Innovation Factory at RWTH Aachen Campus

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RWTH Aachen University initiated the RWTH Aachen Campus with the aim to enable better, faster and leaner innovations. The Innovation Factory on RWTH Aachen Campus shortens the road from the initial idea to market-readiness. This is based on a high concentration of technology competence paired with innovative process management.

One of the first success stories of RWTH Aachen Campus and the concept of the Innovation Factory is the development of the electric city car e.GO Life. The example shows how the Innovation Factory connects and orchestrates the competences on RWTH Aachen Campus. The Innovation Factory strives towards an Agile Product Development to develop innovative and better products in 30% of the development time and at 10% of the conventional development cost. The Innovation Factory combines agile culture, Industrie 4.0 and horizontal networking for radical innovations.

Product development is a highly complex process, from ideation, developing, prototyping, and marketing to industrialization. The Innovation Factory accommodates that complexity in four separate divisions: Shops, Labs, Camps and Convention. Each of these divisions contributes significantly to the envisaged result.

Specialized providers from business and research offer their expertise in shops. Technology and consultancy providers are represented here, as well as research institutes and other service providers.

The labs create prototypes, conduct test series, exhibit finished product innovations and offer live product demos. Technology companies present their machines here in a permanent exhibition.

The camps are temporary homes for teams sent to Aachen by individual companies to develop their future product successes. This is where visions and ideas become initial prototypes using the agile Scrum method and utilizing the special input provided by the shops and labs.

Conventions are an integral part of the Innovation Factory. Conventions, specialist fairs, seminars, training courses – this is where know-how and expertise congregate.

Effectiveness of technology transfer in the Bioeconomy

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Emerging knowledge areas like the bioeconomy are rapidly adopting innovations that draw upon the combination of knowledge from different disciplines, making interdisciplinary collaborations as well as technology transfer from academia to industry especially important. However, technology transfer entails challenges in a context of collaborative research due to the cognitive distance between dispersed and unrelated disciplines.

The effectiveness of such process raises the following questions: (1) How to manage technology transfer in interdisciplinary settings? (2) How the key stakeholder groups involved in technology transfer (i.e. academics from different disciplines, technology transfer facilitators and firms/entrepreneurs) perceive challenges in technology transfer?

Evidence from eight case studies (four research groups and four spin-offs operating in the bioeconomy) evaluated by Borge and Bröring (2017) indicate that an extended version of Bozeman's "Contingent Effectiveness Model of Technology Transfer", with a new criterion "resource complementary", is suitable to assess technology transfer in the bioeconomy. This emphasizes the high relevance and attention that interdisciplinary collaborations acquire in the research setting of the bioeconomy. Additionally, results from a multi-stakeholder representation show that factors related to interdisciplinary collaborations and collaborations between academics and firms are deemed to be crucial. Hence, making interdisciplinary collaborations mandatory in research proposals might lead to interdisciplinary opportunities and in turn, enhance technology transfer.

Innovating the Patient Journey - Patient Centric Solutions for the Future

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Chronic heart, respiratory and kidney diseases are the major cause of death and disability worldwide. One of the common denominators of those progressive and irreversible disease conditions is the gradual worsening of the organ function over several years. The individual patient journey leads from the various stages of chronic, long-term conditions, that can not be cured- but controlled, finally to end stage organ failure. Depending on the diagnosis, later and severe stages are usually accompanied by sudden deteriorations of the underlying chronic disease, so called acute-on-chronic events, which require hospitalization. Finally, the availability and tolerability of an organ transplant is necessary for survival. In this case the patient journey continues with the associated follow-up treatment.

The patient journey is not a linear event, and in addition, significant number of patients with chronic diseases, have more than one chronic condition, which is referred to as multimorbidity. This means, that interactions between kidney, lung and heart functions are intimately related in both, health and disease, and the complexity and incidence of these comorbidities increases during the patient journey and leads to a worsening of the overall prognosis. As a consequence there is a significant impact on patient's outcome as well as on quality of life, complicating the management of the disease and accounting for more than two-thirds of health care spending. Given this need and these complex interactions, multiple dimensions of patient centric solutions along the journey are urgently required. This includes a product dimension, comprising innovative devices like platform solutions for extracorporeal multi organ assist. In addition comprehensive services will leverage such platform solutions to standardize patients care with more safety, efficiency and an increasing cost-effectiveness from initial diagnosis to ongoing treatment options. This requires further steps in development, containing the utility of Big Data and Artificial Intelligence. This work comprises an overview about ongoing challenges and developments in this field.

Challenges in Recommending Biomedical Experts for Collaborations

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Research, development and innovation in biomedical engineering are getting more and more complex and thus extensive. The major challenge for being successful is to balance out patient safety and the accelerated pace of innovation. Numerous authors stated that collaboration is the most promising lever to overcome these difficulties. But how to identify the best fitting collaboration partner? So far, finding a suitable expert is mostly characterized by 'asking around' and relying on already known and regional partners. Data-based and computer-assisted approaches are rare, although 'big data' on the expertise of researchers is readily available (e.g. published literature). However, a manual search is biased, lacking of domain-sensitivity and coverage. So, an automated data mining procedure is necessary to get a comprehensive and comparable picture of unknown potential collaborators. Thus, we propose our approach starting from a project idea leading to the recommendation of experts with the required professional competences. The core idea consists of three steps: (1) using text mining to classify experts into the fields of the domain model according to their semantic data (projects, scientific publications, patents), (2) profiling the records and (3) matching them to the demand. Besides many difficult details, three major challenges are analyzed using example data of renowned researchers. First: Who is who? The unique and automated identification of individuals and their related documents is studied by comparing the potential of different disambiguation techniques. Second: What is the expert's competence? In contrast to most approaches focusing on citation- and network-based assessment, we develop an activity-based representation by classifying the experts' texts with supervised learning. Third: Who is the best match? According to the requirements of a collaboration intent, the most suitable experts need to be selected and ranked. The basic feasibility of a matching approach (e.g. using cosine similarity) is discussed. Acknowledgement: Klaus Tschira Stiftung.