

ERP-ORE: A Framework to Measure Organizational Risk during ERP Systems Evolution in a Distribution Business

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What is ERP-ORE?

- Enterprise Resource Planning systems (ERP) – Organizational Risk Evaluator (ORE)
- A framework to measure organizational risk during ERP systems evolution in a distribution business
- Structure of this presentation
 - An overview of the rationale and framework
 - A detailed case study description
 - Explanation of the framework principles and elements based on a detailed case study

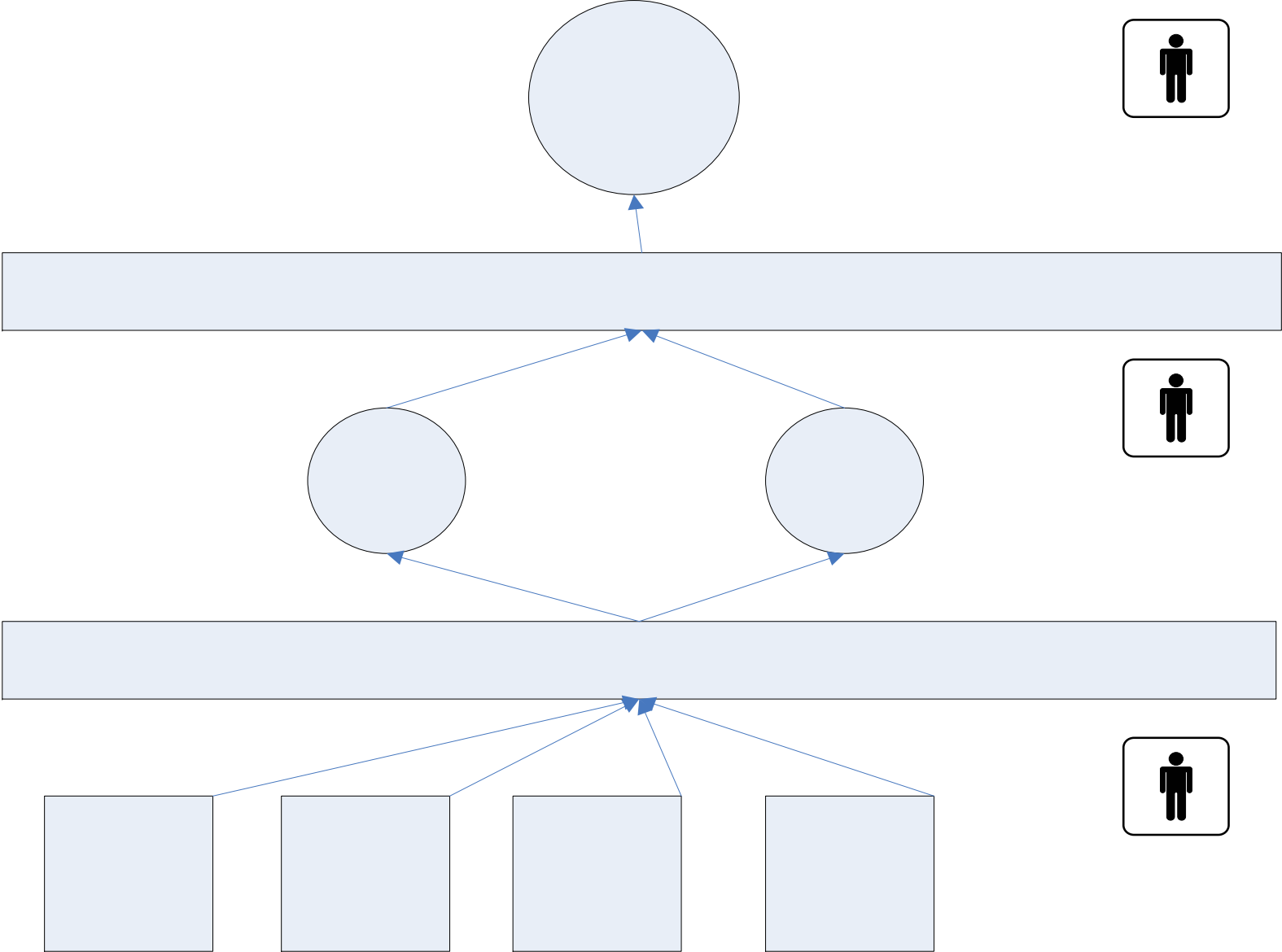
ORE and ERP-ORE: Motivation

- ERP-ORE customizes original ORE framework
- ORE
 - Information systems change initiatives often represent the single largest investment (and therefore risk)
 - Few corporations have formal risk assessment methodologies
 - Metrics and frameworks do not provide *causal* support for decision making

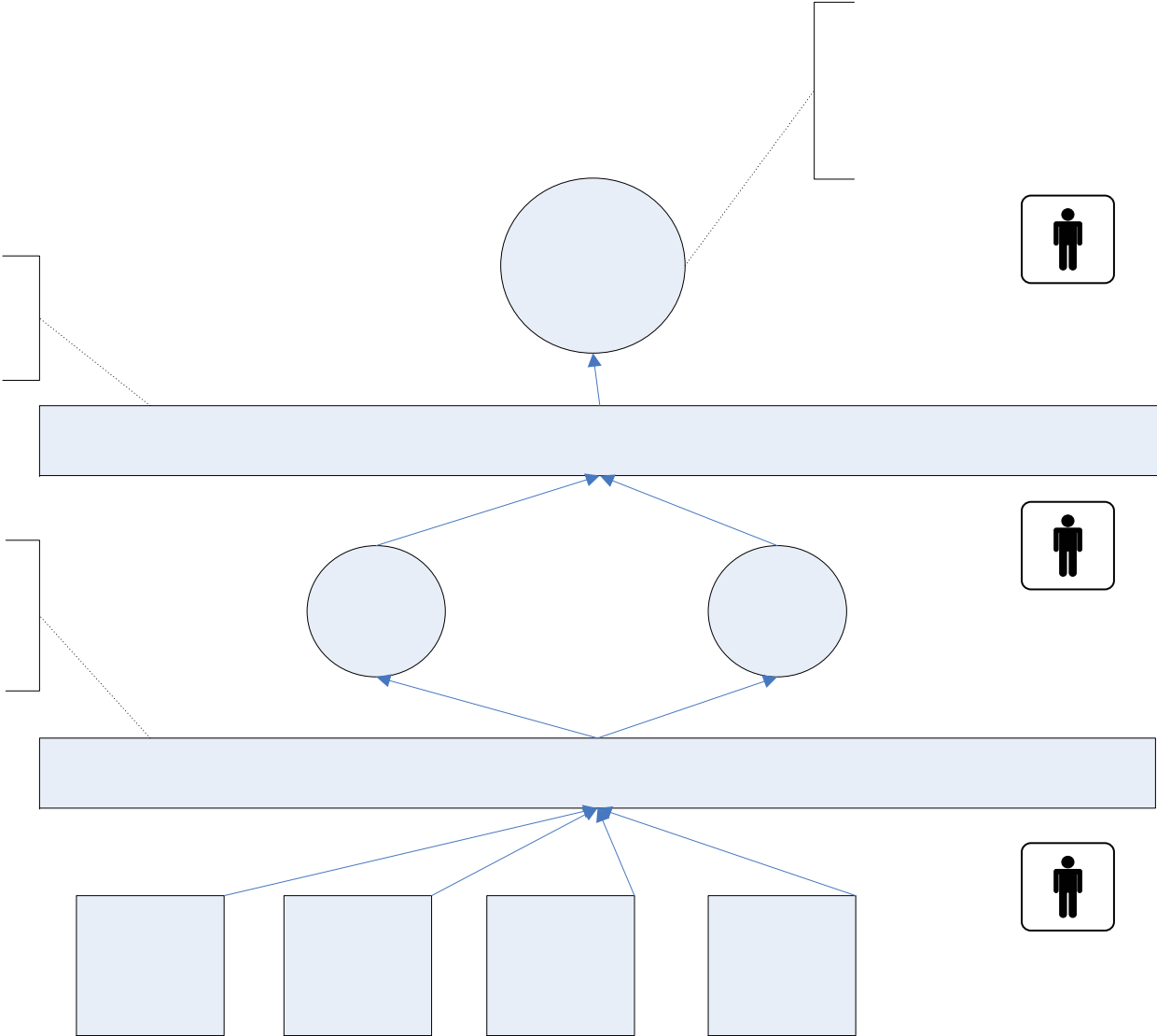
ORE and ERP-ORE: Motivation

- ERP-ORE
 - Distribution businesses redefining their role as information managers in supply chain
 - Deploying ERP systems to serve as business operating system and manage information flows
 - ERP-ORE customizes ORE for the ERP in Distribution problem

The ORE Solution

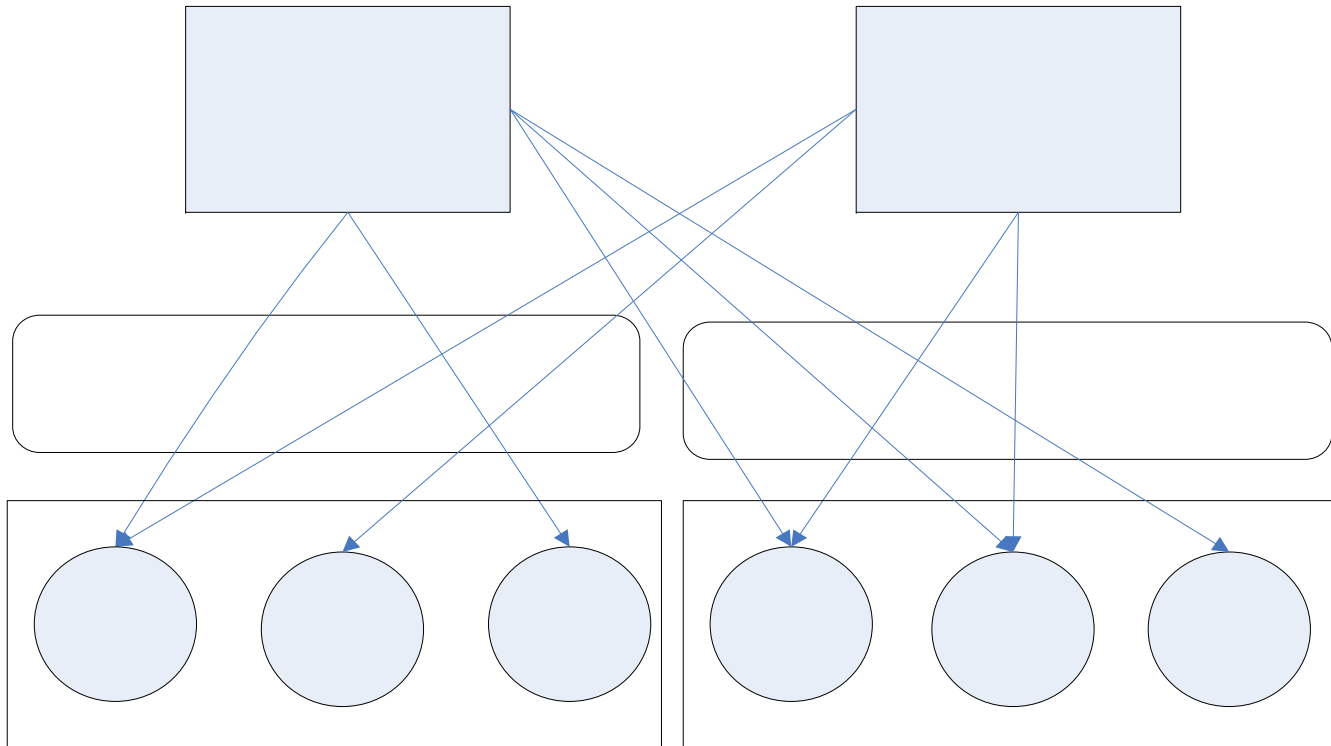


ERP-ORE Customizations



ERP-ORE Customizations

- Major dimensions of risk for ERP in Distribution problem: *Process* and *Politics*. Operationalized as two semi-structured organizational factors, Internal Context and External Context



ERP-ORE Customizations

- Technical sub-projects are implementation of specific ERP modules
- PLC becomes the ERP Delta Team
- OLC becomes the executive steering committee

ERP-ORE Customizations

- Size change factor reinterpreted as total size of system to be customized
- Manpower outsourcing factor removed
- Project team factor redefined as cohesion between ERP, management and consultant team

Case Scenario

- US based medical supplies distributor
- New role in supply chain as information manager requiring coordinated internal and external information flows
- Replacing multiple legacy systems with single ERP solution
- No formal risk assessment methodology, no past risk scale for comparison

Case Scenario

- Modules being implemented are
 - A) Distribution Systems Planning
 - B) Sales Order Processing
 - C) Warehouse Operations
 - D) Financials
 - E) Executive Information Systems

Case Scenario

- Project Heads: Business unit managers (meet as required)
- PLC: Delta team composed of power users and business heads (meets weekly)
- OLC: Executive steering committee (meets fortnightly)
- Consulting team hired to provide external expertise
- ERP-ORE is used for formal risk assessment

ERP-ORE Methodology

1. Dividing a business goal into sub-projects
2. Entering priority assignments for each project
3. Entering dependency relationships
4. Measuring individual sub-project risk (use AHP)
5. Measuring organizational factors risk (use AHP)
6. Calculating organizational risk
7. Analyzing evolution of organizational risk and decision making

Step 1: Dividing a Business Goal into Sub-Projects

- Each sub-project is the implementation of a specific ERP module

Identifier	Module
A	Distribution Requirements Planning
B	Warehouse Management
C	Sales and Order Processing
D	Financials
E	Executive Information Systems

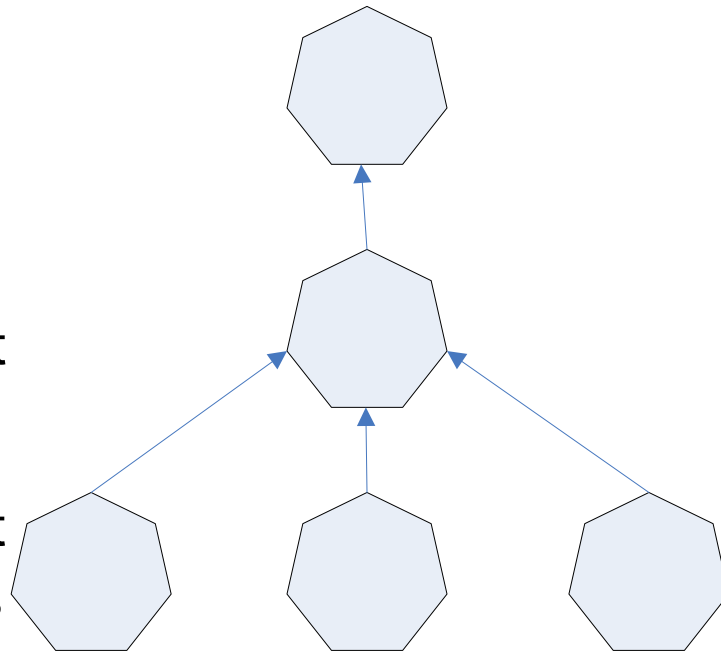
Step 2: Entering Priority Assignments for Each Sub-Project

- All organizational factors are assigned equal value
- The priority is a numeric measure between 1-10; determined by the OLC
- Represents the importance of the sub-project deliverable to the success of the entire project.

Module	Priority
A) Distribution Requirements Planning	5.13
B) Warehouse Management	0.63
C) Sales and Order Processing	0.33
D) Financials	1.29
E) Executive Information Systems	2.61

Step 3: Entering Dependency Relationships

- Dependency model enables measurement of cause and effect etc. relationships
- Default full risk propagation model is kept
- Executive (E) is informationally dependent on Financials (D) which is informationally dependent on rest of modules



Step 4: Measuring Sub-Project Risk

- Default additive risk model maintained
- Measured by project managers
- Default weightings based on CMU SEI empirical results. Can be customized using AHP

Metric	Weight
Technology Change	0.10
Size Change	0.10
Requirements Change	0.20
Personnel Change	0.37
Parallelism	0.18
Development Platform	0.09
Project Team	0.06

Step 4: Measuring Sub-Project Risk

- Project Manager for A: Distribution Requirements Planning decides upon the values for sub-project risk metrics
- Similarly values maybe assigned for remaining sub-projects

Metric	Value
Δ Technology Change	45.00
Δ Size Change	23.00
Δ Requirements Change	8.00
Δ Personnel Change	49.41
Parallelism	75.90
Development Platform	4.00
Project Team	7.00

Step 5: Measuring Organizational Risk Factors

- The OLC assigns weights and values to the organizational factors
- OLC draws upon the combined expertise of the Delta team, consultant team and ERP team

Internal Context	Value
Culture & Organization	60
Business Process Risk	75
Communications Flow	50

External Context	Value
Legal & Environmental	50
Compatibility	79
Supply Chain Pressures	80

Step 6: Calculating Organizational Risk

- Overall organizational risk equation is,

$$\rho(\text{organizational}) = (\omega_{SP} * \sum_{i=1}^n (\rho_i * \sigma_i + \delta_i)) + (\omega_{IC} * IC) + (\omega_{EC} * EC)$$

Part 1Part 2Part 3

- Part 1 refers to the sub-project risk contribution to organizational risk
- Part 2 refers to the contribution of the Internal Context factor to organizational risk
- Part 3 refers to the contribution of the External Context factor to organizational risk

Step 7: Analyzing Risk Evolution

- In implementing the business requirement the organizational risk measure at this present time t1 is r1
- At the next measurement time t2 the risk is r2. r2 - r1 is highly positive indicating significant increase in organizational risk (time granularity is flexible)
- The OLC undertake measures m1 and m2 to mitigate risk
- The organizational risk scale has begun to be calibrated using (r1, t1) as the origin point

Summary

- ERP-ORE customizes ORE for the ERP problem in distribution businesses
- Politics and Process main dimensions of risk
- The dimensions are operationalized as Internal Context and External Context organizational factors
- Analytic Hierarchy Process is incorporated into the framework to assist in disciplined decision making
- ORE concepts including OLC, PLC and sub-project are redefined for the new domain

Directions for Future Work

- ERP-ORE risk output structured into front office and back office components for resource allocation decisions
- Formal mathematical structures such as matrices will enable enhanced analysis
- Usage and experience will refine factors, metrics and framework design. Experience papers expected as framework matures.

Questions/Comments?