Influences of Digital Transformation on Freedom to Operate Processes in the Chemical Industry

I3PM/CEIPI/BETA IP Management Conference
Strasbourg, May 4, 2017

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This will be about patents
Agenda

1. Digitalization in the Chemical Industry
2. Key Differences between Chemical Inventions and IT Inventions
3. Impact of Digitalization on FTO Processes
4. Risk-based FTO Approach
5. IP Risk Management
6. Outlook
Chemical Industry: BASF’s segments

Chemicals
- Petrochemicals
- Monomers
- Intermediates

Performance Products
- Dispersions & Pigments
- Care Chemicals
- Nutrition & Health
- Performance Chemicals

Functional Materials & Solutions
- Catalysts
- Construction Chemicals
- Coatings
- Performance Materials

Agricultural Solutions
- Crop Protection

Oil & Gas
- Oil & Gas
Digitalization in the Chemical Industry

Digitalization along the value chain

Supply chain management, smart manufacturing

Smart innovations

Digital Business models
Digital Patent Filings by Chemical Companies from 2010 to 2015

- Reliance
- Sabic
- Akzo
- DSM
- Monsanto
- BASF
- Dow
- Bayer
- Dupont
- Sinopec

Graph showing the number of patent filings by each company from 2010 to 2015, with Sinopec having the highest filings and Reliance having the lowest.
Focus on Specific Segments

- maintenance
- electric power
- color, coating
- biotechnology
- risk, safety
- business
- medial, pharma
- process
- other
- agro
- oil, gas, mining
Sinopec with Clear Focus on China
Patenting Chemical Inventions

- Active ingredient
- Formulation
- Method

→ Patent(s)

→ Product

Long R&D

Long product life cycles

Aim: Secure return on investment for research expenses
Patenting IT Inventions

Multiple technology stacks build on each other

Touch display
algorithms
sensors
Interfaces

Patent(s)
Patent(s)
Patent(s)
Patent(s)

Smart phone
Smart phone 2

Idea realisation

Short product life cycles
Short product life cycles

Multiple technology stacks build on each other
## Key Differences between Chemical Inventions and IT Inventions

<table>
<thead>
<tr>
<th></th>
<th>Chemistry</th>
<th>IT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>Discrete</td>
<td>Complex cumulative</td>
</tr>
<tr>
<td>No of inventions in product</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Distribution level</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Investment per innovation</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Product life cycle</td>
<td>Long</td>
<td>Short</td>
</tr>
<tr>
<td>Technical Terminology</td>
<td>Standardized</td>
<td>Not Standarized</td>
</tr>
<tr>
<td>Cross-licensing</td>
<td>Rare</td>
<td>Common (pools, standards)</td>
</tr>
</tbody>
</table>
## Patent Landscape Chemistry vs. IT

<table>
<thead>
<tr>
<th>Chemistry</th>
<th>IT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 patent per product</td>
<td>1000 patents per product</td>
</tr>
<tr>
<td>Chemical company innovation owner</td>
<td>Innovation often with IT partner</td>
</tr>
<tr>
<td>Patents very relevant</td>
<td>Patents slow, Know-how protection essential</td>
</tr>
<tr>
<td>Established legal environment in many countries</td>
<td>Little case law; scope of patents difficult to assess; changing laws</td>
</tr>
<tr>
<td>FTO key element of IP and business strategy</td>
<td>Multi layer patent landscape; Full FTO nearly impossible</td>
</tr>
</tbody>
</table>
Impact of Digitalization on FTO Processes „Front-end“ and „back-end“

3 different FTO worlds
- Chemical invention $\leftrightarrow$ „classic“ FTO
- IT invention $\leftrightarrow$ „risk-based“ FTO
- Cross-over invention $\leftrightarrow$ both FTOs

Selection facilitated by white space analysis with big data

Ideas
Projects
Products
Risk-based FTO Approach for IT inventions

- Step 1: white space analysis during early R&D stage
- Step 2: risk analysis: FTO yes/no
- Step 3: risk-adapted FTO analysis

Examples

- Identify oldest patents
- Identify oldest patents of key competitors
- Identify patents with highest “Patent Asset Index”

=> Check 5 to 10 „quality“ hits for relevance
Risk Matrix
red => FTO, Green => no FTO

<table>
<thead>
<tr>
<th>Probability of litigation</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact on business</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Project 1</td>
<td>Green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Model 3</td>
<td>Red</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Risk mitigation for high risk areas by FTO opinion.
Risk Matrix
red => FTO, Green => no FTO

Probability of litigation
- Patentability
- IP owner
- Visibility
- Country

Impact on business
- High investment
- High cost of change
- Profit loss
- Reputation damage
IP Risk Management

- Technical circumvention
- Stop of the project
- Managing
  - Prepare for defense to litigation
  - Careful communication
  - Avoid countries of high risk
  - Indemnification caps in contracts with 3rd parties
- Carve out IP risks (invalidation of patent…) in M&A
Cross-Licensing as Risk Management: LOT (License on Transfer) Network

- Nonprofit organization to combat patent trolls by cross-licensing patents
- Google-led initiative from 2014
- 70 members, from IT-tech, automotive, finance; 0.5 mio patents
- Annual fee USD 1.500 – 20.000
- Royalty-free license to all other LOT companies on condition of the sale of a patent by a LOT company to a troll
- LOT companies free to sue each other, sell patents

- Quality of patents is not addressed
Outlook
Artificial Intelligence and FTO Processes

Future A.I. products
• White space analysis with Big Data
• Case law analysis
• Infringement analysis
• Invalidity analysis
• Risk assessment analysis

Questions
• Legal relevance of computer-generated (mass)-patent filings
• Legislative changes
• A.I.-generated FTO as legal work product
THANK YOU