COLLABORATIVE NETWORKS AND INNOVATION

Luis M. Camarinha-Matos

New University of Lisbon
cam@uninova.pt

INNOVATION?

COLLABORATIVE NETWORK?

INNOVATION IN COLLABORATION?
Innovation is creating new ideas and getting them to work.

- Innovation must be user-focused.
- Innovation is not science or technology.
- Innovation creates economical prosperity rather than knowledge.
- **Innovation is turning an idea into a business success.**
- Innovation is a change in the economic or social environment.
- Innovation is the exploitation of an invention.
- Exploitation is everything involved in the implementation or commercialization.

All these descriptions could be composed in a qualitative equation:

\[
\text{Innovation} = \text{Invention} + \text{Commercialization or Implementation.}
\]

[J. Dias, 2010]

Innovation is not science or engineering, and it is not technology; it is about taking ideas and developing them into products and services and bringing them to the marketplace to generate new economic growth.

Raw ideas provide no benefit, unless pursued toward some end.

The Universal Industrial Success Curve shows a seven stage segmentation scale of ideas: from 3,000 unwritten ideas, 300 will be formalized in written form that perhaps leading to one success.

(Greg A. Stevens and James Burley, “3000 Raw Ideas = 1 Commercial Success!” Research Technology Management, May-June 1997)
FROM IDEA TO MARKET

Can this be done by a single organization?

What if it is a SME?

Phase 0 Research
Phase 1 Solution proposal
Phase 2 Prototype
Phase 3 Pre-commercial product/service
Phase 4 Commercial product/service

Research push

Innovation “no man’s land”

Market pull

A missing link in innovation

INNOVATION & COLLABORATION

Innovations are increasingly brought to the market by networks of enterprises, selected for their unique capabilities, and operating in a coordinated manner.

> Creation of new value ...

by confrontation of ideas and practices, combination of resources and technologies, and creation of synergies

⇒ INNOVATION

Particularly important for SMEs!

... but this demands that companies develop different skills, in particular, the ability to collaborate with partners to achieve good innovation performance.
COLLABORATION – WHY?

A classical supply chain

Example: Automotive industry

NETWORKS IN INDUSTRY

Long-term, quasi-“stable”, coordinated
EXAMPLE OF CN

Movie industry

A typical example of a dynamic, temporary network

VIRTUAL ENTERPRISE – A “CLASSICAL” DEFINITION

“A virtual enterprise is a temporary alliance of enterprises that come together to share skills or core competencies and resources in order to better respond to business opportunities, and whose cooperation is supported by computer networks.”
OTHER EXAMPLES OF CN

Elderly telecare

Healthcare
Social security
Police
Insurance...

Virtual Teams

Professional Virtual Communities
APPLICATION IN CIVIL SERVICES

- Advances in the technology rises the citizen’s demands for better and easier use of civil services, recently addressed by virtual civil / municipality organizations (e-gov net)
  - To give the appearance of a single organization to the citizens, while encompassing services provided by:
    - City Hall, Municipal Water/Electricity distribution,
    - Internal revenue, Public leisure facilities, Cadastre, etc.

- Recently spread to virtual education organizations and virtual institutes
  - constituting a number of educational institutes (or even individuals) providing a joint educational program

APPLICATION IN OTHER SERVICES

The paradigm is now spreading into

- Tourism
- Insurance
- Transportation
- Consultation
- Disaster rescue
- European borders protection
- Accounting/financial support
- Legal support
- Smart grid
- ...
EXPECTATIONS

Participation in a collaborative network has the potential of bringing benefits to the involved entities:

- “Survivability” in a context of market turbulence
- Acquisition of a larger dimension
- Access to new / wider markets and new knowledge
- Sharing of risks and resources
- Joining of complementary skills and capacities
  - focus on core competencies
    while keeping a high level of agility
- Better achieving common goals by excelling individual capabilities
- etc.

COLLABORATION MOTIVATION

“can’t do it alone”
“size”
“survival”

Examples of motivation factors

- Coping with market turbulence
- Increase chances of survival
- Increase activities / profit
- Better chances to compete with larger companies
- Lobbying & market influence
  (branding / marketing)
- Easier access to loans
- Cheaper group insurance
- Better negotiation power
  (e.g. Joint purchasing)
- Prestige, reputation, reference
- Access to / explore new market / product
  (e.g. Multidisciplinary sector)
- Expand geographical coverage
- Increase potential for innovation
- Economy of scale
- Develop branding
- Achieve (global) diversity
- ...
- Also regional strength
HISTORICAL PERSPECTIVE

WHAT IS IN A CN?

- Variety of entities - organizations and people … even machines
  - largely autonomous
  - geographically distributed
  - heterogeneous in terms of their:
    - operating environment, culture, social capital and goals

- Collaborate to (better) achieve common or compatible goals

- Interactions are supported by computer network.

Much more than simple customer-supplier or outsourcing relationships
COLLABORATION REQUIRES PREPAREDNESS!

According to some empirical studies failure to achieve successful collaborations nearly reaches 50% of the cases!

(Kelly et al., 2002),
(Barnford et al., 2004),
(Bloqvist et al, 2005)

- Diverse business practices
- Different cultures
- Heterogeneous infrastructures
- Trust building takes time
- Long negotiation times
- Communication “overheads”
- ...

COLLABORATIVE NETWORKS – Main classes

- Virtual Team (VT)
- Professional Virtual Community (PVC)
- Temporary Organization (Request Driven)
- Virtual Organizing Environment (VO)
- VO Breeding Environment (Long-term strategy)
SOME EXAMPLES OF VBEs

**virtuelle-fabrik.com**
Metal-mechanics sector
Switzerland, Germany

**Swiss Microtech**
Watch industry sector
Switzerland, China

**netWork Oasis / Science Park**
Finland

**torino wireless**
Telecommunications sector
Italy

**EIC**
Metal-mechanics sector
Spain

**ORONA**
Electronics sector
Ireland

**Kouvolan Keskustaeräyys / Engineering Region**
Engineering
Finland

**TechMoldes**
Moulds industry
Brazil

Towards a PVC (Examples)

**projektwerk**

Founded in 1999
About 4500 freelancers & small enterprises

Publish profiles
Submit bid invitations
Search for cooperation
Partners search

Common portal
Till 2001 ➔ More than 1000 projects!
COLLABORATIVE NETWORKS - Taxonomy

Collaborative Network

Collaborative Networked Organization

Ad-hoc Collaboration

Long-term strategic network

Goal-oriented network

VO Breeding Environment

Professional Virtual Community

Grasping opportunity driven net

Continuous production driven net

Virtual team

Virtual enterprise

Supply chain

Virtual organization

Virtual government

Extended enterprise

Dynamic VE

Dynamic VO

Collaborative transportation network

(Future) Smart grid

Distributed manufacturing

WHERE ARE WE?

ICT Infrastructures

VO Breeding Environments

Virtual Organizations

Theoretical Foundation

Professional Virtual Communities

Concepts?
Methodologies?
Support technology and tools?
Practices?

Are we done?
Drivers of innovation in collaboration

**Cost**

- Lower labor costs
- Lower material costs
- Lower supplier costs (joint purchasing)
- Lower infrastructure costs

**Drivers of product / service differentiation (innovation)**

**Superior competencies**
- Lowering time to market and increasing responsiveness
- Rapid access to capacity
- Technical know-how
- Process expertise
- Domain knowledge

**Contextual knowledge**
- Access to local knowledge and local relationships
- Market access
- Supplier relationships
- Institutional ties
- Government connections

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**ABL TO COLLABORATE?**

**Pillars of Collaborative Capability**

**People**
- Acquisition of soft skills (training) – e.g. Communication and motivation
- Evaluation of contributions and rewarding
- Reaching common understanding – ontological support, negotiation wizards
- Modeling emotional status (network health), managing trust
- Orchestration and coordination of distributed teams
- Exert influence over resources not under direct control
- Traditional processes (e.g. water-fall) not well-suited for distributed teams; thus new processes and support tools for business services design are needed
- Combination of different sub-processes (by different sub-teams)
- Understanding the foundations of the co-innovation process & factors
- Handling additional processes – e.g. IPR, tracking contributions, rewards

**Process**
- Improve efficiency of distributed work
- Facilitate seamless integration
- Handling governance rules, knowledge & assets management
- Support rapid / agile reconfiguration of network structures / value chains
- Cope with technological evolution (logical layer vs. Implementation layer)

**Platform**
- Dealing with collaboration at “program”/strategic level (not project by project basis)
- Endogenous / exogeneous features to support long-term cooperation and dynamic goal-oriented (short-term) collaboration
- Learning from experience – monitoring and governance.
Four models of network-centric innovation

<table>
<thead>
<tr>
<th>Innovation Space</th>
<th>Creative Bazaar</th>
<th>Jam Central</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergent</td>
<td>A dominant firm shops for innovation in a global bazar of new ideas, products, and technologies</td>
<td>Individual contributors coming together to collaborate in envisioning and developing an innovation</td>
</tr>
<tr>
<td>Defined</td>
<td>Orchestra</td>
<td>MOD Station</td>
</tr>
<tr>
<td></td>
<td>As musical instruments need to resonate with each other, the innovative contributions of network members also complement one another</td>
<td>(MODification) Communities come together to innovate around a well-defined technology or platform</td>
</tr>
</tbody>
</table>

Centralized       Diffused

Network Leadership

CUSTOMER INVOLVEMENT

[Berger et al. 2005]

Customer-direct collaboration

Manufacturer-driven collaboration

Retailer-driven collaboration

Intermediary-based collaboration
CUSTOMER INVOLVEMENT

Co-creation
Co-innovation

CO-INNOVATION NETWORK

CHALLENGE: Enable collaborative innovation
TOWARDS CO-CREATION NETWORKS

From customer-centric ... to co-innovation networks

AN EXAMPLE

Collaborative solution space (co-creation playground)

Service provision space (along PLM)

Deploy

Product model + support services

Cloud-based pool of resources

Physical space

Cyber space

Product design

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AN EXAMPLE ...

Manufacturers network
- Small & relatively stable VBE
- Mostly located in Europe
- Little overlapping
- Loose interactions?
  ... Not yet a VBE!

Product development network

Customer “network”
- Not clearly organized as a network
- Local suppliers
- Other entities – R&D, regulators, etc

Product servicing network
- Virtual enterprise (product life cycle)
- Members from “manufacturers network” & “customer network”
- Long duration, evolution

SERVICE CO-CREATION / CO-INNOVATION

“Involvement of the customer ... and local stakeholders ... in the process of collaboratively creating new products / services”

Location: Near desert
Problem: Power loss due to accumulation of dirt on the solar panels (soiling loss)

Co-creation team

Measurement Box
- Trigger panel cleaning
- New service

Uncleaned panel  Daily cleaned panel
OPEN INNOVATION

Open Innovation is the process of doing new things with outsiders that deliver value

It’s as much about Attitude
Involvement of people outside core task
Involvement of non-employees

Open Innovation - Sources

• Inside
  – Employees in different divisions...
  – Geographies
  – Functions

• Outside
  o Suppliers
  o Customers
  o Consumers
  o Partners
  o Universities & research institutes
  o Retirees
  o Anybody
Open Innovation stages collaborative climb – who and why

<table>
<thead>
<tr>
<th>Closed Innovation – the lab is our world</th>
<th>Open Innovation – the world is our lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hire the best and the smartest</td>
<td>Recognize that lots of smart people work elsewhere, so find ways to interface with them</td>
</tr>
<tr>
<td>Put them in special conditions</td>
<td>Open your networks to diverse talents</td>
</tr>
<tr>
<td>Innovators are free from market pressures to innovate from within</td>
<td>Innovators are exposed to real world needs, pressures and information exchange to innovate by engagement</td>
</tr>
<tr>
<td>Very pushy - move technology pipeline from ideas to products</td>
<td>Push and Pull - non-linear process of ideation advances products and services</td>
</tr>
<tr>
<td>Delivered to passive customers</td>
<td>Delivered to engaged customers</td>
</tr>
</tbody>
</table>

http://www.flcmidatlantic.org/power_point/2009/Open_Innovation_and_Social_Networking/sorenson_090216.ppt

OPEN INNOVATION ...

Open source communities

Social networks?

A social network is a description of the social structure between actors, mostly individuals or organizations. It indicates the ways in which they are connected through various social familiarities ranging from casual acquaintance to close familiar bonds.
OPEN INNOVATION ...

Living Labs?

A "Living Lab" is a ...

citizen-business-public partnership operating in real life/work environment providing human-centric (user-driven) innovation service

A living lab is a research concept. A living lab is a user-centered, open-innovation ecosystem, often operating in a territorial context (e.g. city, agglomeration, region), integrating concurrent research and innovation processes within a public-private-people partnership. [Wikipedia]

Example:

CROWDSOURCING

Crowdsourcing - outsourcing tasks, traditionally performed by an employee or sub-contractor, to an undefined, large group of people or community (a "crowd"), through an open call.

Frequently there is a “prize” for the winning idea (prize competitions)

“Crowdsourcing” - “crowd" + “outsourcing"

Jeff Howe, June 2006
Wire Magazine
CROWDSOURCING - Examples

http://www2.innocentive.com/

CROWDSOURCING - Examples

http://www.crowdsourcing.org/
CROWDSOURCING - Examples

Who said the world has become cynical?
One Billion Minds connects people like you & me to striking projects of change. Start your own project or join 2052 minds helping 11 amazing changemakers today.

http://www.onebillionminds.com/

CROWDSOURCING - Examples

Open Pitches
Here you can view all currently active pitches...
The pitch information is limited. To access all of the information please Register.

http://www.ideahunting.net/

(not very active recently)
CROWDSOURCING - Examples

10EQS
CrowdControl
CrowdEngineering
CrowdFlower
CrowdSource
CrowdTogether
DesignRider
Elance
freelancer
imagebrief
Lingotek
Lionbridge
mob4hire
mobileworks
mygengo
Mypitch
Myplace
mediapiston
ODesk
thinkspeed
TopCoder
twago
usbb
userfeedback
UTest
Voice123

http://www.crowdengineering.com/
Crowd4Care
Crowd4Any
http://www.crowdengineering.com/

CROWDSOURCING – Tools (examples)

http://www.crowdtogether.com/
CrowdTogether
Bandana Design Contest
http://ideascale.com/crowdsourcing-tool.html
IdeaScale
http://www.iaascale.com/crowdsourcing-tool.html
**CROWDSOURCING - ....**

**Why would people participate?**

http://www.hypios.com/concept/pdf-download/id/2

**Is it effective?**

**Is it a collaborative process?**

**Crowd or individuals?**

"Wikipedia seems like a good example of a crowd of people who have created a great resource. But at a conference last year I asked Wikipedia founder Jimmy Wales about how articles were created.

He said that the vast majority are the product of a motivated individual. After articles are created, they are curated--corrected, improved and extended--by many different people. Some articles are indeed group creations that evolved out of a sentence or two. But if you took away all of the articles that were individual creations, Wikipedia would have very little left. “  

Dan Woods, 29-9-2010

CROWDFUNDING

Crowd financing
Equity crowdfunding
Hyper funding

The collective effort of individuals who network and pool their money, usually via the Internet, to support efforts initiated by other people or organizations

[WikiPedia]

MORE ...
1. Kickstarter
2. IndieGoGo
3. GoFundMe
4. ChipIn
5. RocketHub
6. GiveForward
7. Fundable
8. Crowdtilt
9. Crowdfunder
10. AppBackr

http://crowdfunding.com/
http://crowdfunding.pbworks.com/w/page/10402176/Crowdfunding

OTHER TRENDS – FAB LAB

Fab Lab - A small-scale workshop offering (personal) digital fabrication

Concept was developed in the Center for Bits and Atoms (CBA) of the Massachusetts Institute of Technology (MIT)

Large network: http://fab.cba.mit.edu/about/labs/

Typical fab lab equipment:
- Laser cutter, plasma cutter, water jet cutter, knife cutter:
- sheet material cutting
- 3-axis CNC machines: 3 or more axes, computer-controlled subtractive milling or turning machines
- Rapid prototyper: typically a “3D printer” of plastic or plaster parts
- Printed circuit board milling: 2 dimensional, high precision milling to create circuit traces in pre-clad copper boards
- Microprocessor and digital electronics design, assembly, and test stations

http://www.fablabedp.edp.pt/
OTHER TRENDS – **SOCIAL INNOVATION**

**Social innovation** refers to new strategies, concepts, ideas and organizations that meet social needs of all kinds — from working conditions and education to community development and health — and that extend and strengthen civil society.  

[Wikipedia](http://www.socialinnovationeurope.eu/)

A recent Call from the European Commission:

**Objective ICT-2013.5.5 Collective Awareness Platforms for Sustainability and Social Innovation**

The objective is to stimulate and support the emergence of innovative ICT based platforms for grassroots Social Innovation, providing **societally, environmentally and economically sustainable approaches and solutions to tackle societal challenges**. Such collective intelligence platforms will include collective decision-making tools and innovation mechanisms allowing and encouraging individual and community creativity, participation and situational awareness.

The vision is that individuals and groups can more effectively and sustainably react to societal challenges by acting on the basis of a direct extended awareness of problems and possible solutions. To foster this, the objective has an experimental approach where concepts and tools are developed and verified in real world cases.

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OTHER TRENDS – **Hybrid value chains**

**Hybrid Value Chain** (HVC) is a business model that leverages the capabilities of the business and citizen sectors to enable the delivery of needed goods and services to low-income populations in a more cost-effective way.

[Ashoka](https://www.ashoka.org/hvc)
ASSIGNMENT

Identify three motivating factors for SMEs to pursue innovation in networks

Give two clear examples of contexts in which innovation in networks is more promising than innovation in-house

Can you imagine a scenario of crowdsourcing in collaboration?