Tunnel similar modeling notation and spherical viewpoint

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Annotation

The article proposes a spherical model of perception, groups and levels of complexity, notation for modeling abstractness, complexity.

Keywords: notation of tunnel similar modeling, complexity, cycle.

Introduction

Currently, there is an active process of creating notations for computer modeling. Most notations offer flat images for models. There are several cyclical approaches in the world: the theory of functional systems [https://en.wikipedia.org/wiki/Theory_of_functional_systems], the Deming cycle [https://en.wikipedia.org/wiki/PDCA], the OODA loop [https://en.wikipedia.org/wiki/OODA_loop]. Also known about the division of the domain into levels of complexity and types of abstraction.

To construct a notation, it is proposed to combine the approach of Descartes' dualism, the classification of complexity, cycles. Classification of types of resources by levels of complexity is proposed. Types of resources correspond to the columns of the ontology of the enterprise Zachman [https://en.wikipedia.org/wiki/Zachman_Framework].

Legend for difficulty levels

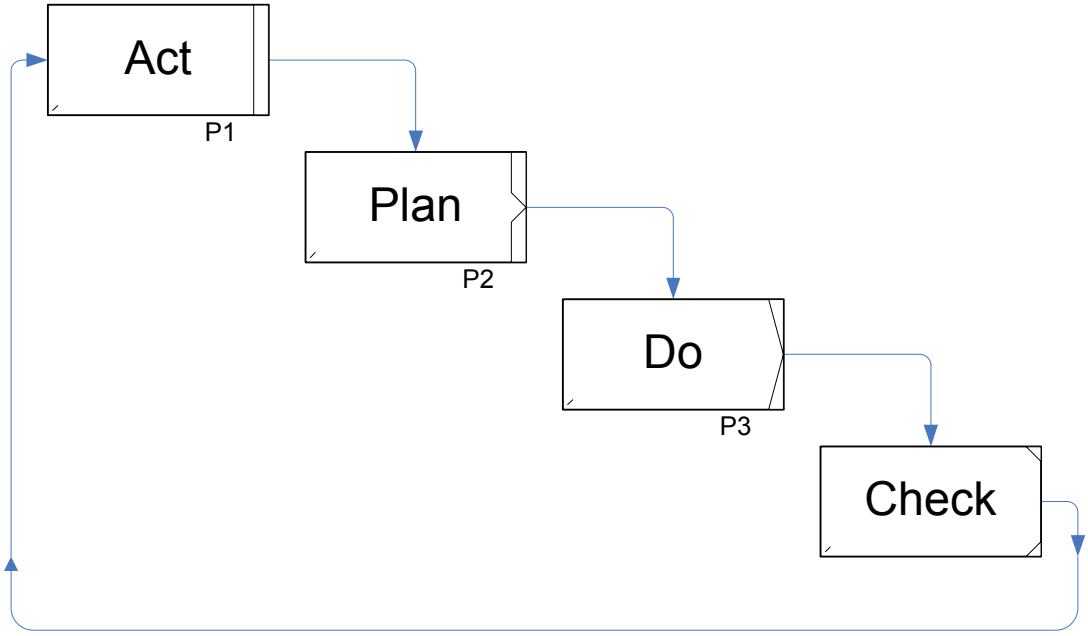
It is assumed that the complication goes in the form of a sigmoid chain. Each sigmoid consists of three main periods: preparation, development, stabilization, followed by a conservation phase. In the period of preparation, chaotic stimulation occurs. In the period of development, the complication acquires a positive feedback. In the period of stabilization negative feedback starts to act.

Each sigmoid forms a group of complexity. Analogues of groups can be considered types of complexity in the diffusion of innovation. We can assume the presence of the following groups:
- chaotic
- fractal
- energy
- information
- systems
- processes
- synergetics
- bureaucracy
- ecology
- cosmic

For middle groups, we designate pairs of triangles or segments of a circle on the left side of the rectangle. To indicate periods, we suggest painting the figures in pairs in accordance with the two-bit notation: 00, 01, 10 [http://itue.ru/?p=1603].

Symbols for phases

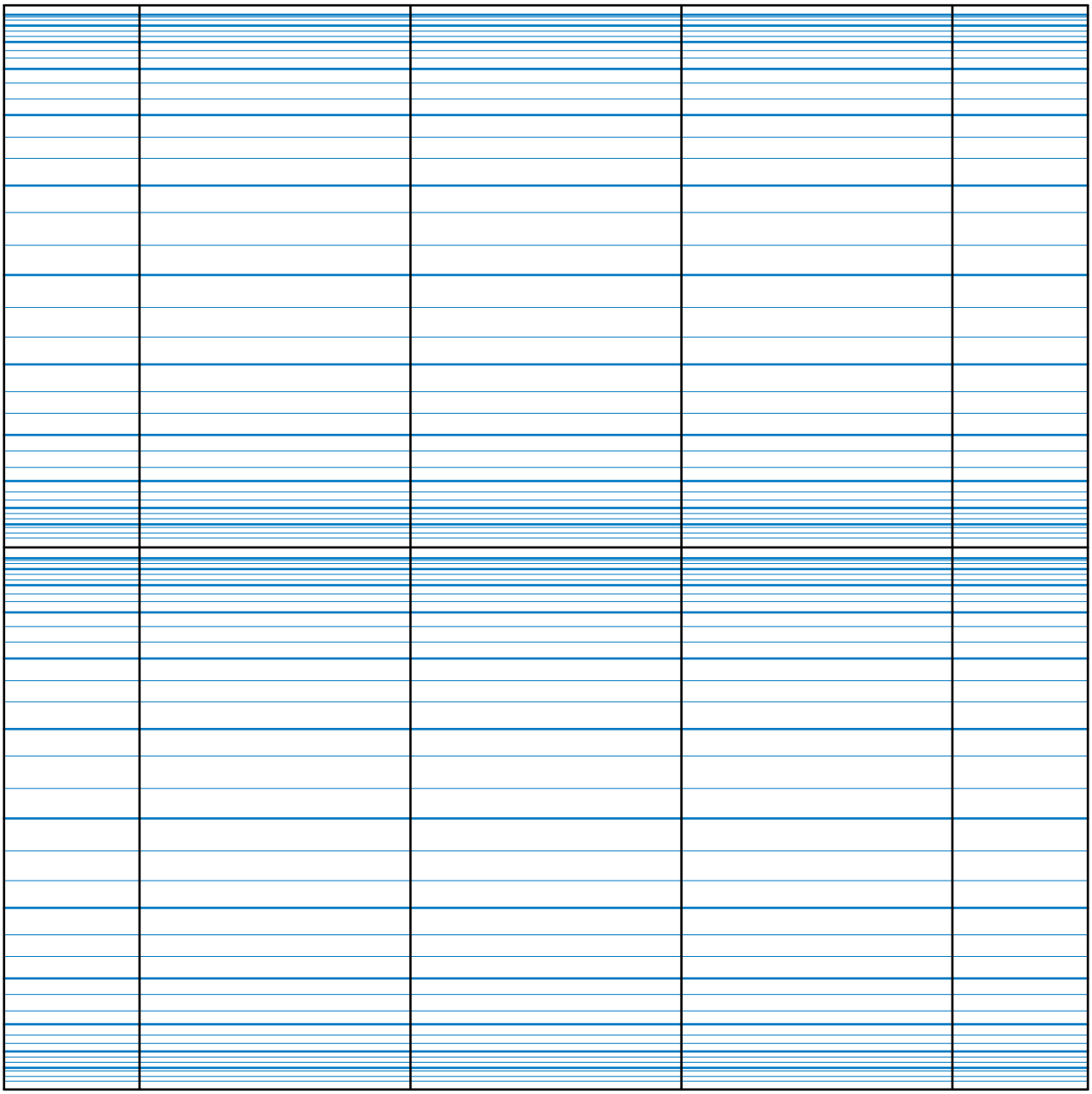
Each activity can be divided into 4 phases. For the phases, the PDCA cycle designations are used. For each phase, you can use the symbols on the right side of the rectangle [https://habrahabr.ru/post/259291/].



Pic. 1 Legend of the phases of the Deming cycle.

Spherical Model

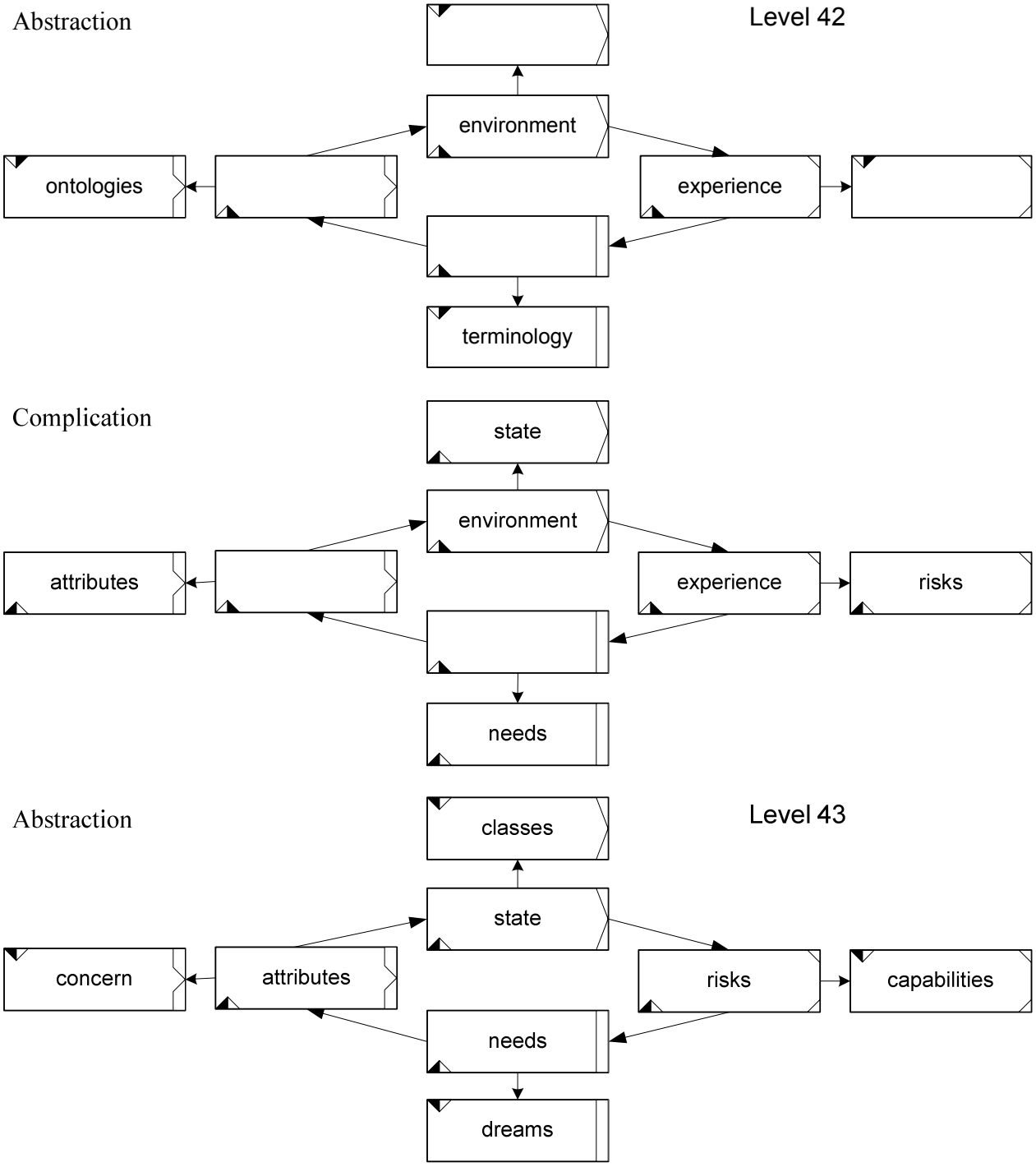
In accordance with the theorem proved by Perelman, any connections can be represented on a sphere. For the sphere we introduce the abstractness, increasing from below upwards. The complexity increases from the poles to the equator. Phases are placed along the equator. Thus, we will get a sphere on which to place the modeling elements. You can get a map of the sphere using the Mercator projection. For our purposes we use two pseudospheres formed by rotation of hyperbolas [https://en.wikipedia.org/wiki/Pseudosphere]. The upper branch corresponds to the abstract, the lower branch corresponds to the material. Dualism is revealed in the book L.E. Balashov, How We Think [http://philosophystorm.org/files/Balashov.Kak-mi-dumaem-2.pdf]

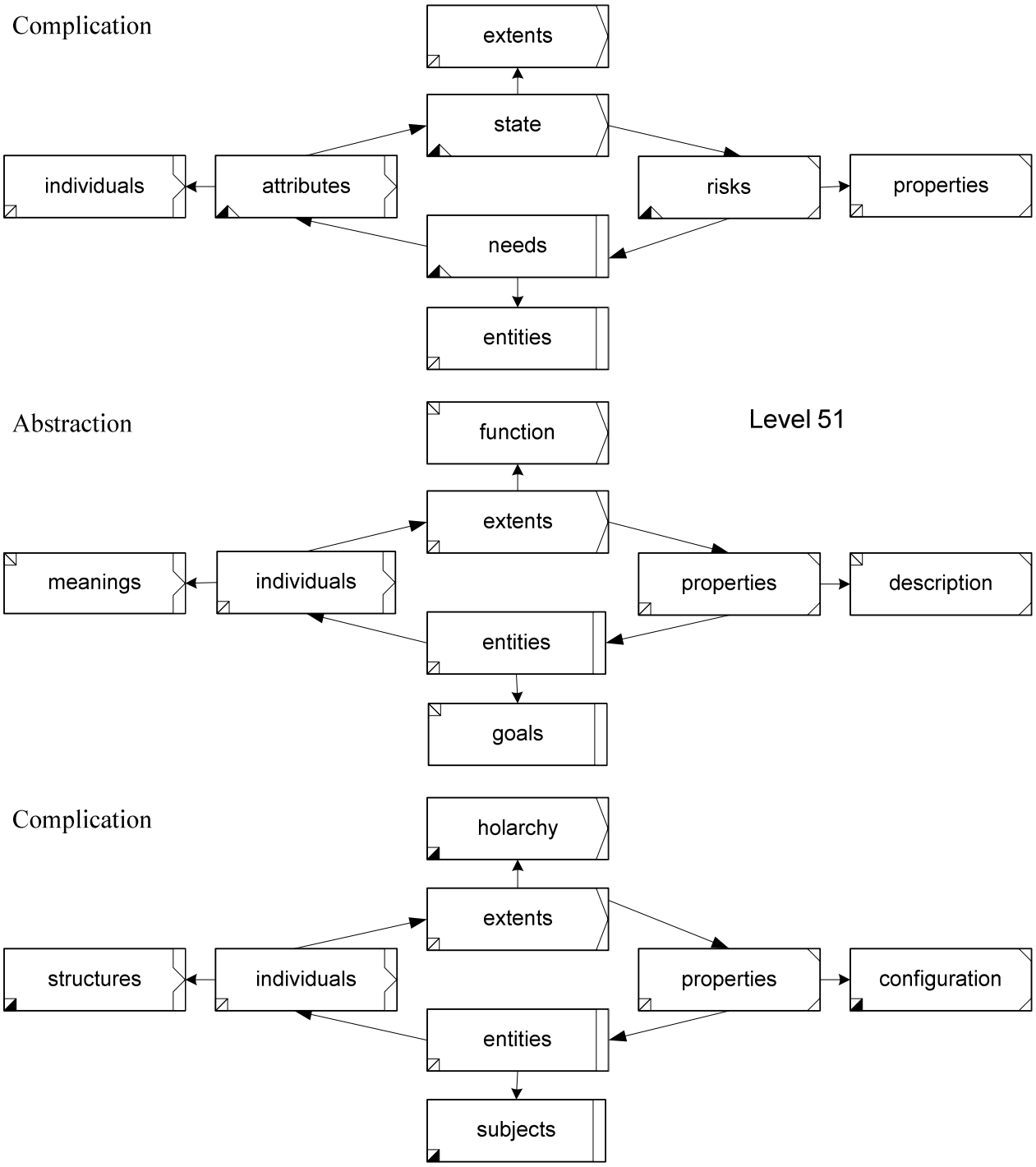


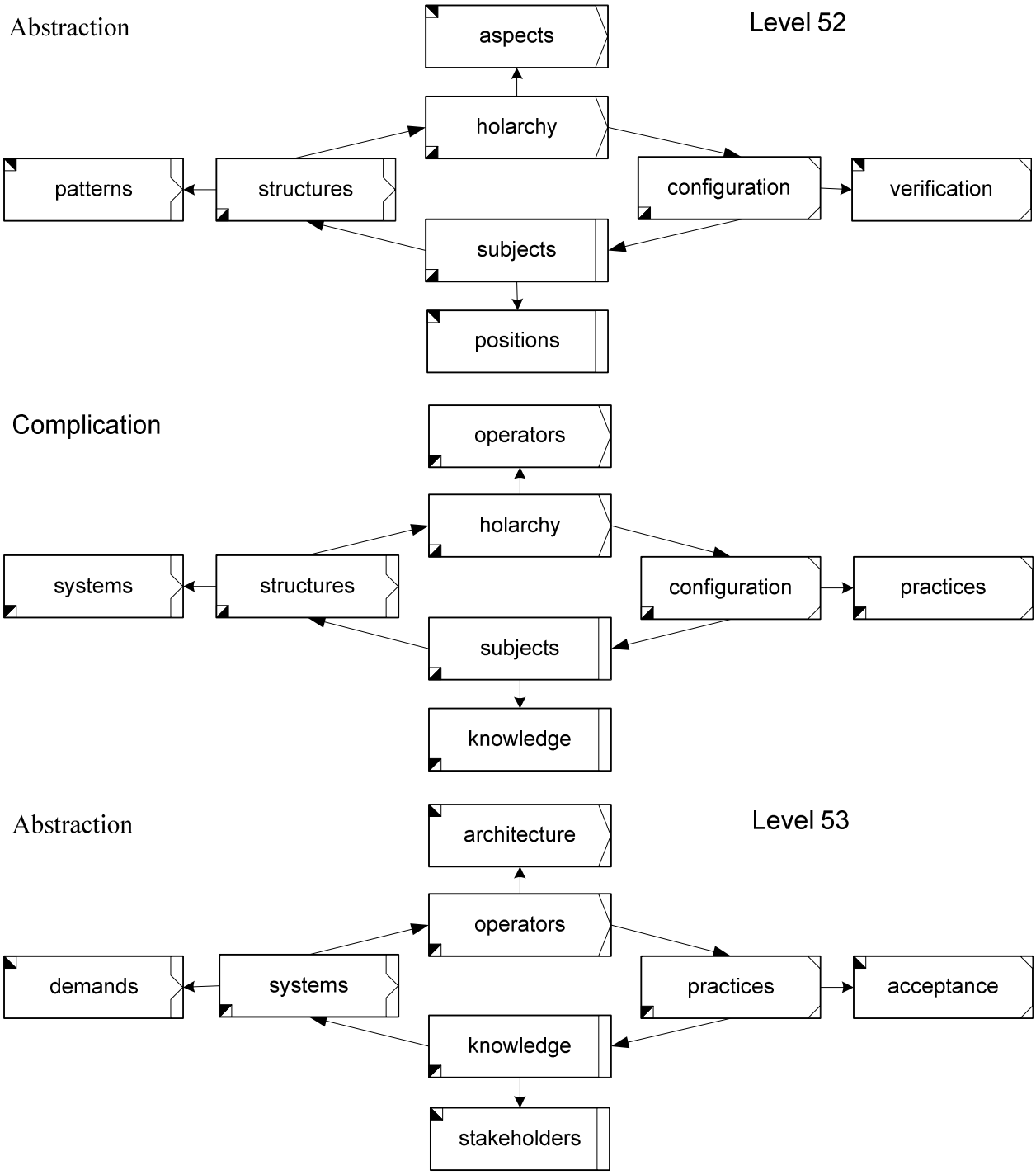
Pic. 2 A spherical image for the hyperbolic coordinates

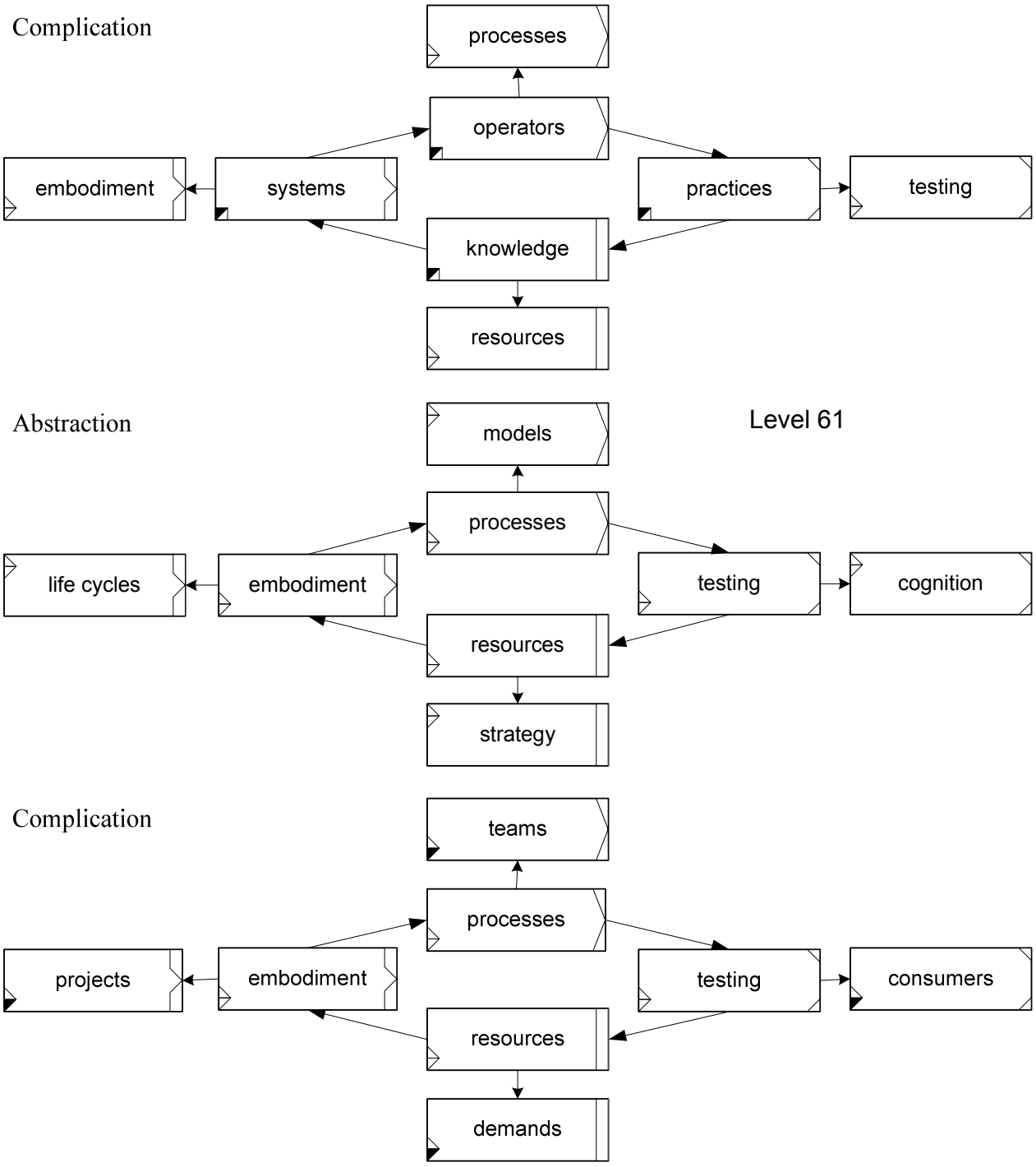
Levels of thinking

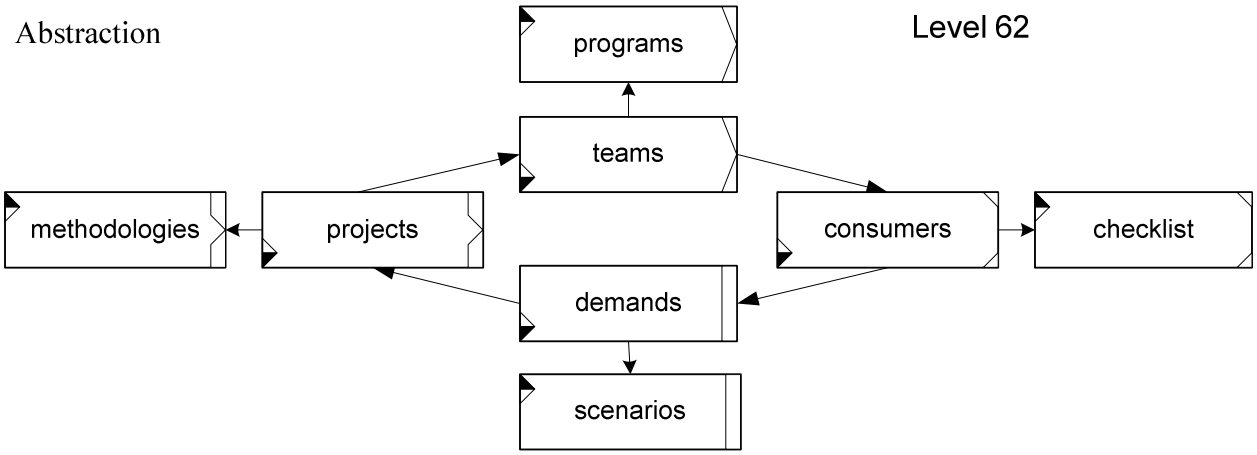
Below is the content for the levels.

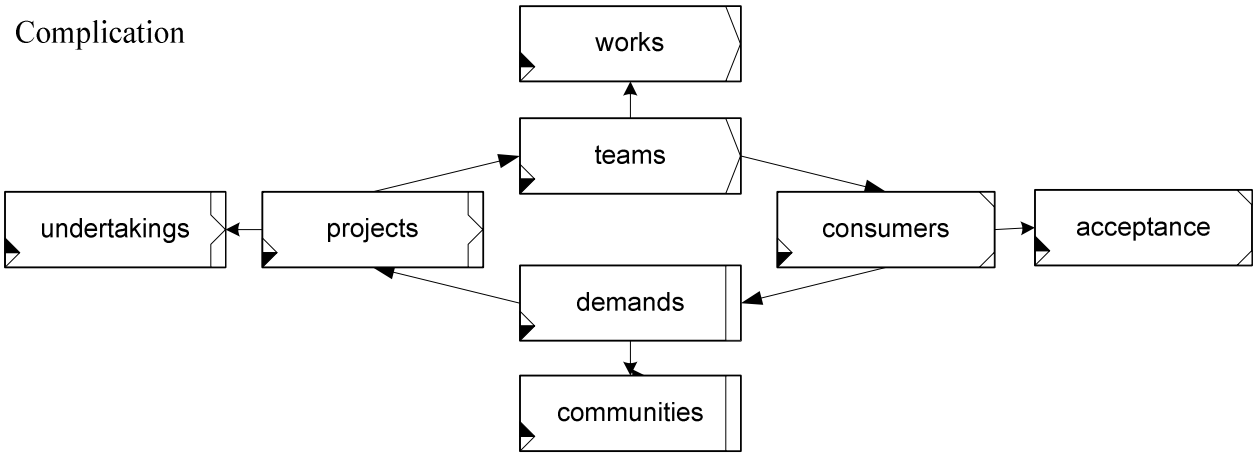

Abstraction
Level 42
environment
ontologies
experience
terminology
Complication
state
environment
attributes
experience
risks
needs
Abstraction
Level 43
classes
state
concern
attributes
risks
capabilities
needs
dreams

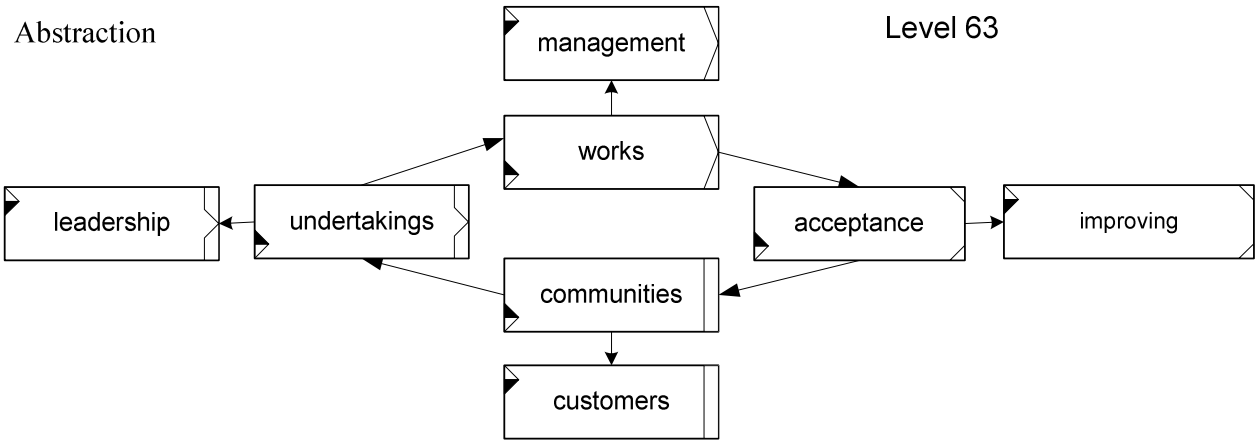

Complication
extents
state
individuals
attributes
risks
properties
needs
entities
Abstraction
Level 51
function
extents
meanings
individuals
properties
description
entities
goals
Complication
holarchy
extents
structures
individuals
properties
configuration
entities
subjects

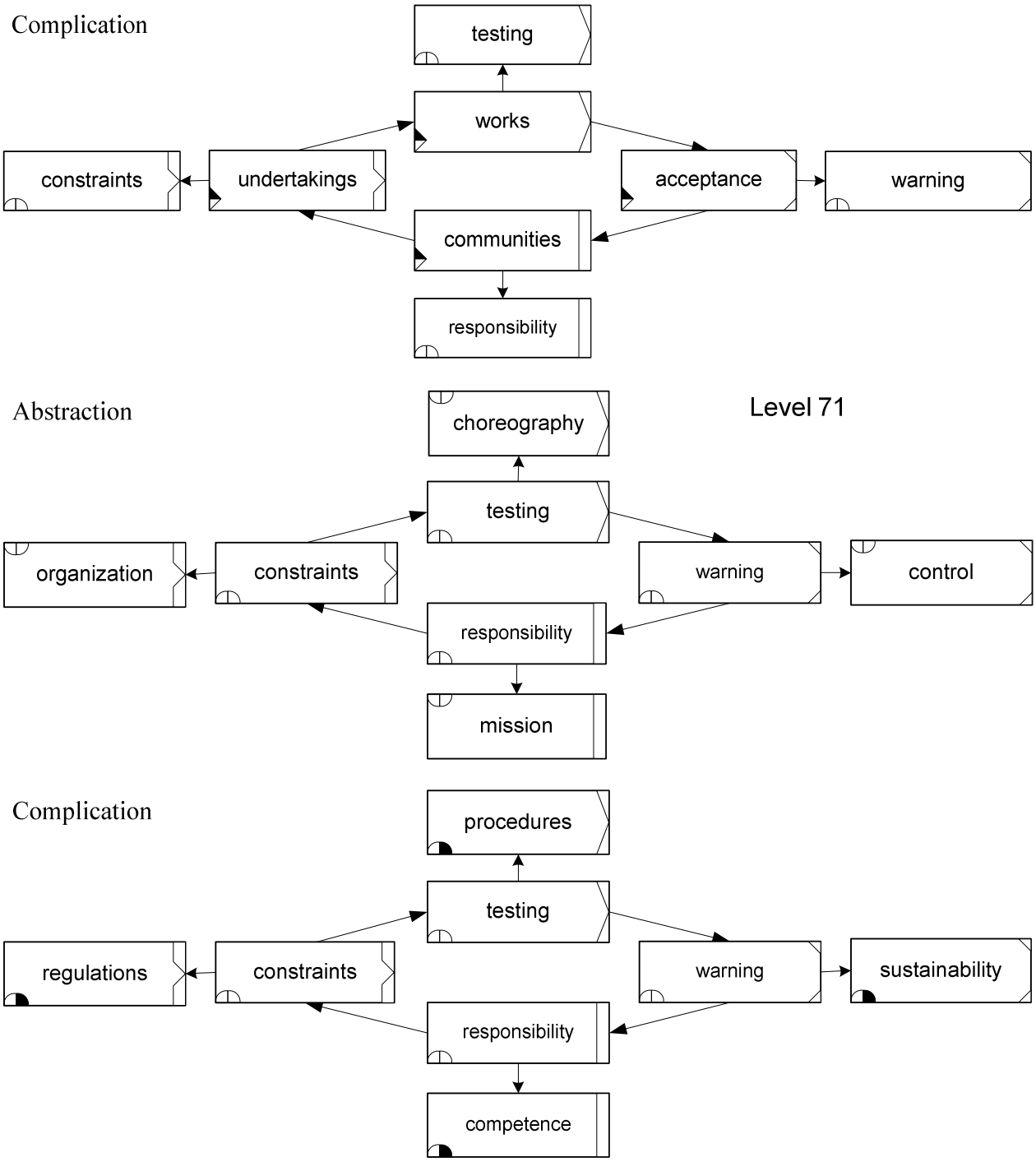

Abstraction
Level 52
aspects
holarchy
patterns
structures
configuration
verification
subjects
positions
Complication
operators
holarchy
systems
structures
configuration
practices
subjects
knowledge
Abstraction
Level 53
architecture
operators
demands
systems
practices
acceptance
knowledge
stakeholders

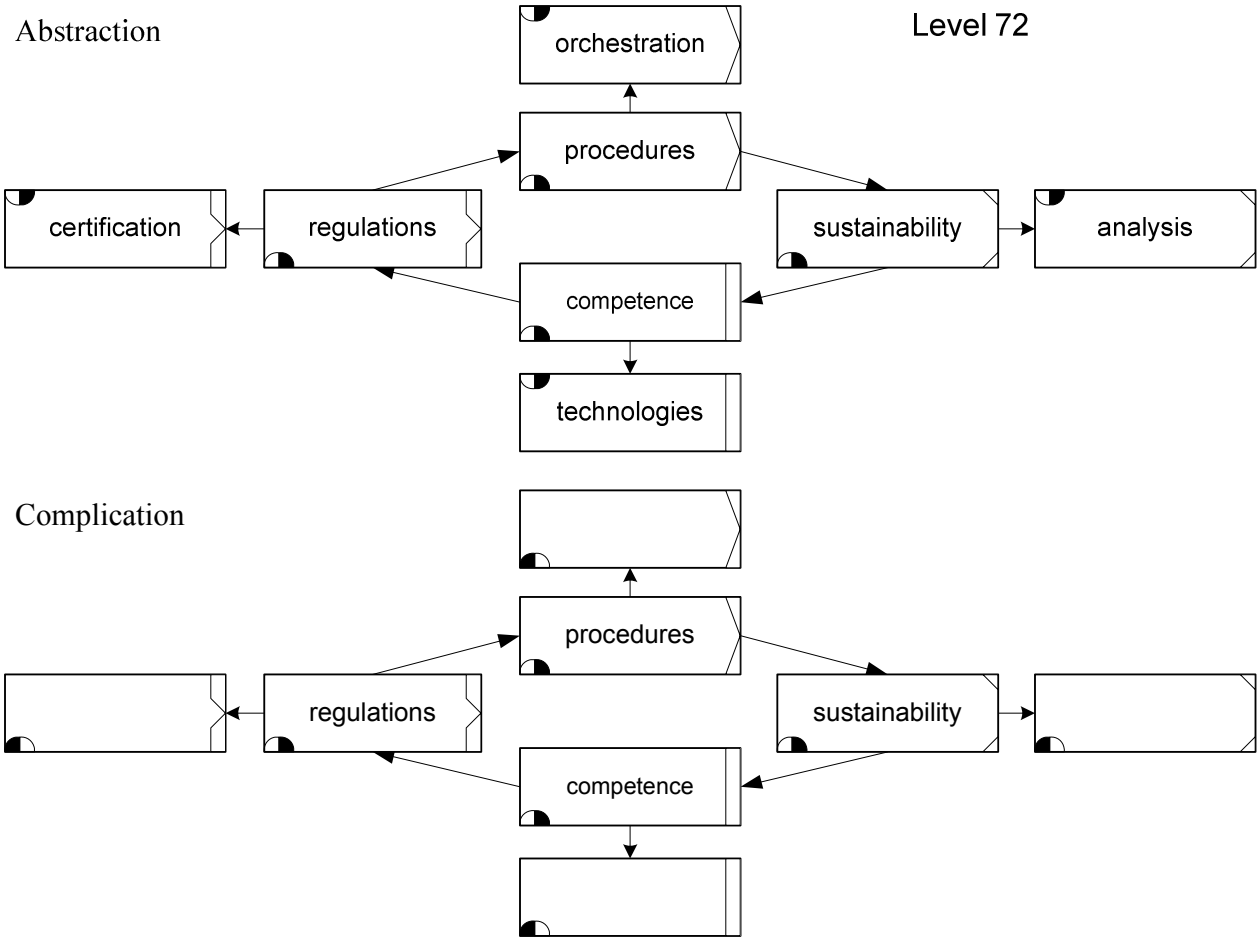

Complication
processes
operators
embodiment
systems
practices
testing
knowledge
resources
Abstraction
Level 61
models
processes
life cycles
embodiment
testing
cognition
resources
strategy
Complication
teams
processes
projects
embodiment
testing
consumers
resources
demands


Abstraction
Level 62
programs
teams
methodologies
projects
consumers
checklist
demands
scenarios


Complication
works
teams
undertakings
projects
consumers
acceptance
demands
communities


Abstraction
Level 63
management
works
leadership
undertakings
acceptance
improving
communities
customers


Complication
testing
works
constraints
undertakings
acceptance
warning
communities
responsibility
Abstraction
Level 71
choreography
testing
organization
constraints
warning
control
responsibility
mission
Complication
procedures
testing
regulations
constraints
warning
sustainability
responsibility
competence



Types of algorithms for artificial intelligence

For each complexity group, you can align the algorithm from the book [Domingos, Pedro (2015). The Master Algorithm: How machine learning is reshaping how we live]:
probabilistic conclusion (Bayes) - chaotic
genetic search (evolution) - fractal
optimization with constraints (analogies) - energy
reverse deduction (symbolists) - information
gradient descent (connectionists) - static
probabilistic conclusion (Bayes) - dynamic (processes)
genetic search (evolution) - synergistic (market)
optimization with limitations (analogies) - bureaucratic (regulations)
reverse deduction (symbolists) - ecological
gradient descent (connectivity) - cosmic.

The proposed series is an illustration. To verify compliance, research is required.

Conclusion

The notation for modeling of the enterprise is offered. The notation for different elements is proposed. The concepts of groups and periods of complexity, phases of activity are introduced. Spherical coordinates are introduced to classify the terms of the domain.