



# Models of Complex Enterprise Networks

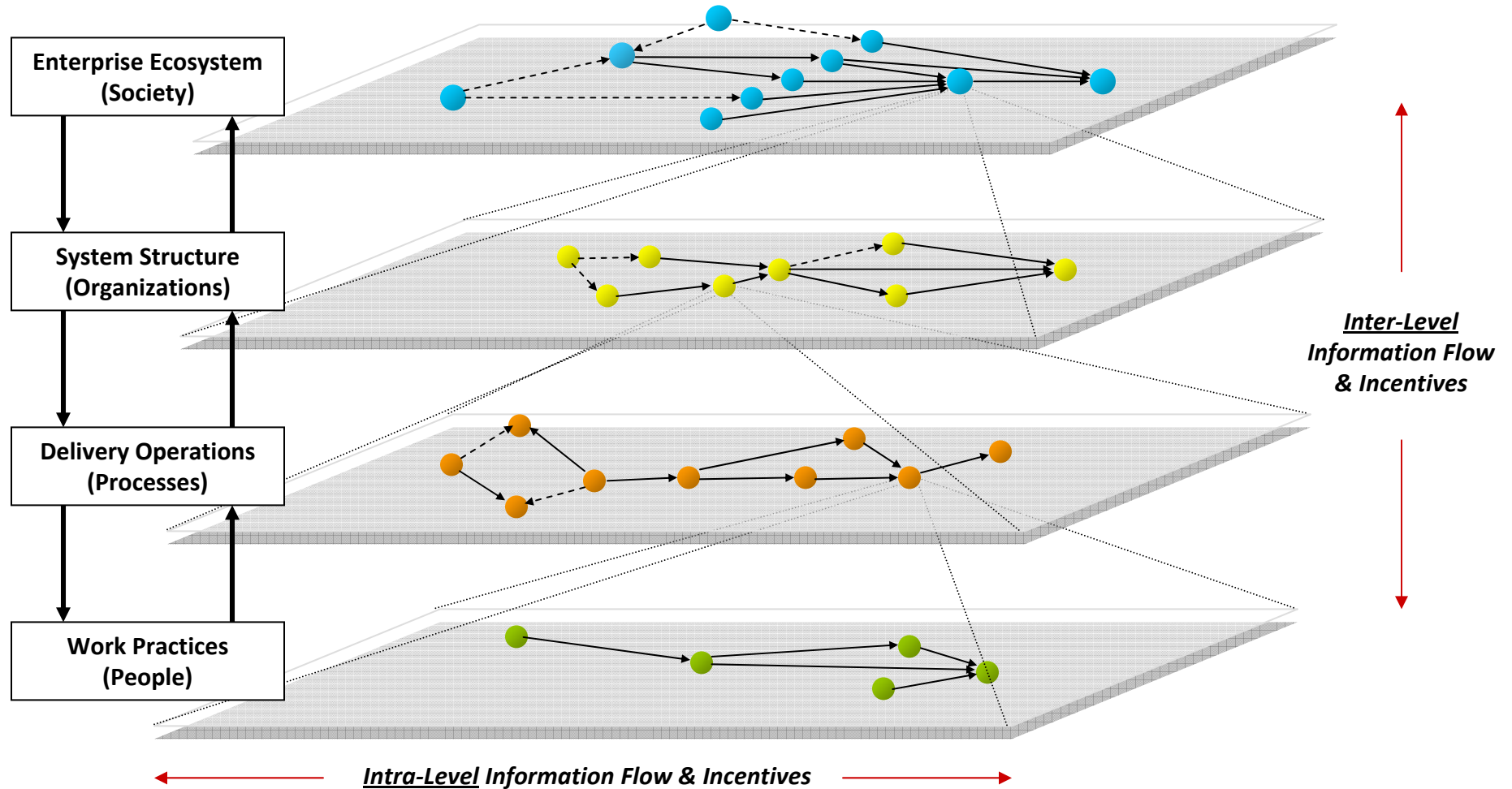
**W.B. Rouse, L.F. McGinnis, R.C. Basole, D.A. Bodner & W.C. Kessler**

# Overview

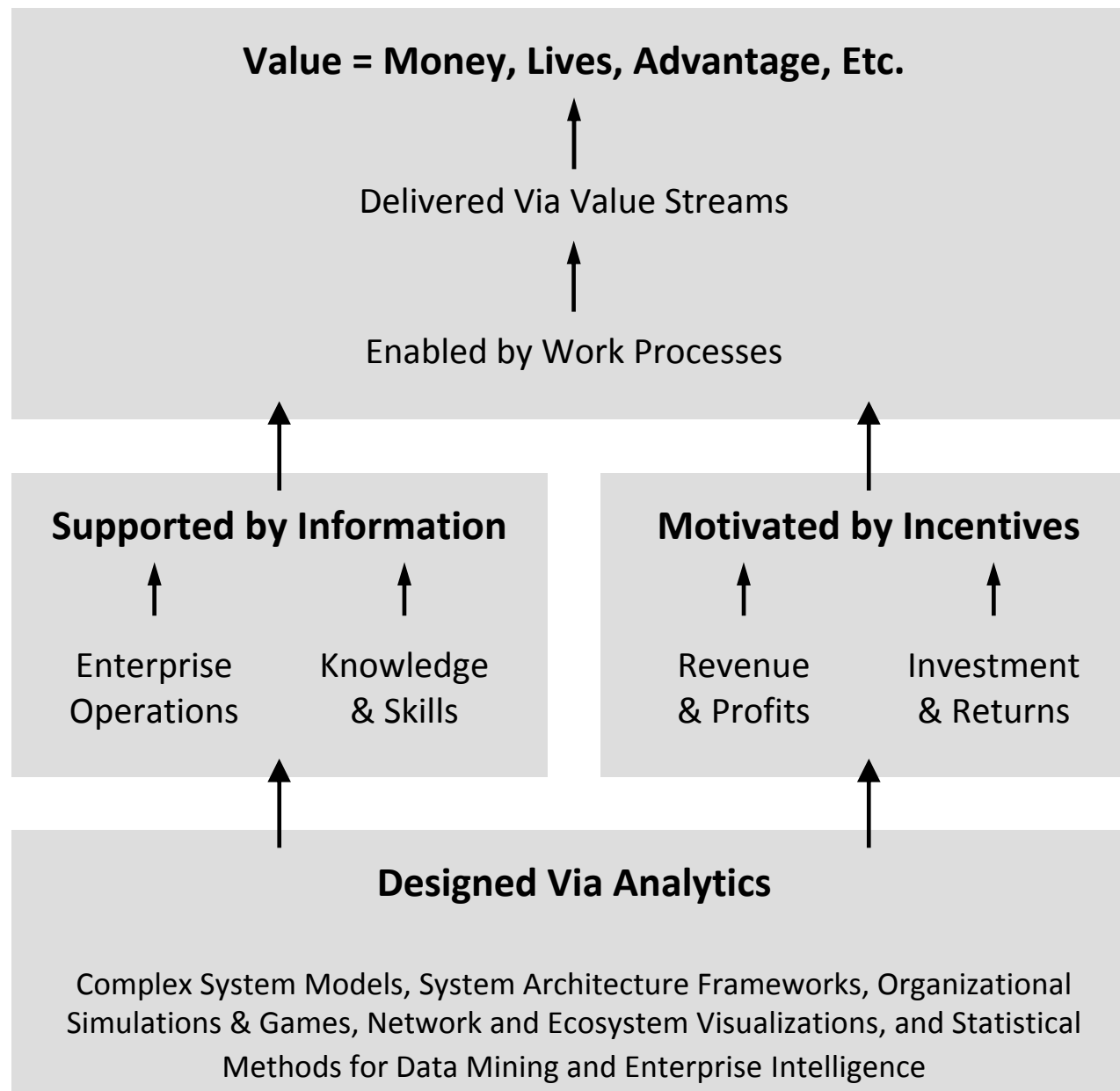
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- Hierarchical Enterprise Network
- Value-Driven Nature of Enterprises
- Representation
  - Transformations
  - Flows
  - Controls
  - Forces
- Modeling Hierarchy
- Domain Contrasts
  - Mfg vs. Healthcare
- Enterprise Transformation
- Conclusions

# Network Hierarchy



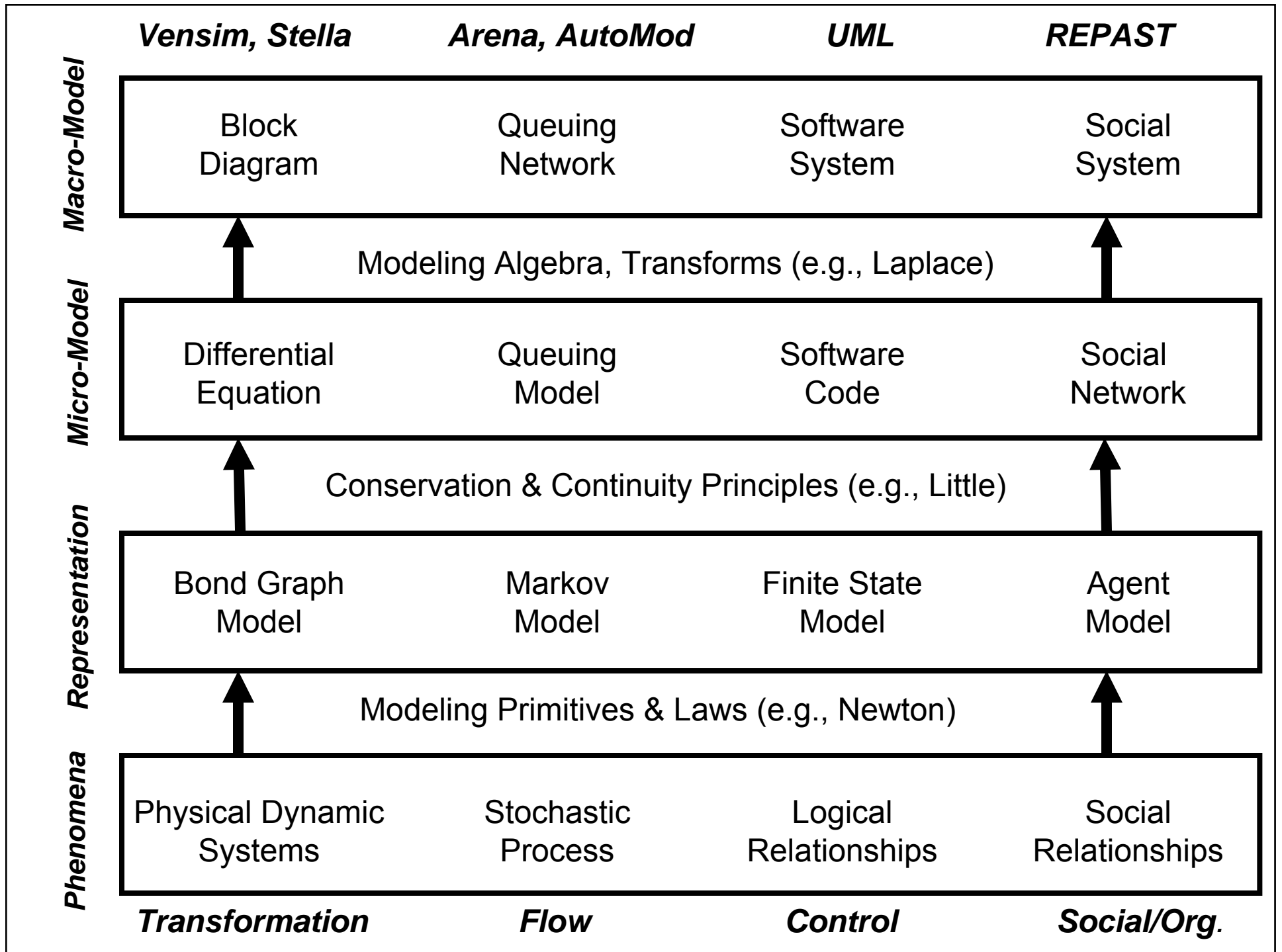
# Value-Driven Nature of Enterprises



# Representation

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- Transformations in Nodes
  - Conversion of materials into products
  - Conversion of person into customer
- Flows Between Network Nodes
  - Components, assemblies, subsystems
  - Customers, patients
- Controls of Transformation and Flows
  - Information, e.g., work in process, inventory
  - Money, e.g., receivables, payables, assets
- Forces of Social/Organizational Networks
  - Reporting relationships
  - Who knows what, does what, and with whom



# Domain Contrasts

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- Knowledge of the (Near Term) Future
- Work Process Variability
- Expectations of Customers
- Ability to Buffer Against Variability
- Variability of Cost to Produce
- Traceability from Performance to Result
- Connection Between Cost and Revenue
- Duration of Production Process

# Mfg vs. Healthcare

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- Patients have more variability than most products, at the very least in terms of size, age, race, etc., but also in terms of disease characteristics at particular points in time, as well as lifestyle choices and their evolving consequences.
- As a result, health care networks have more branching than manufacturing, especially unplanned branching due to evolving discovery of patient-specific patterns of symptoms.
- The nodes of specialists, tests, and treatments are somewhat standardized, but patients' paths are not, resulting in considerable variability of flows among transformation nodes.
- Primary care is intended to serve the role of managing the paths of patients, but the fragmentation of the enterprise severely limits the possibility for control to align time-varying demands and processing capacities.

# Enterprise Transformation

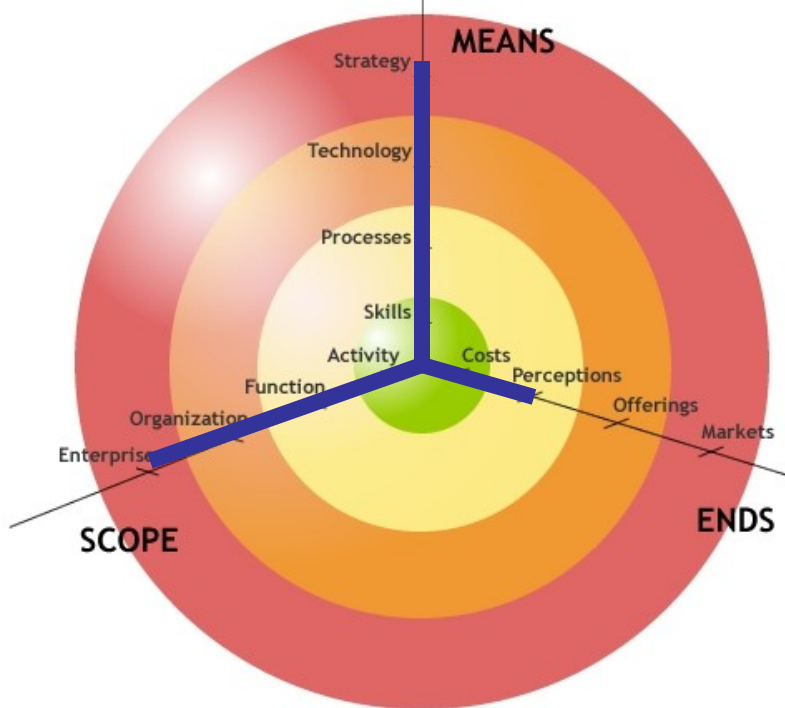
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- Four Case Studies of Fundamental Change
  - LM Aero (LMT): Merger of Siblings
  - Newell (NWL): Focus on Mass Retailers
  - Reebok (RBK): Brand Resuscitation
  - UPS (UPS): Beyond GDP Growth
- Analysis of Case Studies
- Observations on Results
- Implications for Modeling

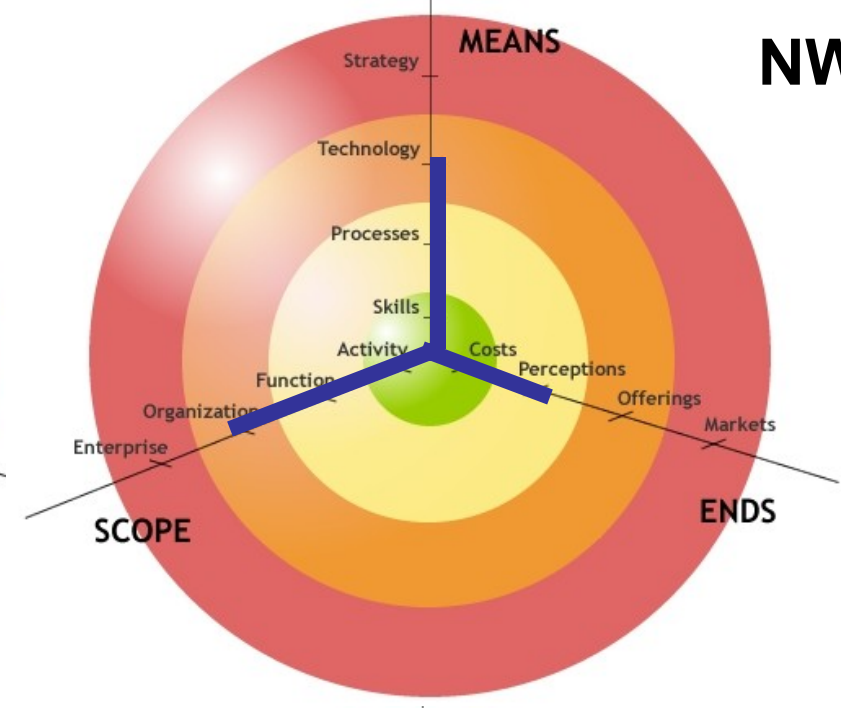
Note: The first three cases are drawn from Chapters 18-20 of *Enterprise Transformation*; the fourth is drawn from HBS and UVA published cases and personal experiences with the company.

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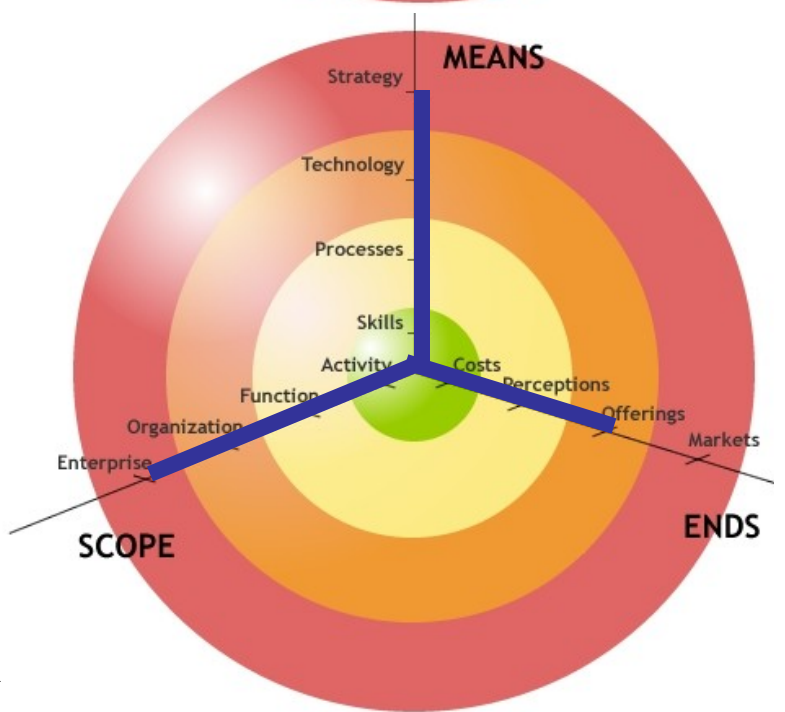
**LMT**



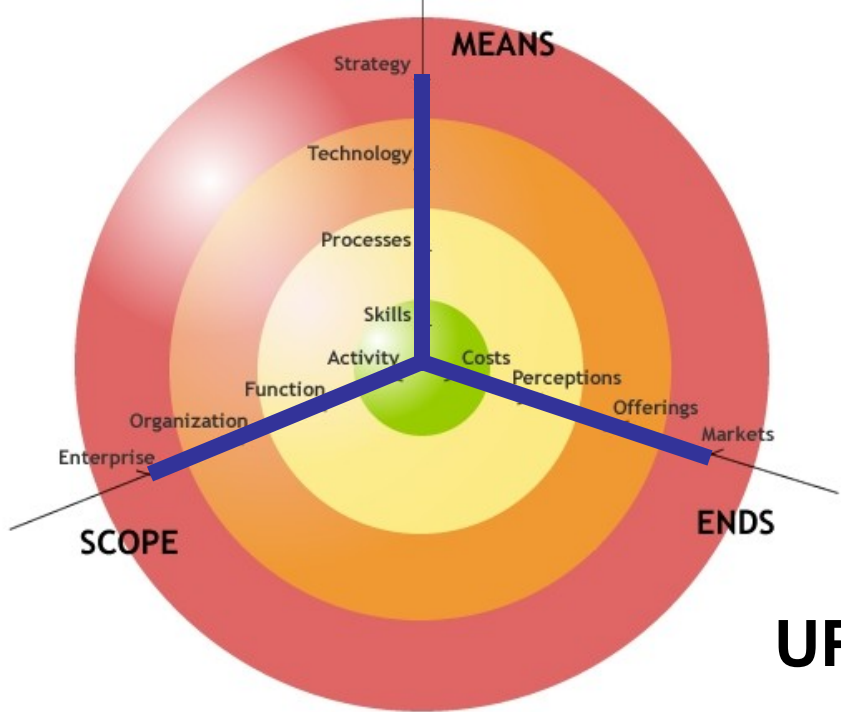
**NWL**



**RBK**



**UPS**



# Analysis of Case Studies

Competencies (18)

Real Cases (4)

## Transformation Cases

- Lockheed Martin
- Newell Rubbermaid
- Reebok
- UPS

Initiatives/Tasks (125)

## Analysis of Cases

- Driver(s) of Transformation
- Approach to Transformation
- Elements of Transformation
  - $\Delta 1$  = Focus on Customer
  - $\Delta 2$  = Increase Oper. Efficiency
  - $\Delta 3$  = Change Enter. Culture
  - $\Delta 4$  = Execution

Executive (20%)

- Leadership
- Vision
- Strategy
- Acquisitions

Analytical (60%)

- Financial mgt
- Industrial engr.
- Product mgt
- Reengineering
- Supply chain mgt.
- Change meth.
- Org. design
- Planning
- Market research

People (20%)

- Culture & change
- Marketing
- Collaboration
- Communications
- HR & training

# Observations

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- Executive competencies are central to seeing where markets are going, deciding on the ends, and formulating high-level imperatives
- Analytical competencies are central to formulating, designing and evaluating the means to achieving imperatives
- People competencies are central to motivating and supporting stakeholders to invent, implement and execute the means

# Implications

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- Modeling hierarchy can readily support analytical competencies
  - Integration of multiple modeling paradigms remains a challenge
- Modeling hierarchy can support some elements of the people competencies but not all
  - Some people issues act as “forces” on the enterprise network and modeling of such phenomena is still rudimentary
- Modeling hierarchy can support some elements of the executive competencies but not all
  - Leadership and vision, or their lack, are difficult to predict and subject to fundamental attribution errors – see “Car Wars”

# Conclusions


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- Information and incentives are the factors that dominate an enterprise's abilities to fundamentally change the nature of the value provided and the ways in which this value is provided.
- Understanding the transformations, flows, controls, and social/organizational nature of the "as is" and "to be" enterprise are central to orchestrating the changes needed.
- Full application of the modeling hierarchy to fundamental change of complex organizational systems is very much a work in progress.

# Summary

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