Rule-based versus Principle-based Regulatory Compliance

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Setting: AEO Self-assessment

- Companies may become ‘Authorized Economic Operator’ (AEO) in the EU, when they are trustworthy to customs, and can demonstrate to be ‘in control’ of the safety and security of their supply chain.
- To apply, they perform a self-assessment, audited by customs.
- EU guidelines are ‘open norms’: hard to adopt and implement, and to audit.
Rule-based vs Principle-based Regulation

- Two kinds of regulations
  - Rule-based: "the speed limit is 120 km/h"
  - Principle-based: "drive responsibly when it is snowing"

- Relevance to IT ('compliance by design')
  - Principle-based norms need to be translated into specific rules before they can be implemented in an information system

- Can we explain observations in the regulatory process, by differences in reasoning with rules or principles?
  - Verheij et al (1998): no logical difference; only a matter of degree.
  - … but we can find dimensions to characterize rules and principles.

- Case study: customs regulations concerning safety
  - Compare AEO (EU, principle-based) with CTPAT (USA, rule-based)

Rules vs Principles, or a bit of both?

- E.g. in accounting: "... rule-based traditions of auditing became a convenient vehicle that perpetuated the unethical conduct of firms such as Enron and Arthur Andersen" (Satava et al 2006)

- So the US are moving towards more principle-based standards.

- But, over time, systems of rules tend become more principle-like through exceptions, and principle-based systems become more rule-like by the addition of best-practices and qualifications (jurisprudence)!

- “One reason why relatively younger standard setting regimes […] appear more principles-based is that they haven’t had as much time to accrete rules.” (Nelson 2003)

- “Every accounting standard will exist somewhere along a spectrum between rules and principles. The goal must be to seek the ‘sweet spot’ on that spectrum.” (DiPiazza et al 2008)
Characterizing Principles and Rules

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Typical Principles</th>
<th>Typical Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Temporal</td>
<td>ex post</td>
<td>ex ante</td>
</tr>
<tr>
<td>2. Conceptual</td>
<td>general / universal / abstract</td>
<td>specific / particular / concrete</td>
</tr>
<tr>
<td>3. Functional</td>
<td>large discretionary power</td>
<td>little discretionary power</td>
</tr>
<tr>
<td>4. Representation</td>
<td>declarative (what)</td>
<td>procedural (how)</td>
</tr>
<tr>
<td>5. Knowledge needed</td>
<td>quite a lot</td>
<td>relatively little</td>
</tr>
<tr>
<td>6. Exception handling</td>
<td>allow exceptions (defeasible)</td>
<td>all or nothing (strict)</td>
</tr>
<tr>
<td>7. Conflict resolution</td>
<td>weights (trade-off)</td>
<td>no conflicts possible</td>
</tr>
</tbody>
</table>

Case Study: Security Regulations in EU and US

- After 9/11, governments try to improve safety and security
- Note: safety measures crucially depend on the context
  - Example 1: height of fence
  - Example 2: computer parts or fertilizer
- Comparison:
  - AEO: generic EU guidelines
    benefits: reduced inspections in all of EU certificate, based on verification of self-assessment
  - C-TPAT: specific standards for different sectors
    benefits: reduced inspections, access to ‘FAST’ program certificate, based on inspection and security profile
## Selection of AEO principles and C-TPAT rules

<table>
<thead>
<tr>
<th>AEO – article 14 k -ii</th>
<th>C-TPAT – Security criteria for foreign manufacturers</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) appropriate access control measures are in place to prevent unauthorized access to shipping areas, loading docks and cargo areas;</td>
<td>Procedures for the issuance, removal and changing of access devices (e.g. keys, key cards, etc.) must be documented. Proper vendor ID and/or photo identification must be presented for documentation purposes upon arrival by all vendors. Alarm systems and video surveillance cameras should be utilized to monitor premises and prevent unauthorized access to cargo handling and storage areas.</td>
</tr>
<tr>
<td>(c) measures for the handling of goods include protection against the introduction, exchange or loss of any material and tampering with cargo units;</td>
<td>A high security seal must be affixed to all loaded containers and trailers bound for the U.S. All seals must meet or exceed the current PAS ISO 17712 standard for high security seals. A seven-point inspection process is recommended for all containers: Front wall, Left side, Right side, Floor, Ceiling/Roof, Inside/outside doors, Outside/Undercarriage. The cargo should be accurately described, and the weights, labels, marks and piece count indicated and verified. Private passenger vehicles should be prohibited from parking in or adjacent to cargo handling and storage areas.</td>
</tr>
<tr>
<td>(f) the applicant conducts, in so far as legislation permits, security screening on prospective employees working in security sensitive positions and carries out periodic background checks;</td>
<td>Application information, such as employment history and references must be verified prior to employment.</td>
</tr>
</tbody>
</table>

## Characterizing AEO and C-TPAT

<table>
<thead>
<tr>
<th>Dimension</th>
<th>AEO</th>
<th>C-TPAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Temporal</td>
<td>certainty ex post</td>
<td>certainty ex ante</td>
</tr>
<tr>
<td>2. Conceptual</td>
<td>relatively more general</td>
<td>relatively more specific</td>
</tr>
<tr>
<td>3. Functional</td>
<td>much (company), much (auditor)</td>
<td>little (company), little (auditor)</td>
</tr>
<tr>
<td>4. Representation</td>
<td>declarative</td>
<td>both declarative and procedural</td>
</tr>
<tr>
<td>5. Knowledge needed</td>
<td>context expertise, normative knowledge</td>
<td>context expertise</td>
</tr>
<tr>
<td>6. Exception handling</td>
<td>built into ‘understanding the business’</td>
<td>no, only by consulting US Customs and Border Patrol</td>
</tr>
<tr>
<td>7. Conflict resolution</td>
<td>risk assessment</td>
<td>no</td>
</tr>
</tbody>
</table>

Principles AEO C-TPAT Rules
Reasoning with Principles and Rules

- Claim: no difference in logical structure.
- “If the condition of a rule is satisfied, the rule is applied and its conclusion follows directly. [...] In contrast with a rule, a principle only gives rise to a reason for its conclusion if it applies. Moreover, there can be other applying principles that give rise to both reasons for and reasons against the same conclusion. A conclusion then only follows by weighing the pros and cons.”(p2)
- But, a rule also provides a reason for its conclusion.
- So, for rules or principles in isolation the difference disappears. “The observed differences between rules and principles are the result of different types of relations that they have with other rules and principles.“
- Moreover, for established rules, potential conflicts have already been solved; a rule ‘replaces’ the underlying principles.

What is meant by reasoning?

<table>
<thead>
<tr>
<th>Verheij et al (1998)</th>
<th>AEO case study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Case</strong></td>
<td></td>
</tr>
<tr>
<td>Sale of a house should not terminate rental agreements</td>
<td>Be ‘in control’ of safety and security in supply chain</td>
</tr>
<tr>
<td>Principle pro: protect inhabitants against eviction</td>
<td>Principles pro: safety, social responsibility</td>
</tr>
<tr>
<td>Principle con: contract only binds contractual parties</td>
<td>Principle con: profitability</td>
</tr>
<tr>
<td>Parliament: pro &gt; con</td>
<td>depends on case</td>
</tr>
<tr>
<td><strong>Domain</strong></td>
<td></td>
</tr>
<tr>
<td>contract law</td>
<td>security in international trade</td>
</tr>
<tr>
<td>=&gt; settled</td>
<td>=&gt; open; context dependent</td>
</tr>
<tr>
<td><strong>Task</strong></td>
<td></td>
</tr>
<tr>
<td>adjudication</td>
<td>adoption, implementation, auditing</td>
</tr>
<tr>
<td><strong>Roles</strong></td>
<td></td>
</tr>
<tr>
<td>judge</td>
<td>subject, consultant, auditor</td>
</tr>
</tbody>
</table>
Reason-based Logic (Verheij et al 1998)

- **fact**: formula of predicate logic
- **rule or principle**: \( \text{Rule}(\text{condition}, \text{conclusion}) \)
- **reason**: \( \text{Reason}(\text{fact}, \text{state of affairs}) \)
- **validity**: \( \text{Valid}(\text{Rule}(\text{condition}, \text{conclusion})) \)
- **exclusion**: \( \text{Excluded}(\text{Rule}(\text{condition}, \text{conclusion}), \text{fact}, \text{state of affairs}) \)
- **applicable**: \( \text{Applicable}(\text{Rule}(\text{condition}, \text{conclusion}), \text{fact}, \text{state of affairs}) \)
- **applies**: \( \text{Applies}(\text{Rule}(\text{condition}, \text{conclusion}), \text{fact}, \text{state of affairs}) \)
- **weighing**: \( \text{Outweighs}(\text{reasons pro}, \text{reasons con}, \text{state of affairs}) \)

\( \text{Applicable}(\text{rule}(c1,c2),\text{f,sa}) \) is true iff \( \text{Reason}(\text{f, applies}(\text{rule}(c1,c2),\text{f,sa})) \) is true.

If \( \text{Applicable}(\text{rule}(c1,c2),\text{f,sa}) \) is true, then \( \text{f is true} \)

**NB 1.** applicable: there are reasons for, but also reasons for not applying it.

**NB 2.** applies: a rule applies exclusively (i.e. \( \text{fact} \) is unique)

Reasoning in the case (AEO)

- **principle**: Require (c) measures for the handling of goods include protection against the introduction, exchange or loss of any material and tampering with cargo units.
- **context**: petrochemical company, explosive goods, low value of goods per unit, automated processes, transport in high pressure tanks, transport by road, ...
- **priorities**: Security is important, but costs per product must be kept low.
- **reasons pro and con**:
  1. If tanks are under pressure, introduction, exchange or loss of materials is impossible.
     - **conclude**: For high pressure tanks, high security seals are not needed.
  2. Explosive goods must be well protected.
     - Automated processes reduce possibilities to tamper with the goods.
     - Inside PCC premises, tanks are well protected.
     - Outside PCC premises, an electronic tracking device can be installed.
     - An electronic tracking device is expensive.
     - Outside PCC premises, the truck driver is responsible.
  - **conclude**: Do not invest in electronic tracking device. Use only trusted transporters.
Reasoning in the case (C-TPAT)

- **rule**: A high security seal must be affixed to all loaded containers and trailers bound for the US. All seals must meet or exceed the current PAS ISO 17712 standard.
- **context**: PCC is sending shipment TX4312 to customers in Texas. Texas is in the US.
- **conclude**: A high security seal must be affixed to shipment TX4312, which meets or exceeds PAS ISO 17712.

Conclusions

- **Debate: principle-based versus rule-based regulation**
  - Deregulation, adaptability, robustness (intrinsic), ethics (truth, social) vs ease of implementation and certainty about compliance (level playing field).
- **Principles and rules form a continuum**
  - dimensions to characterize a regulatory system
- **Case study: safety and security in international trade**
  - AEO is principle-based, C-TPAT is largely rule-based
- **Reasoning: applying rules vs weighing principles**
  - Technically, there is indeed no difference in logical structure,
  - large differences in adoption and implementation effort for non-established domains
  - The method for weighing principles still needs to be ‘filled in’
Future research

- Which factors influence the social process of norm emergence?
  - Form of norm communication in ‘regulatory dialogue’?
  - Role of the subject, auditor, consultant and branch organization in disseminating knowledge and experiences.
- How to fill the ‘Outweighs’ predicate?
  - Risk analysis: residual risk = likelihood x impact, after measures (costs!)
    Analogy between:
    - Practical reasoning: deciding what actions to take in order to achieve goals, and thereby promote social values
    - Compliance reasoning: deciding what control measures to implement in order to meet control objectives, and thereby promote corporate values.

Value-based argumentation of compliance

Values

- V: Social responsibility
- V: Empowered people
- V: Superior performance

Goals

- G: Ensure a safe work environment
- G: Be ‘in control’ of safety and security
- G: Take responsibility and be accountable
- G: Achieve and sustain cost leadership

Circumstances

- C: Only authorized personnel may access tanks in assigned areas
- C: Controls are designed, implemented and operational
- C: Only authorized persons and vehicles can enter and stay at the premises
- C: The unauthorized opening or loss of high pressure tanks during road transport is prevented
- C: Control costs are kept within budget

Actions

- A: Train personnel
- A: Automate processes
- A: Codify controls
- A: Implement controls
- A: Verify visitors
- A: Administer visitors
- A: Restrict access to areas
- A: Use access cards for personnel
- A: Use trusted transporters
- A: Secure high pressure tanks
- A: Monitor transport
- A: Provide communication
- A: Use safe transport routes
- A: Monitor transport
- A: Provide communication
- A: Use trusted transporters