Journal of Knowledge Management Application and Practice
An International Journal

http://dx.doi.org/10.18576/jkmap/010303

"CoMod" – A Model to Support Collaboration and Innovation between Digital Innovation Labs and SMEs

Karsten Böhm[*].

FH Kufstein Tirol - University of Applied Sciences, Kufstein, Austria.

Received: 1 Oct. 2019, Revised: 25 Oct. 2019 Accepted: 13 Nov. 2019

Published online: 25 Dec. 2019

Abstract: For a number of different reasons the cooperation between Digital Innovation Labs (e.g. FabLabs) and Small and Medium Enterprises (SMEs) is currently not being used to its full extent. This paper reports on the results of an applied research project in Italy and Austria that aims at supervising, stimulating and assisting the cooperation between Labs and SMEs with a number of pilot projects that have been executed on different locations in two countries. It sheds light on the challenges and direct as well as indirect benefits of such a cooperation for all involved partners. The findings of the specific projects are used to derive a generalized Cooperation Model for FabLabs and SME ("CoMod"). This model can be used to provide guidance to other Labs and SMEs to realize the benefits of a collaborative Innovation project. For the Knowledge Management community, the project demonstrates that the collaboration between Labs and SMEs involves significant amounts of tacit knowledge, which can be made more visible using the proposed model.

Keywords: FabLabs, Collaboration, Innovation, Knowledge Transfer, Rapid Prototyping, SME.

1 Introduction

The cooperation between Digital Innovation Labs and Small and Medium Enterprises (SMEs) is currently not being used to its full extent. This paper subsumes different types of Labs under the term „Digital Innovation Labs" (or Labs for short). We include more production oriented Labs, aka Fab Labs as well as Labs that focus more on the innovation process or digital technologies. A common aspect of all relevant labs is their focus towards the creation of new and innovative products and services as well as the general availability for small and medium sized enterprises (SME). Mortaraa & Gontran (2016) give a good overview on the different type of Labs that are available for companies.

There seem to be a number of reasons that lead to this situation: (a) Despite the fact that Labs offer interesting resources and knowledge, SMEs are often not aware of those resources, sometimes not even of the existence of the Labs themselves. (b) Sometimes the SMEs do not know how they could initiate and successfully execute a project together with a Lab. (c) Likewise most of the Labs see themselves merely as a resource provider and not as a facilitator for the generation of new knowledge or even as a knowledge hub connecting different sets of expertise from a group of experts, possibly in different organisations. (d) Labs are usually a regional knowledge hub for a wide range of expertise, some offered directly by the staff of the lab and some provided by external partners when needed. (e) There seem to be hidden benefits for both sides as every project always represents a learning process in which new knowledge is generated on each side and existing knowledge exchanged in a continuous project. Thus, the first project often is the initiator for a longer and more intensified cooperation – it is the door opener for a sustainable cooperation.

These paper reports [1] about the specific outcomes of the collaboration between different SMEs and Labs in two European countries. It will [2] explain how such collaborations can be facilitated. The findings of the specific projects are used to [3]generate a general Cooperation Model ("CoMod") by comparing different projects. The model subsumes and generalizes the specific collaboration results and focusses on impacts that might not be obvious such as the generation of new knowledge or the root causes for innovations within the collaboration. Those results will [4] provide guidance to other Labs and SMEs to realize the benefits of a collaborative Innovation project. For the KM community the project demonstrates, that [5] the collaboration between Labs and SMEs involves significant amounts of tacit knowledge, which can be made more visible using "CoMod". The project, that brings together research organizations, practitioners, companies, labs and

[*]Corresponding author e-mail: Karsten.Boehm@fh-kufstein.ac.at

mediating organizations, stimulated and supported the collaboration between SMEs and Labs and supported the collaboration throughout the period of 3-6 months for each pilot-project.

Besides the direct support of the activities in the pilot project the authors conducted an accompanying research with quantitative and qualitative methods in order to elicit the effects of knowledge generation, knowledge transfer and knowledge use in the context of inter-organizational innovation with a specific goal.

The paper is structured in the following way: In the next section, a literature overview provides the context of this contribution before the research methodology and the data acquisition method is described in the following section. We summarize important aspects from the data gathering in section 3 and aggregate these data into the cooperation Model ("CoMod"), which is introduced in section 4. In the final section concludes the paper and provides an outlook to future research.

2 Literature Overview

A research on relevant literature revealed that there is an awareness of Labs organizations or spaces that foster and create innovation, see the extensive overview for a German metropolis by Schmidt & Brinks (2017). Even the collaboration between different labs has been considered useful and the exchange of knowledge beneficial for both sides, see e.g. Wolf et. al (2014) or Maravilhas & Martins, J. (2019). It is interesting to see that the focus is mostly among the persons in the lab ("makers") or between different labs. Sometimes Labs are seen as a way to provide specific education as in the study of Fiore, Sansone & Paolucci (2019) or Bull et. al (2010) already early on.

On the other side there is a substantial about of work on the field of knowledge creation and sharing in the field of companies, also in the relation to innovation, see for example Dechamp & Szostak (2014) on the creativity in organizations or Limaj & Bernroider (2019) on the absorptive potential of knowledge in the context of innovation

The aspect of the specific collaboration between SMEs and Labs (as different 'kinds of' organizations) seem to be neglected so far, but could yield great potentials, as in the interactive co-creation aspect between those two different entities can lead to satisfying results as Peraa & Vigliab (2015) point out.

In this contribution, the authors build on the concepts of trust and control as a way to build confidence, see Das et. al (1998) with the goal to establish a collaboration on mutual benefit (see Daugherty et. al (2006)) between the Lab and the SME. The proposed model relies on three key concepts to establish cooperation: 1) reliable and trustworthy (personal) connections, 2) a consensus building process on the common goal of the cooperation a good story-telling approach to communicate good examples and successful technology use.

3 Research Methodologies and Data Acquisition

In order to achieve an overview about the current cooperation of Labs and SME a number of surveys were executed to elaborate the state of the art in the covered regions, which stretched in two regions in Austria (Tyrol and Salzburg) and several regions in the northern part of Italy. In order to support the cooperation of Labs and SMEs a number of cooperation projects targeting specific innovations of SMEs had been initiated (10 in Austria, 10 in Italy). These pilot projects were called Innovation Challenges since a call-based mechanism was used for project proposals that were rated according to a number of criteria for each project: (a) level of innovation, (b) level of mutual benefits for both SME and Lab, (c) probability of a successful project and (d) level of embeddedness in the local ecosystem.

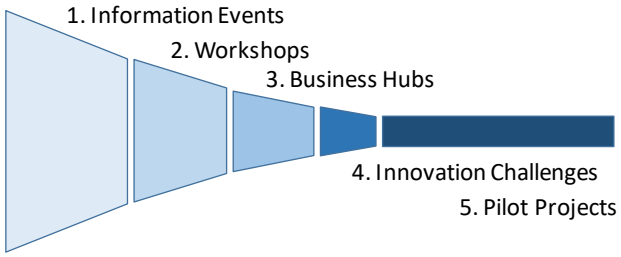

Fig. 1: Process of selecting the Pilot Projects for the collaboration of SME and Labs.

A step wise approach was used to identify potential candidates for the Innovation Challenges: a first round of information events with brief but general information for the SMEs were held, then more in-depth workshops with selected companies were used to talk about possible ideas and within another event (called Business Hub) the final idea for the innovation challenge was outlined. Those proposals were submitted to the Innovation challenge competition and after a blind peer-review; the resulting 20 pilot projects were selected. Figure 1 illustrates this process.

A first finding on those initial steps were, that most of the projects were innovative according to our criteria, but needed some coaching support to emerge from an initial idea or initial conversation. The resulting project often differed quite a bit from the initial starting point and usually required a moderation from an external partner (facilitator) that stimulates and structures the communication between the Lab and the SME in the initial phases.

When communicating to SMEs what a lab does and what results can be expected usually the explanations of previous success stories was the most successful way of providing information to SMEs, esp. to those that were not used to a cooperation with a Lab. The information about available resources, tools and competences as it could be found on almost every Website of a Lab was less useful for this purpose. From a Knowledge Management point of view, it is noteworthy, that in an initial cooperation setting without previous experience the method of storytelling works well to create awareness on the side of the SME about what to expect from the Lab.

Another difference that could be noted was the approach to innovation projects in the two countries. While the Italian companies were more open towards a competitive cooperation with a Lab, Austrian companies seemed to be more cautious and required more guidance before entering into a collaboration with a Lab (for the first time).

The selected Pilot Projects were carried out over a period of about six months and involved a SME and a Lab in each case. Each project was facilitated and supported by the authors in a more indirect role to supervise and coach the project. The monitoring phases started with an initial kick-off meeting and involved status updates about by the authors approx. once a month to track usual project properties like the use of resources, the achievement of milestones and similar characteristics. In order to learn more about the nature of the cooperation and the knowledge creation and knowledge sharing the authors executed qualitative interviews after approx. 3 months (interim interviews) and at the end of the pilot projects after approx. six months (final interviews). Every project was evaluates at least with one interview, several projects has an interim and a final interview (depending on the progress of the projects). Overall data from approx. 30 interviews have been collected. The individual interviews took the form of physical meetings for each pilot project with representatives from the SME and the Lab together with the authors. Every meeting was recorded and later transcribed to make it accessible for a qualitative analysis. While the focus of the interim interviews was more on the process and the ongoing collaboration, the final interviews took a reflective position that took the final result(s) into focus, together with the learnings for each participant. Most of the 20 pilot projects were successful in terms of reaching the planned results and milestones. Some required an extension of the project duration due to difficulties in resource allocation or more time needed for some activities. A few projects (2-3) struggled to reach the project goal, which was interestingly mostly due to one of two reasons: a) underestimating the complexity of the projects, often due to the lack of (enough) technology expertise or b) the lack of the requires knowledge among the stakeholders to carry out the project successfully.

The interim interviews showed that an active collaboration could be established after relatively short time and that an active communication process helped to identify challenges during the innovation process. One intention of the interim interview methodology was to identify challenges across all pilot projects early and have the opportunity to improve the innovation and collaboration process when needed. It turned out that an intervention by the authors in their facilitating role was not really needed, was most of the projects were running rather smoothly. On closer inspection, it turned out, that the Labs applied their lessons learned in one project already to other pilot projects, when this was appropriate. Thus, the Labs worked a knowledge hub also in the sense of applying rather process knowledge concerning the core innovation projects. One such example was the use of initial sketches for a solution that proved to be the right artefact to get a productive discussion going. This was perceived in one of the pilot project as useful methodology and then later applied in other projects too. Without explicit reflection the participants used an externalization of knowledge as a tool to communicate their ideas in a suitable form (a graphic sketch being much more suitable that a conversation over the phone or a describing text). The example shows that the participants also improved their KM capabilities, without explicitly focussing on that aspect. Again, it was the role of the facilitator to make that process obvious.

The final interviews were used to reflect on the result(s) of the pilot project and it can be said that in most cases the result were not only achieved in a single artefact (e.g. a prototype) but usually a set of variations that emerged from different trails in the innovation process (e.g. prototypes in different shapes, for different use cases or made of different materials).

Quite often the participants also mentioned their insights from the project as intangible results that can be exploited in further projects and activities. From a KM perspective, it was interesting to see, that the participants reflected on the innovation process actively as a process of knowledge creation and knowledge sharing.

It turned out, that the initial proposal phase in the innovation challenge was a substantial aspect to derive an initial structure (rough project plan with milestones and a definition of the intended target), which could be used as a basis to build the project on. Most pilot projects worked in a rather agile style, which sometimes led to unexpected paths based on results that were derived during the collaboration. Quite often small obstacles or challenges led the innovation project into new directions regarding the solution space.

Thus, the knowledge creation process was a constant and ongoing activity that was not actively perceived by the SME or the Lab. In those phases, the facilitator role helped to make this knowledge creation process more conscious to the participants, leading to new insights. For the labs, for example, was the fact that they are a center of a knowledge hub for a wide range of expertise not perceived as an important aspect of their work. Still, their ability to identify and mediate required skills for a project were quite substantial for the success of many of the projects. On the side of the SME often the insights into the capabilities of new technologies, like laser cutting or 3D-printing became only explicit knowledge to them, while using them in their own project that represented the domain of their expertise. From a Knowledge Management perspective, it seemed that the learning and the knowledge creation was successful when addressed in the problem domain of the SME (domain specific knowledge). The innovation often came from a different domain and the application of knowledge across different domains seemed to be a typical property of the Labs. The Labs however also learned from the domain knowledge in the pilot projects as they applied technologies that were already known to them in a field that was completely new to them. This sometimes led to interesting side effects, for examples when they realized that a technology feasible solution was not possible due to safety regulations in that domain.

The next section will present the most important result from those interviews in more detail.

4 “CoMod” – A Cooperation Model for Fab Labs & SME

This section explains how the different results from the interviews are aggregated into a model that can be used by other partners (other Labs or other SMEs) for future projects.

Concerning the roles that are involved in the collaboration between a Lab and a SME there are three roles taken into account in our setting: the Lab that usually has the primary role of a provider of services, resources and knowledge, the SME in the primary role of a consumer of the provided resources and services. The third role is that of a facilitator, which is trying to support the collaboration as a more external partner, e.g. not being affiliated with the SME or the Lab. The relation between those three roles is illustrated in the following figure.

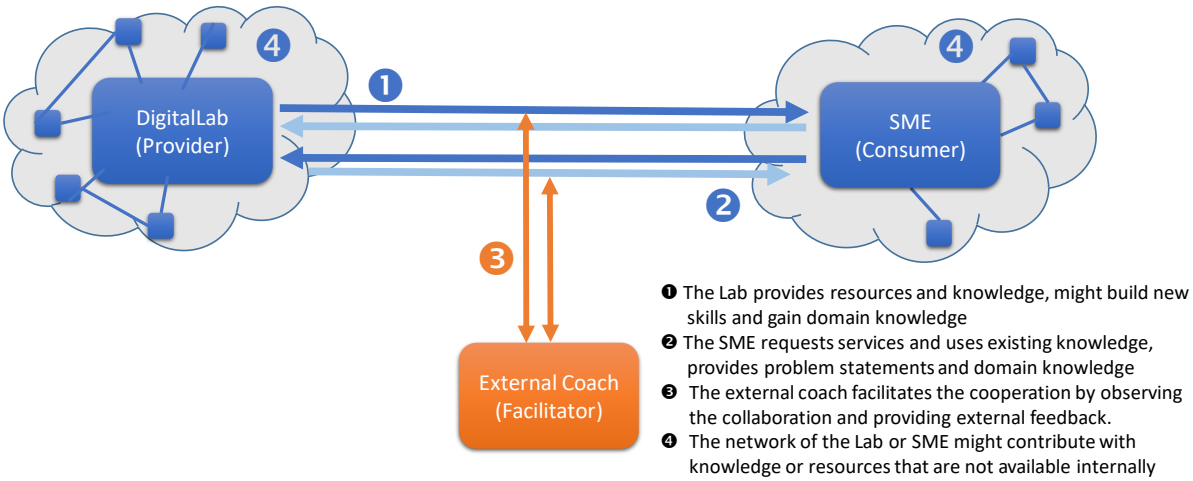

Fig. 2: The Roles in the Cooperation between Labs and SMEs.

As can be seen, there are other aspects are present there, which are not such obvious. One of them are the secondary roles of Labs and SMEs in which a Lab can be the receiver of new knowledge that comes from the SME. This is often the case for domain specific knowledge. In the same way the SME might in this situation work as a provider of knowledge, sometimes even of specific resources that are available in the company and can be used in the collaboration. A second aspect is the existing network of the Lab and sometimes of the SME that can be used to include in the collaboration in cases that the needed resources are not available in the lab. This usually happens for aspects/resources/knowledge that is not central to the activities of the Lab or that is rarely needed. This aspect is esp. relevant for the Labs which usually act as a knowledge hub throughout different technology fields that are connected to its core competences.

When the collaboration on the pilot projects was elaborated a bit more in detail, it turned out that there are three different dimensions of aspects in the collaboration (see figure 3, below).

Such categories could be summarized on three different levels:

1) Obvious aspects that were related to the artefacts of the innovation project, such as prototype versions that emerged during the projects. It is useful, to mention that ere is an iterative nature of such prototypes in innovation projects. Mostly this relates to the interaction between the SME and the Lab. There was a no clear role model by whom the active role was taken, but more often it was on the Lab side.

2) The structure of the project was mentioned as important. The defined time and resource frame seemed to be important to generate results (no open research although open question). The role of the facilitator was more important here. It seemed that otherwise the cooperation would be more continuous but maybe also less focused. Another interesting aspect that was mentioned: as a reflection on the projects it was recommended to do small but individual projects. Smaller projects provide a better more specific focus than larger projects – this might be a viable approach to handle complexity for small organizations like Labs and SME (this might be perceived in an intrinsic way).

3) The generated knowledge: Was visible on both sides, explicitly and often a specific result, although not as explicit as the prototype – here a relation to Knowledge Management could be identifies: it seems that the level of explicit knowledge (in the artefact(s)) and implicit knowledge (in the learning(s) is very present here. The awareness varies and became visible in the interviews only. The role of the facilitator important in this step.

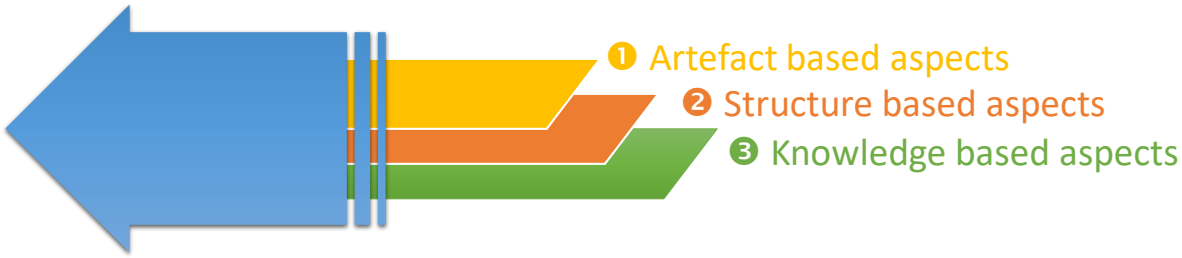

Fig. 3: The different Levels in the Cooperation between Labs and SMEs

Those levels will now be elaborated in more detail below.

The most obvious aspects are the level of the direct artefact based objectives of the collaboration in the pilot projects. In most cases these have been some sorts of physical objects (artefacts) such as prototypes. Most of them emerged in an iterative process of collaboration between the Lab and the SME. Starting from initial sketches and the selection of materials prototypes, sometimes partial ones, were developed produced and evaluated against the goals of the project. The collaboration was in all cases very much driven by the physical properties of the goals and the experiences that were made during the manufacturing steps. From a knowledge based perspective this was an aspect in which initial assumptions on the right physical materials, for example, where verified using the practical experiences that were gained during the interaction with the material. Upfront research on the possible solutions retrieved external knowledge but only the application with the specific target could validate the correctness of the decision. External knowledge was thus put into the context of the right application. Not always the first choice developed as the optimal solution; therefore, an iterative approach needed to be employed. Another aspect was the explorative nature that resulted from the more open research questions of all the pilot projects. In that sense the projects resembled true innovation projects as they intended to create new ideas (creating new

knowledge) with the intention to put them into practice and create new products and services with them (applying the new knowledge).

The second level of the cooperation addressed the structural aspects of the collaboration. Since the pilot project emerged from a more structured approach with the Innovation Challenges, the process of transforming the idea into a pilot project resulted in a more specific project structure that the usual cooperation between a Lab and a SME that are usually more ad-hoc and less focused on a specific goal. The milestones in the project provided both a structure and an orientation during the execution of the project. They were reported as useful guidance to stick to the original set goals and not felt as restrictions. It is worthwhile to mention that the duration which limited to ca. 6 months contributed to scoping the project in the same way like the limited budget did. It seemed useful to have those restrictions in order to keep the scope of the project manageable for the small teams that worked on the project both on the side of the SME and on the side of the Lab. Given those limitations, upcoming new ideas where either postponed to a follow up project or prioritized according to the goal setting of the project. It was the external role of the facilitator that provided a framework for the projects in order to provide some form of similar structure as a basis for a comparison. But this was perceived as a positive aspect by the provider and consumer role, also since it was referred to by the facilitator regularly. The facilitator also took the role of being the constant reminder on the progress of the pilot projects, which helped to get the SME and the Lab at the project as everyday responsibilities in other tasks often distracted the involved persons, which is due to the limited personal resources in both the Lab and the SME (all the personnel that worked on the projects had other responsibilities and duties apart from the project). From the Knowledge Management perspective, it seemed important to provide a structural framework in which new knowledge could be created but in which this knowledge could also be evaluated against the benefits for the set targets of the project. This helped to ensure the use of the knowledge for the benefits of the created artefacts.

Finally, the third level in the collaboration is dedicated towards the knowledge based aspects. The focus here is on knowledge creation and sharing between the Lab and the SME. In the assessment before that project starts the following aspects should be taken into account: Which knowledge is necessary to employ the technologies that are supposed to be used? Usually the main source for this knowledge is the Lab, but it might also be the case that knowledge from the external network need to be included. Next, which knowledge about the application domain will be relevant for the execution of the project? Here, usually the SME is the main provider of relevant knowledge, but some aspects (such are legal or safety regulations) might be included from external partner, often from the network of the SME. While the project is running, it is important, that the aspects of knowledge transfer and knowledge sharing aspect are explicitly taken into account. Often the facilitator can help here to make those processes more aware to the SME and the lab as they might not be aware of the created knowledge that can be shared or externalized in a more explicit way. The types of knowledge involve both technology and domain specific knowledge types.

There was one situation, for example, in which a lab realized a new form of knowledge in one project (a computer generated form of dovetailing for connecting wooden boards) that also had an application potential in another project, exploiting the interesting design aspects of dovetail connections that were an implicit result from the other projects. The projects have been executed by different people from the Lab and it was only by a facilitated review of the facilitator the inter-project transfer of that knowledge was made aware to all participants. Therefore, as more projects evolve it becomes more important to realize and document the generated knowledge in order to make more implicit practices in a project visible for people that have not been involved in the project. Currently, this is mostly done through socialization within the final debriefings after the project had been finished. This aspect is probably more relevant on the Lab side, as the number of projects is usually higher than on the side of the SME. Again, the method of story-telling could be used to create awareness about the generated knowledge and create awareness about the generated knowledge and to provide a source of inspiration for future projects and activities.

It also proved to be useful for the SME and the Lab to investigate way for the exploitation of the generated knowledge as further steps after the project has finished. These questions, asked by the facilitator, helped to contemplate also about those outcomes of the project that are less visible and present than the physical artefacts. For the Lab-side, it is also relevant to make those knowledge gains visible in their communication (e.g. their Website) as they become more solid and robust because they've been proven useful in several project. Currently, this is often not one in an explicit form but part of the tacit knowledge of the staff at the Lab (usually not too many key people, running the Lab).

In order to provide a more general model for the cooperation of Labs and SME the authors have derived a process-based view along the different phases of the execution of the project that could serve as a guideline for future projects (see Figure 4 below). It reflects on root cause of challenges/benefits by reflecting them from the KM-perspective, focusing on Knowledge Sharing/Innovation/Dynamics – a view that was not the primary focus of the Lab/SME but considered very

useful for improving future collaboration processes.

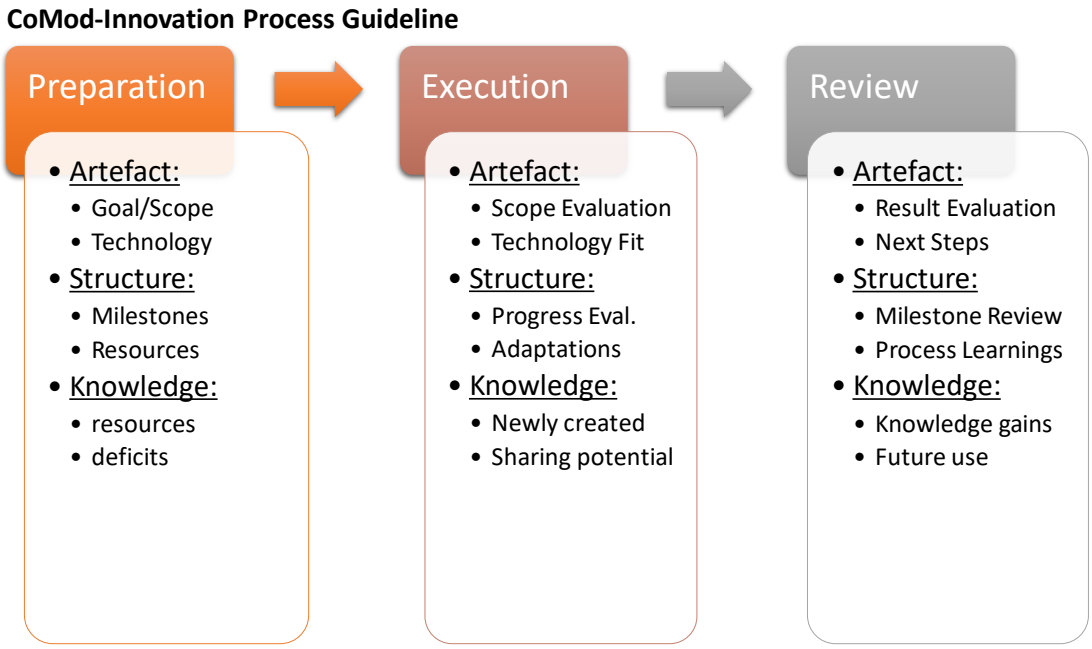

Fig. 4: The Cooperation model between Labs and SMEs.

During the innovation project the authors divide between three phases (Preparation, Execution and Review) and uses the three different aspects explained earlier (Artefact, Structure and Knowledge). The resulting matrix of 3x3 is being filled with some core activities that should be focused on by the participants.

This view is complemented by a role based view that uses the three roles mentioned earlier (the Lab, the SME and the external facilitator, see Figure 5, below). In this Role Guideline of the CoMod-model the authors focus on the main activities that are central to the primary role of the involved partner.

The guideline focuses on the most important activities of each role.

From the role of the provider the focus is on the activities of providing the relevant technology and the application know-how for these technologies. Other relevant aspects that are as important are the application of creative methods and the inclusion of experiences from previous projects. Finally, the role as being a knowledge hub for additional competences from other organizations is an important activity, too.

The facilitator is the only role that is not directly and actively involved into the innovation project and can thus provide an external view on the project. This could be helpful for a coaching support on the project and for the stimulation of new ideas for the project. Another aspect is the possibility to create awareness on the creation of intangible results of the project. Finally, the role is able to provide a more neutral and objective evaluation of the result.

The consumer role is the primary provider of the innovation challenge or problem. It acts as the project owner and provides the relevant domain knowledge for the project. In this respect the role is the initiator of the activities in the project and the same beneficiary of the results – therefore, it is the driving force behind the project. At the same time, the role also has the primary role of adopting the learnings of the technology for the application in other activities of the organization. Within the different projects, this less obvious aspect has been present in different intensity.

From the view of Knowledge Management, the main aspects are probably in the area of Knowledge Creation and Knowledge Transfer. Knowledge creation is also a mutual process here and both partners (Lab and SME) did benefit in every project under investigation although this was not always clear to the actors at the beginning.

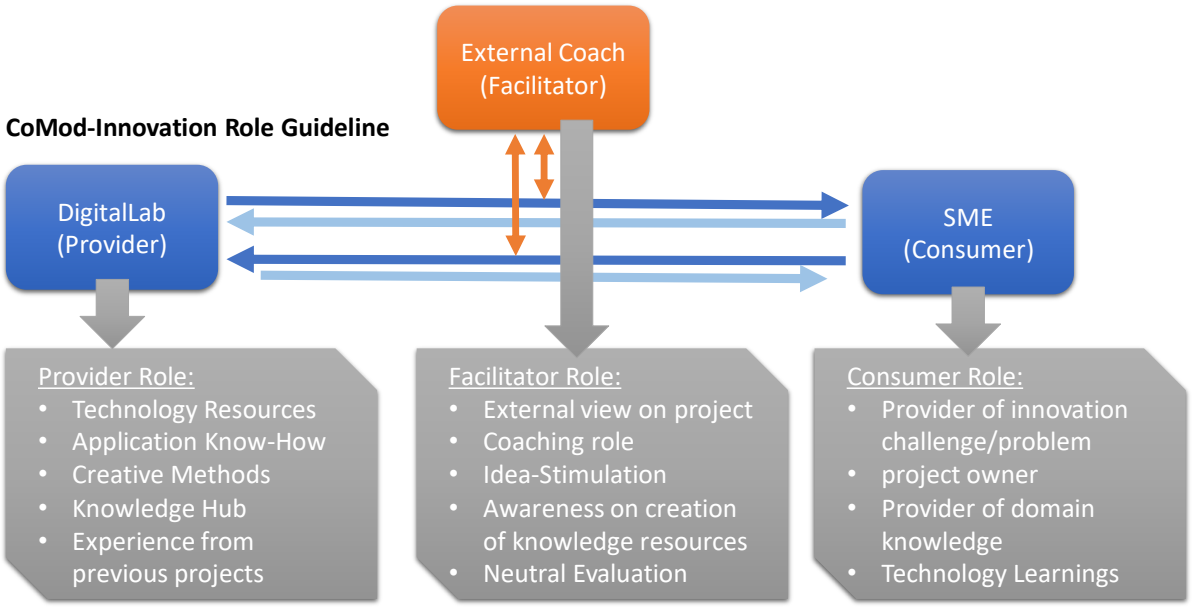

Fig. 5: The Cooperation model between Labs and SMEs.

From the view of Knowledge Management, the main aspects are probably in the area of Knowledge Creation and Knowledge Transfer. Knowledge creation is also a mutual process here and both partners (Lab and SME) did benefit in every project under investigation although this was not always clear to the actors at the beginning.

It was also stressed several times that the constant communication and collaboration was one of the keys for generating the insights that led to the results. Sometimes this was done in a continuous fashion, sometimes in a workshop style, in which more intensive phases of interaction interchanges with phases in which every partner worked on her own tasks.

5 First Results from Preliminary Testing of the Cooperation Model

The CoMod was derived from the observations in the pilot projects and were presented to the involved organizations and stakeholders in a reflective workshop session with all project partners after all projects have been completed. The discussion revealed, that the model might provide a good guidance for the cooperation between Labs and SMEs as it structures the process of the cooperation in a meaningful way. It was confirmed that each project had the different cooperation levels (artefact, structure, knowledge), but the importance of the levels were quite different in each project, depending on the context. Sometimes the artefact (e.g. a prototype) had been central to the project, sometimes the generation and sharing of knowledge was the important point in the project. Another interesting aspect was the result that the first cooperation with a Lab and a SME is the most critical step towards a successful collaboration. The initial matchmaking is not always successful at the first attempt and especially in this step; the role of the facilitator was assumed to be very helpful. It turned out that an underlying success factor was also the trust among the involved parties. Trust was either already present (e.g. by the reputation of an organization or individual people), or was gradually being built over the iterative and intensifying communication during the selection of the pilot projects (see figure 1). The successful project contributed to the trust building process, too, which is the basis for a sustainable collaboration.

The CoMod clearly needs a more in-depth evaluation as future research in order to assess its formative qualities and the necessary aspects for improvement. However, the first preliminary experiences and the feedback are quite promising that the CoMod can provide a structured guideline for Labs and SMEs to start into a productive collaboration.

6 Conclusions

This contribution reported on the results of a research on the current forms of cooperation between Digital Labs and SMEs and showed that the results from several individual projects could be aggregated into a more general model that could help to structure and facilitate the cooperation between SMEs and Labs. The results of the initial feedback of the CoMod-model look promising and encourage the authors to validate the findings in future research. This contribution also shows that there

is a strong relation between the typical cooperation between Labs and SMEs and the typical Knowledge Management activities, although those concepts are not frequently or explicitly used in the domain of Innovation Projects in Digital Labs.

Acknowledgement: The research presented in this contribution has been party supported by the European INTERREG V-A Italy-Austria research fund under grant no.: ITAT1008.

References

[1] Bull, G.; Maddox, C.; Marks, G.; McAnear, A.; Schmidt, D., Schrum; L., et al. (2010) "Educational Implications of the Digital Fabrication Revolution", Journal of Research on Technology in Education., **42(4)**, 331–338, 2010.

[2] Das, T. K.; Teng, B-S. (1998) „Between Trust and Control: Developing Confidence in Partner Cooperation in Alliances". Academy of Management Review, https://doi.org/10.5465/amr.1998.926623., **23(3)**, 491–512, 1998.

[3] Daugherty, P. J.; Richey, G.; Roath, A. S.; Min, S.; Chen, H.; Arndt, A.-D.; Genchev, S. (2006) "Is collaboration paying off for firms?" Business Horizons,. ISSN 0007-6813. https://doi.org/10.1016/j.bushor.2005.06.002., **49(1)**, 61–70, 2006.

[4] Dechamp, G.; Szostak, B. (2014) "Organisational creativity and the creative territory", Journal of M@n@gement, https://www.management-aims.com., **19(2)**, 61-88, 2014.

[5] Fiore, E.; Sansone, G.; Paolucci, E. (2019) "Entrepreneurship Education in a Multidisciplinary Environ-ment: Evidence from an Entrepreneurship Programme Held in Turin", Journal of Administrative Sciences https://doi.org/10.3390/admsci9010028., **9**, 28, 2019.

[6] Limaj, E.; Bernroider, E. (2019) "The roles of absorptive capacity and cultural balance for exploratory and exploitative innovation in SMEs", Journal of Business Research https://doi.org/10.1016/j.jbusres.2017.10.052., **94**, 137-153, 2019.

[7] Maravilhas, S., Joberto Martins, J. (2019) "Strategic knowledge management in a digital environment: Tacit and explicit knowledge in Fab Labs", Journal of Business Research., **94**, 353–359, 2019.

[8] Mortaraa, L.; Gontran Parisot, N. (2016) "Through entrepreneurs' eyes: the Fab-spaces constellation", International Journal of Production Research, http://dx.doi.org/10.1080/00207543.2016.1198505., **54(23)**, 7158–7180, 2016.

[9] Peraa, R.; Vigliab, G. (2015) "Turning ideas into products: subjective well-being in co-creation, The Service Industries Journal., **35(7–8)**, 388–402, 2015.

[10] Schmidt S, Brinks V. (2017) "Open creative labs: Spatial settings at the intersection of communities and organizations." Creat Innov Manag, https://doi.org/10.1111/caim.12220., **26**, 291–299. 2017.

[11] Wolf, P; Troxler, P.; Kocher, P-Y.; Harboe J.; Gaudenz, U. (2014) „Sharing is Sparing: Open Knowledge Sharing in Fab Labs" Journal of Peer Production, ISSN: 2213-5316, http://peerproduction.net

Karsten Böhm is a Computer Scientist and Research Professor at the Kufstein University of Applied Sciences in Austria. His main research interests are in the area of IT-supported Knowledge Management Systems and the domain of Innovation Management, typically in the setting of small of medium enterprises.
He is also managing several degree programs that center around web and mobile applications as well as data analytics research and applications at the same university.