

# Automated Compliance Checking

## Expert Interview

Parallel drafting of building regulations as  
human and machine-readable rules

Interviewers: Stefan Fuchs and Judith Fauth



THE UNIVERSITY OF  
**AUCKLAND**  
Te Whare Wānanga o Tāmaki Makaurau  
NEW ZEALAND

# Formal representation

```
<lrml:PrescriptiveStatement key="ps_tcpc_8_1_1_a_x_E">
  <ruleml:Rule key="tcpc_8_1_1_a_x_E">
    <lrml:Paraphrase>The supplier must implement, operate and comply with a
      Complaint handling process that is transparent, including E. prohibiting
      a Supplier from canceling a Consumer's Telecommunications Service only
      because, being unable to Resolve a Complaint with their Supplier, that
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    </lrml:Paraphrase>
    <lrml:hasStrength>
      <lrml:DefeasibleStrength
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      </lrml:hasStrength>
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      <ruleml:And>
        <ruleml:Neg>
          <ruleml:Atom>
            <ruleml:Rel>resolution</ruleml:Rel>
          </ruleml:Atom>
        </ruleml:Neg>
        <ruleml:Atom>
          <ruleml:Rel>complaint</ruleml:Rel>
        </ruleml:Atom>
        <ruleml:Atom>
          <ruleml:Rel>external dispute resolution</ruleml:Rel>
        </ruleml:Atom>
      </ruleml:And>
    </ruleml:if>
    <ruleml:then>
      <lrml:Obligation iri="http://test.org/deontic#OM">
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          <ruleml:Atom>
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*Illustration from Governatori et al. (2016)*

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# Formal representation

- Are you already conducting any step towards formal representations?
  - Organisation of codes and standards
  - Semantics of requirements



# Example 1: Korea

```
Check (BA_64_1) {  
  IF (getBuildingStoriesCount () >= 6  
      AND getGrossFloorArea () >= 2000)  
    THEN isExist (Elevator) = TRUE  
  ENDIF  
}
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# Example 1: Korea

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  IF (getBuildingStoriesCount () >= 6  
      AND getGrossFloorArea () >= 2000)  
    THEN isExist (Elevator) = TRUE  
  ENDIF  
}
```

*[Enforcement Decree of Building Act, article 64]*

*A project owner of a building with six or more floors and a total floor area of 2,000 square meters or more shall have an elevator installed therein.*

*Example from Lee et al. (2016)*

# Example 2: US

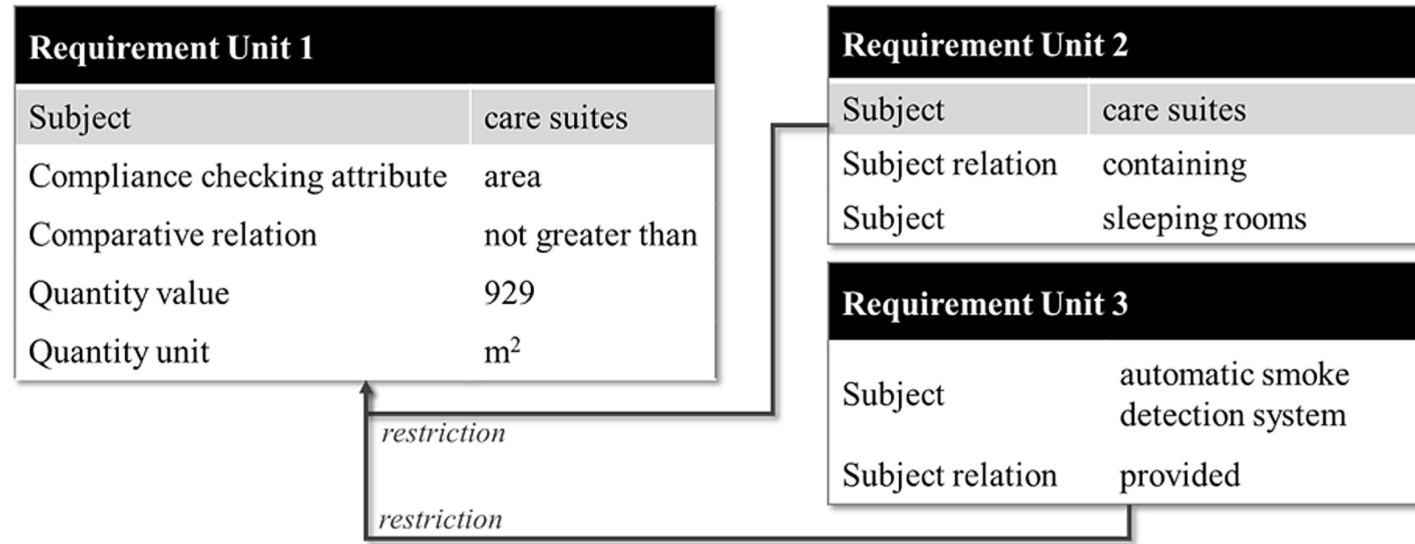
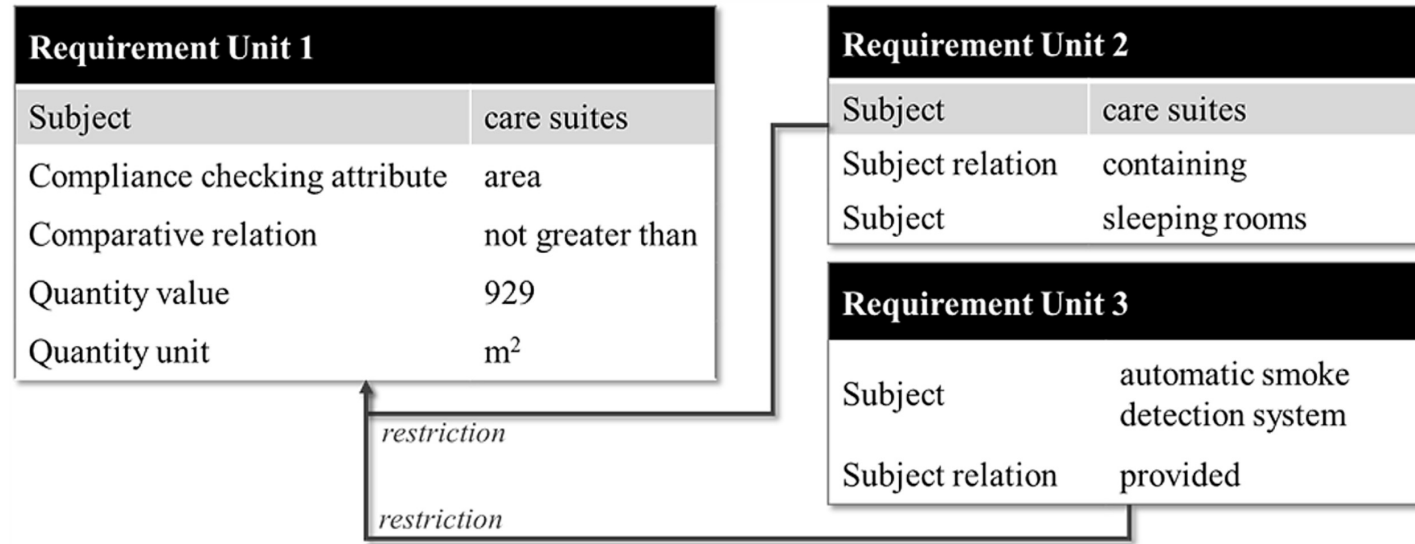


Illustration from Zhang and El-Gohary (2022)

# Example 3: US



*Care suites containing sleeping rooms shall be not greater than 929 m<sup>2</sup> in area where an automatic smoke detection system is provided.*



# Reflection

- Please reflect on the previously seen examples.
  - Which of the representations would you prefer and why?

# References

- Governatori, G., Hashmi, M., Lam, H. P., Villata, S., & Palmirani, M. (2016). Semantic business process regulatory compliance checking using LegalRuleML. In *European Knowledge Acquisition Workshop* (pp. 746-761). Cham: Springer International Publishing.
- Lee, H., Lee, J. K., Park, S., and Kim, I. (2016). Translating building legislation into a computer-executable format for evaluating building permit requirements. *Automation in Construction*, 71:49–61.
- Zhang, R. and El-Gohary, N. (2022). Natural language generation and deep learning for intelligent building codes. *Advanced Engineering Informatics*, 52:101557.