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## Conference Paper

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# The Co-innovation Bingo: An Object-Oriented Networking Mechanism to innovate in Open Innovation Services

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## Abstract

In this paper, we describe a business networking tool aiming at fostering collaborative innovation emergence between actors. This tool is designed as a game to encourage participants to share and meet as many partners as possible in a given time. This artefact is based on previous research aiming at identifying collaborative innovation mechanisms and getting inspiration from different fields such as organization design, service design and prospective. The proposed artifact comes as a set of prescriptive rules (Van Aken, 2005) that support managers' co-innovation opportunity elicitation. In preliminary test, 30 exchanges emerged among 20 participants, who did not know each other beforehand. Our contribution is twofold: from a practical point of view, we contribute to help companies to find emergent co-innovation opportunities; and from a theoretical point of view, this artefact is part of our emergent theory of object-oriented co-innovation mechanisms.

**Keywords:** Collaborative innovation, Coupled innovation, Open innovation, Innovation mechanisms, Design science, Gamification

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## Introduction

Due to the complexity of products, services and ultimately of the needs of customers, thinking about firm's cooperative strategies is a fundamental issue in the search for business growth's avenues (OECD/Eurostat, 2018). Indeed, the World Economic Forum stated that collaborative innovation between companies "can [...] foster new growth through new products and non-market considerations that enable the evolution of entire systems" (World Economic Forum, 2015). Therefore, we define inter-firms' collaborative innovation as 'ad hoc innovation,' involving changes in competences, technologies and an interactive construction of new outcomes (Castaldi et al., 2010; Gallouj & Weinstein, 1997).

### *Nature of the problem: Innovation's capacity in SMEs*

Facing high transaction costs, and resource-based competitiveness, entrepreneurs seek partners to carry out innovations and develop markets. The relationships sought are of different types: entrepreneurs are sometimes seeking short-term relationships (swinger) and sometimes long-term relationships (keeper). Entrepreneurs can find themselves in these identical processes with different objectives. In addition, their needs and capacities evolve over time. Hence, the multiplicity of professional and thematic networks, representative of a profession or aimed at commercial objectives, creates uncertainty for the entrepreneur who wishes to find an alliance partner in order to elicit or produce innovation.

According to M&BD Consulting (2016), 94% of SMEs surveyed see innovation as an essential factor in ensuring the sustainability of their business and 56% use creativity methods. However, 78% have neither a formal idea generation process nor a formal idea evaluation process and 50% of the respondents practice occasional innovation. It is also interesting to note that more than 50% of companies practice open or collaborative innovation, through customers, suppliers, or clusters. The authors conclude that "efforts to improve the innovation process must be oriented towards creativity through the involvement of employees and the provision of tools" aimed at 1) raising awareness among leaders and managers on the need to involve all employees in the innovation process, and 2) provide leaders and managers with tools that allow them to generate ideas from which future innovations will flow.

### *The innovation support in Switzerland does not focus on inter-firms cooperation*

According to our survey of 500 entrepreneurs in French-speaking Switzerland, entrepreneurs are looking for solutions to support creativity and the development of non-technological innovation, particularly in the service sector. The business services of the Regional Innovation Systems (RIS) in Switzerland mainly offer help to create a business plan, training, legal and accounting services, market studies, help with exporting or finding foreign partners, help in e-business and information and communication technologies, advice on the development of new products and services, help in finding financing from banks, help in raising funds from business angels and venture capitalists, recruitment and human resources consulting, networking of entrepreneurs or mentors [unpublished data]. Some initiatives encouraging creativity are emerging, such as hackathons (Flores et al., 2019) and other intergenerational creative events [unpublished data]. But a lack of understanding the factors of choice and the decision conditions of the actors remains.

Our analysis of the 3 biggest innovation support organization in French-speaking part of Switzerland shows that very few services toward cooperative strategies are proposed so far (see Appendix 1: Services' comparison of the Swiss innovation support organisations).

On the one hand, the partners' research services are based on the work of the coaches able to advise entrepreneurs in choosing a cooperative organisation. On the other hand, previous research [unpublished data] showed that the participation in hackathons or "ideathons" is not a guarantee of finding a cooperation partner.

### *The business network services are in need of a framework to support their inter-firms cooperation strategies*

Nevertheless, Zeng et al. (2010) finds that there are significant positive relationships between inter-firm cooperation, cooperation with intermediary institutions, cooperation with research organizations and innovation performance of SMEs, of which inter-firm cooperation has the most significant positive impact on the innovation performance of SMEs.

The Business Network International (BNI) states that in Switzerland, it generates 327 million CHF in one year across 2'645 members and 84 Swiss chapters, thanks to the weekly networking events (BNI, 2020). This characterizes the aim of the classical business clubs, as known as bringing together people with same interests, to share experiences and ideas and create new commercial relations. At our knowledge, rare are traditional business clubs providing innovation actively.

Recently, the international network of Impact Hubs has fostered a global community devoted to the promotion of entrepreneurship as a driver for positive change (Impact Hub, 2020). With 16'500 members in more than 55 countries, the aim of the network is to "gain access and insight into social innovation by co-creating locally rooted, globally connected programs and events". The impact ambition target goes from corporate innovation to ecosystem development (Impact Hub, 2019). The Impact Hubs organize recurrent resource sharing sessions among their members that can promote the emergence of innovation.

### *The need for prescriptive rules and solution-oriented knowledge*

The need for identifying action mechanisms and the consideration of contingency factors are unveiled by literature especially in the fields of open innovation, such as outside-in innovation, and of coupled innovation, as innovation with complementary partners (Bogers et al., 2019; Gassmann & Enkel, 2004). The literature shows a need for prescriptive rules and recommendations for action (Chauvet & Chollet, 2010; Gregor & Jones, 2007; Van Aken, 2005) at the formation phase of the alliance and specifically regarding the identification of the stage of emergence of the collaborative innovation opportunity.

### *Research gap*

Plenty of solutions exists to create commercial relationships and to find a partner, such as business clubs, commercial chambers, dedicated hubs, or events aiming at sharing knowledge such as conferences, research institutes or business school events, or events aiming at unveiling innovation opportunities such as Hackathons. Nonetheless, a system that combines these features toward the emergence of innovation appears to be missing (see Appendix 2: Comparison of different knowledge sharing and networking artefact). Hence, our research question is: How to foster the emergence of inter-firms' collaborative innovation?

The rest of the paper proceeds as it follows. We firstly present the methodology and artefact we used. Then we present the results of the quasi-experimentation before we discuss the findings and conclude.

## Methodology

We built a prototype (called *Co-innovation Bingo*) based on constructs from previous research on collaborative innovation mechanisms and adopted a methodology based on design science (Gregor & Jones, 2007) and comparable to grounded theory in the sense that solutions emerged by testing a design artefact with companies.

### *Components of our design theory*

According to Gregor and Jones (2007), to provide explanations and predictions, and to be testable, a design theory must rely on eight components. The six core components are the purpose and scope, the constructs, the principle of form and function, the artefact mutability, and the testable propositions; the two additional components are: the principles of implementation and the expository instantiation. Table 1 below shows the anatomy of our design theory.

Table 1  
Anatomy of the "Co-Innovation Bingo" Artefact

<b>Purpose and scope</b>	<b>Foster discovery of innovation opportunities and emergence of alliances between professionals</b>
<b>Constructs</b>	a) Joint/Shared Vision b) Joint/Shared Resources c) Joint/Shared Market
<b>Principle of form and function</b>	a) Vision of the project leader b) Underused resources owned by one participant c) Noncompetitive markets that are accessible by one participant
<b>Artefact mutability</b>	a) Project description b) Playing card c) Limited tokens
<b>Testable propositions</b>	a) The project description supports linking professionals (P01) b) Playing card supports stages of completion (P02) c) Tokens materialize exchanges (P03)
<b>Justificatory knowledge</b>	a) Vision for sustainable partnerships (Nidumolu et al. 2014) b) Dynamic capabilities for alliances (Das & Teng, 2000) c) Service dominant logic for innovation (Vargo & Lusch 2008)
<b>Principles of implementation</b>	a) Personal gamecard material with limited resources b) Human game orchestration during the event c) Sharing contact details & analyzing results with network analysis
<b>Expository instantiation</b>	Professionals networking events

Source: Author's contribution

*Elements of motivation: the gamification*

To generate participation, game mechanisms were used, such as a playing card and tokens, time constraints, limited resources, in order to support game dynamics such as competition, egoism, altruism, and rewards (Groh 2012; Bunchball Inc., 2010). Figure 1 presents the Co-Innovation bingo Cardboard.

*Participation conditions (artefact conditions)*

Before the event, participants are invited to describe their vision and their starting resources with a preliminary questionnaire (name, activity) in order to receive their gamecard and the game points. An alternative to enter the game is to simply describe a project on a new gamecard and to take a series of game points at the entry of the event.

*Game Rules (interaction conditions)*

Participants are invited to discuss with their neighbours to identify in which project they could invest points. They can invest game points in the projects they want, and get points regarding resources, markets, and vision to create a consortium. The goal is to totalize 9 points: 3 resources, 3 market accesses and 3 visions. The low amount of points assures simplicity and quick wins. Figure 1 below shows the Bingo cardboard.

Figure 1  
Co-Innovation bingo Cardboard



Source: Author's contribution

*Artefact description and testable propositions*

Accordingly, we state the following testable propositions, and settle the circumstance of a quasi-experiment. The Co-Innovation Bingo:

- P1: allows to extract new ideas from a set of existing insights in less than 60 minutes

- P2: has a setup time of less than 5 minutes and an overall cost of less than 5 euros/ participant
- P3: allows to visualize how participants interacted by means of a dynamic network of ideas

### *Description of the quasi-experiment: TEDx Martigny 2019*

The quasi-experiment allows settling an interventional study to evaluate the causal impact of an intervention on a population without random assignment (Gibbons & Herman, 1997). We tested our artefact during the TEDx conference<sup>1</sup> that took place in Martigny in 2019. The general conference topic was "Together" and the attendance reached around 250 participants, including volunteers.

The event was short, and the cadence of the game was handled as follows:

- online preregistration for the game is possible during conference registration
- 90 minutes of pre-conference available to record spontaneous registrations and distribute play materials
- 45 minutes of mid-conference for networking session (active play)
- 105 minutes of post-conference time for the networking session (active play), participant interviews and collection of game cards.

## Results

In the remainder of this section, we present first the quantitative results, followed by the qualitative results, and a summary of the quasi-experiment results.

### *Quantitative results*

In this section we present the quantitative results regarding participation, the mechanisms and dynamism of gamification, the interaction results, and the nature of the exchanges. Figure 2 presents the participants' interactions' networks.

#### *Participation*

- 21 total registrations
- 14 spontaneous registrations on site
- 8 active players
- 7 online pre-registrations
- 3 people are not interested (1 employee of an REO and 2 pensioners)

#### *Results in terms of mechanisms and dynamics*

- 30 formal exchanges
- 9 returned playing cards
- 7 playing cards with interactions
- 1 complete playing card (winner)

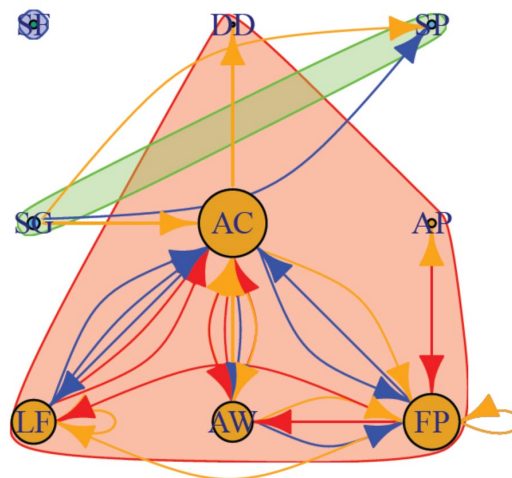
#### *Interaction results*

- 30 total interactions
- 8 playing cards / unique receivers
- 7 single transmitters
- 1 empty game cards

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<sup>1</sup> "TEDx is a grassroots initiative, created in the spirit of TED's overall mission to research and discover "ideas worth spreading." TEDx brings the spirit of TED to local communities around the globe through TEDx events." Source: <https://www.ted.com/about/programs-initiatives/tedx-program>

Figure 2  
Participants' interactions Networks



Legend:

- Type of relation: Red arrow = Market sharing; Orange arrow = Resource sharing; Blue arrow = Vision sharing

- Colored surface = Clusters

Source: Author's illustration with RStudio (libraries: iGraph, rMarkdown)

Nature of the exchanges

- 13 resource exchange
- 9 objectives exchange
- 8 market exchanges
- 5 self-sharing

Qualitative results

In this section, we present the synthesis of the interviews of the participants during the experimentation regarding good points and areas of improvement.

General comments

- "It's a great concept!"
- "Who's in the red card club?"
- "I'll get rid of my stickers!"
- "It's hard to find the contestants in this crowd!"
- "That's great, it works!"

Good points

- "Easy to understand."
- "It's a good opportunity to meet people."
- "It helps you learn things, meet people."
- "It makes you think about what you can share."
- "It's also useful to meet people who didn't have boxes."

Areas of improvement expressed by players (individual quotes)

- "The explanations on the cardboard are not enough."
- "A session to present everyone's visions would be a plus."
- "Cardboards are not visible enough."
- "Not useful if you know people or are introduced to certain people."



- "Depends on people's natural ability to reach out to others."

### *Quasi-experiment results*

Every testable proposition was validated : The project description supported linking professionals (P01), playing card supported stages of completion (P02), tokens helped to materialize exchanges (P03). Moreover, the artefact allows extracting new ideas from a set of existing insights in less than 60 minutes (P1). The artefact had a setup time of less than 5 minutes and an overall cost of less than 5 euros/ participant (P2). The artefact allows visualizing how participants interacted by means of a dynamic network of ideas (P3; see Figure 1). P4?

## Discussion

According to Davis (1971), "all interesting theories, at least all interesting social theories, then, constitute an attack on the taken-for-granted world of their audience". Consequently, this section is split into two statements regarding what we consider interesting: the impact of organization and composition, and the impact of co-relation and context.

### *Organization and composition toward simplification*

The frontier objects of collaborative innovation are reduced to three elements (resources, vision, markets) to simplify the emergence of pertinent shared objects. The three doors belong to a single business model as building blocks. Moreover, the consolidated elements emerged from several actors are part of a single innovation ecosystem.

### *Co-relation & contextuality foster the emergence of innovation*

The building blocks and the interactions with unknown people are both interdependent to foster the emergence of relations. Projects are changing according to emergent collaboration propositions.

It is only when you read about the projects that you know if you have something to share; you cannot do it in advance. The game is therefore an emergence factor according to the emergence theory (Clayton & Davies, 2006). The co-innovation bingo can lead to several types of emergence: the synchronic emergence because the appearance of the property occurs at different, undefined times; the weak emergence in case of a simple sharing of resources or market access; the strong emergence when creating new objectives and redefining the needs for resources and access to markets.

## Conclusion

The Co-innovation Bingo allowed participants to share information and to create alliances in a limited time and space, and for a very low cost. This artefact is useable during the break between two conference sessions. People can identify valuable assets only once they reach enough information about the contact person's project.

The artefact allows researchers to trace the circulation of the tokens through the participants and to rank the players.

The game gives the possibility to gather a database of projects, specific resource holders and specific market access holders. To improve the usability of the database, Participants could/should clarify the nature of the resources and markets they share. Then, with more data in the database, it will be possible to print personal profiles and to connect people based on current and previous data. Moreover, as

the session's progress, a network-modeling tool could report on emerging relationships. The effects over time regarding the perenity of the consortium remain to be observed.

We have already applied the model internally within an organization and plan to continue the quasi-experiments internally and externally, as well as to continue the analysis of the link between this model and the business model and the value chain. Other applications are being tested such as internally within an organization.

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## Appendix 1

Table 1

Services' comparison of the Swiss innovation support organisations

<b>Cimark</b>	<b>Platinn</b>	<b>Genilem</b>
<a href="http://www.cimark.ch/">http://www.cimark.ch/</a>	<a href="https://platinn.ch/">https://platinn.ch/</a>	<a href="https://genilem.ch/">https://genilem.ch/</a>
<b>Innovation in your SME</b>	<b>Business</b>	<b>Diagnosis</b>
Development of new products/offers	Increased sales	Innovative elements of your project
Diversification and extension of market	Diversification of supply	Idea potential to business
Business processes/organization	Strengthening customer relationships	
Adapting the strategy	Project validation and implementation	
	Evolution of the strategy	
<b>Start-up</b>	<b>Organisation</b>	<b>Accompanying</b>
Professional coaching	Increasing productivity	Coach in business development
Support for funding	Control of flows and processes	Leadership, strategy, positioning and sales
Help to create business plans	Optimal use of resources	Building and expanding your network
Providing space	Adequacy to the strategy	Strategic thinking, mentoring sessions
Access to networks of specialists	Cost optimization	
<b>Networking</b>	<b>Cooperation</b>	
Support for potential customers	Potential analysis	
Networking (BtoB or BtoC)	Partnership creation	
Accompaniment at trade fairs	Access to public funds	
Search for academic partners	Setting up of cooperation projects	
	Negotiation of cooperation contracts	
<b>Management</b>	<b>Finance</b>	
Program management	Financing strategy and due diligence	
Tender management	Network of investors and funding sources	
Cluster animation	Investor relations	
Technology valuation	Negotiation and fundraising	
Intellectual property, patent management		
Technology transfer agreements		
Market rating		
Technical feasibility		
<b>Events</b>	<b>Formation</b>	
Thematic information sessions	Information sessions	
Hackathons, ideathons	Intensive courses	
Workshops	Workshops	

Source: Author's comparison

## Appendix 2

Table 2

Comparison of different knowledge sharing and networking artefact

	<i>Commercial relationship</i>	<i>Partnerships to discover/enter markets</i>	<i>Innovation results sharing</i>	<i>Knowledge sharing</i>
<b>Business Clubs</b> (BNI, AEVEX)	Yes	Yes		
<b>Innovation Conferences</b> (TEDx, Jiyu)			Yes	Yes
<b>Commercial Chambers events</b> (Petits déjeuners)	Yes	Yes		
<b>Research institute events</b> (Entremets)			Yes	Yes
<b>Business School events</b> (Hackathon)				Yes
<b>Professional Associations events</b>				
<b>Impact hubs events</b> (Resources sharing events)	Yes	Yes		Yes

Source: Author's contribution

Table 2 (continued)

Comparison of different knowledge sharing and networking artefact

	<i>Problem solving Features</i>	<i>Innovation alliance development</i>	<i>Innovation opportunity discovery</i>
<b>Business Clubs</b> (BNI, AEVEX)	Yes		
<b>Innovation Conferences</b> (TEDx, Jiyu)		Yes	
<b>Commercial Chambers events</b> (Petits déjeuners)			
<b>Research institute events</b> (Entremets)			
<b>Business School events</b> (Hackathon)	Yes		Yes
<b>Professional Associations events</b>			
<b>Impact hubs events</b> (Resources sharing events)		Yes	

Source: Author's contribution