C1 WPS

TU Delft Delft University of Technology

Software Improvement Group

A Cognitive Model for Software Architecture Complexity

Eric Bouwers, Carola Lilienthal, Joost Visser and Arie van Deursen

ICPC 2010, July 1

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The organizational structure of a software system including components, connections, constraints, and rationale.

P. Kogut and P. Clements, "The software architecture renaissance,"
The Software Engineering Institute, Carnegie Mellon University, vol. 3, pp. 11–18, 1994

Evaluating Software Architectures

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A Light-weight Sanity Check for Implemented Architectures

Eric Bouwers, Arie van Deursen. IEEE Software July/August 2010 (vol. 27 no. 4), pp. 44-50

Basis of LiSCIA: 15 system attributes

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- Abstraction
- Layering
- Logic in Database
- Module Inconsistency
- Module Size
- Source Grouping
- Technology Combination
- Textual Duplication
- Functional Duplication
- Libraries / Frameworks Usage
- Module Dependencies
- Module Functionality
- Relation Documentation and Implementation
- Technology Age
- Technology Usage

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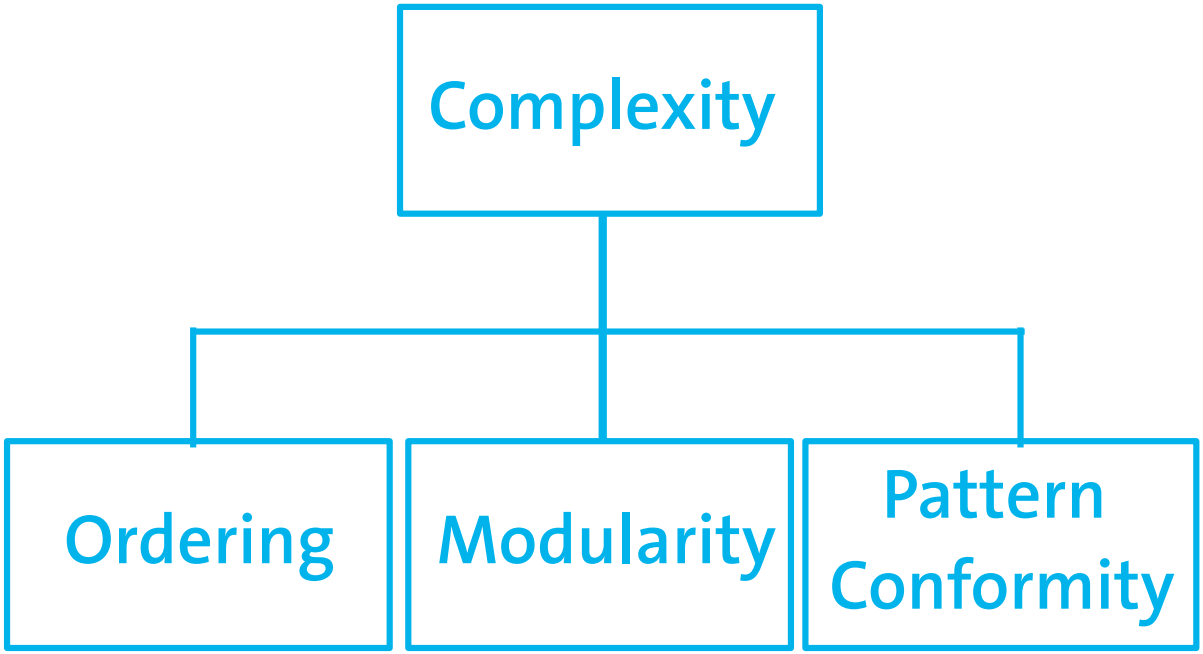

Practice versus Theory

Software Improvement Group

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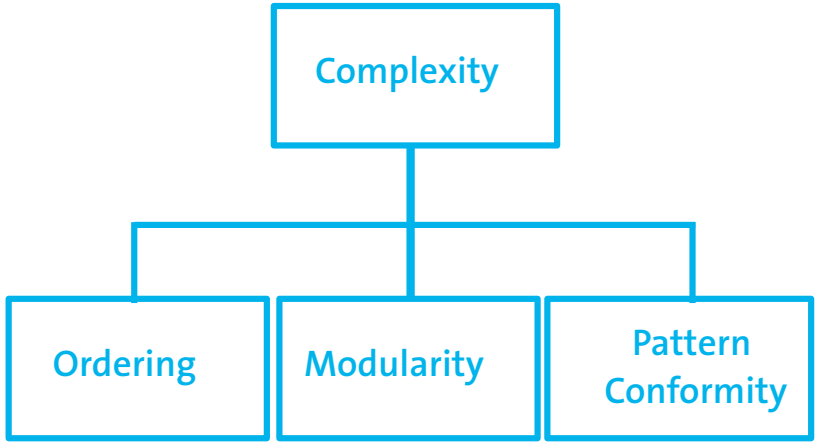

A First Inventory

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	Ordering	Modularity	Pattern conformity
Abstraction			X
Functional Duplication			
Layering	X		
Libraries / Frameworks			
Logic in Database			
Module Dependencies	X	X	
Module Functionality		X	
Module Inconsistency		X	X
Module Size		X	
Relation Doc. / Impl.			X
Source Grouping			X
Technology Age			
Technology Usage			
Technology Combination			
Textual Duplication			

Extending the model

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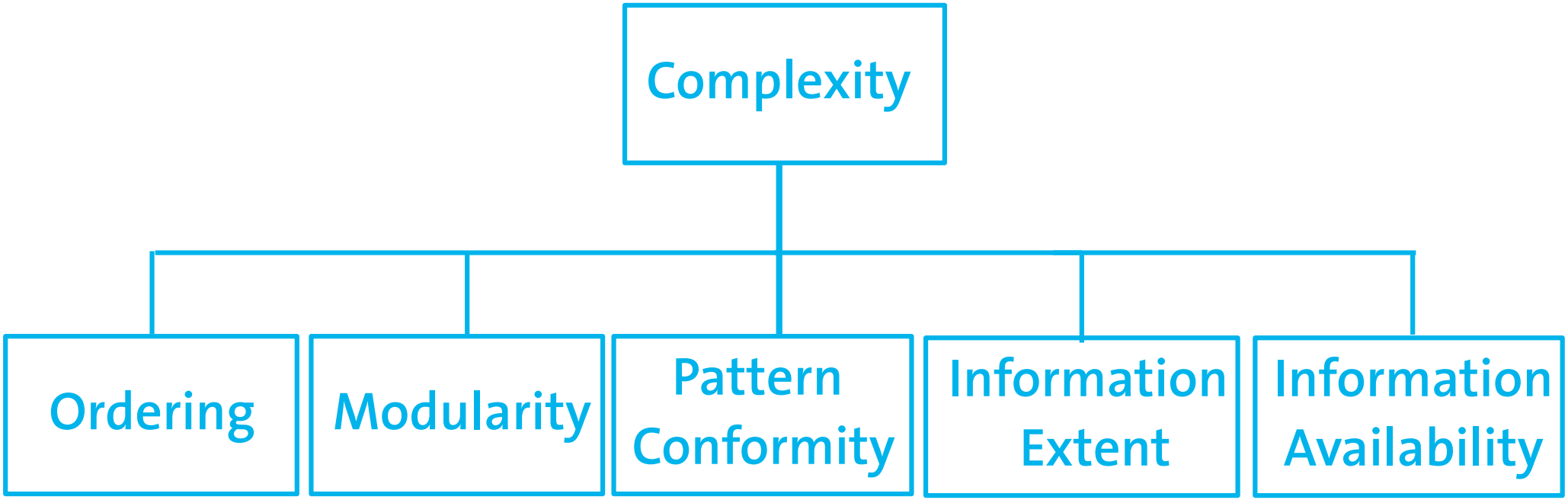

The complete model

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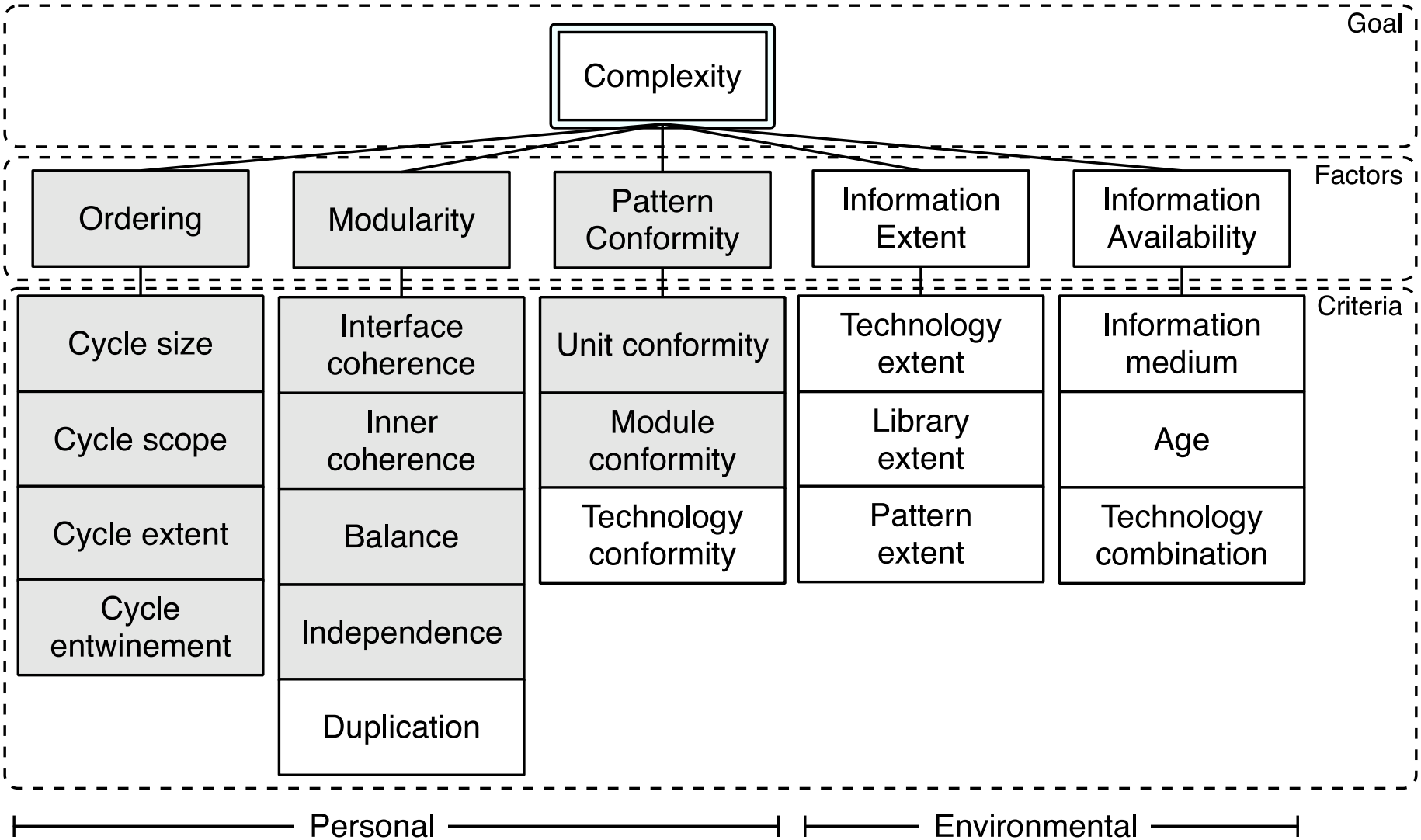

The result

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	Ordering	Modularity	Pattern conformity	Information extent	Information availability
Abstraction			X		
Functional Duplication		X			
Layering	X				
Libraries / Frameworks				X	
Logic in Database				X	
Module Dependencies	X	X			
Module Functionality		X			
Module Inconsistency		X	X		
Module Size		X			
Relation Doc. / Impl.			X		
Source Grouping			X		
Technology Age					X
Technology Usage			X		
Technology Combination					X
Textual Duplication		X			

Future work

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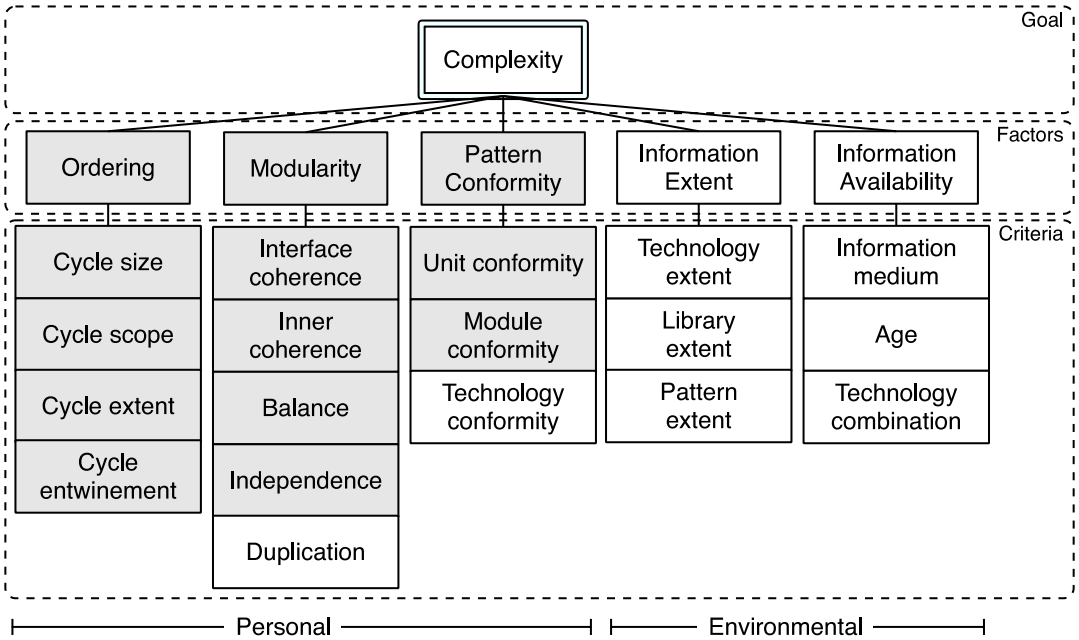

- apply the model in case studies to validate the complete model
- develop metrics to support the evaluation of the criteria.

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