Life Cycle Management in decision making: a monetization approach
Case study 3D P&L Accounting at AkzoNobel

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Agenda

• Introduction
• Methods
• Case 1 Product perspective: A book
• Case 2 Company perspective: AkzoNobel 2016
• Conclusions
Monetization of externalities
• **Externalities**: Consequence of an economic activity experienced by unrelated third parties, these could be positive or negative
• **Monetization**: expressing something in Monetary / Financial terms

**AkzoNobel: Paints and Chemicals company**
• Using 3D Profit and Loss (3D P&L) since 2014
• Quantify impact on 3 themes: economic, environmental and social
• 3D P&L builds on publicly available methods in line with LC

**Ecomatters: Consultancy firm in Quantitative sustainability**
• Specialized in LCA and LCM related topics
• Supported development of 3D P&L
• Implemented and executed various monetization projects
3D P&L Methodology - Economic Capital

**Economic capital**
Quantifies positive externalities e.g.
• Aims for a wide benefit accounting, regardless the receiver

Gross Value Added based on:
Organisation for Economic Co-operation and Development (OECD)

**Value added** =
- Profit after tax
- Taxes
- Interest
- Depreciation
- Lease rentals
- Staff compensation

References: Financial capital creation along the value chain (Ecomatters, 2016).
[www.ecomatters.nl/financial-capital](http://www.ecomatters.nl/financial-capital)
Environmental capital
Quantifies negative externalities
e.g.
• Based on Environmental Priority Strategy methodology
• Main drivers are fossil fuel use, CO2 emissions and forestry.

Based on Environmental Priority Strategy 2015 (EPS):

LCA results  
\[
\begin{align*}
\text{CO}_2 \text{ emissions} & \times \frac{\text{Cost}}{\text{ton CO}_2 \text{ emitted}} \\
\text{Natural gas consumption} & \times \frac{\text{Cost}}{\text{ton natural gas consumed}} \\
\vdots & \\
\text{Etc.} & \times \frac{\text{Cost}}{\text{Etc.}} \\
\end{align*}
\]

EPS characterization factors

Environmental Capital
\[
\sum \begin{align*}
\text{CO}_2 \text{ capital loss} \\
\text{Natural gas capital loss} \\
\text{Etc.} \\
\text{Total negative Environmental Capital}
\end{align*}
\]

Social capital

Quantifies positive and negative externalities e.g.

- Future payments to employees as a measure of their human capital value
- Expected inflation corrected wage development

Social Capital =
Expected value of future earnings (current wage x inflation corrected wage development x time till retirement x fraction of compensation related to work) + Societal costs of incidents

Data based on:

Reference: Human capital creation along the value chain (Ecomatters, 2016).
www.ecomatters.nl/human-capital
Case study 1: 3D P&L of a book

Why 3D P&L of a book for AkzoNobel?

• Investigate downstream value chain
• Show contribution of AkzoNobel in a consumer product
• Show the real numbers and test and explain method

System

• Typical book bought in bookstore for €20
• Produced in Europe
• Paper: 50% recycled; 50% produced in Brazil, 50% produced in Sweden
• 100.000 copies sold
3D P&L of a book – Value chain

Writing & marketing → Book Production → Book tran. → Book shop → Personal transport → Book use

Other material → Pulp & paper making → Bleaching chemicals

Lorry, wages… → Building, energy, wages…

Recycling
### 3D P&L of a book – Results

<table>
<thead>
<tr>
<th>Economic capital (Positive €)</th>
<th>Environmental capital (Negative €)</th>
<th>Social capital (Pos/neg €)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper production</td>
<td>Authoring &amp; publishing</td>
<td>Distribution &amp; sales</td>
</tr>
<tr>
<td>Total</td>
<td>Transport to customer &amp; recycling</td>
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</table>

<table>
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<tr>
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<td>€ 0,50</td>
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</tr>
</tbody>
</table>

Negative Environmental effects in material intensive steps  
Positive financial effect in services (Writing & sales)  
Social Capital related to salary growth in sales
Case 2: Annual report AkzoNobel

Large societal challenges to deliver on the Paris Agreement and SDG’s
- Accelerating to apply innovation
- Solve societal development challenges
- De-risk value chains from increasing limitations on resource use and carbon emissions

Aim to create shared value across three dimensions
- Economic
- Environmental
- Social

Use the 3D P&L assessment as a metric to track and follow up impact on society at large

**Overall:** Positive for full value chain (Economic + Social + Environmental)

**Economic Capital impact**
- Mainly positive Economic capital in own operations
- Captures only a small part of product value added

**Social Capital impact**
- Dominated by future earning future earnings mainly positive
- Societal cost related to incidents small

**Environmental Capital impact**
- Negative environmental Capital about as much as positive economic capital

[Link to document](https://84e1202b204d21a1cb9b0e1ab5244fd095dbeb138ed6f973369e.ssl.cf3.rackcdn.com/akzonobel_3d_profit_and_loss_accounting.pdf)
**Economic Capital**
- 46% of fin capital is related to wages
- Overall value created in value chain (22,8 € bln) ~7X Profit after tax (3 € bln)
- Estimated economic mainly downstream

**Social Capital**
- Significant future earning especially due to wage increase in China
- Incidents very minor negative effect

**Environmental Capital**
- Climate change (CO2+ energy resource + VOC) 33%
- VOC health effects 27%
- Mineral Resources 35%

[Link to AkzoNobel 3D Profit and Loss Accounting.pdf](https://84e1202b204d21a1cb9b-0e1ab5244fd095dbeb138ed6f973369e.ssl.cf3.rackcdn.com/akzonobel_3d_profit_and_loss_accounting.pdf)
Can be used for

- Strategic decision making
- Identifying business risks and opportunities
- Stimulate innovation and cooperation with value chain partners around impacts to reduce the negative and strengthen existing positive externalities
- Various internal comparisons (benchmarking of sites, regions and value chains)
- Monitor progress and refine tracking of externalities

Limitations

- Very early stage of monetizing and impact measuring
- Not just within AkzoNobel, but as a society in general
- Work needed to fully digest and understand these results in the organization