Techno-legal content protection and structural substitutes

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The fundamental Problem: Copying and Exchange of content are facilitated through ICT

Non-rivalry: Digitization / Perfect copies
Non-excludability: Easy and cheap exchange

Source: Ünlü04
Consequences of Digital Piracy: „Stakeholder Perspective“

**Past:**
- Technical protection measures (TPM)
  - Encryption
  - Watermarking
  - Rights expression languages
- Legal (Information Law)
  - Contractual and statutory protection
- Structural
  - Alignment of business model

**Future:**
- Establishment of technological property rights
- Reduction of the need for technological protection
  - Revenue model
  - Product configuration
  - Value chain

Source: Ünlü04

Changing content protection strategies
Digital Rights Management Systems as the most effective solution?

- DRM pursues the objective of technically enforcing the economic and moral interests of content providers.
- By using a bundle of technical components, a secure and efficient use of digital content via all media is ensured and usage-dependent business models are made possible.

Source: Ünlü04

Logical architecture of Digital Rights Management Systems

Source: Ünlü04
The optimal level of content protection: “The access-usage-control-matrix”

The optimal level of technical content protection (1): Media Asset Value Maps

Source: Ünlü04
The optimal level of technical content protection (2):
Industrial Organization model

\[ \Pi_c^* = (p_1 + p_c) \Pi_c^* + (1 - p_1 - p_c) \Pi_c^* - K_c(p_1) - K_c(p_c) \]

Stage

1. O decides on level of technical protection
2. O (and P) set prices
3. Consumer decision

Supply

- Content
- Pirate

Demand \( U(\theta) \)
\[ \begin{align*}
0 & ; \text{No Buy} \\
\theta + \sigma D - P_n & ; \text{Buy O} \\
\theta + \sigma D - P_p & ; \text{Buy P}
\end{align*} \]

Source: Ünlü04

Basic Industrial Organisation model

Core results
- Optimal level of protection increases with higher valuation of media good
  - Example: Hollywood movies vs. generic novels
- Optimal level of protection increases with lower degradation
  - ERP software vs. music songs
Concept of Network Effects

CONCEPT

Direct Network Effects → Network effect goods

Indirect Network Effects → System goods

ORIGIN

Original Utility
- Utility that an economic good delivers to the consumer irrespective of how many homogeneous or complementary goods are used by other consumers (Singular product)

Derived Utility
- Utility that an economic good delivers to the consumer by using it in interaction with homogeneous or complementary goods of other consumers (Network effect product)

Model extension 1: Impact of network effects

Core results
- Optimal level of protection increases with increasing network effects (for a sufficient valuation)
- “Myth of profitable piracy” can not be confirmed
Model extension 2 / 3: Utility decline / Deliberate content degradation

<table>
<thead>
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<th>Protection level</th>
<th>Degradation factor</th>
<th>Profit</th>
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</tbody>
</table>

- Sustainable degradation does not add value
- Degradation measures are prohibitively costly
- Protective measures harm content providers
- Results in a lower level of content protection

Alignment of business model: Superdistribution of book content

- Superdistribution
- Metered-usage Billing
- Pay-per-use (Pay-per-Listen) (Pay-per-view)
- Usage Metering
- Superdistribution

Publisher

- Price of book
- Rights
  - Rendering: display on output device, print
  - Extent: indefinite

Book buyer

- Price of book minus X%
- Superdistribution

- Rights
  - Rendering: display on output device
  - Extent: indefinite

Source: Ünlü04
Conclusion

- "The important thing is to maximise the value of your intellectual property, not to protect it for the sake of protection" [ShVa99,97]
- Need for content providers to determine and implement the optimal level of content protection
- Valuation and Content degradation are main determinants of optimal level of content protection
- Network effects: "Myth of profitable piracy" can not be confirmed
- Content degradation measures are prohibitively costly
- The profits of content providers are reduced, when protective measures cause utility decline on the consumers side
- Additional positive revenue impact may result from an alignment of business model