Domain Specific Languages for the Model Driven Organization

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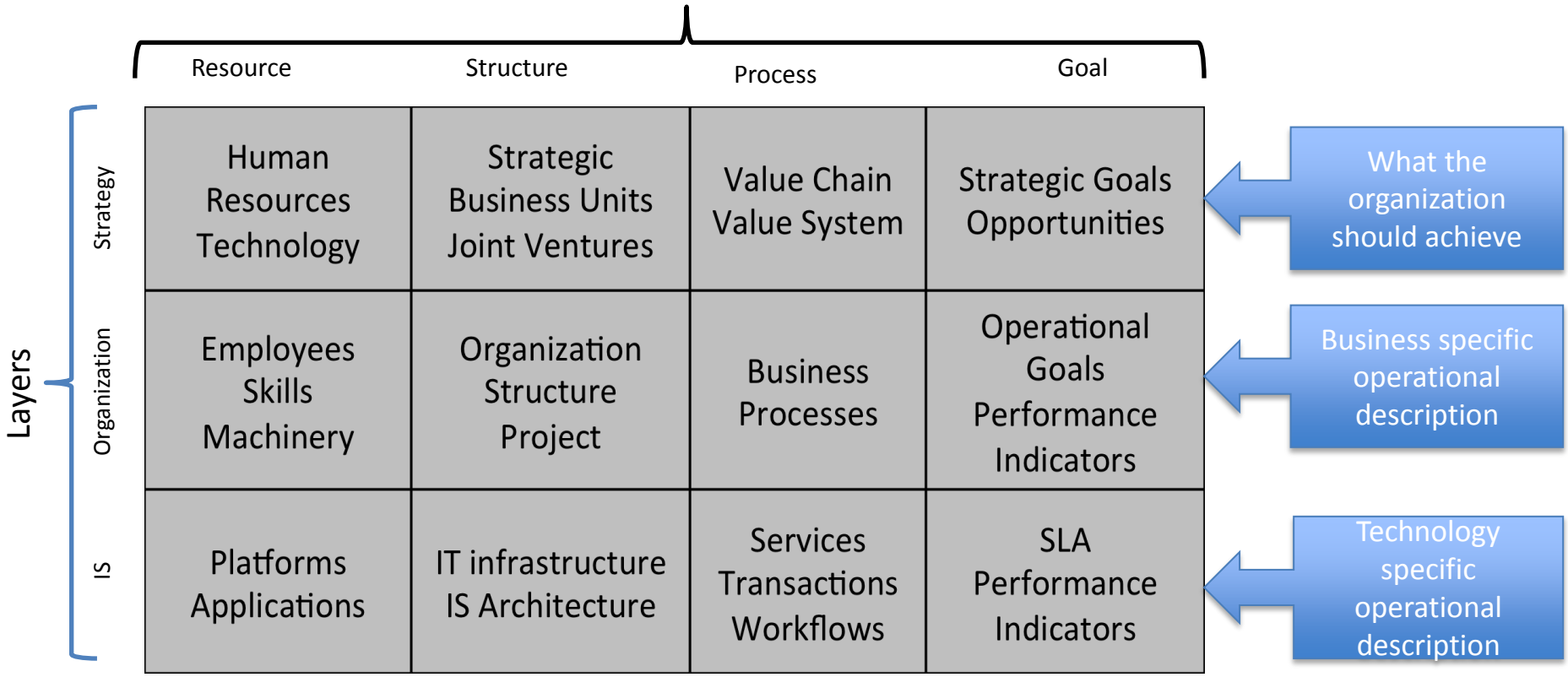
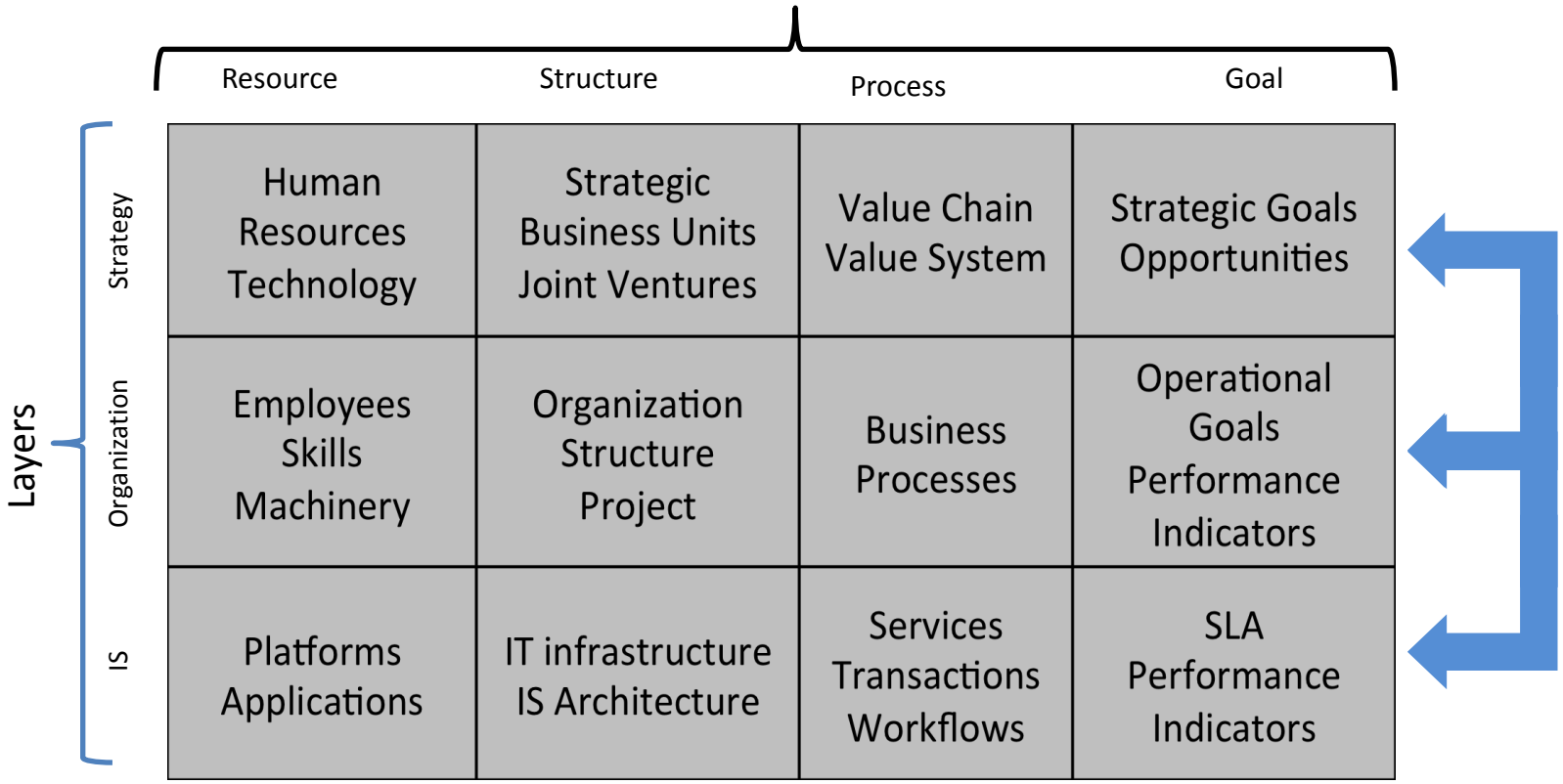
Organizations: 3-Layer Model



Problem: Alignment

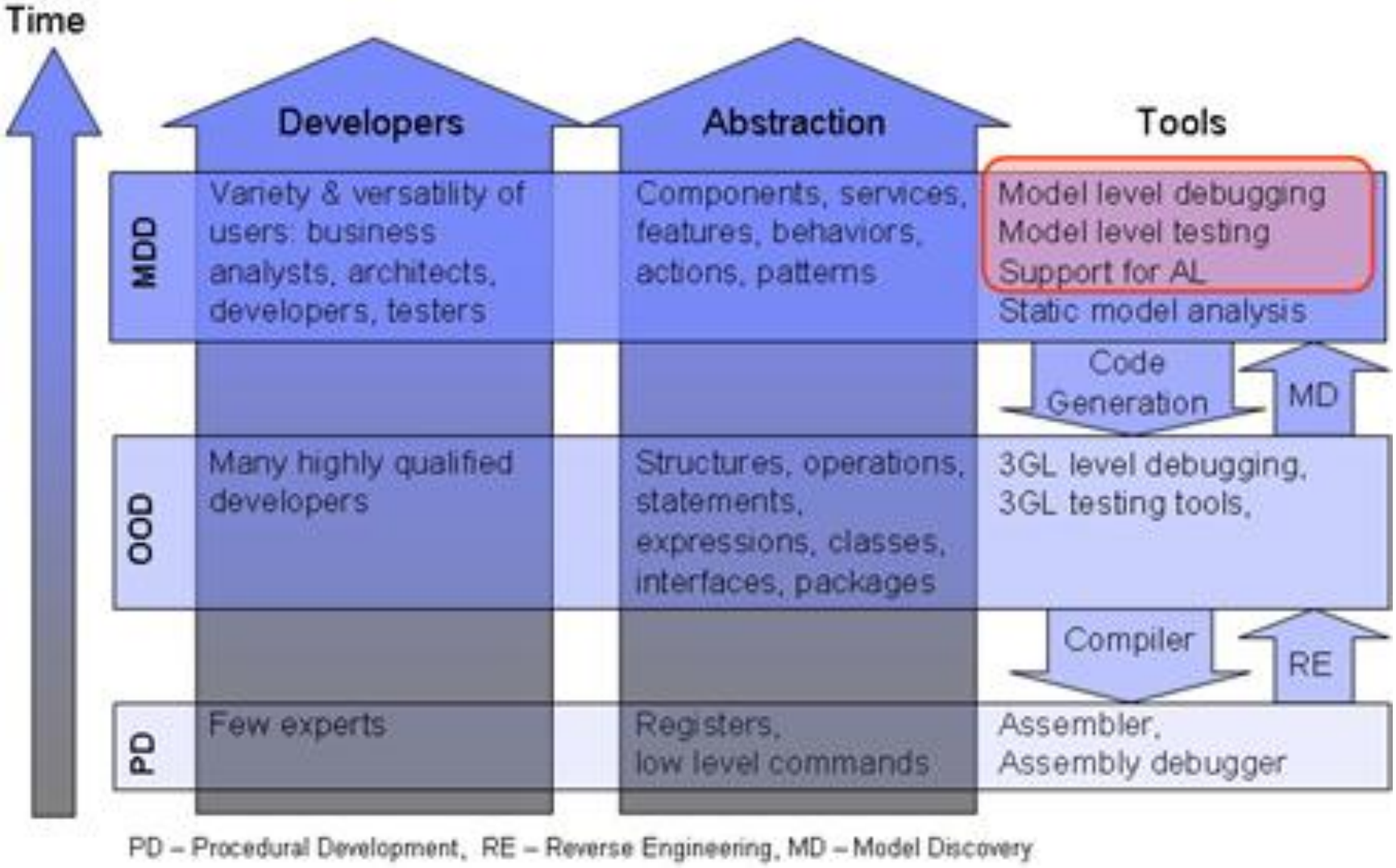


Organizational Change: EA Use Cases

Respond to the change while maintaining business-IT alignment:

- Reactive (e.g. regulatory compliance) and Pro-active (e.g. Resource planning, Outsourcing, Merger and acquisition etc) changes
- Excessive dependence on human expertise and past experience
- An important objective is to provide certainty through impact analysis, risk analysis, and as-is to-be change management
  - Managerial directives like invariant constraints
  - Business-IT mapping from IS state to high-level business specific concepts

A Diversion: Model Based Systems Engineering (MBSE)



IBM: http://www.research.ibm.com/haifa/projects/services/uml/vision.shtml

Model Based Systems Engineering

Definition:

Model Based Systems Engineering (MBSE) is the formalized application of modeling to support system requirements, design, analysis, verification and validation activities beginning in the conceptual design phase and continuing throughout development and later life cycle phases.

(From “INCOSE System Engineering Vision” 2020 INCOSE-TP-2004-004-02 Sept. 2007)

Solution by Analogy: Model Driven Organizations (MDO)

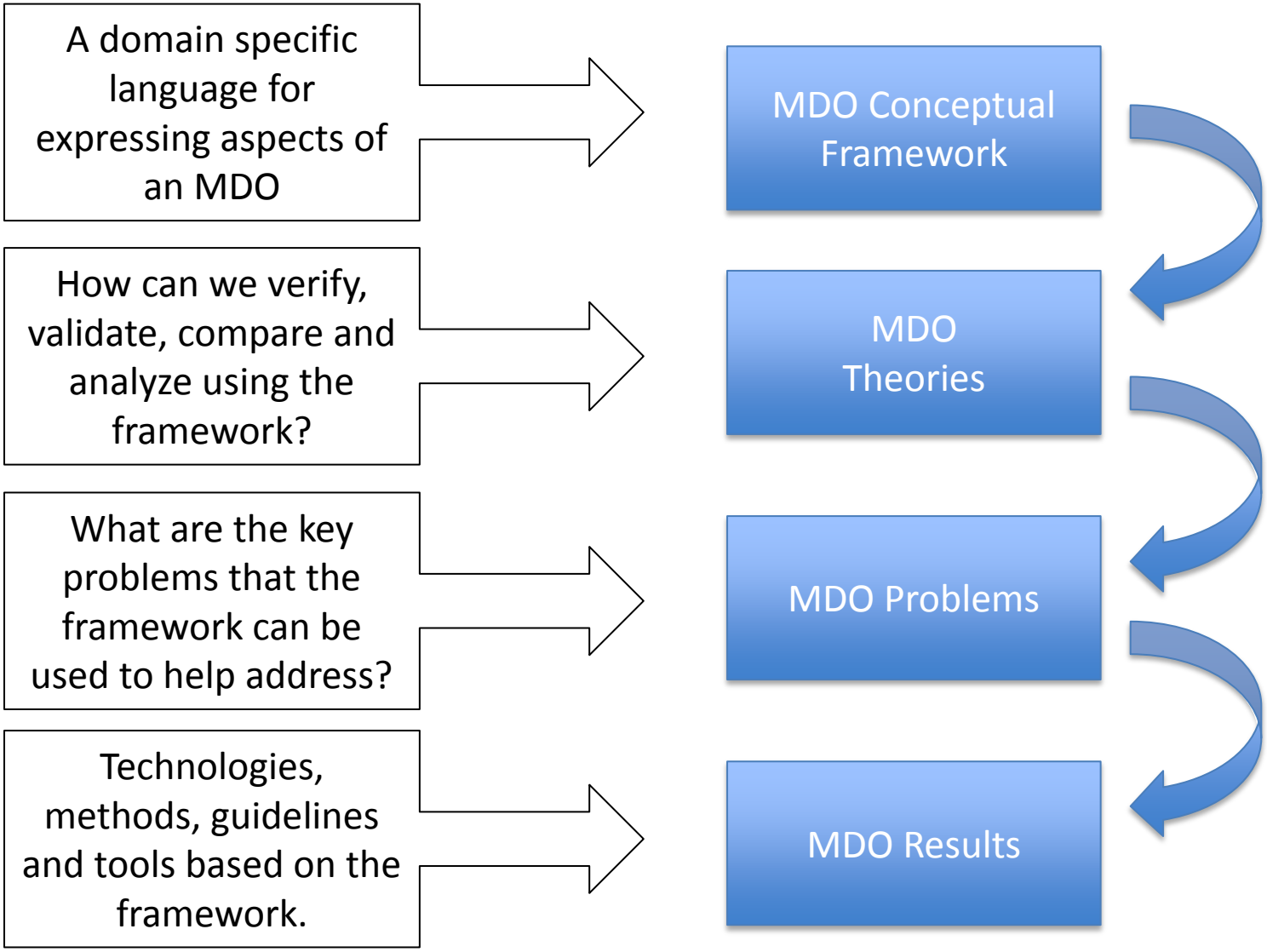
- MBSE targets **systems**.
- MDO targets **organizations**: includes MBSE features but specifically needs to address the 3-layers:
  - Strategy: goals, directives, regulations, risks, opportunities, threats.
  - Organization: business processes, business structures, resources, humans.
  - IS: includes systems (from MBSE), reliability, architecture, product lines.

A Vision for MDO

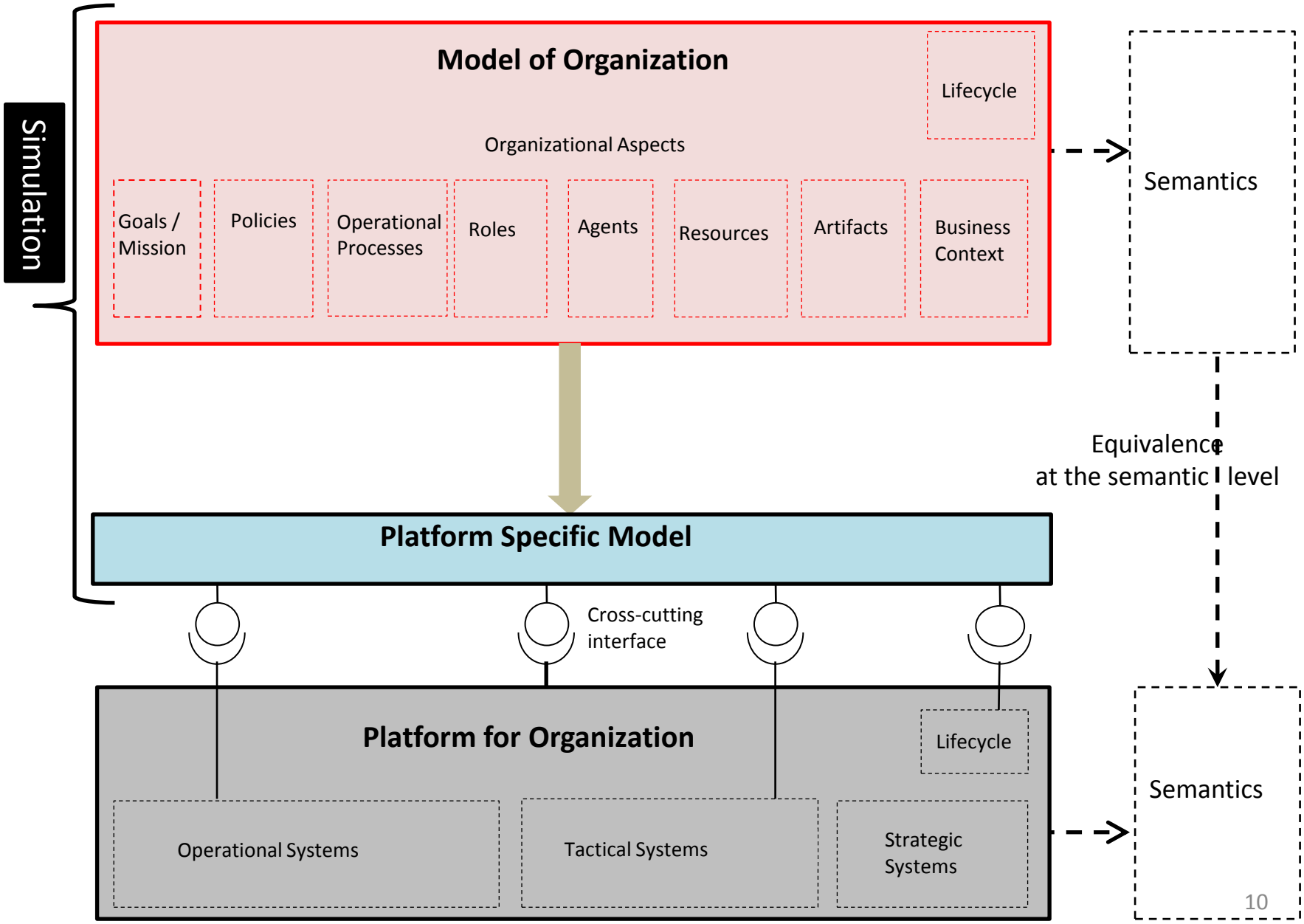
Definition:

A *Model Driven Organization* uses models in the analysis, design, simulation, delivery, operation, and maintenance of systems to address its strategic, tactical and operational needs and its relation to the wider environment.

MDO Research



A Candidate Conceptual Framework



Framework Requirements for MDO Theory Development

- Precision: no ambiguity.
- Formal: amenable to machine processing.
- Executable: supports simulation.
  - Quantified as well as qualitative
- Meaningful: engages all stakeholders.
- Interoperable: many different views.
- Dynamic: responds appropriately to change.
- Layered: supports multiple abstraction levels.

Candidate Technologies for the MDO Framework

Some current GPL EA frameworks:

- ArchiMate
- TOGAF
- MODAF
- SysML

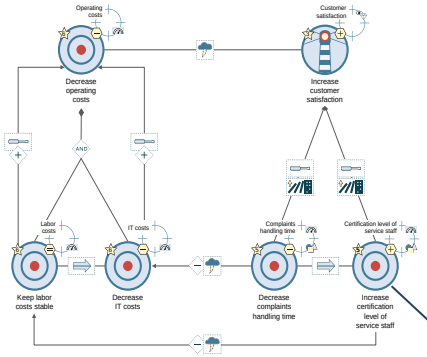
Fail on most of the requirements from the previous slide.

Some promising paradigms:

- Stock-n-flow
- Intentional
- Probabilistic relational models

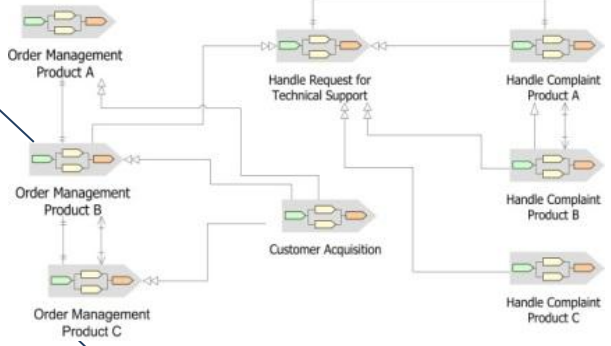
Don't integrate with GPL EA frameworks

Framework Populated by DSLs for the MDO

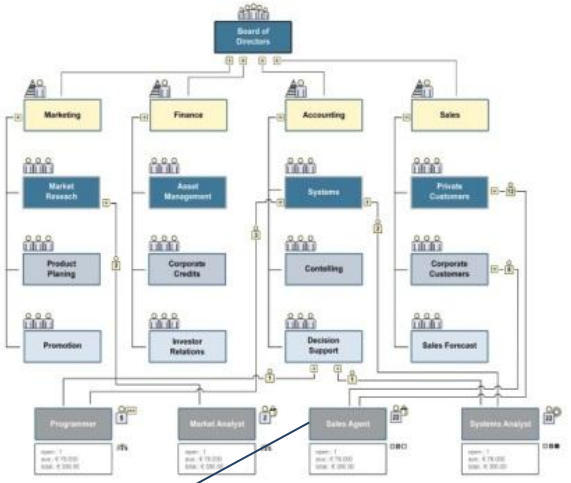


Goal System

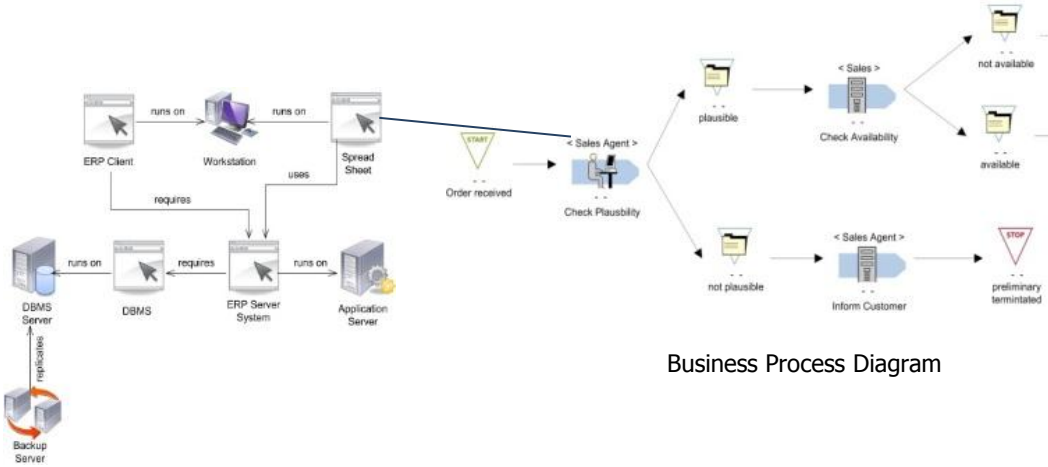
Value Chain Diagram



Business Process Map

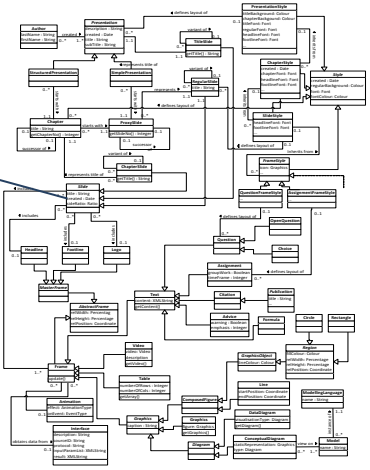


Organisational Chart



Business Process Diagram

IT Resource Diagram



Object Model

Technologies for the MDO Framework

Technologies need to:

- Support dynamically evolving DSLs.
- Support dynamically evolving organizations.
- Support tight integration of DSLs.
- Be *self-aware* and able to reason about own structure and behaviour.

Claim: M0-M3 strict meta-modelling will not support the MDO.

Hypothesis: Multiple meta-levels with self-referential type-levels are required.

Conclusion

- Organizations are complex and involve multiple levels and aspects.
- MDO is defined to support organizational development and operation by analogy to MBSE.
- MDO is a new field therefore needs a framework.
- We have presented such a framework and proposed requirements for DSLs that will populate it.
- Next steps are to iteratively develop MDO theories based on case studies and EA use-cases.