Digitalization in Chemical Distribution
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The Chemical Industry moves in line with general industry trends

Digitalization and Circular Economy are **the** Chemistry 4.0 issues

<table>
<thead>
<tr>
<th>Industry</th>
<th>1.0</th>
<th>2.0</th>
<th>3.0</th>
<th>4.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver</td>
<td>Mechanization</td>
<td>Industrialization</td>
<td>Automation</td>
<td>Digitalization</td>
</tr>
<tr>
<td>Time</td>
<td>1784</td>
<td>1870</td>
<td>1969</td>
<td>2012</td>
</tr>
<tr>
<td>Game Changer</td>
<td>Steam Engine, Water Power</td>
<td>Conveyor Belt, Electricity</td>
<td>Electronics, Computer</td>
<td>Big Data, Internet of Things</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemistry</th>
<th>1.0</th>
<th>2.0</th>
<th>3.0</th>
<th>4.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver</td>
<td>Industrialization</td>
<td>Substitution</td>
<td>Globalization</td>
<td>Digitalization, Circular Economy</td>
</tr>
<tr>
<td>Time</td>
<td>1865</td>
<td>1950</td>
<td>1980</td>
<td>2010</td>
</tr>
<tr>
<td>Products</td>
<td>Synthetic Dyes, Fertilizers, Soaps, Pharmaceuticals</td>
<td>Synthetic Fibres, Plastics, Rubbers</td>
<td>Tailored Chemical Solutions, New Material Mixes</td>
<td>Hybrid materials, spin electronics</td>
</tr>
<tr>
<td>Technology</td>
<td>Large scale, batch production</td>
<td>Large scale, continuous production</td>
<td>Scale economies, Gene Technology</td>
<td>On purpose, additive production</td>
</tr>
<tr>
<td>Raw Materials</td>
<td>Coal, tar, fat based</td>
<td>Crude Oil</td>
<td>Natural Gas, Renewables</td>
<td>Sugar, cellulosics, C-cont. waste, CO2</td>
</tr>
<tr>
<td>Peer Structure</td>
<td>Vertically integrated, national companies</td>
<td>Internal and external Verbund structures</td>
<td>Horizontal M&amp;A, global segment leaders</td>
<td>New eco-systems, Circular Economy</td>
</tr>
</tbody>
</table>

Source: VCI-Deloitte study on Digitalization & Circular economy (9/2017)
Digitalization in Chemicals is the usage of data to boost „Operational Excellence“, „Profitable Growth“ and/or „Commercial Excellence“.

1. „Operational Excellence“
   Improve and connect processes

2. „Profitable Growth“
   Introduce new products, services and business models

3. „Commercial Excellence“
   Improve and capture the customer interface
When validating VAT numbers of our customers, we are using a zoo of different applications and spend hours copying values from one to another. The task is required, yet completely mindless and the risk of copy & paste errors is high.
Example: In the first wave of a project for a chemical company, 8 finance processes have been automated, saving 15+ FTEs.

Processes in scope of pilot project

- Invoice verification with PO
- Creation and maintenance of master data
- Verification of Tax ID number
- Contact critical creditors
- Invoice verification w/o PO
- Intercompany reconciliation
- Intercompany netting
- Manual payments

Benefits realized

- Approx. 15 FTE* effort saved
- 2–3 times faster process execution
- Reduced overtime
- Higher value activities

* FTE = Full Time Equivalents
An investment into a robotics project will pay out quickly by exploiting many benefits of RPA

**1. 24/7 Operations**
- Non-stop performance – not queues at peaks

**2. Internal control**
- Avoiding human fraud, easily performed Control & Compliance checks

**3. Cost reduction**
- Cost reduction net 30%–60% per automated process

**4. Scalability**
- Capacity can be increased – without long build-up phase

**5. Speed increase**
- Turn-around-time decrease (up to 80%)

**6. Quality**
- Increase quality by avoiding human errors and focusing on exceptions

**7. Short Payback period**
- RPA implementation costs are paid off in < 12 months

**8. Valuable Work**
- Employees do not waste any capacity for routine tasks
Robot Process Automation (RPA) is the first proven solution on the way to more advanced solutions and ultimately artificial intelligence.

**RPA**
- **Mimics human actions**
  - Used for rule-based, simple to complex (transactional) processes
  - Addresses priority business problems driven by process breakages
  - Enables:
    - Faster handling time
    - Higher volumes
    - Reduced error rates and handling costs

**Cognitive Automation**
- **Mimics/augments quantitative human judgment**
  - Used for judgment based processes
  - Covers machine learning capability
  - Interprets human behavior

**Artificial Intelligence**
- **Augments human intelligence**
  - Used for predictive decisioning
  - Dynamically self-adaptable and managing

**Proven solutions, large-scale rollouts started**

**Organizations explore possibilities, first showcases developed**

**No current true AI capability yet**

During test definition: „A test for intelligence in a computer, requiring that a human being should be unable to distinguish the machine from another human being by using the replies to questions to put to both”
Chemical companies are struggling to capture the value of designing & building superior, resource efficient solutions.

**Commoditization**
Lack of Innovation

**Deflation**
Declining unit prices, Low growth, Marginal returns

**Dematerialization**
Digital Disruption, Substitution & New Material combinations

**Disruptive Technologies**
Additive Manufacturing, Business Excellence 4.0

**Circular Economy**
Sustainability, Ressource Efficiency, New Ecosystems

**New Materials**
Smart connected products, multi-material mixes

**“Old World”**

**More is Better**
Leading producer of increasingly standardized chemicals & materials

**“New World”**

**Sustainable is Smarter**
Leading designer and builder of superior, resource efficient solutions & ecosystems
Example 3D printing: Who is capturing the Design & Build Value Add? The Resin or Printer Producer? The Applier or a new 3rd (distribution) party?

Source: Local Motors; Daimler; Fraunhofer Institute; Deloitte
Profitable Growth

Example Digital Farming: Will there be a closed (iOS) or open system (Android). Will AgChem Companies or other players drive it?

1. Product
2. Smart Product
3. Smart, interconnected Product

**Value add**

- **Extended Digital Products**
  Products with digital properties, i.e. sensors, communication, etc.

- **Solution Provider**
  Problem solutions, combining physical products and data based services

**Asset Intensity**
4. Product-System

- **Smart Tractors**
- **Farm equipment**
- **Planter**
- **Harvester**
- **Cultivation**

5. Ecosystem

- **Farmer & Retail**
- **Bio and organic**
- **Innovation Model**
- **Proprietary integrated solutions**
- **Independent Farmers**
- **Commoditization and generics**
- **Open shared, publically available technology**
- **Integrated Ecosystems**
  - Integration of products and services of complementary partners / peers; complete management of ecosystem
- **AgChem and Digital Farming**
- **AgChem, Seed & OEM**

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Source: ClimateCorp, now Bayer-Monsanto (2015), PWC Global Industry 4.0 Survey; Deloitte
Profitable Growth

Example Re-usu / Recycle – Cannibalizing own business. Further commoditization or differentiation by specific product DNA?

Using “Re-Design“ of products to balance the trade-off between “design-to-performance“ and “design-to-recycling”

Enhance resource- and climate efficiency, not just for the chemicals and materials industry, but especially for clients / users of chemicals and materials

- Close material cycles
- Reduce raw material consumption
- Decrease production of waste
- Meet sustainability targets of clients

Controlled disposal of inevitable industrial waste
Operational Excellence and Profitable Growth are opportunities. Commercial Excellence is often seen as a threat. Can a new “Chemazon” disrupt the industry?
Besides efficiency effects, principals see digitalization as a main source of organic business growth, with or against distributors.

Q: In which of the following areas of your business could digital initiatives hold the most opportunity for business growth?

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing sales force effectiveness</td>
<td>51%</td>
</tr>
<tr>
<td>Enhancing customer experience and loyalty</td>
<td>44%</td>
</tr>
<tr>
<td>Deepening customer understanding and insights</td>
<td>44%</td>
</tr>
<tr>
<td>Adding intelligence to current product and service ...</td>
<td>41%</td>
</tr>
<tr>
<td>Creating new products and service offerings</td>
<td>37%</td>
</tr>
<tr>
<td>Integrating with channel partners</td>
<td>35%</td>
</tr>
<tr>
<td>Finding sources of growth for the core and adjacent ...</td>
<td>30%</td>
</tr>
<tr>
<td>Improving pricing strategy and execution</td>
<td>27%</td>
</tr>
<tr>
<td>Developing transformational businesses in the ...</td>
<td>22%</td>
</tr>
<tr>
<td>Reducing “idea to market” time</td>
<td>16%</td>
</tr>
<tr>
<td>Expanding internationally and in emerging markets</td>
<td>15%</td>
</tr>
</tbody>
</table>

(Colors indicate different categories: Business, Customer, Product)
Principals either strengthen the distributor relationship via joint platforms and/or they reduce the dependency from distributors.

Q: What type(s) of digitally-driven ecosystem would facilitate sustainable and profitable business growth? Select all that apply

<table>
<thead>
<tr>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer relationship management platforms</td>
</tr>
<tr>
<td>Distributor relationship management platforms</td>
</tr>
<tr>
<td>Innovation platforms to foster collaboration and creativity among partners</td>
</tr>
<tr>
<td>Multi-sided selling platforms*</td>
</tr>
<tr>
<td>Third-party online distributor platforms (wholesale/retail)</td>
</tr>
<tr>
<td>Web-shops on third-party online marketplaces</td>
</tr>
<tr>
<td>Non-compete supplier consortium platforms**</td>
</tr>
</tbody>
</table>

* to serve end-users with complementary products and services around a given vertical
** to monitor demand trends to design new products around a given vertical/application

Source: Deloitte 2016 Global Digital Chemistry Survey: 102 responding executives from more than 50 chemical companies over the May-June period
Commercial Excellence

Customers ask for online services, which allow suppliers to accelerate growth, maximize client potential and optimize costs-to-serve.

Accelerate organic growth through market penetration

Maximize client potential

Optimize costs-to-serve

56% of customers track orders via phone/email

Digital growth opportunity
17% of current customers already prefer to order online

More value with online tracking
Online tracking offers higher convenience for customers

Cost savings by shifting information online
This is more cost efficient than the current process

Source: Deloitte Customer Online Survey, 206 participants, January 2017
Principals shift 15–25% of their business to E-Commerce. It will be crucial to own more customers and capture their data.
“Constants” and “Switchers” offer the greatest potential to exploit E-Commerce advantages

<table>
<thead>
<tr>
<th>Segment</th>
<th>E-Commerce value creation</th>
<th>Recommendation</th>
<th>Online Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Innovators</td>
<td>Long-tail innovators are likely to order small test amounts without need for service</td>
<td>Direct</td>
<td>5%</td>
</tr>
<tr>
<td>2. Constants</td>
<td>Similar and regular orders do not need manual handling, which frees up time</td>
<td>Online</td>
<td>25%</td>
</tr>
<tr>
<td>3. Switchers</td>
<td>Lower Cost-to-Serve allows for price competition and market share gains</td>
<td>Online</td>
<td>30%</td>
</tr>
<tr>
<td>4. Innovators</td>
<td>Gain further European presence in adjacent markets by targeting small resellers</td>
<td>Direct</td>
<td>10%</td>
</tr>
</tbody>
</table>
Customers ask for reliable supply of quality products and for seven additional, differentiating features, esp. in mature markets.

Survey respondents ranked different order criteria from 1 most important to 10 least important.

- **Right to Play**
  - Product value for money: 3
  - Delivery speed and supply reliability: 4
  - Product quality: 5

- **Differentiator Level 1**
  - Customer support and service: 5
  - Product range and portfolio: 5
  - Technical knowledge: 6
  - Technical/legal product information: 6

- **Differentiator Level 2**
  - Order tracking: 7
  - Customisation around delivery: 8
  - Order history: 8

The “Right to Play” is offered by all peers: It is not a true differentiator.

“Expectation Criteria” have to be met: Not serving these expectations destroys loyalty.

Least important does not mean unnecessary: It is the right battle place in a mature market.

Source: Deloitte Customer Online Survey, 206 participants, January 2017
70% of customer time is spent on product search and quoting activities ...

**Typical B2B customer journey**

1. **Need**
   - Social media integration

2. **Information Gathering**
   - Video and pdf tutorials
   - Product finder/search
   - Product bundling
   - Regulatory & technical product information
   - Shopping history

3. **Decide, Quote**
   - Time spent: 40%
   - Time spent: 30%
   - Personalized pricing

4. **Sample Testing**
   - Time spent: 30%

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70% of time are spent already!
... only 30% on sample testing, negotiating, and purchasing

Especially services such as product bundling, shopping history and personalized pricing improve potential lead conversion before the selling decision phase.

Source: Deloitte Customer Online Survey, 206 participants, January 2017
Commercial Excellence

New Digital challengers are focusing on those 70% of customer time spend on product search and quoting (website services).

Survey respondents ranked different order criteria from 1 most important to 10 least important.

E-Marketplaces
- incl. chemicals

Online Retail
- WiFi connected Dash Buttons

Chemicals Marketplace

Chemicals B2B Platform
Webshop services cover the remaining 30%. Focus on customer centricity and digital capabilities lead to fully integrated webshops.
Commercial Excellence

Chemical Distributors should capture or team up with start-ups on new business models and operate webshops with principals

<table>
<thead>
<tr>
<th>Team up / capture start-ups</th>
<th>Operate webshops with principals driven by distributor or driven by principal</th>
</tr>
</thead>
<tbody>
<tr>
<td>New D “ChemConnect v2.0”</td>
<td>DODO “Amazon” Distributor with full customer contact, promoting selected producers</td>
</tr>
<tr>
<td></td>
<td>CODO “Shell” Distributor with customer contact on behalf of producer</td>
</tr>
<tr>
<td></td>
<td>COCO “Apple” Direct Sales Full Customer control by producer</td>
</tr>
</tbody>
</table>

Product Portfolio  
Customer Portfolio  

Brand, Price Range  
Promotion, Advertisement  

Local Sales / Technical Service  
Local Pricing  
Distribution / Logistics  

Impact of Chemical Distributor
Chemical Distributors are facing the threat to be mitigated away by their principals, but especially by new platforms that capture the client relationship. It's not time for panic, but for bold action.
Digital Trends

So what does that mean for Chemical Distributors? Call for Action – Doing Nothing is not an option!

**Explore and capture digitally enabled cost reduction potential in**
- Marketing & sales,
- Supply chain & warehousing and
- General Administration

**Identify and mitigate Cyber Security risks**
- Secure supplier & customer (price-volume) data
- Protect against cyber attacks

**Explore and capture e-commerce opportunities**
- Online information, ordering, track-and-trace and other services
- Webshops, webpages, social media actions (together with principals*)
- Explore role and offering in new ecosystems (ressource efficient solutions) (alone, in collaboration with other, complementary chemical distributors, or liaising with one of the new “Chemazon” disruptors) or funding an own platform with complementary distributors

* in case of exclusive distribution rights / factory packed specialties
Chemical Distributors face more fundamental challenges than ever before. They need to define their role in a digital world – vis-à-vis their principals and customers and try everything to sustain and not be mitigated away by new platforms.
Why Deloitte

Deloitte has proven digital capabilities and tools ...

... innovation for us and for our clients

[the garage]

Incubator

Our innovative business models and solutions (selection)

- analytics INSTITUTE
- blockchain INSTITUTE
- Deloitte Digital
- Deloitte Center for the long view
- Deloitte Center for Process Robotics
- Deloitte Pixel™
- design Studios
- neuroScience institute

Innovation Advisory Services

We help our clients setting up an innovation strategy, generating new ideas, developing and implementing innovations, setting up an accelerator

- Strategy
- Structure
- Portfolio

Key Assets

- Expertise
- Methods & Frameworks
- Partnerships
- Facilities
Deloitte’s experience in Chemicals and Chemical Distribution is a true differentiator

Deloitte’s Value Proposition

#1 in servicing the Chemicals industry
We serve 69% of the top 100 global chemical producers
We generate US$ 1,1B revenues in the Chemicals & Specialty Materials Industries

Multi-Functional Expertise
• Consulting
• Tax & Legal
• Risk Advisory
• Financial Advisory
• Audit & Assurance

We Understand Global
• 150+ countries
• 270K+ professionals
• 700+ Offices

#1 in Global Consulting*
• Strategy
• Operations
• Change Management
• Systems

Also working with associations

*Source: Gartner, Kennedy, Market Share Analysis: Consulting Services, Worldwide, Deloitte
Why Deloitte

Deloitte has proven and recognized the best digital transformation capabilities

Worldwide Digital Strategy Consulting Services

- **Deloitte Digital #1** in innovation consulting
  - ALM Intelligence, 2016
- “Global Leader in CRM and Customer Experience Implementation Services”
  - Gartner, 2016
- “Global Leader in Digital Customer Strategy and Experience Consulting”
  - Kennedy Ranking, 2015
- “Global Leader in Digital Strategy Consulting Services for Customer and Brand Engagement”
  - IDC, 2015
- “Global Leader in Strategy Consulting Services for Digital Operations”
  - IDC, 2015
- “Global Leader in Digital Strategy Consulting Services for Digital Products and Services”
  - IDC, 2015
- “Global Leader in Digital Strategy Consulting Services for Digital Products and Services”
  - Gartner, 2015
Thought Leadership (illustrative examples)

- Global chemical industry mergers and acquisitions
- End market alchemy: Expanding perspectives to drive growth in Chemicals
- Driving innovation: Advanced Materials Systems
- Annual global survey on the impact and use of digital in the chemical industry
- Key Industry 4.0 applications across different stages of the chemicals value chain
- The future of chemicals and advanced chemical multiverse
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Wolfgang specializes in strategy, organization, carve outs, pre- to post-merger integration as well as improving purchasing, sales, and distribution performance of chemical, petrochemical and chemical distribution companies. He has carried out various engagements, mostly for large, global clients. After serving as an application technology manager for the beverage industry at Henkel, Wolfgang spent 15 years with Roland Berger, where he was an equity partner and leader of the global chemicals and oil practice. Before joining Deloitte in 2015, Wolfgang spent more than 9 years with AlixPartners, leading the Oil, Gas & Chemicals practice in EMEA.
Digitalization in Chemical Distribution

Winners & Losers
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