

Cross Cluster Cooperation – Means and Tools for Enabling Inter-Organisational Innovation and Business Incubation

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Abstract

The paper reports about a German cross-cluster cooperation project that links a microelectronics cluster with a biotechnology cluster. The focus is on cross-cluster innovation: How can new products and start-ups be systematically generated and qualified at the intersection of the two fields? The article presents methods and tools that were custom-tailored and applied for cross-cluster innovation activities and events (Idea Lounge, Idea Day). Evidence was collected for the effectiveness of a custom-tailored cross-innovation processes, indicating the need for creative innovation management and customized workshop design. Generally, they indicate key components for the model of an open virtual incubator.

Keywords

Technology cluster, cross-cluster innovation, inter-organizational knowledge exchange, creative techniques, incubator

1. BACKGROUND

Cluster Formation: The formation of clusters has – among other goals – the enhancement of innovation activities as main objective. The (local) accumulation of enterprises and institutions under one thematic umbrella resp. technological focus promises scaling effects for knowledge transfer, for resource sharing, and inter-organisational interaction [1]. Commonly, cluster are organised around key enabling technologies, e.g. optics, photonics, microelectronics, biotechnology. However, the formation of cluster is hampered by increased organisational inertia: the coordination of cluster activities is complex due to the number of stakeholders and their interests, that must be negotiated and properly managed [2],[3]. In the

worst case, clusters (which are often lushly funded by public money) may merely grow into self-sustaining bureaucratic structure.

Cross Cluster Innovation: On top of cluster formation, idea of which has influenced to considerable extent economic and technology policy in the past two decades, there is the new demand for cross-cluster innovation [1],[2],[4]. Policy makers have recognised that the thematic and technological focuses on which clusters are build, also result in systematic limitations to their scope of activities. Microelectronics clusters work in microelectronics, and may still intensify their activities within this field of competence – because it is their competence. In effect, cross-cluster policies have been issued (for instance by the European Commission) which attempt to make cluster boundaries more open, and stimulate cooperation between different types and themes of clusters.

A central expectation is a substantial increase in innovation. It is hold that major innovation appear at the boundaries of established technologies, and at the intersection of different clusters and fields of R&D e.g. material science and medicine / healthcare [5]. Thus, a systematic exploration of promising cross-over technologies and their innovation potential on the level of clusters have come into focus [6], [7]. Nothing less than the emergence of new industries is expected. However, the difficulties especially in regards to innovation activities are not minor if large and potentially inert organisations such as clusters are being linked [8],[9]. There is a scale-up of complexity. Effective methods and means are needed to enable cross-cluster innovation.

C3 Saxony: This paper reports on an on-going EU funded project (Emerging Industries Program) in cross-cluster innovation, currently carried out between a microelectronics / semiconductors cluster and a biotechnology cluster based in Saxony, Germany. Part of the ambitious cross-cluster experiment – which includes policy learning measures as well as the setup of incubation services – is the invention of appropriate innovation techniques that bring together the two clusters, and eventually results in original novelties in terms of products, processes, and services, up to the systematic creation of start-up businesses or corporate spin-offs.

Responsible for the creation of cross-cluster innovation techniques in this project is the laboratory of Knowledge Architecture at Dresden University of Technology. Over a period of two years, it will have established a repertoire of tools and methods that trigger cross-cluster innovation, and track empirical evidence on their effectiveness.

2. METHODS

Within the C3 Saxony Project, Knowledge Architecture Lab's role was defined as an active go-between for the two involved clusters, Biosaxony and Silicon Saxony.

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Here, the lab's purpose is to identify and facilitate meaningful connections between the multifarious fields of technology, research, and development in the clusters.

The specific aim of a work package in the C3 Saxony Project, which comprises the core activities of the Knowledge Architecture Lab, is the identification of cooperation projects at the intersection of ICT and biotechnology. For this, we conceived the following measures, which are in the process of implementation: „Innovation Fora“, „Innovation Prize“, and „Matchmaking Events“.

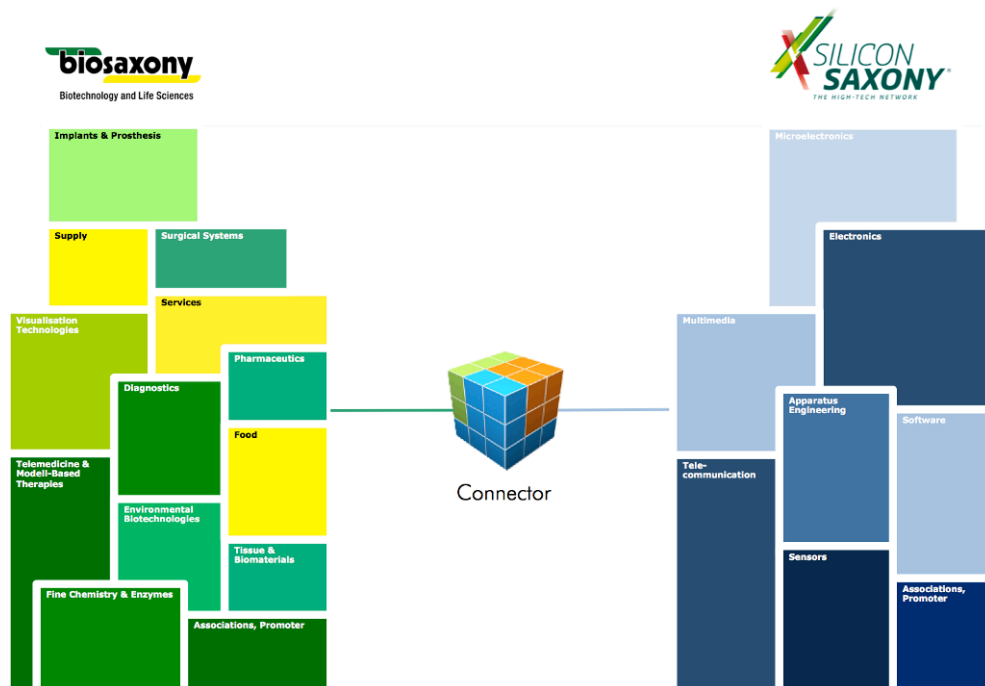


Figure 1. Connecting sectors of technology clusters.

The necessary activities can be represented by an input-output scheme, in which basic ideas, concepts and existing projects must be collected from the members of both clusters, qualified and developed through a sequence of workshops and other measures, thus finally leading to cooperation projects including and intertwining the expertise from both technological fields.

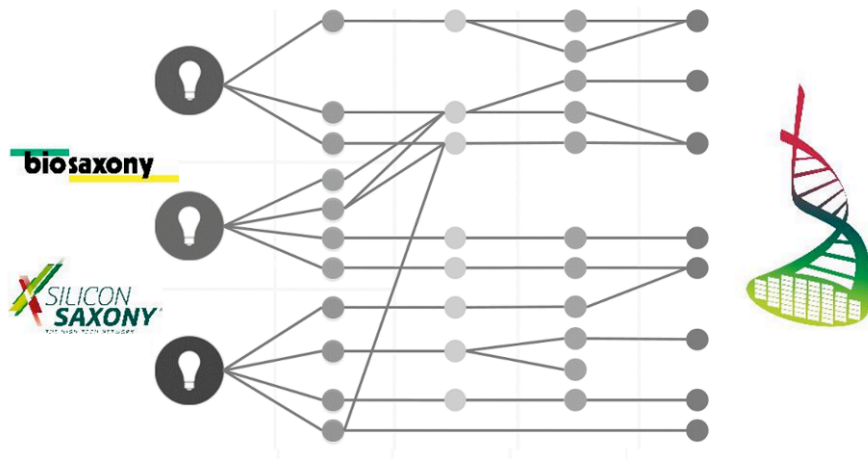


Figure 2. Input-output scheme of the C3.

The method of the Knowledge Architecture Lab (KAL) can be generally termed „Creative Networking“, as it employs tools for interactive group work, ideation processes, and project management to foster creative group-work across disciplinary boundaries. Previous applications of the method include cross-cluster cooperation workshops (Silicon Saxony, OptoNet/Co-Optics), intra-cluster knowledge management (Euro-pean Centre of Emerging Materials and Processes) as well as strategic workshops for policy makers and governmental institutions (Saxony State of Economic Development). The method itself is scientifically based on a novel integration of findings from knowledge management (KM) (e.g. co-creation) and archi-tectural skills and competencies (e.g. design thinking).

In contrast to comparable KM projects in technology clusters, in which the KAL created cooperation-ideas from a scratch, for the C3 Saxony Project another approach was chosen. As there was intelligence about a reliable pool of existing project ideas, it was decided that the identification of potential candidates from this pool was a necessary first step, whereupon further project development is to follow. If necessary, a session of idea generation from scratch may be still included.

3. IDEAGENERATION

3.1. IDEA CALL

In order to identify existing project ideas within the scope of the C3 Saxony Project, we designed and distributed an “Idea Call”, in which members of the clusters (e.g. companies, research institutions) were asked to briefly profile themselves and their preliminary idea. The call itself was designed as an interactive, easy to handle

form-sheet of two pages and was issued to a few hundred contacts taken from the contact lists of the cluster agencies and regional business promotion. Upon completion, the forms were sent back to the C3 team. Altogether, we collected 13 valid idea sketches, whose originators ("Project Owners") we invited to a follow-up "Idea Lounge".

Figure 3. Idea Call form sheet.

3.2. EVENT I – IDEA LOUNGE

As a first large-scale innovation forum within the C3 scope, a so-called "Idea Lounge" was designed and carried out at the 9th Silicon Saxony Day (July 3rd, 2014), the annual international convention of the Sax-on microelectronics and semiconductors industries. The KAL carried out the Idea Lounge as a semi-public event with approximately 100 participants. Besides the contributors of the idea sketches, further experts and stakeholders joined the presentations and talks.

The event consisted of two activities:

1) The Project Owners briefly introduced their idea sketches in micro-talks of ten minutes, thus leading to a quick sequence of project presentations ("Pecha-Kucha"). The basic idea of this format is to provide a quick spotlight on each project idea for all participants of the event.

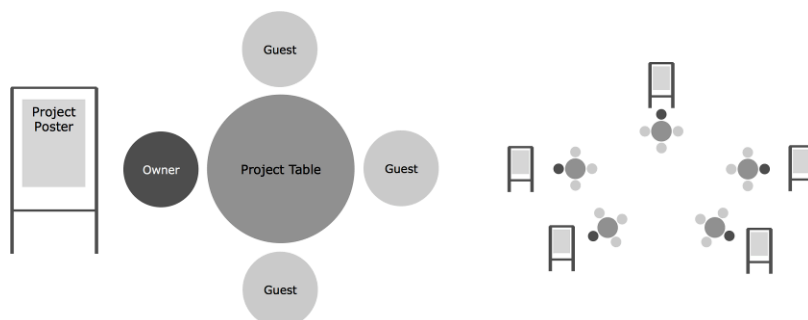


Figure 4. Idea Lounge Activities: “Bar Camp”.

For the presentation of the Idea Sketches, KAL had asked the participants to prepare a structured presentation lining out all information necessary for the upcoming matching and project development process, e.g. keywords, market aspects, partnerships. The presentations were prepared in the format of a pre-structured power point presentation, to be easily filled with the respective project information.



Figure 5. Idea Call – Prestructured presentation.

2) The participants formed small talk rounds to discuss the individual Idea Sketches presented before. For this, the conference hall was re-furnished into a set of individual discussion tables where the groups of 3 to 8 people gathered for approximately 20 minutes in front of posters showing the Idea Sketches. At these parallel table discussions, the Project Owners identified potential project partners, collected hints and criticism. Each table talk was facilitated by Knowledge Architects who were moderating and visualizing the discussion, and also completed the project sketches with discussion inputs. Wrapping up, complete Idea Sketches were presented to the Silicon Saxony audience by a poster exhibition in the conference lobby.

The results of the Idea Lounge were re-edited into digital project sketches and prepared for further qualification and subsequent assessment for voucher eligibility.

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Figure 6. Output of the Idea Lounge (workspace); discussion notes (below).

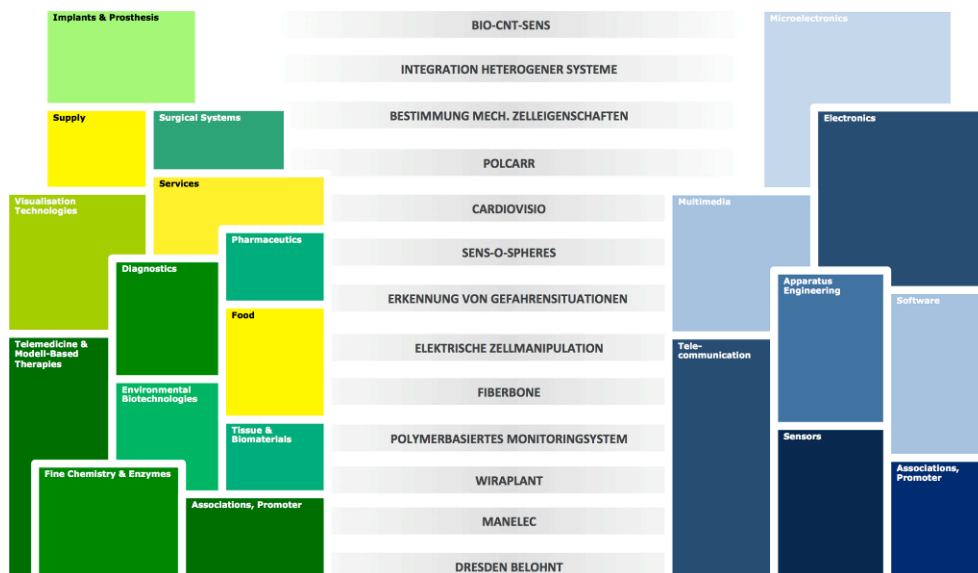


Figure 7. Titles of the 13 project sketches (Idea Lounge).

3.3. EVENT II – IDEA DAY

In November 2014, a second innovation forum was scheduled in Biocity, a center for biotechnologies in the city of Leipzig, Germany. The event collected another set of around 20 project ideas, for which a second Idea Call was launched in advance. In addition, sketches that were collected on the Idea Day were further qualified in in-depth workshops. In order to attract especially SMEs for participation, the focus of the Idea Call was set on business and market issues.

The Idea Day was choreographed as one-day-workshop along a tripartite design: 1) speeches and hand out of awards ("Innovation vouchers"), 2) micro-presentation ("Pecha Kucha") of ideas handed in, and 3) group work sessions in order to generate cross-cluster ideas with the attending people. First two activities filled the morning, the third the afternoon session.

1) Speeches and voucher awards

Voucher awards: After introducing the cross-cluster project's macro-economic and political intention and goals by representatives of the State Ministry of Economic Affairs ("Saxony Innovation Strategy"), four selected projects of the previous Idea Lounge were prized ("Innovation Vouchers"). The relatively small sum (5000 €) must be dedicated to the enhancement of the project – e.g. market research, technical support, patent inquiry.

Poster show: From the beginning a poster show was set up in the same room. On the one hand, 13 ideas created in the previous Idea Lounge were presented – likewise to inform and to motivate participants. On the other hand, posters on the current 20 projects were displayed, summarizing the presentations before. Thus, the project owners could be approached during the whole event for in-depth talk and additional information.

2) Short presentation of before inhande Ideas

Pecha-Kucha: The 20 project ideas collected with the prior Idea Call were presented in the format of "Pecha-Kucha" micropresentations. For this, presentation material was collected from the idea owners beforehand, and edited into pre-set 3 minutes presentations. Thus, and overall presentation time of only one hour could be maintained, still providing a quick overview over projects and people in the room. Discussions on the presented project ideas followed in the lunch break. Because people were informed and prepared for this shortcut each participant had the same level of knowledge and could discuss their interest during lunch break.



Figure 8. Discussion at the project poster exhibition.

Topic Radar: Changing the audience from passive to an active event after nearly two hours of presentation-listening, participants were asked to place their name-cards with an indication of a potential cross-cluster project on a poster, which cross-connected the competence fields of both clusters (“Cross-Cluster Topic Radar”). Already early in the event, participants were asked to collect ideas they would potentially discuss with other participants. Altogether 23 new ideas emerged, from which five topic sets were derived for which high interest was indicated.

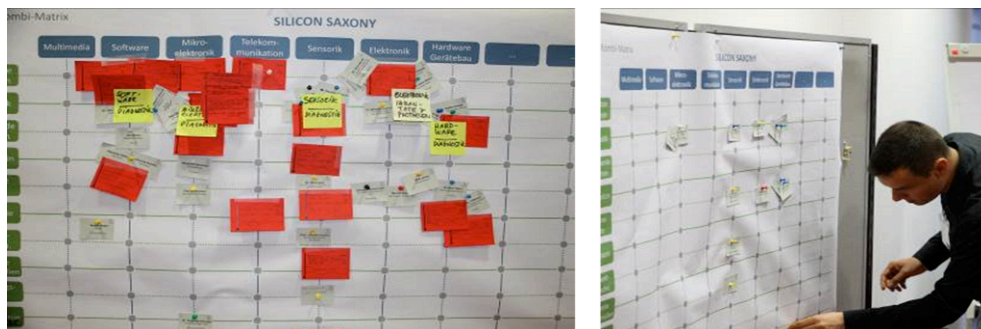


Figure 9. Cross-cluster Topic Radar.

Competence matcher: In order to figure out matches of competences and demands from the participants in the room, they were asked to visualise their “Deliveries” resp. “Needs” on large wall posters printed with keywords (taken from the project sketches) and the names of participants organisation. The separate posters were finally assembled, thus forming a need-competence map.

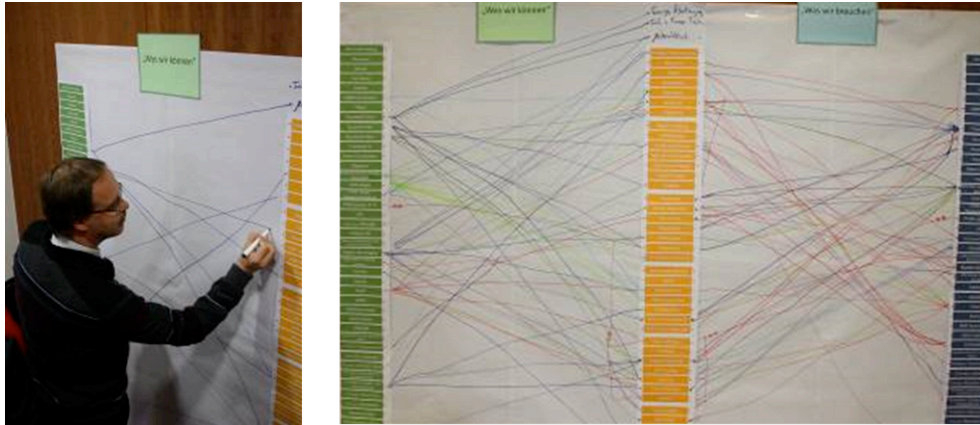


Figure 10. Need-Competence-Map.

3) Group work session on new ideas

On the basis of thematic input of the micro-presentations, the clusters of Topic Radar and the Need-Competence-Map, interest groups were formed and separate workdesks ("Project Tables") assigned. Basis were the five topic clusters that had emerged in the Topic Radar. Only people whose topic was included in one of the five clusters / project tables, were asked to moderate their table group, while others could move freely and join any group. Each table was supported by facilitators (Knowledge Architects) with visual and moderation support. A structure poster was prepared for noting the conversion and discussion results.



Figure 11. Project tables.

After a time of intense discussion and group work, the IDEA DAY was closed by a short presentation of the newly developed five table projects, and an outlook onto the upcoming selection process for innovation vouchers and a large innovation award.



Figure 12. Final presentation and edition of group projects.

4. RESULTS

From participants and organiser alike, the Idea Day was termed a success. Simple and relaxed though, the one-day workshop was highly productive. With little effort on the side of the participants (three minutes presentation, simple line-drawing on posters, pin-up cards on matrix) a maximum outcome was produced. 23 new ideas had emerged („Topic Radar“), from which five had been developed further into group projects, and recorded by the project form sheet. In review, following key success criteria can be named:

- custom-tailored workshop design
- a proper composition and balance of participants
- interested community with intrinsic motivation and commitment
- sufficient not-scheduled / programmed time for informal talks
- assessability and comparability of projects due to form sheets
- discussion of unconventional ideas already in a very early phase

The workshop features a good balance of different psycho-physical activities (listening, presenting, discussing, moving). The concentration on competences and projects created a focussed yet comfortable, cooperative and relaxed cooperative atmosphere. The physical-spatial environment played a central role too: there were opportunities for retreat. The workshop was lean and resource efficient; used materials and means were conventional.

5. OUTLOOK: TOWARDS AN OPEN INCUBATOR MODEL

Beyond the innovation events described above, the implementation of a systematic innovation and transfer mechanism will be central in order to sustain the ongoing innovation activities at the intersection of microelectronics and biotechnology. Therefore, a central middle-term goal is to develop a specific incubator model for respective startup projects, and to outline (and ideally provide) appropriate incubation services.

The cross-cluster project can be regarded an incubator in itself. It successfully scouted ideas and concepts, actively linked science, industry, and politics, and finally generated a number of early-phase projects. In turn, this virtual incubator assessed and qualified projects and handed out incentives (vouchers) for follow-up activities. Idea Lounge and Idea Day have created an exchange network on personal and professional level that allow longterm communities of practice [11],[12],[13]. Moreover, an initial community of partners was formed with the capacity to comprehensively and collectively explore R&D and business opportunities at the intersection of microelectronics and biotechnology.

Most importantly, these incubation activities were not bound to one institution but distributed across many actors, including university, state ministries, transfer agencies and hightech associations. Although demanding much coordination and synchronisation, this operation system foreshades the characteristics of a distributed business incubation. The incubator then turns into a virtual and somewhat diffused structure. In contrast to incubators that are connected to companies, cluster or institutions (and thus closed to a certain extent), this open incubator scheme explores and capitalizes on the synergetic potential of a whole technology region and its ecosystem. It reacts on tendencies like resource sharing, open data, co-creation and participation.

In order to establish a virtual open incubators at the intersection of highly divergent technologies and organisations, we suggest a four-step methodology:

1. Determining necessary components, i.e. incubation activities and services in accordance to stakeholders, context and specific demands of the involved technological fields; this may be done on an empirical basis (investigating successful startups in the respective field);
2. Mapping existing components, i.e. incubation activities and services that are already available in the region, which may form one functional element of the virtual incubator;
3. Establishing missing component, i.e. incubation activities and services that are not available in the region, but were identified as necessary functional elements of the virtual incubator;
4. Networking the existing and newly established components, i.e. connecting the incubation activities and services of various origin into a functional

structure with an “open business operation system” that works across institutions and actors.

This sequence certainly being schematic, it yet indicates key components and features for the novel incubator model. Informed by experiences and insights of the project, following activities and services may be lined out as generic ingredients:

- Regular innovation competitions with relatively small prize money and low participation threshold to stir a large number of idea proposals;
- Custom-tailored innovation and co-creation events, like interactive workshops, matching fairs, world cafés etc., in order to create common sense and personal understanding between engineers, economists, and researchers of different fields;
- Post-ideation project care – Business Support Services delivered after the initial concept-phase, that ensure momentum of promising projects (e.g. market research, fund scouting, search, international marketing, business modelling, partner network and consortia building, counseling on startup, funding, and IP issues);
- Creative knowledge management, that connects and matches persons and projects, and actively co-develops ideas into communicable project sketches and prototypes;
- Sound assessment and evaluation of concepts throughout the various stages of project development, based on well defined criteria informed by knowledge in transfer management, marketing, and market research.
- Establishment of project life cycles according to best-practice examples, previous experiences, which must be appropriated to local needs and conditions;

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