

# Simulating Value Chain and Co-operation Practice

Matthias Klumpp\*, Laura Koppers

Venice/Italy, June 7<sup>th</sup> 2011

Industrial Simulation  
Conference (ISC) 2011

Università Ca'Foscari Venezia



1. Introduction
2. Co-operation Elements
3. Business Practice
4. Simulation
5. Conclusions

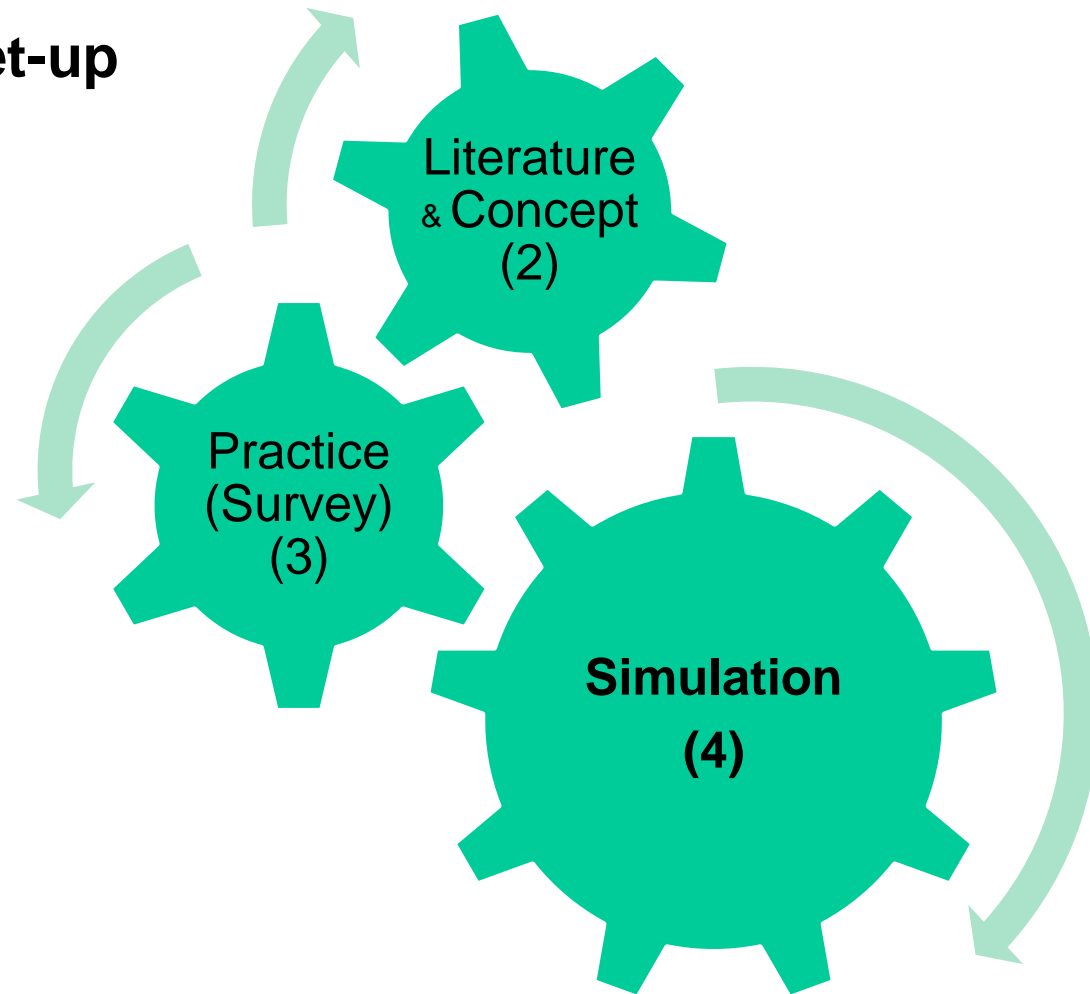
- Co-operation within **value chain management**

- SCM, ECR and VMS differ in co-operation intensity
- Optimal co-operation intensity maximizes total value chain profit (EBIT)

→ **Objectives:**

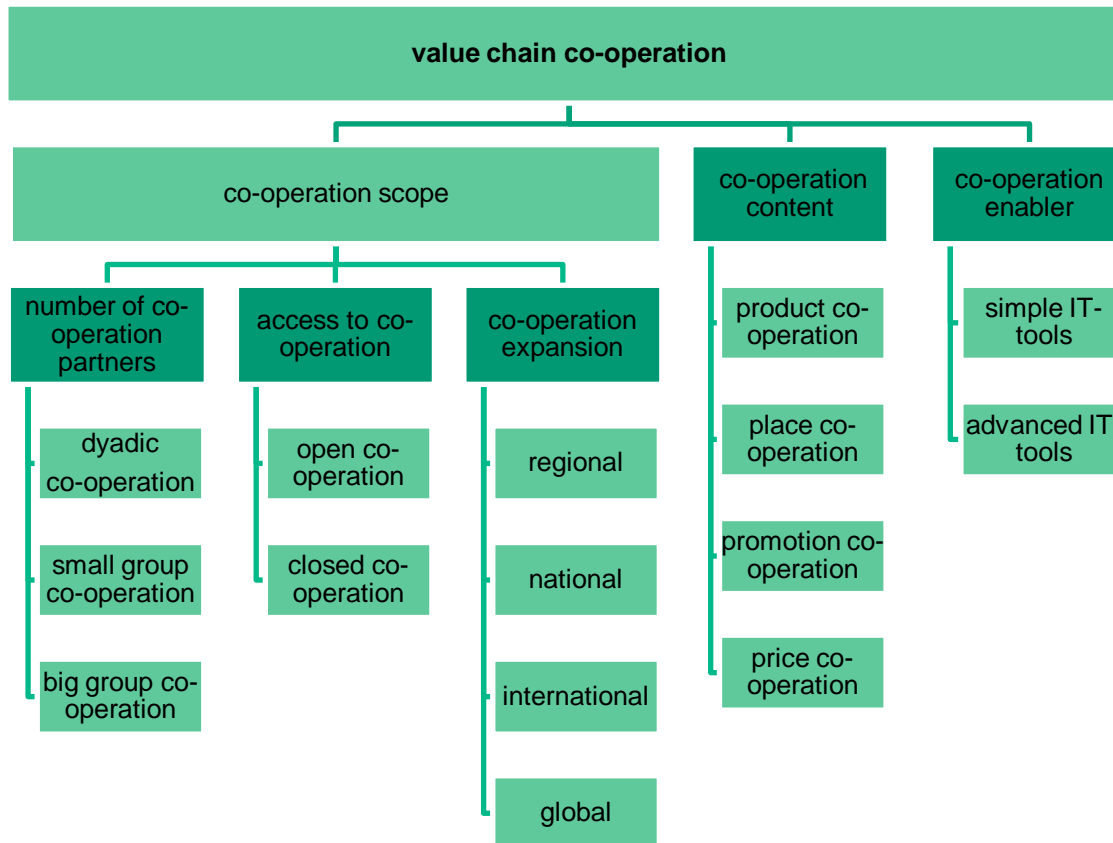
- Integrating existing concepts into one holistic approach
- Overcoming limitations of existing concepts

- **Research set-up**

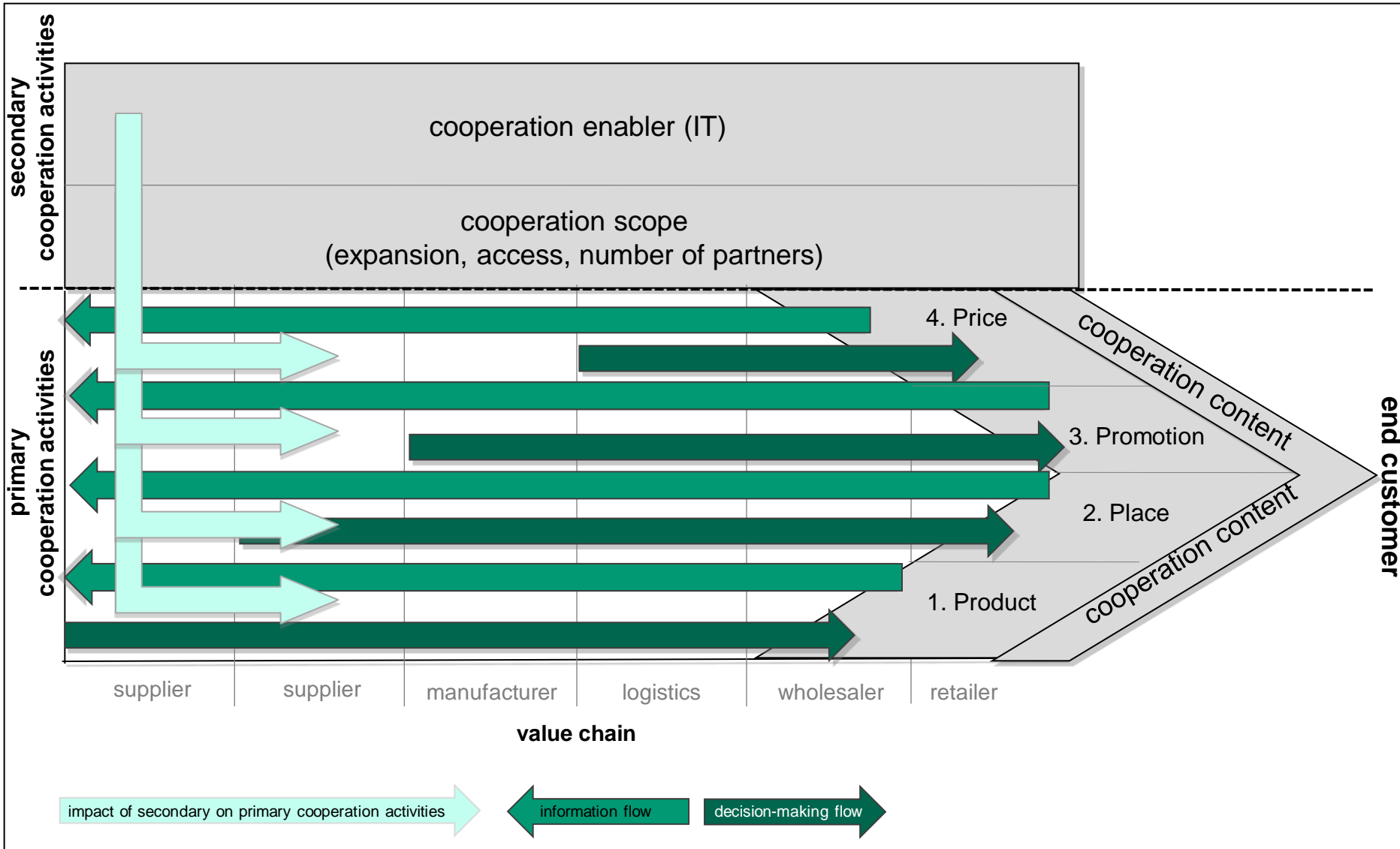


# 2. Co-operation Elements

- Discussion of SCM, ECR and VMS is conducted separately
- No common structure
- Introduction of co-operation differentiators



# 2. Co-operation Elements



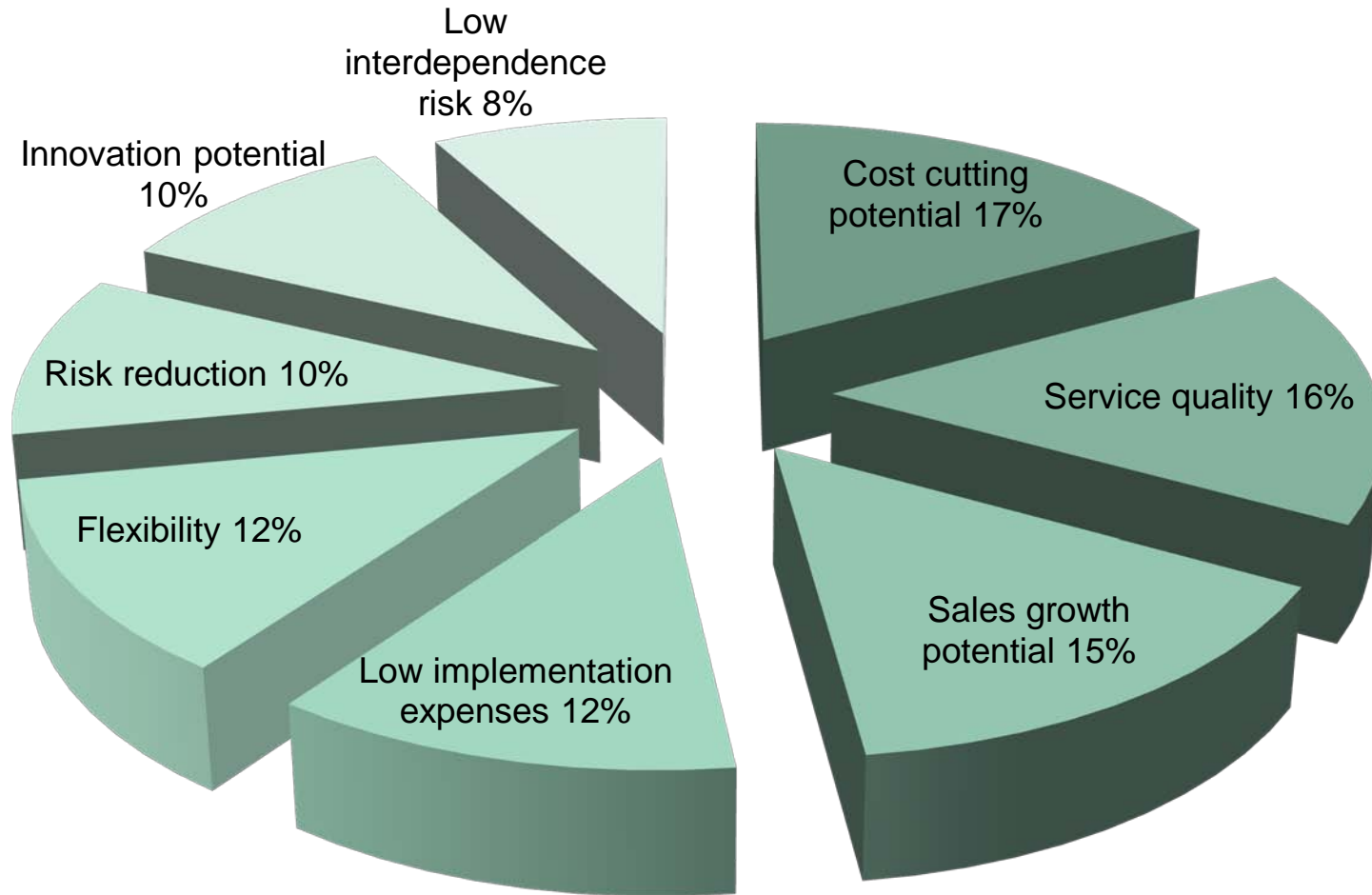
# 3. Business Practice

	supply chain management	low intensity concept	vertical marketing systems	medium intensity concept	efficient consumer response	maximum intensity concept
implementation expenses						
cost cutting potential						
sales growth potential						
risk reduction						
interdependence risk						
flexibility						
innovation potential						
service quality						

**Lower scores indicate better evaluation results**

- Set-up
  - 34 experts from 16 industries
  - March 2010
  - Interview with questionnaire
    - Importance of evaluation criteria
    - Evaluation of six concepts

# 3. Business Practice



## Initial situation

- VCM co-operation in place
  - Scope: small group co-operation, international, closed
  - Content: product, place, promotion
  - Enablers: simple IT-tools

### **Decision problem:**

**Shall the existing co-operation be expanded from simple IT-tools to advanced IT-tools?**

- VCM co-operation evaluation criteria
  - Cost cutting potential (variable costs)
  - Implementation cost (fixed costs)
  - Sales growth potential

## Function

$$f = e * 100,000$$

$f =$  Total fixed costs  
 $e =$  Enabler co-operation (1)  
 or  
 non-co-operation (0)

## Example

$$f = 1 * 100,000 \text{ EUR}$$

$$f = 100,000 \text{ EUR}$$

$e =$  Enabler co-operation (1)

## Function

$$o = 0.95 + \left( 0,05 * \left( 1 - \frac{e}{1} \right) \right)$$

$e =$  Enabler co-operation

$o =$  Co-operation multiplicator  
total variable value chain cost

## Example

$$o = 0.95 + \left( 0.05 * \left( 1 - \frac{1}{1} \right) \right)$$

$$o = 0.95$$

$e =$  Enabler co-operation (1)

## Function

$$v = \left( \sum_{i=1}^I \sum_{j=1}^J c_{j,i} * d \right) * o$$

- $v =$  Total variable costs
- $i =$  Number of companies in the value chain
- $j =$  Cost centers per company
- $d =$  Total value chain sales volume (units)
- $o =$  Cost saving percentage

## Example

$$v = (1.200.000 \text{ EUR}) * 0.95$$

$$v = 1.140.000 \text{ EUR}$$

- $i =$  3 companies in the value chain
- $j =$  4 cost centers per company
- $d =$  100,000 units
- $o =$  0.95

## Function

$$q = 1.05 - \left( 0.05 * \left( 1 - \frac{e}{1} \right) \right)$$

$e =$  Enabler co-operation

$q =$  Co-operation multiplier  
earnings

## Example

$$q = 1.05 - \left( 0.05 * \left( 1 - \frac{1}{1} \right) \right)$$

$$q = 1.05$$

$$e = 1$$

## Function

$$m = p * d * q * -v - f$$

- $p =$  End-product price
- $d =$  Total value chain sales volume (units)
- $q =$  Co-operation multiplier earnings
- $v =$  Total variable costs
- $f =$  Total fixed costs

## Example

$$m = p * d * q * -v - f$$

$$m = 125.000 \text{ EUR}$$

- $p =$  13 EUR
- $d =$  100.000 units
- $q =$  1.05
- $v =$  1.140.000 EUR
- $f =$  100,000 EUR

- **Field Research**
  - VCM needs to go beyond existing co-operation concepts
  - Co-operation content “price“ to be included
  
- **Simulation**
  - Innovative model linking co-operation intensity to total value chain profit
  - Basic structure to be extended in future research
  - Restrictions to be resolved
    - Nonlinear algorithm
    - Dynamic time frame

# Simulating Value Chain and Co-operation Practice

Matthias Klumpp\*, Laura Koppers

**Thank you for your attention.**

Industrial Simulation  
Conference (ISC) 2011

Università Ca'Foscari Venezia

