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## Support of Innovation Networks in Manufacturing Industries Through Identification of Sustainable Collaboration Potential and Best-Practice Transfer

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### Abstract

The increasing global competition within today's manufacturing industries is confronting organizations with interdisciplinary challenges that require intellectual expertise and innovative technological solutions in various knowledge areas. Research organizations and manufacturing companies can improve their overall performance by bundling expertise in collaborative innovation networks. For this purpose a systematic Benchmarking approach has been developed by Fraunhofer IPK to match the competencies and capacities within a pool of organizations in order to facilitate a sustainable cooperation in terms of resources, customers and R&D topics. Furthermore, a KPI-based identification of best performing network-partners allows an initiation of Best-Practice transfers to gain sustainable competitive advantages for the whole network. Based on a methodological approach, the identification of collaboration potentials and Best-Practices is supported by software tools that visualize the results in an understandable and applicable way.

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### 1. Introduction

The increasing complexity and competition on global markets as well as the necessity for shorter product lifecycles nowadays are putting manufacturing companies under pressure and forcing them to react. The innovation capability of an organization that allows a quick adaptation to the increasing variety of customer requirements is an essential prerequisite to stay ahead of the global competition. While large companies dispose of the financial means to apply comprehensive R&D projects, small and medium-sized enterprises as the economy's driver for innovation and employment, have to search for alternative solutions, since they are not able to rely on equally powerful resources.

Collaboration can be a key success factor for companies that cannot finance major projects solitarily. Therefore, the significance of collaboration networks in manufacturing in-

dustries gains constantly more importance. In particular, the number of interdisciplinary projects is constantly growing, since the need for collaboration in terms of expertise and technical applications from different research fields becomes indispensable for a flexible and diversified service delivery.

Following this development, the Information Centre Benchmarking (IZB) at Fraunhofer IPK and the Technical University of Berlin developed a methodological benchmarking approach to identify the collaboration potentials of innovation networks in manufacturing industries. The approach aims to create multiple-win situations for all involved participants. The elaborated results of participating enterprises, universities and research institutes should take each participant's performance to the next level in terms of acquisition, problem solving and efficiency. However, this approach is not supposed to deliver quick-wins, but rather enables strong and sustainable commitments among the network on the long-run.

## 2. Framework

### 2.1. Benchmarking & Best Practice Transfer

Benchmarking as a management tool for organizations was developed by Robert C. Camp, who defined Benchmarking as “the search for solutions, which are based on the best methods and procedures of the industry, the Best Practices, and are leading enterprises to top performances” [1]. Since industries are constantly changing, benchmarking must be seen as a dynamic and continuous process of comparing products, services, processes and methods among multiple enterprises to identify improvement potentials [2].

In particular, branch-independent benchmarking facilitates the acquisition of innovative external ideas and best practices that can be adapted and implemented as an individual solution for the own organization. Therefore, benchmarking can be perceived as a possibility to internalize valuable knowledge that exists outside the own organization. Thereby, a company is able to strive for a leading position among the competition by setting new standards in the world of the world’s best. Such companies are considered to be “best in class” [1].

However, the scope of benchmarking goes far beyond the comparison of processes or products, since almost any aspect of an organization can be subject to a benchmarking project. Furthermore, the benefit of a benchmarking project is not only limited to a single organization. The selection of benchmarking partners is supposed to enable a mutual learning from each other, since every organization can be excellent in specific areas and needs support in other ones.

Consequently, the participants of an innovation network have many possibilities to compare and learn from each other, given the right benchmarking scope and approach.

### 2.2. R&D Collaboration in Innovation Networks

Innovation networks provide an important contribution to the development of the national innovation system and the economy in general as well as to the manufacturing industries in specific. The successful collaboration of innovative organizations and individuals foster the development of business opportunities and jobs creation. According to Ritter and Gemünden “network competence” is furthermore an essential prerequisite to facilitate product and process innovations [3].

The composition of an innovation network is determined by its players, individuals and organizations. Participants of those innovation networks can be start-ups, universities, research institutes, venture capitalists or business angels.

Rosenfeld distinguishes broadly between soft and hard networks. According to his definition, soft networks consists of three or more organisations that cooperate in an informal way on issues such as sharing information, acquiring new skills or solving common problems. Hard networks on the other hand are formed by three or more firms that cooperate on aspects such as co-production or co-marketing [4].

More specific examples for innovation networks are

- Community of Practice, which is defined as “groups of people, who share a concern or a passion for something they do and learn how to do it better as they interact” [5],
- Networked Organization, which is defined as “companies that are bound to some short- or limited-term contractual agreements aimed at a targeted joint business activity, such as the joint delivery of some service to final customers” [6],
- Virtual Community, which is defined as “a group of people who come together through computer-aided communication mechanisms to share information of interest” [7].

The relevant factors that contribute to successful operating innovation networks are shown below [8]:

- Trust between the participants
- Relations usually designed in a long-term time perspective
- Redundancies within the network, i.e. options and absence of hierarchy
- Openness, dynamics and flexibility
- Competition between the network actors
- Independence and voluntary cooperation
- Scale economics through cooperation

Innovation networks are clearly beneficial for the economy as a whole, and single organizations alike. But what are the individual motivations of organizations that participate in innovation networks to collaborate on R&D topics?

Hansen suggests three possible outcomes of collaboration that are suitable to motivate an organization to cooperate: “Better innovation, better sales, and better operations” [9].

Camarinha-Matos aggregates the benefit for collaboration activities only to an increase in efficiency [10]. In other words, an organization can save costs by collaborating with others. This statement is further supported by the research of Levermore and Hsu, who argue that collaboration can lead to the reduction of societal transaction costs and cycle time [11].

How efficient R&D collaboration can be shows the work of Audretsch and Vivarelli, who highlighted that SMEs have an even higher R&D productivity than big companies, which can be addressed to their ability to internalize knowledge that was created outside the firm [12].

As a consequence, a collaborative benchmarking approach needs to consider the stakeholder requirements, the principles of a successful cooperation in the innovation network and a clear focus on the topic of collaboration. The benchmarking approach has to integrate these views aiming for an informal and unlimited long-term collaboration that facilitates the target of developing joint R&D solutions by resource sharing and knowledge transfer to address mutual customer demands in manufacturing industries. Therefore, a workshop concept will build the orientation for a traditional and/or virtual collaboration among the network.

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