Virtual Organizations Management (VOM)

Martin Ollus (VTT)
CONTENT

1. Definitions
2. Challenges for VO Management (VOM)
3. VOM approach in ECOLEAD
4. VO realization
5. Remaining research challenges
Virtual Organizations, some definitions

The Virtual Organization (VO) is a temporary consortium of partners from different organizations established to fulfil a value adding task, for example a product or service to a customer.

The lifetime of a VO is typically restricted: It is created from the network for a definite task and dissolved after the task has been completed.
Concepts

- VO
- Opportunity driven
- Preparedness
- Long-term strategy

Different levels of commitments and rules possible
A DEFINITION OF VO MANAGEMENT (VOM)

VO Management denotes the organisation, allocation and co-ordination of resources and their activities as well as their inter-organisational dependencies to achieve the objectives of the VO within the required time-, costs- and quality frame.

Full life-cycle of VO covered
Management in networks

**Challenges for the management**

- **Independent organizations**
  - little/no forcing power
  - own internal procedures & behaviour

- **Collaboration voluntary**
  - objectives & motivation not fully known
  - hidden agendas
  - opportunism

- **Simultaneous participation in several Vos**
  - conflicts

- **Incomplete information**
  - measurements mainly at interfaces

- **Different cultures & business practices**
  - impact on management means
Goal oriented management

**VO created to fulfill a task**
- Partners need to work towards a common goal
- Management needs to continuously know the status of the activities
- Management needs means for (pro)active management

**Objectives for management:**
* Achieve the "common" goal by collaboration
* Performance measurement based real-time VO management
* Management structure & measurements: VO specific
* Set-up phase short as possible (Ideally in days)
* Management has to be beneficial during the life-time of VO
* Build on existing applications in partners' organizations
Management Approach can be VO-specific

Different management approaches may depend on
- VO objectives
- VO structure
- VO manager and management styles
- Etc.

Some management approaches
- Multi-organizational project management
- Encouragement approach
- Self-organizing approach
- Time-dominated VOs
- Supply Chain Management approach (not considered in ECOLEAD)
ECOLEAD approach in VO management

- **Monitor**
  - Finance Monitor
  - Activities Monitor
  - Operations & Performance Monitor
  - “Are we earning or wasting money?”
  - “Are we in line with our plan?”
  - “What (where) is the reason of the problem?”

- **VO Manager**

- **Past VO Performance**
- **Expected VO Performance**

- **Communicate, Negotiate & Implement Decisions**

- **Dashboard & Alert System**
- **Impact of Problems & Deviations**
- **What-if Scenarios**
- **Decisions Support**

Based on available knowledge

Focus on future

ECOLEAD approach in VO management

Focus on future

Based on available knowledge

Communicate, Negotiate & Implement Decisions

Impact of Problems & Deviations

What-if Scenarios

Dashboard & Alert System

Past VO Performance

Expected VO Performance

Based on available knowledge

Focus on future
Performance measurement in VOM

Categories of Performance
- fulfilling the given task
- contribution from partners
- partners’ collaboration
- performance of management approach & methods

Different management approaches etc. require their own support from the measurement

Performance info to VBE/PVC
- Experience, references
- Results
- Liabilities
- Rights
- Input to value system & "bag of assets"
Inheritance from a VO

Experience, knowledge, liabilities, rights

Inheritance, input to value system…

VO Management

Creation
Operation & Evolution
Dissolution

Organise, Allocate, Control, Guide, Act, Measure, Co-ordinate, Use, Share

VO Partner

Internal Functions
Internal Resources
Internal Organisation
Internal Information

VBE

VO
Some dimensions of management in networks

- **Interoperability**
  - Integration platforms, ERP integration, web-based, etc
  - Data formats, standards (XML, Rosettanet, etc)

- **System**
  - ERP integration
  - PMBOK, SCM, data acquisition, etc

- **Transaction**
  - Information exchange
  - Monitoring
  - Active management

Focus so far
RAVO Functional architecture

Real-time VO Management Architecture

- VO Set-up
  - Structure
  - Goals
  - Value

- VO Model
  - VO Performance Measurement Model
  - VO Milestones & Achievement Plan
  - VO Management Model
  - VO Vertical Applications
  - VO Set-up
  - VO Operation Management
  - Performance Monitoring
  - Data Warehouse
  - VO Dashboard
  - Decisions Support
  - Analysis & Reporting

- Reference Models
  - VO Vertical Applications
  - ERP/SCM/Other applications – Partner 1
  - ERP/SCM/Other applications – Partner 2
  - ERP/SCM/Other applications – Partner 3

- Integration Broker
  - EVM
  - NPV
  - Resources
  - Activities Monitor
  - Performance Monitor

- Alert Dispatcher
  - SCOR
  - EFQM
  - KPIs

- Feedback Information, Lessons Learnt
  - Structure
  - Goals
  - Values
  - Progress
  - Deviations
  - Feedback
  - Analysis
  - Summary
  - Inheritance

SID

DSS

SID Inheritance

Normalized, Consolidated Data Model
Checking status in the dashboard

The dashboard indicates when an indicator is beyond the acceptable corridor (red) or if a task is not on track (yellow).

MAF provides more details and advanced features for analysing the exception (here: monitor the budget and the completeness of each task).
What-if-analysis

The DSS is used in a first step to analyse the workflow of VO members, e.g. task dependencies ...

... as well as for simulations, eg. different behaviours of the VO members

<table>
<thead>
<tr>
<th>VO Member</th>
<th>Behavior Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUBRY</td>
<td>Hard working</td>
</tr>
<tr>
<td>EIC</td>
<td>Reliable</td>
</tr>
<tr>
<td>ELECTRA</td>
<td>Reliable</td>
</tr>
<tr>
<td>HERREROS</td>
<td>Hard working</td>
</tr>
<tr>
<td>IKERLAN</td>
<td>Reliable</td>
</tr>
<tr>
<td>MGEP</td>
<td>Hard working</td>
</tr>
<tr>
<td>ORONA</td>
<td>Lazy</td>
</tr>
<tr>
<td></td>
<td>Reliable</td>
</tr>
</tbody>
</table>

Schedule Activities | Define KPI | Measure Indicators | Monitor KPI | What-if-analysis
### Decision support based simulation results

Simulation produces different WBS workflows:

DSS analyses the simulated workflow and provides suggestions to the user who can then make decisions.

#### Findings vs Suggestions

<table>
<thead>
<tr>
<th>Findings</th>
<th>Suggestions</th>
</tr>
</thead>
<tbody>
<tr>
<td>▼ Task M3 is likely to miss its deadline (there is no buffer).</td>
<td>Consider adding more resources to IKERLAN partner.</td>
</tr>
<tr>
<td>▼ Task M5 is waiting for available resource. It could be executed 9 days earlier if there was an available resource.</td>
<td>Consider adding more resources to HERREROS partner or fill the gap with another task.</td>
</tr>
<tr>
<td>▼ Task M8 might be delayed because of unreliable partner.</td>
<td>Keep an eye on the responsible partner (SC-CONS) and watch the task progress carefully.</td>
</tr>
<tr>
<td>▼ All partners have tight free capacities. Tasks have no short buffers.</td>
<td>This does not necessarily indicate a problem if all</td>
</tr>
</tbody>
</table>
Some expectations and experiences from trials

1. Establish a common method to define and **visualize the VO model**.

   *The VO-Mod tool seems to be the answer. It is needed to clarify the level of detail needed to manage the OIN VOs.*

2. Establish and **agree about metrics and indicators** used for VOM.

   *The SID tool is a good tool to define them. It is needed to clarify in OIN more indicators needed.*

3. Make **collection of metrics** and construction of indicators from the different partners easier and reliable.

   *The DI3 tool could help in this task. OIN needs to think about integration with partners’ legacy systems.*

4. **Visualize in “real time” the performance** of the different tasks of the VO.

   *The MAF tool will be used to doing that. It is needed to think about the integration of the VO management with the roadmap inside VBE.*

5. **Simulate and take decisions** about the possibilities of management of resources, objectives and partners.

   *The DSS tool could be the answer. It is needed to go deeper in the use of this tool and adapt the definition of the VO to be more effective.*
Conclusions

- Solution and tools for efficient VOM developed
- Prototypes being tested in SME networks
  - Also network access to tools
- The solutions well accepted
  - Answer to real needs
- Final refinements still to be made
  - Based on feedback from end-user networks
Possible areas for future research

- **Interoperability**
  - Communication
  - Performance, collaboration, trust, etc
  - Integration platforms, ERP integration, web-based, etc
  - Data formats, standards (XML, Rosettanet, etc)

- **System**
  - Info from many different systems (web/semantic based)
  - PMBOK, SCM, data acquisition, etc

- **Transaction**
  - Coordinated actions over company borders

- **Business process, People**
  - Understanding & modelling behaviour & relationships
  - Intelligent decision support systems (e.g., simulation based)

Models needed
Aspects on model based management

VOM set-up:
Management structure,
Measuring/Monitoring approach

Collaboration structure:
Work break down structure,
Task allocation

VO performance

COST
TIME
QUALITY
OTHERS?

Management actions?

Communication
Trust
Collaboration
Individual attributes

Incentive system
Others????
Some remaining Challenges

- Efficiency of virtual organisations depends on
  - Performance of the partners
  - Collaboration between partners
  - Trust between partners
  - Configuration of the VO
- Modelling of the relationship between partners’ performance and task fulfilment still a major challenge
  - Needed for definition of management actions
- Measurements
  - All interesting measurements are not available
  - Management of qualitative & subjective measurements
Some references and further reading

• **On the Management of Collaborative Networked Organizations**
  Ollus, M; Karvonen, I; Jansson, K. Proceedings of ISTa-Africa; Pretoria, South-Africa, 3-5 May, 2006

• **On the management of collaborative SME networks**

• **Towards the Sustainability of Virtual Organization Management**
  Klen, E.; Pereira-Klen, A. A; Gesser, C. E. Proceedings of IV Global Conference on Sustainable Product Development and Life Cycle Engineering, São Carlos, São Paulo, Brazil, 03-06 October, 2006.

• **Virtual Organization Management: An Approach Based on Inheritance Information**

• **Identification of Forms and Components of VO Inheritance**
  Karvonen, I; Salkari, I; Ollus, M. Proceedings of PRO-VE’07, Guimaraes, Portugal, 10-12 Sep 2007.

• **Measuring Collaboration Performance in Virtual Organizations**
  Westphal, I; Thoben, K-D; Seifert, M. Proceedings of PRO-VE’07, Guimaraes, Portugal, 10-12 Sep 2007.
Thank you

Further information

www.ecolead.org
martin.ollus@vtt.fi