0.6</td>
<td>0.4</td>
</tr>
</tbody>
</table>

\(^1\) 5-year average ratio of revenues over total assets;  
\(^2\) Includes electronics business since the division has not reported financials separately in prior years  
Source: 10K filings, Deutsche Bank estimates, Capital IQ, JP Morgan equity research report 2015, Roland Berger

from the legacy DuPont portfolio, with strong competitive positions in their respective industries and exposure to attractive long-term growth drivers. On a pro forma basis, the segment has indeed recently delivered profitable growth – despite recent growth pressures driven by the large portion of revenues coming from outside the US and the strength of the dollar – and has fallen in the "Winners" quadrant of the Roland Berger Winners’ framework. → D

However, the four businesses will have limited relatedness as they each sell different products and operate in diverse industries. Therefore, any commonality in the portfolio will be driven through business models rather than operations or end-markets. For this reason, only a fraction (10\%) of the USD 3 billion of cost synergies expected from the Dow and DuPont will come from the Specialty Products segment. While the announced Specialty Products management team will come from DuPont and therefore provide parenting advantage over the largely DuPont-based portfolio, it will need to improve the performance of some of the businesses. Health & Nutrition in particular has struggled to deliver acceptable asset returns given the significant amount of goodwill associated with the Danisco acquisition in 2011.
The gauntlet is thrown

THE MERGER AND SUBSEQUENT BREAKUP CARRIES SIGNIFICANT EXECUTION RISK

The Dow-DuPont transaction requires merging two of the largest chemicals companies before breaking the combined entity into three separate segments. This will present significant execution challenges, from an organizational, operational, and cultural perspective, which may result in some businesses losing their strategic focus during the transition.

Organizationally, the deal will combine businesses from two companies known for their strong centralized management processes. For the merger and separation to happen, these processes will have to be replaced entirely to fit the businesses in each segment. Based on DuPont’s Chemours and Dow’s Chlorine Products divestitures, creating these new structures will be a difficult, time-consuming activity which may distract management. Operationally, the transaction will break up certain Dow integrated value chain positions, separating upstream and downstream assets. As a result, it is likely that the Material Sciences and Specialty Products segments in particular will be largest supplier and customer to one another. Setting up and valuing the associated contractual arrangements will be critical – Dow’s 20-year ethylene supply contract to its chlorine business was a key discussion factor with potential buyers throughout the sale process. Finally, merging Dow and DuPont will require bringing together two different cultures: Dow’s integrated value chain, and operational excellence focus with DuPont’s innovation and solutions-orientation.

LIMITED OVERLAP ACROSS SPECIALTY PRODUCTS’ BUSINESSES

Dow-DuPont Specialty Products segment businesses\(^1\) and key competitors

<table>
<thead>
<tr>
<th>Specialty Products</th>
<th>Electronics business</th>
<th>Nutrition and health</th>
<th>Industrial biosciences</th>
<th>Safety and protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue USD</td>
<td>-2.0 bn</td>
<td>-3.3 bn</td>
<td>-1.2 bn</td>
<td>-3.5 bn</td>
</tr>
<tr>
<td>EBITDA [%]</td>
<td>23.9%</td>
<td>18.7%</td>
<td>24.5%</td>
<td>24.9%</td>
</tr>
</tbody>
</table>

Key competitors

- Hitachi
- Air Products
- Arkema
- Cabot Microelectronics
- ShinEtsu
- Asahi Kasei
- Cargill
- Ingredion
- Kerry
- Tate & Lyle
- FMC
- Chr. Hansen
- Novozymes
- DSM
- AB Enzymes
- BASF
- Chr. Hansen
- Cosentino
- DSM
- Honeywell
- 3M
- Teijin
- Kimberly-Clark

---

\(^1\) Revenue and EBITDA figures are reported 2015 numbers; \(^2\) Based on the consumer business which includes electronics

Source: Deutsche Bank, Capital IQ, Investor documents from Dow and DuPont, SEC Filings, Roland Berger
In the aftermath of the deal, direct and indirect competitors will be pressured to accelerate their own transformations.

The merging of Dow and DuPont’s agriculture businesses will change the competitive landscape and trigger industry consolidation

Agriculture chemicals and seeds is the only industry in which the deal has a significant and immediate impact on the competitive landscape. After years of exceptional growth (11% per year over 2010-2013), the top 6, “Tier 1” players in the agricultural chemicals and seeds industry (Monsanto, Syngenta, Bayer, DuPont, Dow, BASF) have seen their growth fall to 4% and profit margins contract, as a consequence of a strong dollar, weak demand in emerging markets, particularly Brazil, and challenges in commercializing new genetically modified crops. As a result, major companies have been in deal discussions with each other through much of 2015. The Dow-DuPont combination is the first large deal to materialize and has reignited deal talks between industry players. Syngenta’s board just accepted an offer from ChemChina after reportedly re-exploring Monsanto and other offers — shareholders and regulators have yet to approve the deal. The combination of Dow AgroSciences, a strong crop chemicals player, with DuPont Agriculture, the #2 seeds player, also validates the industry thesis that crop chemicals and traits are synergistic. Within the remaining group of Tier 1 players, Monsanto and Bayer are most focused on agriculture and on either seeds (Monsanto) or crop chemicals (Bayer): they will likely see the need to take action as well. As the “prior industry leader”, Monsanto’s next step is critical. With its strong presence in seeds and traits, it will be looking to buy, or be bought by, a player that is strong in the crop protection segment: only Bayer and BASF appear to fit the bill. → Bayer is particularly affected, since it has narrowed down its industry focus to life sciences and agriculture, and the recent
DOW-DUPONT AGRICULTURE

The new leader with balanced seeds and chemicals portfolio

Key agriculture players' revenue mix, seeds vs. crop chemicals [USD bn]¹)

Dow-Dupont 16
Monsanto 15
Syngenta 13
Bayer CropScience 9
Dupont Agriculture 10
BASF Ag. Solutions 5
Dow Chemical Ag. Sciences 6

¹) Where available, 2015 published figures have been used; split between crop chemicals and seeds are based on estimates; Totals may not always add up due to rounding errors

Source: Capital IQ, Deutsche Bank estimates, Roland Berger
FINANCIAL MARKETS’ POSITIVE RESPONSE TO THE MERGER IS LIKELY TO PRESSURE DIVERSIFIED CHEMICAL COMPANIES TO ACCELERATE THEIR PORTFOLIO TRANSFORMATIONS VIA LARGE-SCALE M&A

With the merger and breakup of Dow and DuPont, two of the top three diversified chemicals companies will be transformed into three more focused companies. Other small and mid-size diversified chemicals players, like Eastman, Solvay, Ashland, Celanese, and FMC have been taking similar portfolio actions to refocus on their specialty businesses, after their commodity assets, which had done well in the recovery period from 2009 to 2012, began underperforming relative to the rest of the portfolio, especially from a growth standpoint:

- Eastman recently exited its legacy PET business after successively acquiring Solutia in 2011 and Taminco in 2015.
- Solvay has partially exited vinyls in 2014 after setting up the Inovyn JV with INEOS, and is in the process of exiting Nylon. In parallel, it acquired specialty players Chemlogics in 2014 and Cytec in 2015.
- Ashland exited distribution in 2010 and is now splitting Valvoline into a separate company.
- FMC sold soda ash to Tronox in 2015 after selling its peroxygens business, exiting its legacy commodity businesses.

Many of these diversified players are still in the middle of their transformation process. The Dow-DuPont transaction removes an important comparable for them, and its warm reception by financial markets demonstrates continued investor support for clearer, more focused portfolios. This may embolden activist investors to push diversified chemicals players to accelerate their portfolio transformations via large M&A.

MATERIAL SCIENCES AND SPECIALTY PRODUCTS WILL DRIVE M&A ACTIVITY

As noted above, the Material Sciences and Specialty Products segments may not be the highest value owner of all of their portfolio businesses: both segments will likely need to exit certain businesses to appeal to investors. In the Material Sciences segment, the Infrastructure Solutions and Consumer Solutions businesses may become divestiture candidates, as a whole or component by component, given the business model difference, and lower financial performance relative to the segment’s other businesses.

Both solutions businesses consist of a myriad of entities which may appeal to a range of investors, strategic (e.g. Kemira or Solenis for Dow Energy & Water, Celanese for Dow Automotive Systems) or financial. In addition, other smaller, poorly performing parts of the segment could be divested: DuPont engineering thermoplastics business (currently part of DuPont Performance Materials) falls in this category; as do parts of Dow’s polyurethanes business (which belongs to Dow Performance Materials & Chemicals).

In businesses where the Dow and DuPont businesses are complementary (e.g. Electronics or Health & Nutrition), the combination may up the ante for competitors, pressuring them to pursue M&A to close growing scale or offering gaps to the new Dow-DuPont businesses. For example, the addition of Dow cellulosics to DuPont’s Health & Nutrition portfolio will likely challenge cellulosics competitors like FMC or CP Kelco to think more aggressively about M&A growth options to keep up with industry leaders.

A slowdown in agriculture has challenged this move. A deal between Monsanto and Bayer will put BASF in the last place among large companies. BASF as a company is typically an industry leader and thus, this could lead to a scramble to formulate a deal with Monsanto or even divest the agriculture segment to a PE investor. As the Tier 1 consolidates, Tier 2 agriculture businesses like FMC’ Agricultural Solutions or Platform’s Agriphar CropSolutions business (formerly Chemtura AgroSolutions) will likely be driven towards M&A as well to reduce the scale and portfolio offering gap relative to leading players. Opportunities exist, but will shrink quickly. Once the music stops, some players may be left without a chair.
Conclusion.

The Dow-DuPont deal makes sense. If approved and successfully executed given the significant organizational, operational, and cultural complexity of the merger and subsequent breakup, the deal takes the Dow-DuPont portfolios in the right direction by separating out businesses with different models and drivers. It creates the leader in Agriculture seeds and crop protection chemicals. In the plastics businesses within the Material Sciences segment, or the Electronics and Health & Nutrition businesses within the Specialty Products segment, Dow and DuPont positions mutually reinforce each other. However, the deal does not fully address Dow and DuPont’s legacy issues. The future Dow and DuPont chemicals segments will need additional actions to address the business model and organizational issues which have hindered the legacy companies.

For the chemicals industry overall, the deal does not fundamentally change the competitive landscape, except for Agriculture where it shakes up industry rankings and validates the seeds and crop chemicals synergy thesis. Nevertheless, we do expect the deal to drive significant additional M&A activity, creating opportunities for chemicals industry participants. The combination of the Dow AgroSciences and DuPont Agriculture will likely trigger a wave of consolidation in agriculture. The Material Sciences and Specialty Products segments will likely transact – both on the buy and sell sides – to align businesses with similar models and growth potential and fill portfolio gaps. Companies that have broad diversified portfolios will have to address the direct competitive challenges of the three focused and strengthened businesses. They will also need to address the likely increasing pressures to follow suit and liberate the full value from their portfolios through M&A. The sheer scale, audacity and industrial logic of Dow-DuPont throws the gauntlet at the rest of the industry.
ABOUT US

Roland Berger, founded in 1967, is the only leading global consultancy of German heritage and European origin. With 2,400 employees working from 36 countries, we have successful operations in all major international markets. Our 50 offices are located in the key global business hubs. The consultancy is an independent partnership owned exclusively by 220 Partners.

FURTHER READING

THE WINNERS: HOW CHEMICAL COMPANIES DELIVER SUPERIOR SHAREHOLDER VALUE

As part of our extensive strategy work in the chemical industry, we have observed that chemical companies deliver a very wide range of shareholder returns (dividends and capital gains). We thus set out to investigate how chemical companies create value for their shareholders.

PORTFOLIO MANAGEMENT IN THE CHEMICALS INDUSTRY

There is clearly an ongoing portfolio management trend in the chemical industry. Furthermore, a number of other chemical and materials companies are being pressured by both activist and traditionally passive investors to revisit their portfolios. In our view, the time is right for companies to ask themselves: “Am I the highest-value owner of my portfolio businesses?” The companies which have answered “no” to this question and taken action by shedding businesses have clearly been rewarded by the market.

Links & Likes

ORDER AND DOWNLOAD
www.rolandberger.com

STAY TUNED
www.twitter.com/RolandBerger

LINKS AND LIKES
www.facebook.com/RolandBergerStrategyConsultants

A detailed insight into current thinking at Roland Berger is available via our new microsite at new.rolandberger.com
Publisher

ROLAND BERGER GMBH
Sederanger 1
80538 Munich
Germany
+49 89 9230-0
www.rolandberger.com

ROLAND BERGER LLC
177 Huntington Avenue
18th Floor
Boston, Massachusetts 02115
USA
+1 617 310-6600

WE WELCOME YOUR QUESTIONS, COMMENTS AND SUGGESTIONS

RICHARD ENO
Senior Partner
+1 617 794-4750
richard.eno@rolandberger.com

ROB HENSKE
Senior Partner
+1 215 820-9148
robert.henske@rolandberger.com

BRIAN GERSH
Principal
+1 857 222-3703
brian.gersh@rolandberger.com

FREDERIC CHOUMERT
Principal
+1 617 869-8771
frederic.choumert@rolandberger.com

NEIL CHECKER
Partner
+49 160 744-2237
neil.checker@rolandberger.com

SURABHI SHANKAR
Senior Consultant
+1 857 205-8996
surabhi.shankar@rolandberger.com

Marketing and Public Relations
LINDA SALIBA
linda.saliba@rolandberger.com

This publication has been prepared for general guidance only. The reader should not act according to any information provided in this publication without receiving specific professional advice. Roland Berger GmbH shall not be liable for any damages resulting from any use of the information contained in the publication.

© 2016 ROLAND BERGER GMBH. ALL RIGHTS RESERVED.