

Hochschule Furtwangen University

# Project Report

Examining the subject:

***Start-up Activities at German Universities***

-

***Analyzing universities entrepreneurial environment and  
examining the respective key success factors***

---

presented by

Lisa-Marie Merkel

Matriculation Number: 261340

Natalie Lanitz

Matriculation Number:261367

Daniil Filipenkov

Matriculation Number:261342

---

Submission: Villingen-Schwenningen

Date: July, 2019

## **Abstract**

Entrepreneurship is being characterized by innovation and change. An entrepreneurial mindset possesses the ability to simplify business operation processes and consumer products as well as improving service features. Furthermore, entrepreneurship does not only result in economic growth and prosperity, it also accelerates and promotes research and development.

The economy as well as individuals benefit from such innovative inventiveness. Many governmental departments recognize the positive and advantageous effects and therefore want to support and stimulate entrepreneurial activities right from the outset. Therefore, governmental authorities introduced a numerous of different funding programs in recent years, specifically designed for young entrepreneurs.

To enhance start-up activities and to increase the overall entrepreneurial spirit in Germany, universities need to expand their educational framework by one component, namely the Third Mission. Hence, universities are not only responsible to promote education and research, but also to create an entrepreneurial culture as well as anchoring it in the educational system. The objective is to support and expedite entrepreneurship from its very beginning.

This paper aims to analyze current entrepreneurial business activities, specifically at German universities. Moreover, key success factors, for instance, state subsidy programs as well as business cooperation's will be presented and analyzed. Hence, the essential objective of this paper is to find appropriate and successful entrepreneurial approaches which are feasible at the Hochschule Furtwangen University.

## Table of Contents

|  |           |
|--|-----------|
| Abstract.....  | I         |
| Table of Contents.....   | II        |
| List of Figures.....   | III       |
| List of Tables.....  | IV        |
| Table of Abbreviations.....  | V         |
| <b>1. Introduction.....</b>  | <b>1</b>  |
| 1.1 Problem Statement.....   | 2         |
| <b>2. Methodology .....</b>  | <b>4</b>  |
| 2.1 Data Collection.....   | 4         |
| 2.2 Selection of Benchmarks, Funding and Cooperation .....               | 5         |
| 2.3 Benchmark Analyse .....  | 5         |
| 2.4 Data Presentation .....  | 6         |
| <b>3. Research Findings.....</b>   | <b>6</b>  |
| <b>3.1 Theoretical Background .....</b>                                  | <b>6</b>  |
| 3.1.1 Definition and Concept of the Third Mission .....                  | 6         |
| 3.1.2 Alternative Fourth Mission.....                                    | 10        |
| 3.1.3 Innovation System Foresight in relation to the Third Mission.....  | 11        |
| 3.1.4 Third Mission and the Triple Helix Framework .....                 | 13        |
| 3.1.5 Implementation of the Third Mission Theory in HEIs .....           | 15        |
| 3.1.6 The Third Mission in German Universities of Applied Sciences ..... | 16        |
| <b>3.2 State Subsidy .....</b>   | <b>18</b> |
| 3.2.1 The EXIST Program.....   | 19        |
| 3.2.2 EXIST Culture of Entrepreneurship .....                            | 20        |
| 3.2.3 EXIST Potential.....   | 20        |
| 3.2.4 EXIST Business Start-up Grant.....                                 | 21        |

|   |           |
|---|-----------|
| 3.2.5 EXIST Transfer of Research.....   | 23        |
| <b>3.3 Cooperation Opportunities .....</b>  | <b>25</b> |
| 3.3.1 Cooperation with Industry.....  | 25        |
| 3.3.2 Local Support .....   | 26        |
| 3.3.3 Startup Angels Alb-Bodensee e.V. ....   | 26        |
| 3.3.4 IHK Schwarzwald-Baar-Heuberg .....  | 28        |
| 3.3.5 Steinbeis Cooperation –<br>Steinbeis Stiftung für Wirtschaftsförderung (StW)..... | 29        |
| <b>3.4 Benchmark Analysis.....</b>  | <b>32</b> |
| 3.4.1 Hochschule Pforzheim .....  | 32        |
| 3.4.2 Hochschule Bonn-Rhein-Sieg .....  | 39        |
| 3.4.3 Hochschule der Medien, Stuttgart.....   | 47        |
| <b>4. Conclusion .....</b>  | <b>56</b> |
| <b>5. Summary .....</b>   | <b>57</b> |
| <b>6. Outlook.....</b>  | <b>59</b> |
| <b>7. Limitations .....</b>   | <b>60</b> |
| <b>8. Bibliography.....</b>   | <b>61</b> |

---

|  |    |
|--|----|
| <b>Figure 1.</b> Development of the four Missions.....                     | 10 |
| <b>Figure 2.</b> The Triple Helix System.....                              | 14 |
| <b>Figure 3.</b> Types of cooperation between UAS and Third Parties.....   | 18 |
| <b>Figure 4.</b> EXIST Potential - Application Steps .....                 | 21 |
| <b>Figure 5.</b> The EXIST Program- Overview .....                         | 24 |
| <b>Figure 6.</b> Motives for (conceivable) Cooperation.....                | 25 |
| <b>Figure 7.</b> Structure of the Steinbeis Network .....                  | 30 |
| <b>Figure 8.</b> Vision of the Gründungswerk at Hochschule Pforzheim ..... | 35 |
| <b>Figure 9.</b> Schedule of the Summer Camp 2019 .....                    | 37 |

**Table 1.** Comparison of Missions ..... 11

**Table 2.** Relationship between ISF and Third Mission..... 12

**Table 3.** LED – Ozon – Sensor Project ..... 45

**Table 4.** Livestock Strategy Project..... 46

**Table 5.** Hybrid – KEM Project..... 47

---

|               |  |
|---------------|--|
| BMWi          | Bundesministerium für Wirtschaft und Energie   |
| CERlecon      | Central Europe Regional Innovation Ecosystems Network  |
| DHBW<br>e.V   | Duale Hochschule Baden-Württemberg<br>Eingetragener Verein   |
| ECTS          | European Credit Transfer System  |
| ESF           | Europäischer Sozialfonds für Deutschland   |
| GmbH & Co. KG | Gesellschaft mit beschränkter Haftung &<br>Compagnie Kommanditgesellschaft                             |
| GUSTL         | Gründungskultur in Studium und Lehre   |
| HBRS          | Hochschule Bonn-Rhein-Sieg   |
| HEED          | Human Engineering and Empathic Design  |
| HEI           | Higher Education Institution   |
| HELIX         | Application for an interdisciplinary learning concept for the start-up culture at Hochschule Pforzheim |
| HFU           | Hochschule Furtwangen University   |
| IHK           | Industrie und Handelskammer  |
| ISF           | Innovation System Foresight  |
| IUK           | Information and Communication Technologies   |
| KfW           | Kreditanstalt für Wiederaufbau   |
| NGO           | Non-Profit Organization  |
| PhD           | Doctoral Degree  |
| PRME          | Principles of Responsible Management Education   |
| SME           | Small to Medium Enterprise   |
| STW           | Steinbeis Stiftung für Wirtschaftsförderung  |
| UAS           | University of Applied Sciences   |

## 1. Introduction

Becoming an independent entrepreneur or working for a well-established enterprise is a question which arises during the development of a career strategy. Graduates as well as students mostly decide to follow the safe path, as entrepreneurship is being characterized and perceived as a career decision which possesses a high degree of uncertainty as well as high level of risk.

Nevertheless, the importance of entrepreneurship concerning the economy and social structures is continuously increasing. Innovative business ideas and concepts can enhance business operation processes as well as improving goods and services and possess the ability to improve an individual's standard of living (KOVEOS 2016, p. 1).

For many years, universities prime objective was to educate young people hence, their main function was education. In recent years, governmental departments, for instance, the ministry of education and research, recognized the importance of research activities at universities. Therefore, research was anchored in universities central principle and is as important as the educational function. Several governmental subsidy programs had been introduced to support and enhance research activities at germane universities (Hachmeister et al. 2017, p. 1).

However, besides research activities, governmental departments also recognized the increasing significance and importance of entrepreneurship. The main objective is to promote entrepreneurial culture on campus and the education of entrepreneurship itself. Hence, besides research and education, universities need to fulfil another function namely, the Third Mission. This new function mainly focuses on technology transfer as well as social responsibility and wants to increase and enhance local as well as regional initiatives. Moreover, the Third Mission also aims to promote innovative inventiveness as well as supporting continuous learning. Hence, universities are not only responsible to promote education and research, but also to create an entrepreneurial culture as well as anchoring it in the educational system (Hachmeister et al. 2017, p. 1).

Although the Third Mission simply represents another function at universities, it highly differs from the traditional educational function as well as the research function. The prior concept of universities is based on internal knowledge-transfer. The Third Mission mainly focuses on and integrates the external environment. This means, the objective of the Third Mission is to incorporate with external parties. Hence, the aim is to transfer and to provide technology- as well as knowledge-based conceptions to the public (Würmseer 2016, pp. 24–25).

The concept of the Third Mission addresses all universities in Germany and therefore also affects the Hochschule Furtwangen University (HFU). Many universities already implemented and embedded a fully developed start-up center and accomplished to generate an entrepreneurial culture. Hence, in the following a benchmark analysis will indicate key success factors of other universities that already accomplished to fulfil the Third Mission. After analyzing the entrepreneurial activities at other universities, several recommendations will be presented, specifically considering the feasibility at the HFU. Moreover, governmental subsidy programs as well as cooperation opportunities will be presented.

## **1.1 Problem Statement**

The increasing importance of entrepreneurship regarding economic as well as social growth impels governmental departments to take actions. The main objective is to raise the awareness of young individuals of entrepreneurship and to support as well as encourage these individuals to become entrepreneurs. Hence, entrepreneurship must be implemented in the higher education system right from the beginning.

This represents the main idea regarding the Third Mission at universities. It aims to educate young students about entrepreneurial activities, to support them throughout the development phase and, most importantly, to make them aware of the possibility of entrepreneurship as well as dispelling the anxiety of uncertainty and risk.

Nevertheless, the implementation of the Third Mission concept imposes considerable difficulties. For instance, to be able to anchor entrepreneurship in an educational system, the core curriculum needs to be revised. Moreover, to provide professional

support, in the form of seminars and workshops as well as providing a network of co-operation's, implies universities to be able to establish a respective network as well as to provide a professional supporting team. Furthermore, universities need to provide laboratories as well as well-developed research resources accessible for students (Hachmeister et al. 2017, p. 5).

Hence, the availability of resources represents the main difficulty for universities concerning the Third Mission, both financially and non-financially. Bigger universities benefit from their public familiarity as well as financial coverage. Specifically, private universities as well as major and well-known public universities possess a strategic as well as financial advantage comparatively to small- and medium- sized such as the HFU.

Summarizing, universities which aim is to successfully implement the Third Mission concept need to allocate the necessary amount of financial resources and need to be able to provide the required facilities and needed equipment. Moreover, it is important to select a number of professionals at the university, or to employee entrepreneurial experts, which are familiar with the topic and are able to offer support and professional insides. Furthermore, a cooperation network with external enterprises represent an advantage. From a student's point of view, this could be an opportunity to present their product or service directly to the market. Universities may benefit from a financial point of view (Hachmeister et al. 2017, pp. 9–15).

To address these difficulties and to present feasible opportunities for the HFU, the following benchmark analysis is being adjusted. Meaning, three key universities have been selected and analyzed based on the existing similarity concerning educational structure, size and resource capacity. Moreover, to overcome such difficulties and to guarantee a smooth implementation process, several cooperation opportunities will be presented. To enhance the financial performance at the HFU concerning the Third Mission, a successful state subsidy program, offered by the German Federal Ministry of Economic Affairs and Energy, will be introduced as well. With these recommendations, the paper aims to address all difficulties which can occur while implementing a Third Mission concept, particularly at the HFU.

## **2. Methodology**

This paper focuses on the following research questions:

- What is denoted by the term Third Mission and which effects does this approach has on the educational system?
- What considerable subsidy programs and business cooperation's are applicable and beneficial for the Hochschule Furtwangen?
- Which implementation methods, which have already been applied to other universities, are feasible and transferable to the Hochschule Furtwangen?

### **2.1 Data Collection**

This research was carried out through the use of secondary data. The Internet was mainly used as a channel to receive information. Accordingly, websites of universities, companies or supporters provided information for research. In addition, publicly accessible documents as articles in journals, handouts or reports were analyzed.

The use of secondary data had various reasons. Firstly, and related to the goal of this study, it is important to gather relevant and current information. Secondly, it was achievable to compare and select suitable benchmark universities as the entrepreneurial activities of the universities were indicated on their websites. Nevertheless, secondary data should be critically analyzed. In order to minimize the risk of using irrelevant sources, some key criteria were established.

Four key criteria were selected for this research (Scott, 1990):

- Authenticity – is the content of the documents what it claims to be?
- Credibility – is the source well researched or does it seem to be inaccurate?
- Representativeness – is the document representative of all documents at that time and place or are there alternative documents?
- Meaning – is the meaning of the source literally or is interpretation needed?

Initially, articles and scientific papers about the theoretical background of this topic were searched using the databases EBSCO and Google Scholar. The keywords “University Third Mission”, “University Triple Helix”, “Entrepreneurial Education”, and “Knowledge Transfer University” were used.

## **2.2 Selection of Benchmarks, Funding and Cooperation**

In order to select appropriate and interesting universities as benchmarks, cooperation partners or funding programs, locality was a decisive criterion. Local feasibility was important, as this study aims to implement entrepreneurial support at the HFU.

Three universities were selected as benchmarks for the HFU. Thereby, it was important to achieve comparability between the exemplary universities and the HFU. In the selection process, it was ensured that the universities are similar to the HFU in terms of various factors. These factors were size (in terms of number of students), financing, and offered courses of study. The reference was the HFU with 5,813 students, state-financed, and specialized in areas of engineering, computer science, international business, media and health (Hochschule Furtwangen University, n.d.).

The subsidy option should be accessible for the HFU. With regard to the financial support for founders, the initial research of this paper mainly indicates one program. Most universities, which support start-up activities, are part of the EXIST program. EXIST supports university graduates as well as students and academics and therefore meets the desired requirements of the HFU.

In order to find suitable examples of cooperation with the HFU, various criteria were defined in advance. Firstly, the cooperation should provide content support through consultation, workshops or competitions rather than purely financial support. Secondly, local cooperation's are more realistic to implement at the HFU.

## **2.3 Benchmark Analyse**

The research was conducted to obtain ideas concerning the implementation of the Third Mission at the HFU. Therefore, general information about benchmark universities

was provided to decide if the university is comparable with HFU. Moreover, specific funding opportunities were researched. Several programs and cooperation with associations, companies or institutions were introduced. Finally, examples of successful business ideas, which had been developed at the universities, were represented.

## **2.4 Data Presentation**

The result of this research work is a document that shows what opportunities exist to promote entrepreneurial projects at universities. Based on the information provided, it is possible to consider the advantages and disadvantages of these possibilities. Ultimately, it is achievable to formulate recommendations for HFU.

## **3. Research Findings**

In the following, a detailed background analysis, illustrating the theoretical basis and foundations concerning the Third Mission, will be presented. Moreover, the state subsidy program, namely the EXIST Program, will be introduced as a successful funding opportunity regarding the HFU. Additionally, regional as well as local cooperation possibilities will be evinced, followed by a final benchmark analysis.

### **3.1 Theoretical Background**

The Theoretical Background aims to give an overview of the relevant academic literature, particularly concerning the Third Mission at universities. The Third Mission itself as well as the Triple Helix framework will be introduced.

#### **3.1.1 Definition and Concept of the Third Mission**

The importance of knowledge acquisition and knowledge development has significantly increased in the last decades, the idea of Universities' Third Mission has evolved and deserves great political and scientific attention (Piiirainen, Andersen & Andersen 2016, p. 3). The main question is how universities contribute to the innovation and economic growth in total to a greater extent. Though the topic is very actual and discussable in the scientific world, there is still some lack of nature conceptualization and practical application of Third Mission (Piiirainen, Andersen & Andersen 2016, p. 3).

The process of innovation is associated with a Schumpeterian 'creative destruction', particularly with a sense that new innovations replace old technologies (Veugelers, Del Rey 2014, p. 14). During the 20<sup>th</sup> century with its globalization and internationalization processes a lot of massive changes occurred in political, social and economic aspects of higher education (Krčmářová 2011, p.315). The role of education has significantly altered and therefore, it is extremely urgent to conceptualize the Third Mission and its practical implementation (Piirainen, Andersen & Andersen 2016, p. 3).

It is important to understand the concept behind the Third Mission because of its clear distinction comparatively to the first two missions. Therefore, an exhaustive explanation of all three missions is required. The first mission is mainly about the teaching process, meanwhile the second mission, emerged in the middle of the 19<sup>th</sup> century during the first academic revolution, consists in research. These two missions were found to have a complementary nature, though there have been various concerns in the beginning regarding the deterioration of teaching quality as a result of research area emergence (Zawdie 2010, p. 152).

However, these missions are not directly and fully effectively involved into the socio-economic context and sustainable development. Certainly, because of the first mission the labor market is continuously developing and going under transformation due to the new labor force, however, it is far away from the effect caused by the Third Mission, emerged during the second academic revolution.

The Third Mission is a very diversified concept, which does not only include the role of the university as an institution influencing the global economy and society, but also as an organization that is affected by various shifts, for instance, the creation of the technology transfer centers, technoparks and incubators, development of the legislation regarding research commercialization and intellectual property rights (Zawdie 2010, p. 152).

These shifts create a favorable environment where universities are not only able to contribute to the national well-being by entrepreneurial activities, it can also improve universities own financial index by an active participation in the research initiatives. The Third Mission can also be defined as an opening process of HEIs to the external environment in order to accomplish the aim of improving both, HEI and the external environment (Krčmářová 2010, p. 317).

Another definition of the Third Mission consists in the activities regarding generation, exploitation as well as application of knowledge and other HEIs assets outside the scientific environment (Piirainen, Andersen & Andersen 2016, p.5). The Third Mission is usually associated with the development of knowledge economy, emerged under condition of globalization and technological revolution. Knowledge economy is mainly based on the suggestion that the importance of knowledge in all economic sectors is growing (Hadad 2017, p. 214). Based on the conceptual framework of the Third Mission, the Third Mission activities have to focus not only on the economic objectives, but also indirectly on the quality of life and development of society (Krčmářová 2010, p. 318).

Overall, the modern universities are able to contribute to the economic welfare through the engagement into Three Missions, namely (Veugelers, Del Rey 2014, p. 45):

- 1) Providing decent education to the citizens and foreigners, thus contributing to the constant enrichment of the labor market
- 2) Providing decent research in the universities, thus contributing to the accumulation of various ideas and concepts development
- 3) Providing the expertise in the transfer of technologies and thus increasing the innovation capital of the region or the country

Nowadays there exist various frameworks regarding the activities of the universities in terms of the Third Mission, however, the framework, developed by Molas-Gallard et al. (2002, pp. 21-27) is one of the most popular and includes:

- Technology commercialization
- Entrepreneurial activities
- Advisory work and contracts
- Commercialization of facilities
- Contract research
- Non-academic collaboration in academic research
- Academic stuff flow
- Student placements
- Learning activities
- Alignment of curricula to the social needs

- Social networking
- Non-academic publications and media presence

The concept of the Third Mission receives great attention because of its possible benefits it may bring to the society, HEI and economic environment. It should be mentioned that benefits from the Third Mission may be not only obvious, but also implicit, thus it is crucial to define which sort of benefits may appear as a result of a Third Mission implementation.

Mugabi (2014, p. 18) defined several types of benefits for the community among which the main are an open access to knowledge, financial, human and nonmaterial resources in order to satisfy the constantly growing societal needs as well as creation of new bright ideas, especially in terms of social entrepreneurship. However, according to the Mugabi (2014, pp. 18-19), not only local communities receive benefits, also the HEI and its students. HEIs are able to establish strong networks with local businesses, whereas students gain the opportunity to be more involved in the society and increase social awareness.

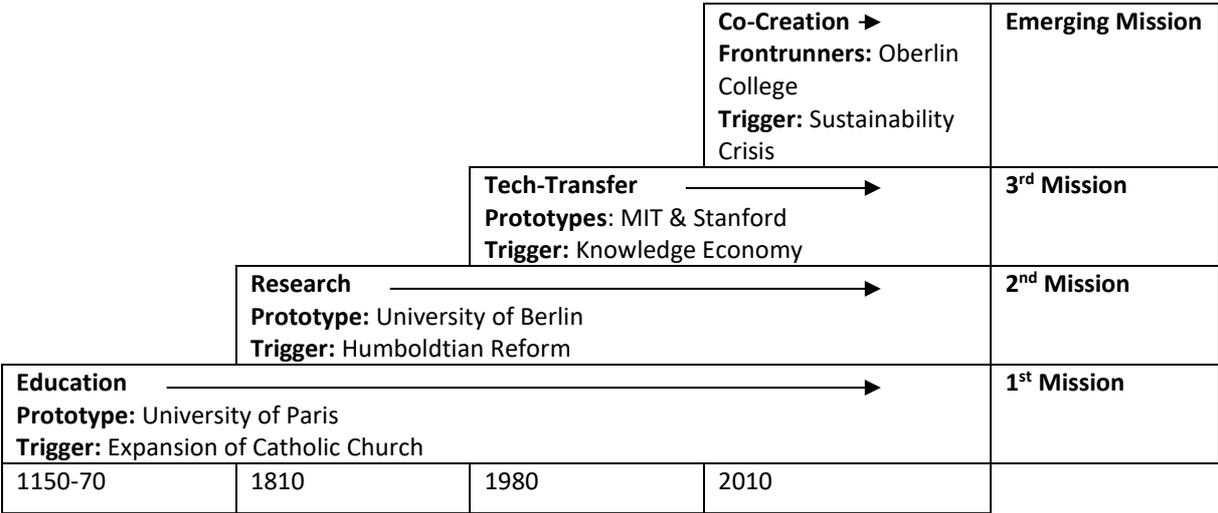
The concept of the Third Mission has been largely criticized by researchers because of its ambiguous nature. Trencher et al. (2014, p. 10) argue that the Third Mission theory is mainly focused on the societal contribution as on the economic contribution. Moreover, it is not fully integrated into the social context and, therefore, there is a gap between the concepts of societal and economic contribution in terms of the Third Mission theory. Thus, there have been several attempts in order to create a new alternative mission that would include the societal contribution in a larger context. In the next section the alternative fourth mission will be discussed, which is supposed to cover the societal aspect of contribution in a greater extent.

### 3.1.2 Alternative Fourth Mission

In the early 2000s, the emergence of the fourth mission had been observed. This Alternative mission does not intent to reject or isolate the previous missions of universities, it rather represents the process of modification concerning the other missions (Trencher et al. 2014, p. 30). Moreover, this new emerging co-creative function may represent a solution concerning the ongoing sustainability crisis, in particular, climate change and the access to resources. This so-called co-creation for sustainability mission could potentially align with the first three missions and perfectly work in a transformative institution (Trencher et al. 2014, p. 30).

Although, the Third Mission is supposed to cover the range of all activities that are not performed by the first and the second missions, in reality this statement is not fully implemented. The main aim of the Third Mission is to foster economic development. Nevertheless, this approach does not consider various vital issues as sustainable development and environmental issues. Therefore, a new mission emerged which mainly concentrates on sustainability issues (Rinaldi and Cavicchi 2015, p. 726).

The development and key points of all four missions is presented in the Figure 1.



**Figure 1.** Development of the four Missions (Source: Trencher et al. 2014, p. 30)

The Third Mission and the emerging mission are compared in various aspects and the results of the work are presented in the Table 1.

| <b>Mission</b>   | <b>Third Mission</b>               | <b>Emerging Mission</b>  |
|------------------|------------------------------------|--|
| <b>Aspect</b>    |                                    |  |
| <b>Function</b>  | Technology Transfer                | Co-creation for sustainability   |
| <b>Objective</b> | Contribute to economic development | Create societal transformations to materialize sustainable development |
| <b>Model</b>     | Entrepreneurial University         | Transformative university  |
| <b>Paradigm</b>  | Market logic and entrepreneurship  | Sustainability   |

**Table 1.** Comparison of Missions  
(Source: Trencher et al. 2014, p. 13)

As it can be observed, there are considerable differences between presented missions, however, the concept of sustainability is the key point in this distinction. The sustainability crisis was the critical moment of the Alternative Mission emergence and therefore, a considerable shift of the scientific attention from the Third to the Alternative Mission can be observed. Although, the concept of the Alternative Mission is comparably new in the scientific world and still faces several modification and transformation; however, it is clear that this fourth mission covers more aspects of contribution to the society, economy and sustainable development, and, thus, is a potential substitution in the HEIs for the dominating Third Mission.

**3.1.3 Innovation System Foresight in relation to the Third Mission**

The Innovation System Foresight (ISF) is supposed to be an efficient instrument during the implementation process of the Third Mission through the creation of an active dialogue between universities, society and businesses (Pirainen, Andersen & Andersen 2016, p. 4). The main aim of the ISF consists in strengthening the innovation system, which involves constructing, rearranging and redirecting the system by mitigating

obstacles and developing learning and innovation initiatives (Piirainen, Andersen & Andersen 2016, p. 10). It is important to clarify that the ISF is not related to the processes of forecasting, predicting or prospecting, rather to the process of identification of various opportunities and obstacles in strategic planning development (Munck 2010, p. 33). Nowadays, universities are developing in uncertain environment and therefore, the identification of the potentially beneficial opportunities and threatening obstacles is one of the key activities of university administrative staff. Scenario planning as well as the basis of the foresight activity is supposed to be an efficient tool to understand future trends, as well as an instrument for decision making in terms of uncertainties of various levels (Munck 2010, p. 33).

The strong relationship between ISF and Third Mission will be presented in Table 2.

| <b>Foresight Activity</b>   | <b>Contribution to the Third Mission</b>   |
|---|--|
| <p style="text-align: center;"><b>Thinking about the future</b><br/>(The cognitive sphere of the foresight)</p>     | <ul style="list-style-type: none"> <li style="text-align: center;">-Social Dialogue</li> <li style="text-align: center;">-Creation of a picture of future expectations</li> <li style="text-align: center;">-Analyzing the modern trends</li> <li style="text-align: center;">-Considering possible modern abilities and knowledge required in the future</li> </ul> |
| <p style="text-align: center;"><b>Debating about the future</b><br/>(The value judgment dimension of foresight)</p> | <ul style="list-style-type: none"> <li style="text-align: center;">-Insight into priorities in the future</li> <li style="text-align: center;">-Legitimizing of technologies</li> <li style="text-align: center;">-Creation of the network and search of partners</li> </ul>   |
| <p style="text-align: center;"><b>Shaping the future</b><br/>(Pragmatic dimension of foresight)</p>                 | <ul style="list-style-type: none"> <li style="text-align: center;">-Identifying research-based solutions</li> <li style="text-align: center;">-Researching possible projects and partners</li> </ul>   |

**Table 2.** Relationship between ISF and Third Mission  
(Source: Piirainen, Andersen and Andersen 2016, p. 31)

Table 2 demonstrates that through the participation in foresight activity, various stakeholders are able to contribute to the Third Mission implementation, cooperate with each other and shape the operating environment. Therefore, the ISF is supposed to be an efficient framework for the Third Mission contribution. Nowadays, almost every HEI organizes various Foresight Events, being used for the creation of an active dialogue between students and professors as representatives of the HEI, governmental bodies and business players on the market in order to contribute the economic development.

The concept of ISF is strongly related to another framework, namely the Triple Helix framework which is supposed to be a base for the Third Mission implementation and thus deserves special attention in the current paper. The Triple Helix concept mainly highlights the urgency of the systematic cooperation and coordination between three main players – HEIs, governmental bodies and business sector in order to foster innovation process and economic growth.

### **3.1.4 Third Mission and the Triple Helix Framework**

In the last decades a continuous shift regarding the main role of a university towards the contribution to the global economy, sustainable development and innovation process had been observed. Some researchers argue that this shift consists in the emerging role of universities as mediators between main players, for instance, entrepreneurs and society and that this shift caused an appearance of two closely connected concepts – Third Mission and Triple Helix (Zawdie 2010, p. 151).

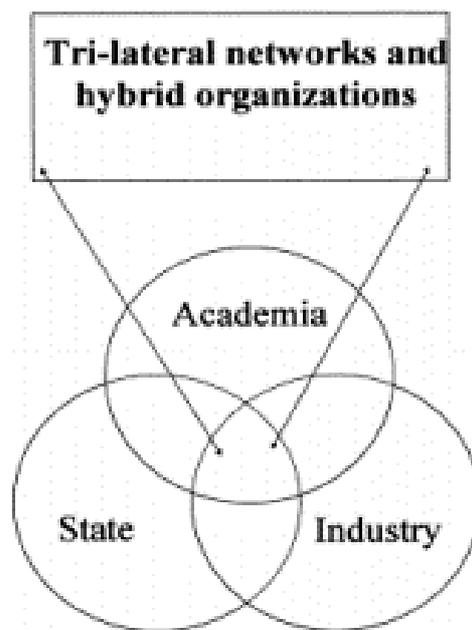
Hence, the respective issues concerning the Third Mission should be investigated in combination with the Triple Helix due to their close interaction. Since the 1980s, the concept of the Third Mission is being debated. This discussion is based on different theories such as Entrepreneurial University, Triple Helix and Mode 2 Approach (Roessler 2015, p. 4).

The combination of the Third Mission concept and the Triple Helix theory determine the impact that universities should cause on the innovation process and sustainable development (Zawdie 2010, p. 151). The Third Mission may be efficiently and sustainably chased in terms of the Triple Helix framework that was initially proposed to be used for explanation of systemic nature of the cooperation between universities, industry and government (Zawdie 2010, p. 152). A Triple Helix is a set of various relations

between academic, government and industry institutions and a key concept of innovation strategy of any state in the last decades (Leydesdorff 1995, p. 2). Some scientists argue that the Third Mission is supposed to be a stage of a Triple Helix System implementation (Nakwa and Zawdie 2016, p. 625).

The concept of the Triple Helix is a set of (Ranga and Etzkowitz 2013, p. 8):

- 1) **Compounds:** University, Industry and Government with a broad variety of actors
- 2) **Interconnection:** Close cooperation between compounds (collaboration, networking)
- 3) **Functions:** The number of activities specified as “Triple Helix Spaces”: Knowledge, Innovation and Consensus Spaces



**Figure 2.** The Triple Helix System  
(Source: Ranga and Etzkowitz 2013, p. 7)

The concept of the Triple Helix System is also going under the process of transformation and is sometimes extended to the “Quadruple Helix System”, meaning the implementation of other players such as society, particularly citizens, NGOs and consumer organizations (Unger, Polt 2017, p. 11).

After presenting and explaining the Third Mission, Innovation System Foresight and the Triple Helix framework, the following part mainly concentrates on the theoretical part of the implementation of the Third Mission Theory in HEIs.

### **3.1.5 Implementation of the Third Mission Theory in HEIs**

Overall, the role of the university has transformed a lot in the previous decades. Nowadays, the collaboration with various third social parties is one of the most important roles for universities. Therefore, they discover and implement social transformations, which aim promoting sustainable development in a particular location (Trencher et al. 2014, p. 4).

In contrast, the Third Mission concept is criticized in the scientific world, as it is an ambiguous concept, comparable to the concept of sustainability (Trencher et al. 2014, p. 10). Indeed, scientific researches posit that a social contribution is supposed to be the core notion of the Third Mission concept. Many medieval universities were even expected to contribute to the development of the society and thus the appearance of the Third Mission concept should be simply viewed as an extension of these expectations, which were even existing in the medieval (Trencher et al. 2014, p. 10).

The implementation of the Third Mission at university is defined by the following factors (Albulescu, Litra & Neagu 2014, p. 8):

- 1) Traditional university activities (education and research)
- 2) Openness to innovation
- 3) The level of the support of university (banks, investments)
- 4) The eagerness to exploit opportunities

Universities usually realize the Third Mission through various methods, particularly by technology transfer, namely (Veugelers, Del Rey 2014, p. 45-51):

- Licensing
- Spin-offs
- Patenting
- Spillovers
- Regional Clusters

- Science Parks
- Incubators

Nowadays, governments of different states realize the Third Mission in order to facilitate universities' contribution to the economic development. Most of the policies, which the government creates, include the introduction of the universities reforms, various laws and governmental bodies, consisting of various stakeholders and parties who are responsible for representing social interests and serving as a mediator between society and HEI (de la Torre, Perez-Esparrells & Casani 2018, p. 15). The current research is devoted to the implementation of start-ups at German universities of applied sciences. Therefore, the focus will partly be on the activities of the German government, which will be presented in the following sections.

### **3.1.6 The Third Mission in German Universities of Applied Sciences**

In terms of the current research on the universities of applied sciences, the implementation of the Third Mission at these institutions includes the following main dimensions (Roessler 2015, p. 4):

- Relation between university and economy (e.g. educational institutions interact with various stakeholders from the economic environment). Those may include the technology transfer or innovation activity.
- Social involvement. This implies the interaction of the educational institution with social environment. For example, the involvement of the university into social innovation activities.
- The engagement of the university into the cultural and political environment.
- Knowledge transfer

The current research will be mainly focused on the university of applied sciences in Germany. Therefore, it is necessary to provide the information regarding the current state of educational system. Nowadays, there are 426 universities in Germany, of which 25% are the traditional universities; a further 25% are various institutions, such as specialized HEIs and the majority of 50% are universities of applied sciences (Statistisches Bundesamt, 2019).

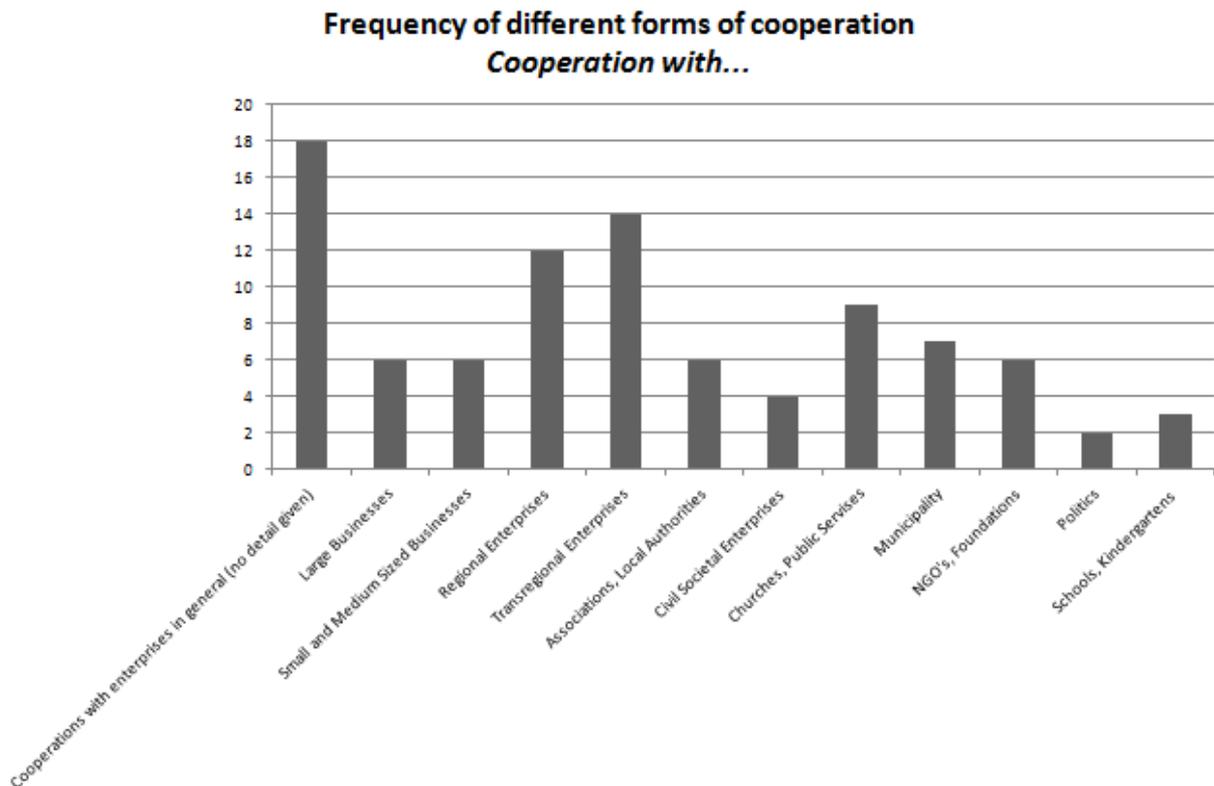
Overall, the universities of applied sciences mainly focused on the applied research. In contrast, universities with a supplemental focus on the basis research, differ in various aspects like aims, funding, and cooperation with third parties.

Universities of applied sciences were firstly established between 1969 and 1971 in order to provide the access to education for the masses. Compared to traditional universities, they possess distinct profiles and own advantages regarding their research and Third Mission initiatives (Roessler 2015, p. 11).

The strategic mission of universities of applied sciences (UAS) was to give the young generation practice-oriented education so that they would be prepared for the future working life (Roessler 2015, p. 11). One of the main purposes of the UAS was to bring Germany from the industrial era to the knowledge society (Roessler 2015, p. 11).

Regarding the methods implemented in the universities of applied sciences, it should be mentioned that a strong focus is given on the work-orientation and application. The UAS have been extremely successful in Germany regarding applied research, as well as the collaboration between industry and universities. For instance, UAS have been allocated almost one third of their third-party funds from business sector. At the same time universities obtained around one fifth of these funds from business sector (Statistisches Bundesamt, 2012).

Universities of applied sciences in Germany are often engaged into various activities and cooperation with third parties. The frequency of different forms of cooperation is presented in Figure 3.



**Figure 3.** Types of cooperation between UAS and Third Parties  
(Source: Roessler 2015, p. 12)

As presented, the universities of applied sciences play an important role in the economic development of Germany and contribute to the wellness in a larger extent. Thus, it is crucial to understand the environment, in which UAS are developing the cooperation they are participating in and what sources of funding they have access to. The following sections will mainly concentrate on these topics and will provide an extensive overview of the external and internal environment of UAS. Afterwards, the authors of the current paper will present three universities of applied sciences located in Germany and create benchmarks for Hochschule Furtwangen University (HFU), located in Schwenningen, Baden-Württemberg, Germany. The authors will also provide some suggestions regarding implementation.

### 3.2 State Subsidy

The availability of resources represents the main difficulty for universities, especially for small- and medium-sized universities. Nevertheless, the Third Mission concept requires financial resources, high-quality equipment as well as specific facilities. To

overcome these difficulties, several governmental departments introduced support and funding programs, particularly for entrepreneurial activities at universities. In the following, the EXIST Program of the German Federal Ministry of Economic Affairs and Energy will be presented.

### **3.2.1 The EXIST Program**

The EXIST Program of the German Federal Ministry of Economic Affairs and Energy (BMWi) aims to encourage and assist entrepreneurs at universities which provide new and innovative business ideas. The program supports university graduates as well as students and academics. Furthermore, the program wants to enhance the entrepreneurial ambience at universities as well as research institutes while increasing the amount of technology and knowledge-based business start-ups. (Dr Marianne Kulicke 2014, p.1)

The program is built upon three concepts, namely EXIST Culture of Entrepreneurship, EXIST Business Start-up Grant and EXIST Transfer of Research. EXIST Culture of Entrepreneurship aims to find and to realize a long-term and sustainable strategy to enhance and support a strong entrepreneurial spirit on campus. The second concept, EXIST Business Start-up grant, encourages and finances students, graduates as well as scientist in initializing technology and knowledge-based start-up projects. The EXIST Transfer of Research provides the financial resources, particularly for technological based business ideas, which are needed in the development as well as preparation phase of a start-up to ensure a successful market introduction. (Dr Marianne Kulicke 2014, p. 2)

The EXIST Business Start-up Grant as well as the EXIST Transfer of Research represent the financial resources the program offers. These two concepts focus on the pre-stages of the business, hence before the official founding of the business. Hereby, the program aims to enable entrepreneurs to develop business ideas, concepts and models by providing the financial resource. Moreover, the entrepreneurs get the chance to see if their start-up team is able to efficiently work together, all without risking personal resources throughout the one-year financial sponsorship. (Dr Marianne Kulicke 2014, p. 3)

### **3.2.2 EXIST Culture of Entrepreneurship**

The EXIST Culture of Entrepreneurship essential goal is to bring an entrepreneurial spirit directly on campus. The programs main intention is to let universities create an entrepreneurial environment by implementing entrepreneurial support in every sector possible. Universities shouldn't see it as a sponsored subject of matter, the EXIST Culture of Entrepreneurship aim is to go beyond teaching entrepreneurship in class. It is about experiencing and supporting innovative ideas. (Dr Marianne Kulicke 2014, p. 12)

The program is willing to subsidize universities on one condition- universities are required to embed entrepreneurialism in all areas, meaning in their education and research environment and including the entrepreneurial spirit in their mission statement. Moreover, the universities need to redesign their educational program towards entrepreneurship, meaning to put more emphasis on topics which are related and important for start-up activities, for instance, patent classifications as well as the right of ownership, targeted marketing strategies and common business strategies. Furthermore, the program prerequisites the availability of labs as well as well-developed research resources accessible for all students. (Dr Marianne Kulicke 2014, p. 12)

### **3.2.3 EXIST Potential**

The Exist potential is a newly integrated funding guideline of the EXIST Culture of Entrepreneurship which aims to further improve the entrepreneurial environment at universities and to strengthen the entrepreneurial network, established through the EXIST Culture of Entrepreneurship program. (Bundesministerium für Wirtschaft und Energie 2019, p. 7)

The main goal of the EXIST Potential program is to advance the entrepreneurial network and to give more universities, in particular small- and medium sized universities, the chance to be part of the EXIST support program. Hence, the EXIST Potential wants to enable smaller universities to enhance their entrepreneurial potential through best-practice examples of other universities. The given best-practice examples can help other universities to improve their start-up activity related performance. Another goal is to promote a regional start-up culture which goes beyond the campus. This means,

regional universities and research institutions work together and cooperate with regional companies, associations or venture capitalists. Moreover, the EXIST Potential aims to internationalize more start-up activities. Meaning, the EXIST program aims to teach students from early on general international business practices to prepare the future entrepreneurs to introduce their innovative product or services not only nationally but also globally. (Bundesministerium für Wirtschaft und Energie 2019, p. 10)

Summarizing, the EXIST Potential wants to reach universities which want to enhance their entrepreneurial environment and want to further develop as well as sustain their network. (Bundesministerium für Wirtschaft und Energie 2019, p. 10)

EXIST Potential is a program designed for private and public universities which are already funded by the EXIST program as well as universities which do not receive the support of EXIST yet. (Bundesministerium für Wirtschaft und Energie 2019, p. 11) The application process will be presented in the figure below (Figure 4).



**Figure 4.** EXIST Potential - Application Steps  
(Source: Bundesministerium für Wirtschaft und Energie (BMWi), 2019, p.11)

### 3.2.4 EXIST Business Start-up Grant

As mentioned above, the EXIST Business Start-up Grant is one of the fundamental financial support opportunities provided by the Federal Ministry of Economic Affairs

and Energy. It mainly focuses on the pre-phase of the development of an entrepreneurial idea or start-up project. The EXIST Business Start-up Grant supports graduates, students and scientist aiming to enable innovative business ideas and concepts. This program provides financial support from the pre- to the post-phase of a start-up project. (Federal Ministry for Economic Affairs and Energy 2016, p. 2)

Suitable for the EXIST Business Start-up Grants are innovative projects which are technology as well as knowledge based. Hence, the projects introduced to the program should be innovative and beneficial for the market based on scientific research. Scientists as well as non-university researchers, graduates and students are able to apply for the EXIST Business Start-up Grant. However, the graduation of former students should be no longer than 5 years ago, and current students should be at least halfway through with their study during the application phase. (Federal Ministry for Economic Affairs and Energy 2016, pp. 2–3)

The EXIST Business Start-up Grant financially supports start-up projects up to one year. Living expenses are covered as well and depend on the degree the applicants hold. For instance, doctorates monthly pay reaches up to 3000 Euro a month. Applicants with a professional qualification instead of a degree get 2000 euro a month and university graduates obtain 2500 Euro a month. Students which are currently studying as well as undergraduate students monthly pay comprises 1000 Euro a month. Additionally, parents obtain an extra payment of 150 per month and per child. Furthermore, the EXIST program covers up to 10.000 Euro material expenses for individual applicants and up to 30.000 Euro for project teams. Specific entrepreneurial training will be funded up to 5.000 Euro. (Federal Ministry for Economic Affairs and Energy 2016, pp. 3)

The EXIST Business Start-up Grant only accepts project applications which are submitted by the university or the research institution. The application should include a detailed overview and outline of the business proposition. Afterwards, the university or institution is responsible to find an appropriate supervisor for the start-up team. An entrepreneurial network will support the start-up teams in every aspect, up to one year. (Federal Ministry for Economic Affairs and Energy 2016, p. 4)

### **3.2.5 EXIST Transfer of Research**

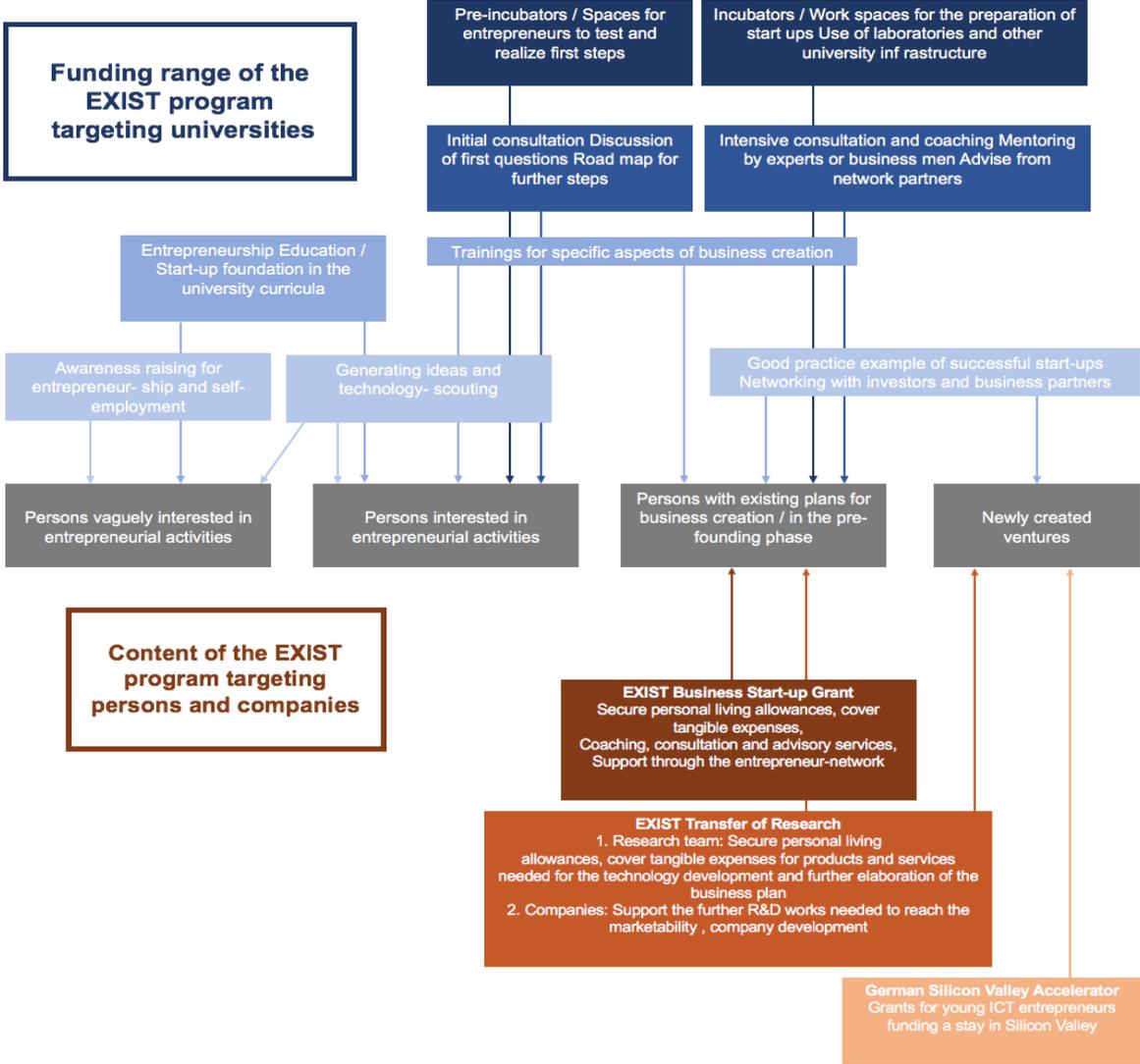
The EXIST Transfer of Research program mainly focuses on high-tech innovation at universities and research institution. With this part of the program the Federal Ministry for Economic Affairs and Energy aims to raise the amount of technology-based start-up projects. (Federal Ministry for Economic Affairs and Energy 2015, p. 2)

Suitable for the EXIST Transfer of Research program are technology-based business ideas which include a long process of development. Specifically, this program is being divided in two parts. For the first part the applications process requires a pre-examination of the realizability and the implementation effort of the start-up project. Additionally, the applicants need to provide a detailed concept of their business idea as well as detailed information about the market introduction process. A maximum amount of three team members are accepted by the program, containing an engineer or lab technician. Moreover, the program consent to one person which possess experience in business administration processes. For the first part of the EXIST Transfer of Research program the application must be handed in by the responsible research institute or the university itself. (Federal Ministry for Economic Affairs and Energy 2015, pp. 2–3)

The second part of the EXIST Transfer of Research program involves a new application process. Nevertheless, the project team which developed a technological based business during the first part of the program is now in charge of the application itself. Hence, the enterprise which has been constructed during the first part or is in progress of being developed presents its application. (Federal Ministry for Economic Affairs and Energy 2015, p. 3)

The program is willing to fund the project team up to 18 months. Nevertheless, this time limitation can be postponed to another 18 months if the project is based on a highly innovative matter. Particularly, during the first part the program covers staff as well as materials cost up to 250.000 Euro. For the second part of the program the start-up team receives 180.000 Euro. Additionally, the program willing's to cover affiliated project expenses up to 75%. (Federal Ministry for Economic Affairs and Energy 2015, p. 4)

Summarizing, to guarantee a successful application processes the applicants need to provide a detailed overview of the overall project idea. Furthermore, the start-up team needs to prove the realizability of the innovation as well as its practicability. The university is in charge to provide an entrepreneurial specialist which acts as a supervisor. Moreover, an entrepreneurial network will support the project team during the whole process. (Federal Ministry for Economic Affairs and Energy 2015, pp. 4–5)



**Figure 5.** The EXIST Program- Overview (Source: Dr Marianne Kulicke, 2014, p. 1)

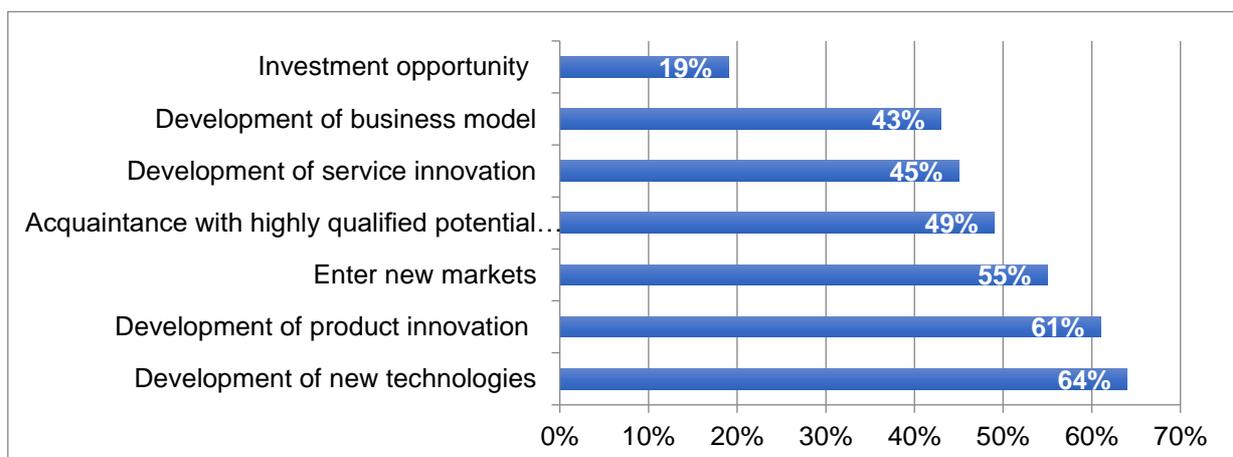
### 3.3 Cooperation Opportunities

A well-established cooperation network with external enterprises will be beneficial for both, the university itself as well as their students. Concerning the implementation of the Third Mission at the HFU, in the following several cooperation opportunities are presented and analyzed.

#### 3.3.1 Cooperation with Industry

Young entrepreneurs who decide to start their own business are willing to take risks and are passionate about turning their wishes into reality. To increase the chances of success of a start-up, cooperation with companies or experienced entrepreneurs can be beneficial. According to a study conducted by the Institut für Mittelstandsforschung Bonn (*English: Institute for SME research*) the larger a company, the more interested they are in cooperating with start-ups. 63,6% of the surveyed firms with more than 1,000 employees collaborating with young enterprises (Bundesverband der Deutschen Industrie e.V. (ed.), 2018, p. 6).

In addition to that, 68.3% of companies with a turnover of more than 250 million euros engage in partnerships with start-ups. Cooperation is becoming more and more important for established companies in order to face new market challenges (Bundesverband der Deutschen Industrie e.V. (ed.), 2018, p. 6). New market challenges are for example new technologies, product innovations or new markets (Figure 6).



**Figure 6.** Motives for (conceivable) cooperation  
(Source: Wallisch & Hemeda, 2018, p. 21.)

Statistically, 43% of cooperations with companies occur with start-ups from the information and communications sector, and 39% of cooperations are with companies from the mechanical engineering and vehicle construction sectors (Wallisch & Hemeda, 2018, p. 17).

The age of the founders plays a very minor role in the establishment of a cooperation. Only 11% of the interviewed SMEs state that the founder should be at least 25 years old (Wallisch & Hemeda, 2018, p. 23). Therefore, students have no disadvantages. Furthermore, universities can assume a crucial role and initiate cooperations between start-ups and companies. As bridge-builders, universities can contribute to raising awareness of the advantages of cooperation between student start-ups and companies and ultimately to ensuring that both parties establish sustainable cooperation (Wrobel, Schildhauer, & Preiß, 2017, p. 91).

### **3.3.2 Local Support**

The following part outlines examples from the local economy that support start-ups. The local criterion makes it possible to consider these examples as role models for the HFU and to analyze them accordingly.

### **3.3.3 Startup Angels Alb-Bodensee e.V.**

Startup Angels Alb-Bodensee is a registered association based in the region between Swabian Alb and Lake of Constance. Experienced entrepreneurs provide support to various start-ups and spinoffs. The association not only supports founders financially but also content related. Additionally, they provide a large network of (regional) business people who are also interested in supporting future companies and who can give valuable insights about various business fields. Due to this wide network, the association has multiple cooperation's with local companies. One crucial success factor of this association is to share knowledge and to support start-ups on their way of becoming financially independent as a company. Additionally, it is an objective to strengthen the business region between Swabian Alb and Lake of Constance. (Startup Angels Alb-Bodensee e.V., n.d.)

In order to further increase the exchange of knowledge, Startup Angels Alb-Bodensee offer regional events. For example, they offer three times per year an investment forum where founders have the opportunity to present their business idea in front of a jury. The members of the jury are interested in investing and supporting start-up businesses and therefore it is a valuable occasion for founders who are seeking for capital and knowledge exchange. Nevertheless, an application for these events is necessary. The application is available for download on the homepage of the association. Interested founders have to describe for example their business idea, technology and unique selling proposition. Moreover, start-ups can already announce their desired financing for the next four years. (Startup Angels Alb-Bodensee e.V., n.d.)

Furthermore, the Startup Angels Alb-Bodensee e.V. organize a pitch at the ThyssenKrupp test tower in Rottweil. Members of the association, as well as investors and business people are willing to invest and to cooperate with start-ups. There are two options to present your business ideas, depending on the current status of the start-up. The first part of this event is the tower pitch which addresses established start-ups in the following areas (Ministerium für Wirtschaft, Arbeit und Wohnungsbau Baden-Württemberg, n.d.):

- IUK Information and Communication Technologies
- Organic Economy and Food
- Technology / Digitization
- Sustainability and Environment

Within ten minutes the founders present their unique selling propositions, business ideas, market situations and desired financing in order to further develop their own business. The Elevator Pitch is the second option, which is dedicated to students and to founders in the seed phase. In a very early stage, they receive the opportunity to present their first business ideas. Within 90 seconds participants explain their idea in the elevator of the test tower in Rottweil. Interested people who want to participate can submit a one-page document and a video introducing themselves and their idea.

To pitch a business idea in front of the jury, the industry is not relevant. Ideas from the following areas are desirable (Startup Angels Alb-Bodensee e.V., n.d.):

- Information and communication technologies (software, internet, mobile, etc.)
- Life sciences (biotech, healthcare, medical technology, etc.)
- Technologies (hardware, e-technology, energy, mechanical engineering, optic etc.)
- Innovative services/innovative services
- Sustainability and environment

The team that wins the Elevator Pitch can receive a prize of 500 euros, as well as an individual coaching regarding the business plan (Startup Angels Alb-Bodensee e.V., n.d.). Especially for students this opportunity is valuable. They get to know business people and entrepreneurs who might be interested in supporting business ideas. The university of applied sciences in Reutlingen points out this competition and therefore encourages their students to participate (Hochschule Reutlingen, n.d.).

### **3.3.4 IHK Schwarzwald-Baar-Heuberg**

The chamber of commerce and industry (*German: Industrie- und Handelskammer, short: IHK*) represents the interests of the entire economy and the enterprises of a region. There is a total of 80 IHK subsidiaries in Germany, which also take on public legal tasks, such as final examinations for apprentices. Moreover, they are a service provider and advice on various business topics. Contributions and fees for services finance the IHK (Industrie- und Handelskammer Hochrhein-Bodensee, 2014). As part of the services, the chamber of commerce and industry for the region Schwarzwald-Baar-Heuberg offers various supports for people who want to start their own business. Since the IHK does not only offer counseling specifically for students and young entrepreneurs, this possibility of cooperation is only briefly outline in this report.

The IHK encourages those interested in setting up a business to inform themselves primarily on their website. Additionally, it is possible to receive a starter package with information regarding procedures, legal aspects or commercial questions (IHK Schwarzwald-Baar-Heuberg , n.d.). In the next step, people who are interested in

founding their own business are recommended to attend an event called “Startschuss Gründung” (*English: starting signal foundation*), where the chamber of commerce and industry informs on a monthly basis about the procedure of setting up a company. Some events are offered to expand the network and exchange ideas and knowledge with other founders. Moreover, the IHK organizes seminars and workshops with the objective to deliver information about starting an own business. Individual support and counseling with an IHK employee are also possible (IHK Schwarzwald-Baar-Heuberg, n.d.).

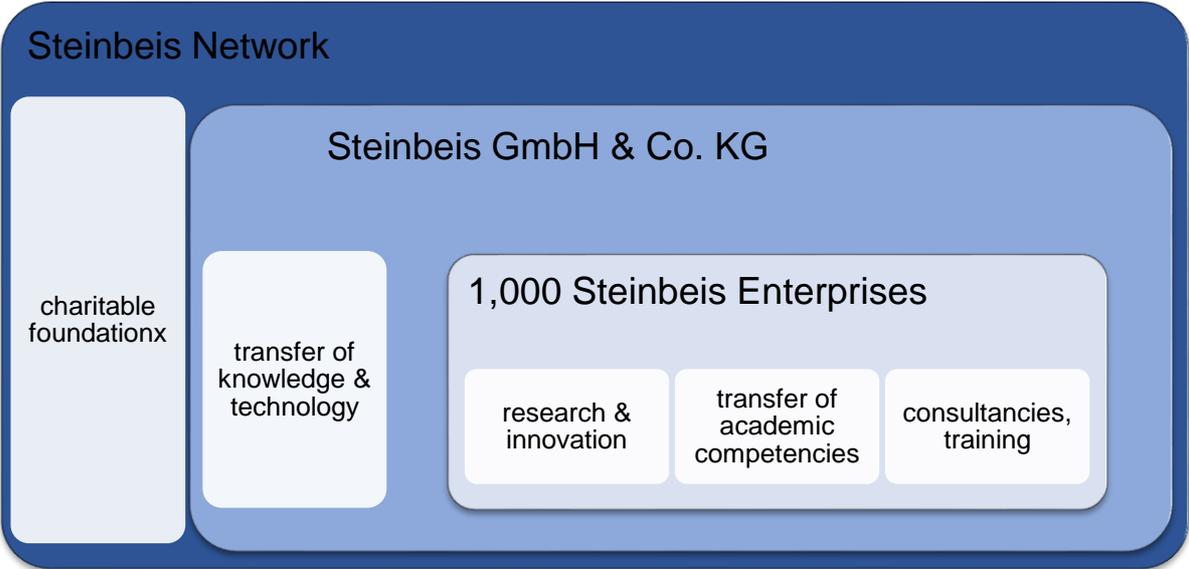
The services offered by the IHK for people interested in setting up a business mainly comprise the providing of information. Especially for students it is advisable as a first or additional resource for information.

### **3.3.5 Steinbeis Cooperation – Steinbeis Stiftung für Wirtschaftsförderung (StW)**

Ferdinand von Steinbeis was a pioneer of his time and set the foundation for today’s knowledge transfer. Already in the middle of the 19<sup>th</sup> century as the head of the Central Office for Trade and Commerce in Württemberg (Southern Germany) he discovered the potential of innovation and dual education. The concept of dual education is still unique in Germany and very successful. Steinbeis was passionate about regional business development in Württemberg and additionally supported talented young people, as for example Gottlieb Daimler. In the year 1868 Steinbeis established the initial Steinbeis foundation, which has to be closed during inflation in 1923. In 1971 today’s Steinbeis foundation was reopened as a service provider for the support of medium-sized businesses in Baden-Württemberg (Steinbeis Stiftung , 2018).

The promotion of economic development is still one of the key responsibilities of Steinbeis Cooperation. Nowadays, it is one of the world’s most successful providers of know-how and technology transfer (Steinbeis Stiftung , n.d.). Since the beginning of Steinbeis, approximately 2,000 companies were founded, whereas 1,100 companies and approximately 6,000 experts still are part of the worldwide network (Steinbeis Stiftung , n.d.). These 6,000 experts work in enterprises and have the know-how to solve problems for 10.000 customers per year (Steinbeis Stiftung , n.d.). To transfer know-how and ultimately build bridges between the source of knowledge (e.g.

university member) and the application (e.g. industry) is an important reason for the existence of Steinbeis. The overarching goal of Steinbeis is, to further expand the network of entrepreneurs and therefore establish more enterprises according to what customers need. One of the unique selling propositions of Steinbeis is, that customers can rely on an effective know-how transfer. As problem solvers and service providers the Steinbeis enterprises work mainly in the fields of consulting, research and development, education and training. Professors at universities or at research institutions very often manage these Steinbeis companies on a part-time basis and in addition to their lectureship and research contract – as a Third Mission. But also, external experts can manage these companies as classical start-ups. Depending on one of the three thematic areas competence, consulting or engineering, entrepreneurs have different opportunities to become involved in the Steinbeis network. They can either work in legally dependent Steinbeis transfer centers, research and innovation centers, consulting centers, transfer institutes or in a legally independent company (Figure 7). The Steinbeis Stiftung für Wirtschaftsförderung (STW) itself is independent and not reliable on government support (Steinbeis Stiftung , n.d.). The Steinbeis enterprises realized in 2018 a total turnover of 172.6 million euros with 86 newly joined enterprises (Steinbeis Stiftung , 2018)



**Figure 7.** Structure of the Steinbeis network  
 (Source: Own representation based on Steinbeis-Stiftung, 2018, p.17.)

As a service provider Steinbeis offers support during all stages of getting an entrepreneur. A crucial issue for many start-ups is the legal aspect, as for example the liability for products. Steinbeis takes over the third-party liability for projects and products and hence guarantees good quality for customers. Moreover, it is possible to get individual support in terms of marketing concepts, financial processes or legal aspects in general, as for example contracts, insurance or personnel. Due to the network with many people from different business fields, new members have the possibility to get insights and learn directly from people who already established their company successfully. Particularly interesting for students, who are considering risks of an own business and are not yet ready to start their own enterprise, they can get experiences as a freelance project manager for a company in the Steinbeis network. In addition to that, it is possible to do an internship, a final dissertation or a PhD in cooperation with Steinbeis to get insights in their daily work (Steinbeis Stiftung , n.d.).

As already mentioned, Steinbeis highly appreciates cooperation with universities or research companies and supports knowledge transfers from universities to industry. Therefore, the target groups for new enterprises are people who work for a university, graduates or students. But also, company employees or self-employed people are welcome. Especially for university members in Baden-Württemberg, Steinbeis provides a framework contract between themselves and the state. Additionally, various cooperation with universities already exist, for example with Baden-Württemberg Cooperative State University (DHBW), Reutlingen University or Ulm University of Applied Sciences. This form of cooperation achieves success for both sides. The universities transfer their knowledge and research to applications in the industry, whereby more people get access to this specialist knowledge. Additionally, this cooperation is good for the reputation of the university. On the one hand, the university is perceived as a good employer that supports and rewards the research work done, on the other hand, students are given the opportunity to experience entrepreneurial activities already during their education. Another advantage for universities cooperating with Steinbeis is that they can expand their network in industry. Companies become aware of the universities, which therefore improve their reputation. Consequently, more experts are interested in becoming a teacher, supporter or speaker at university (Steinbeis Stiftung , n.d.).

### **3.4 Benchmark Analysis**

The Benchmark Analysis focuses on three universities, namely the Hochschule Pforzheim, the Hochschule Bohn-Rhein-Sieg and the Hochschule of Media, located in Stuttgart. General information, funding programs as well as cooperation and projects will be introduced. The aim of the following Benchmark Analysis is to analyze key success factors of other universities which are applicable at the HFU.

#### **3.4.1 Hochschule Pforzheim**

##### **General Information**

With approximately 6,200 students (Hochschule Pforzheim, 2019) Hochschule Pforzheim is one of the largest public universities of applied sciences in Baden-Württemberg. The slogan of this university “Führend durch Perspektivenwechsel” (*engl.: Leading through change of perspective*) reflects its overriding goal and shows what the university stands for. A change of perspective in Pforzheim is created through interdisciplinary learning, international and national networking and through scientific findings that are passed on to society. The initial foundation was in 1877 as the ducal academy of arts and crafts and technical school for the metal processing industry (Schönfelder, 2019).

Nowadays, three faculties form the framework of the university. In the faculties Business, Design and Engineering in total 28 bachelor programs and 19 master programs are available. The university employs 480 professors and lecturers to guarantee a qualitative high education. Important in this context is, that many professors or lecturers worked in industry before they started to teach and therefore, they can provide practical insights, experiences and a network with companies and organizations (Hochschule Pforzheim, 2019).

As already mentioned, the change of perspective is very crucial at this university of applied sciences. Additionally, international networking with partner universities or research cooperation all around the world develops the international focus and provides various opportunities for students. The goal to be achieved till 2020 is, that 60% of professors teach their courses in English language, whereas the university strives that

45% of bachelor students do at least one semester abroad at a partner university (Rade, 2016).

Furthermore, sustainability, business ethics and corporate ethics issues are addressed and an important part of teaching and research. As one of the first universities of applied sciences, Pforzheim follows the principles of responsible management education (PRME), which were established by the United Nations to support sustainable and responsible corporate governance (PRME, n.d.). In order to realize sustainable and responsible development of business management, universities have a key function in educating future business leaders (Hochschule Pforzheim, n.d.). To develop responsible leaders first business experiences in form of start-ups seem to be valuable.

### **Funding**

The “Gründungswerk” at university of applied sciences Pforzheim aims to support, develop and consult members of the university who are interested in a start-up. Students, teachers or employees have the opportunity to obtain further information on various topics related to entrepreneurship. The Ministry of Science of Baden-Württemberg started in 2016 to sponsor and support universities. During the period from 2016 till 2020 the ministry provides 15 million euros for in total 23 projects (Ministerium für Wissenschaft, Forschung und Kunst Baden-Württemberg, n.d.)

Hochschule Pforzheim applied successfully for the so-called “GUSTL – Gründungskultur in Studium und Lehre” (*English: Start-up culture in studies and teaching*). In order to receive the total amount of 600,000 euros from the state of Baden-Württemberg for three years, the Gründungswerk developed a concept called HELIX. This is a concept for interdisciplinary learning in order to increase the start-up culture (Rade, 2016).

One of the main objectives is to develop personalities and social competencies for the purpose of realizing active entrepreneurship at Hochschule Pforzheim. Therefore, students receive support during all stages of founding their own company. The three faculties design, business and law and engineering work closely together, thus supporting students in all stages of setting up an own company (Hochschule Pforzheim, n.d.).

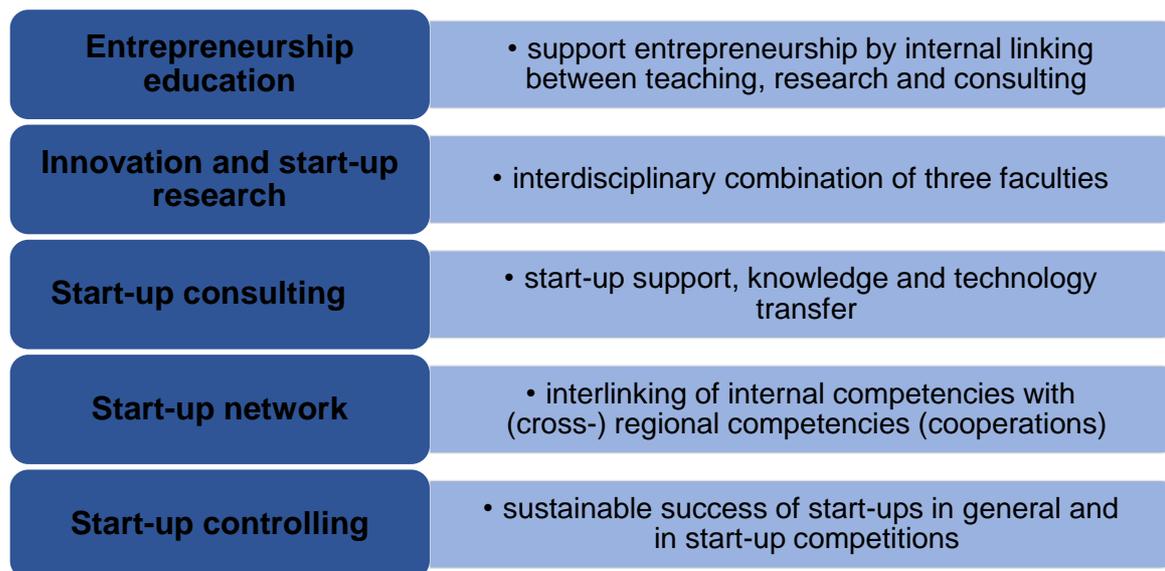
In addition to the money provided by the Ministry of Science, the university of applied sciences also draws 400,000 euros from its own resources (Rade, 2016). Moreover, the Karl Schlecht Stiftung plays an important role in funding start-up activities at Hochschule Pforzheim. This foundation based near Stuttgart provided 700,000 euros including two endowed chairs until 2020 (Rade, 2016).

In October 2016 the Karl Schlecht Stiftung supported the foundation of the HEED institute, which is an innovation laboratory, workshop and a contact point for students who are interested in founding their own business. The Karl Schlecht Stiftung itself focuses on topics like leadership, entrepreneurship, ethical and cultural education and therefore supports young people and prospective managers in their personal development (Karl Schlecht Stiftung, n.d.).

The EXIST program, which was realized by the Federal Ministry of Economics and Energy, supports students, graduates and scientists who are motivated to establish their own business. Hochschule Pforzheim is also part of this network and therefore students get access to these specific possibilities and active support is offered. In the past, students at Hochschule Pforzheim used EXIST to find their own start-up (Hochschule Pforzheim , n.d. ).

### **Cooperation's and Programs**

According to the motto “Gründerwerk – Start.Try.Fly.” (Hochschule Pforzheim , n.d. ) this institution aims to realize an active start-up culture at Hochschule Pforzheim. The focus is on IT solutions (FutureLab), human engineering and empathic design (HEED). Five parts were formulated as the vision with the purpose to establish the Gründungswerk as a sustainable institution to support start-ups (Figure 8).



**Figure 8.** Vision of the Gründungswerk at Hochschule Pforzheim  
(Source: Hochschule Pforzheim, 2019)

As already stated, the translated slogan of the Hochschule Pforzheim is “Leading through change of perspective”. According to this statement, the Gründungswerk aims to achieve the complete integration into the strategic guidelines (Hochschule Pforzheim , n.d.). This means that the center for people interested in founding a company is considered to have an important role to fulfill. The so-called Third Mission become more relevant and universities have to take this into account and consequently represent it in their strategic orientation. Further developing the Gründungswerk attracts more future students who see a good opportunity to study at this university in order to realize their business-oriented objectives. But not only students recognize the benefits, also business people and companies are more interested in the university. As they identify the university as a good partner, they might be interested in cooperating. Cooperation’s are valuable and essential for universities as they therefore get access to networks, financial resources and practical knowledge.

In 2001 a Steinbeis innovation center was founded at the university of applied sciences in Pforzheim. This company focuses for instance on marketing intelligence and also offers various services (Hochschule Pforzheim , n.d.). Moreover, a Steinbeis research center simulation is available. This institution focuses especially on EXIST programs with research and development requirements in product development or product

design (Hochschule Pforzheim , n.d.). Both Steinbeis companies are important partners for the Gründungswerk as they help to establish a sustainable start-up culture at the university.

Additionally, the Hochschule Pforzheim cooperates with the association Entrepreneurs Pforzheim. This association was founded from students who now want to support student entrepreneurs in the region. According to this, they encourage to build student teams for starting a start-up. Additionally, this association offers seminars with experts and promotes the knowledge exchange (Entrepreneurs Pforzheim, n.d.).

One of the most important cooperation's has the Gründungswerk with HEED, which is the institute for human engineering & empathic design in Pforzheim. This institute has the objective to actively support the start-up culture in Germany. According to their understanding, students need to develop their personalities to take risks and to value innovative and business-related opportunities (Hochschule Pforzheim , n.d.).

The HEED institute offers a workshop where students can work on their ideas and additionally receive support during all phases of setting up an own business. Furthermore, humans itself are in the focus and thereby the empathic collaboration of people. This social component is one of the most important success factors of HEED. In addition to that, the institute combines all three faculties, which allows a multidisciplinary exchange of ideas. This kind of exchange is also supported by the means of start-up talks to which entrepreneurs and external experts are invited to give a speech. In order to further improve HEED's work and to receive additional insights from research, students are also welcome to write their Bachelor's or Master's thesis in collaboration with them (Göhring, Theobald, Engeln , & Hensel, 2017).

The FutureLab at Hochschule Pforzheim focuses especially on technical support during the process of establishing an own business. As technical aspects often seem to be a challenging step for students, they can get assistance from professors, academic employees and student assistants (Hochschule Pforzheim , n.d.). The FutureLab provides workshop to various topics, as for example design thinking or requirement management. Moreover, students get the opportunity to improve their product design or to receive information about apps or web-services for example (Hochschule Pforzheim , n.d.).

Before the semester starts students have the opportunity to take part in a one-week summer camp, which aims to teach methods, relevant know-how and useful capabilities for future entrepreneurs (Figure 9) (Gründerwerk, 2019).

| START. TRY. FLY!                     |                         |                       |                         |                     |                     |
|--------------------------------------|-------------------------|-----------------------|-------------------------|---------------------|---------------------|
| Montag<br>16.09.19                   | Dienstag<br>17.09.19    | Mittwoch<br>18.09.19  | Donnerstag<br>19.09.19  | Freitag<br>20.09.19 | Samstag<br>21.09.19 |
| Research<br>                         | Design Thinking<br>     | Value Proposition<br> | Lean Startup 2<br>      | Lean Startup 3<br>  | How To Pitch<br>    |
| MITTAGSPAUSE                         |                         |                       |                         |                     |                     |
| Teambuilding<br>                     | Sustainable Inno. 1<br> | Lean Startup 1<br>    | Sustainable Inno. 2<br> | Business Model<br>  | Final Pitch<br>     |
| ENDE ODER ALTERNATIVES ABENDPROGRAMM |                         |                       |                         | PIZZA & BEER        |                     |

**Figure 9.** Schedule of the Summer Camp 2019  
(Source: Gründerwerk, 2019)

With interdisciplinary teams all participants work on business ideas related to a specific topic. In 2019 the Gründerwerk as organizer has appointed the topic “Sustainable Innovation”. At the end of this seminar all ideas will be pitched in front of an expert jury and a winner will be determined (Gründerwerk, 2019).

At the university of applied sciences in Pforzheim students and people who are interested in founding their own business, have various opportunities to put these projects into practice. An important success factor is the network with business partners, institutes and organizations that actively support the strengthening of the start-up culture at this university.

### Projects and Examples

One example of a successful start-up, which started its initial business at Hochschule Pforzheim, is Morotai. Morotai produces sportswear for amateur athletics that is

characterized by innovative design aspects, multifunctionality and high quality (Morotai GmbH, n.d.). The unique selling propositions of this fashion brand are the timeless design and the simple color range whereas all garments can be combined with each other. Additionally, all pieces have special functionalities and intelligent details such as smartphone pockets with cable guide (Morotai GmbH, n.d.). The price range of this sportswear is between 30 to 80 euros. Since the founder of this company came as a refugee from Pakistan to Germany, they produce under fair conditions only in Pakistan (Morotai GmbH, n.d.).

Everything started with the founder's graduation collection as part of his bachelor thesis at Hochschule Pforzheim in 2017 (Hochschule Pforzheim , 2017). Rafy Ahmed studied the bachelor study program Fashion and together with another student from this university who studied business informatics, he established a start-up. They started with brainstorming their ideas about a business with the help of the Gründerwerk at Hochschule Pforzheim. Additionally, the co-working space and workshop at HEED was important for the founder to come up with 49 pieces as part of his first collection. As the founders of this start-up were always looking for new possibilities, they applied in February 2017 for the German television broadcast "Höhle der Löwen" (*in America: Shark Tank*). In October 2017 the episode was broadcasted on TV and Dagmar Wöhrle invested with 100.000 euros in their start-up. Since then their sportswear is available in various stores in Germany and also via online retailers. Prior to that, in January 2017, they won the innovation voucher and therefore 5,000 euros provided by the state of Baden-Württemberg (Hochschule Pforzheim , 2017). In May 2018, the founder took part in the "Regional Cup Pforzheim/ Nordschwarzwald" which was initiated by the Ministry of Economy, Labor and Housing in cooperation with Hochschule Pforzheim, IHK (*Chamber of Industry and Commerce*), creative workspace in Pforzheim called EMMA and other regional initiators. In this kind of elevator pitch, the start-up founders have three minutes to present their business ideas without any electronic devices, as for instance power point, in front of a jury. Morotai reached the third place with 200 euros prize money (Ministerium für Wirtschaft, Arbeit und Wohnungsbau Baden-Württemberg, 2018). The story of this start-up started at Hochschule Pforzheim where they received initial support and where their first sportswear collection was designed.

The university of applied sciences in Pforzheim offers their students many opportunities to realize their dreams of a start-up business. The Gründerwerk is an institution where students get individual support and consulting during all stages of starting their own business. Because of many cooperation's and initiatives in which the university takes part (for example: Regional Cup) students have various possibilities to find partners, sponsors or supporter.

### **3.4.2 Hochschule Bonn-Rhein-Sieg**

#### **General Information**

The Bonn-Rhein-Sieg university of applied sciences is located in the northwest of Germany, particularly in the region of North Rhein-Westphalia. The University was founded in 1995 by the German Federal State of North Rhine-Westphalia under the name "Fachhochschule Rhein-Sieg" to compensate the loss of Bonn's importance in the German economy after the reunion of West and East Germany in 1989 (History of Hochschule Bonn-Rhein-Sieg, 2019).

Around 8000 students are studying at the University Bonn-Rhein-Sieg. Moreover, approximately 150 professors are employed along with 1000 administrative employees. The university possesses three main campuses located in Sankt Augustin, Rheinbach as well as Hennef/Sieg. The University comprises five departments, namely Departments of Computer Science, Electrical Engineering, Mechanical Engineering as well as Technical Journalism, Natural Sciences, Management Sciences. Additionally, the university offers 35 study programs, presenting a great variety of different study possibilities (Studium an der Hochschule Bonn-Rhein-Sieg, 2019).

The Hochschule Bonn-Rhein-Sieg is pursuing the goal of internationalization. Hence, several study programs are offered in English which makes the university an attractive place for education among foreigners. Moreover, the university possesses 10 different research institutes which insure a successful research conduction. Furthermore, an International Center for Information Technology in cooperation with RWTH Aachen has been implemented (Bonn-Rhein-Sieg, 2019).

Regarding Third Mission activities, the Bonn-Rhein-Sieg university of applied sciences represents a good example concerning the process of knowledge as well as technology transfer. The conducted research activities at the university accelerates the innovation development of North Rhine-Westphalia. Hence, the university won several awards regarding the contribution to the innovation development of the region.

The University offers several programs and events which are built upon the Third Mission concept, for instance, the Research Day. The main goal of the Research Day is to present current research activities to a broad audience (Tag der Forschung, 2019).

Moreover, the university of applied sciences grants various scholarships to outstanding PhD students, graduates of the university and research associates, thus encouraging them to conduct the research activity and contribute to the knowledge and technology transfer (Promotionsstipendienverfahren at HBRS, 2019).

## **Funding**

After its establishment in 1995, the Hochschule Bonn-Rhein-Sieg was mainly funded by the Federal Government of Germany till the end of 2004. Since then, the university is funded by German Federal State of North Rhine-Westphalia.

The HBRS actively supports and encourages its students to develop start-up ideas. Therefore, several different activities are offered at the university which main aim is to assist students and graduates seeking an opportunity to be self-employed. The university possesses two business incubators in Sankt Augustin and Rheinbach, where the company BusinessCampus Rhein-Sieg provides facilities, infrastructure and consulting service (Selbstständigkeit und Unternehmensgründung, 2019).

The EXIST Start-up Scholarship, funded by the Federal Ministry of Economics and Energy, represents one funding option offered by the university. The EXIST program supports students, graduates and scientists who strive to realize start-ups and create a business plan. The START UP NRW, funded by the State government of North Rhine- Westphalia, represents another funding opportunity. The START UP NRW supports talented students, graduates and scientists from Universities located in the region

of North Rhine-Westphalia by developing a business concept (Selbstständigkeit und Unternehmensgründung, 2019).

The state government of North Rhine-Westphalia promotes start-up activities in the HBRS actively via regional programs. “Start-Up NRW” is the most valuable source of funding for young and agile projects, which allows receiving a funding from 240.000 to 320.000 Euros along with valuable support from experts which possess an economical or business administrative background (Start-up Transfer, 2019).

Nevertheless, the program does not only support technological but also business and social innovations. Support is given to students and graduates, who finished their studies no longer than three years. Since 2015, the state government promotes “Start-Up NRW” which comprises 63 business, among which 41 projects were proposed by students and graduates of universities and 22 by students and graduates of universities of applied sciences (Wirtschaft.NRW, 2019). In 2017, the state of North Rhine-Westphalia wanted to allocate financial support up to 21 million Euros through the program “Start-Up NRW” before 2020 to increase the probability of local start-ups success, enabling the creation of new jobs and training places in the region (Neue Wettbewerbsrunde, 2019). The university also cooperates with, for instance, the High-Tech Gründerfonds (HTGF), which represent one of the biggest seed stage investor in Germany, investing up to one million Euros in Seed funding (High-Tech Gründerfonds, 2019) as well as the access to KfW, which is one of the leading promotional banks worldwide (Die Förderangebote der KfW für Unternehmen, 2019).

Moreover, students and graduates have the opportunity to apply and receive the “Gründerstipendium NRW”, a funding program offering 1000 Euros per month for one year. Additionally, the state government is planning to allocate up to 26 million Euros until the end of 2022 (Bonn/Rhein-Sieg, 2019). Through these programs the university aims to support and encourage young entrepreneurs to develop innovative business, to provide the needed resources and to establish entrepreneurial networks (Gründerstipendium.nrw, 2019). These networks provide a chance to share experiences among other students and recent graduates, which might have faced the same problems during the start-up realization.

The next step is to analyze the cooperation's and collaborations, in which HBRS is mostly active. Within the organizational structure of HBRS there are several centers, which serve as a platform for collaboration between all three compounds of the the Triple Helix Framework. Thus, the main focus will be pointed exactly on these centers in order to analyze the interaction between various stakeholders.

### **Cooperation**

The Hochschule Bonn-Rhein-Sieg takes an active part in cooperating with various spheres and scales, e.g. in regional, national and international formats. In this research paper the focus will be centered on cooperation, partnerships and close relations between HBRS and third parties, mostly industry and government in the area of start-up activity.

The university of applied sciences is looking for the extension of its partner activities with local business, higher education institutions and other stakeholders. In 2018 the Center of Applied Research was created with the main goal of creating collaborative working groups with scientists from internal and external environment. This provides an impetus to the innovation with the main focus on technology transfer (Centre of Applied Research of HBRS, 2019).

Thus, the HBRS is enthusiastic to extend its relations with external parties, particularly with business people, in order to create new areas in collaboration. The Center of Applied Research is mainly created for research cooperation with external partners from industry, society and the public sector. The creation of this center allowed HBRS to create a platform where collaboration as well as knowledge- and technology transfer with other stakeholders is possible. All forms of activities are regulated with cooperation contracts. The industry sector has various advantages by being involved in this sort of collaboration with HBRS and other stakeholders.

In particular, the following benefits may be considered (Das Zentrum für Angewandte Forschung, 2019):

- University provides rooms with all required equipment and facilities
- Possibility of scientific exchange in terms of the research group

- Close contacts to the broad range of scientists and businessmen
- A comprehensive administrative support

In the context of cooperation between industry representatives and university on this platform, industry can contribute to the development of partner relations through the following actions (Das Zentrum für Angewandte Forschung, 2019):

- Funding of the research groups
- Sponsorship
- Covering of expenses regarding the rental
- Funding of professorship

Universities are working on various successful projects in collaboration with local companies, among which the most remarkable are (Centre of Applied Research of HBRS, 2019):

- Led Ozone Sensor (New methods of air ozonization)
- Cloud – Lab (Practical application of new soft and hardware)
- Tree – Energy Lab (New methods of energy efficiency)

One of the main centers at HBRS regarding the implementation of the Third Mission is the Center for Science and Technology Transfer (ZWT). The common goal is to provide free access to project acquisition and to project management for project finding. Additionally, the ZWT contributes to improving the cooperation with local business and associations in order to provide advice regarding funding opportunities and legal issues of commercialization and becoming an entrepreneur (Centre for Science and Technology Transfer at HBRS, 2019). This center is collaborating with a broad range of associations, federations as well as expert networks. Moreover, the ZWT is a member of the North Rhine Westphalia (NRW) Innovation Alliance, which is a network of universities located in North Rhine Westphalia regarding issues of innovation, knowledge economy and technology transfer (Centre for Science and Technology Transfer at HBRS, 2019). One of the main advantages for companies to cooperate with the ZWT is a wide range of scientists from various backgrounds. This allows filling the gaps if there is a lack of a person in a project team (Wissen für die Wirtschaft, 2019).

The Center for Entrepreneurship, Innovation and Mid-Size Companies in the HBRS is another major player in the Third Mission implementation and a part of the framework developed by Molas-Gallard et al. (2002, pp. 21-27), which was described in the theoretical part of this paper. This organization is the scientific partner in questions regarding business start-ups, innovations, SME management, and technology transfer (Centrum für Entrepreneurship und Innovation und Mittelstand, 2019).

The following are the main partners of this center (Partner des CENTIM, 2019):

- Kreissparkasse Köln
- Scopevisio AG
- Industrie- und Handelskammer (IHK) Bonn/Rhein-Sieg
- High-Tech Gründerfonds
- Siegener Mittelstandstagung

One of the main activities of the following center in terms of entrepreneurship is to accompany and coach new companies in order to bring them to the condition of the mid-size company (CENTIM - Entrepreneurship, 2019). The main activity in terms of innovation is to develop measurements in order to increase innovation rate in the medium sized companies and in the region in general. Additionally, joint projects with local companies on a regional and national level are conducted (CENTIM - Innovationsmanagement, 2019).

Overall, the interaction between university and business is happening in these three centers described above. The strategy of possessing own centers is very promising and outstanding because it allows to decrease dependence on third parties, to act on your own and to create a constant platform for cooperation with external stakeholders.

The relationships with governmental bodies regarding start-ups support the implementation of the Third Mission. The implementation is based on the allocation of resources by the local and national governments. Former graduates and scientists take up a new role as entrepreneurs for the development of start-up initiatives and encouraging talented students.

After the analysis of the HBRS's external and internal environment, an insight to start-up activity and project implementation at HBRS will be provided. The following section

will concentrate on the existing projects, which are supported by programs like “EXIST” and “START UP NRW”.

## Projects

The current part contains a short but comprehensive overview of the most remarkable projects, which are conducted at HBRS itself and at the Center of Applied Research (ZAF).

### a) LED – Ozon – Sensor

Table 3 provides an overview of the LED – Ozon – Sensor, which was conducted on the platform of the Hochschule Bonn-Rhein-Sieg.

|                            |   |
|----------------------------|---|
| Departments and Institutes | Applied Natural Sciences, Institute for Detection Technologies, Institute for Security Research   |
| Period                     | From 01.07.2017 to 30.06.2019   |
| Funding Type               | Public Research   |
| Key Words                  | Ozone, Photometer   |
| Short Description          | The project is designed in order to provide new LED which mainly aim to extend the range of application of existing photometers for measurement of the ozone concentration. The LED has considerable advantages, mainly the necessity absence of warming up period (15-30 min) compared to the conventional mercury vapor lamp. The application of the new LEDs would help to reduce costs regarding the photometers' application. Thus, the main goal of the following project is to develop a robust, compact, low-maintenance and inexpensive UV ozone photometer for industrial applications. |
| Funding Source             | ZIM Zentrales Innovationsprogramm Mittelstand“ des Bundesministeriums für Wirtschaft und Energie (BMWi) – Projektform FuE-Kooperationsprojekte  |
| Business Partner           | Innovatec Gerätetechnik GmbH  |

**Table 3.** LED – Ozon – Sensor Project  
(Source: LOS, 2019)

### b) Livestock Strategy

The summary of the Livestock Strategy Start Up project is presented in the table 4.

|                            |   |
|----------------------------|---|
| Departments and Institutes | International Center for Sustainable Development  |
| Period                     | From: 15.01.2019 to 30.09.2019  |
| Funding Type               | Funding type: Public research   |
| Key Words                  | Sustainability, Environmental Economics   |
| Short Description          | The aim of the following project is to establish a sustainable structure and strategy that meets the requirements of animal welfare and environmental justice as well as the economic and social needs of livestock farms. There is required an intense dialogue with agriculture, including the upstream and downstream economy, environmental and animal protection associations as well as food retailers and consumer associations. |
| Funding Source             | Ministerium für Umwelt, Landwirtschaft, Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen (MULNV)   |

**Table 4.** Livestock Strategy Project  
(Source: Nutztierstrategie, 2019)

### c) Hybrid – KEM

The Hybrid – KEM Start Up Project is supported by several companies and is one of the key projects at Hochschule Bonn-Rhein-Sieg. The summary of the Hybrid – KEM project is presented in the table 5.

|                            |   |
|----------------------------|---|
| Departments and Institutes | Institute of Technology, Resource and Energy – Efficient Engineering, Institute of Technology |
| Period                     | From 01.10.2018 to 30.09.2022   |
| Funding Type               | Public Research   |

|                   |  |
|-------------------|--|
| Short Description | The aim of the present project is the development of new inorganic/organic hybrid compounds as bone substitute material, especially with release function for bisphosphonate (BP) active substances, exploiting their anabolic and osteogenic effects. |
| Funding Source    | Bundesministerium für Bildung und Forschung  |
| Business Partner  | Spectral Service AG, Artoss GmbH   |

**Table 5.** Hybrid – KEM Project  
(Source: Hybrid-KEM, 2019)

## Conclusion

The Hochschule Bonn-Rhein-Sieg is a comparably new HEI that was established in the year of 1995. As various rankings show, the university has been growing constantly and sustainably and thus, the HEI attracts attention of prospective students, researchers and scientists. The university of applied sciences has established various centers, which allow contributing to the welfare improvement on regional, national and international levels. Moreover, this HEI is a member of various associations and therefore, it attracts prospective investors and foundations, which foster the implementation of the Third Mission at the HBRS. As this overview shows, the start-up activity is developed and HEI puts lot of efforts in the establishment of new contacts with various stakeholders. The HBRS may serve as a pattern for other UAS not only in Germany, but also abroad. Therefore, the authors of this paper are inclined to think that the HBRS will be a sustainably developing institution in the next decades.

### 3.4.3 Hochschule der Medien, Stuttgart

#### General Information

The University of Media is located in Stuttgart, the state capital of Baden-Wuerttemberg. Stuttgart is known for its innovative environment regarding advanced technology. Moreover, Stuttgart is a city of culture, sports and media. Furthermore, Stuttgart is surrounded by big media companies as well as known IT enterprises. Hence, individual

entrepreneurs as well as students gain the ability to successfully introduce and implement their innovative business ideas (Hochschule der Medien 2019, p. 1).

The University of Media is a state-owned university of applied science which specializes on media creation and management, communication management as well as advertising, business informatics and packing engineering. The university aims to effectively link media and technology content with economical aspects (Hochschule der Medien 2019, p. 2).

Approximately 5000 students are studying at the University of Media. The university offers around 16 bachelor programs as well as 11 master programs. Moreover, 145 professors are employed at the university, alongside with 251 employees and a numerous of lecturers. Furthermore, the university cooperates with over 90 universities worldwide. Additionally, the university possesses an outstanding research infrastructure with over 70.000 research resources and high-quality equipped laboratories (Hochschule der Medien 2019, p. 2).

Nevertheless, the university is also widely known for its highly innovative and entrepreneurial culture. In 2009, the university established and introduced its Start-up Center which was developed to support and encourage young entrepreneurs to successfully work on innovative business ideas. The multidisciplinary working environment of the Start-up Center provides support for every student, from freelancing activities to developing a whole new technology system (Volksbank Stuttgart eG 2015, pp. 26–27).

The Start-up Center of the University of Media offers a consulting service, seminars as well as workshops and different funding opportunities. The procedure of the consulting service by the Start-up Center is individually and adjusted to the needs of the start-up team. To get an appointment with the consulting team, students need to fill out an online formula. This comprises the name of the project, the names of all team members and the respective field of expertise, for instance, funding, cooperation's, business ideas, legal guidelines and several other topics. This is a chance for students to present their business idea, to ask questions and to get professional feedback. Moreover, with this first consultation meeting the university tries to encourage and support their

students to realize their entrepreneurial ideas and to provide needed resources (Generator HdM Startup Center n.d).

The seminars and workshops offered by the Start-up Center provide general information on entrepreneurship itself, law and regulations, patent rights as well as property rights. Furthermore, they teach students how to successfully implement products or services in the market. Hence, market strategies as well as advertising strategies are covered as well. An additional advantage is given as all seminars and workshops are accepted by the University of Media as additional courses, meaning students earn extra credit points (ECTS) (Generator HdM Startup Center n.d).

The seminars are structured in four different levels. The first level is a beginner seminar or an awareness-rising training namely, Innovation Studio Workshop. During this workshop, first semester students learn through playful activities more about innovation and entrepreneurship. The second workshop is to establish a basis namely, IDEA- Idea Workshop. IDEA emphasizes to teach students how to find innovative ideas that will matter to potential customer in the future. Hence, the workshop covers topics on how to construct and how to develop a new business idea and how to recognize its market potential. After three course days, the project teams must provide a pitch presentation of their idea and need to present their main business model using the business model canvas (Generator HdM Startup Center n.d).

The third workshop is for advanced start-up ideas and known as the ADVANCE e-School Workshop. It is a one-week crash course which offers expert talks and professional insides on acquisition processes, sales and marketing strategies, business models, financial management, PR activities, law and regulations and organizational management. At the end of the seminar, all business ideas will be presented at the Business Unplugged event. During this event, all entrepreneurs and start-up teams have the chance not only to present their business model and innovative idea, this event also enables students to come together and freely talk about their experiences (Generator HdM Startup Center n.d).

The last workshop is called the Sandbox which is the entrepreneur accelerator program for creative business innovation. It is a six-month program comprising a training

which is built upon three parts, input, monitoring and internationalizations. For the first part, entrepreneurs and start-up team will get general information about entrepreneurial activity and business processes. For the second part, mentors will provide insider information and support start-ups during the development of their business plan as well as during the validation process. The last part gives the entrepreneurs the chance to get deeper insights on the European Start-up Scene as all teams take part in an international competition. Moreover, they get the chance for a one-week exchange with other Playparks, provided by the project CERlecon, where they can meet different entrepreneurs around Europe. Furthermore, the whole workshop gives start-up's the opportunity to network with other entrepreneurs as well as companies due to several company visits. Moreover, students get the chance to use the so-called Playpark at the universities, meaning the university provides facilities and equipment which is needed (Generator HdM Startup Center n.d).

## **Funding**

The University of Media provides four main funding opportunities for students. The most common one is the EXIST Start-up Grant. As described above, the EXIST Start-up Grant is a funding program of the German Federal Ministry of Economic Affairs and Energy and supports start-up teams in the early stages of their business development (Generator HdM Startup Center n.d).

The second funding program is called the Junge Innovatoren (*English: Young Innovators*). This program is sponsored by the Ministry of Science, Research and Arts. This program aims to encourage and support independent research institutions, graduates as well as scientific employees at universities to develop and to implement their entrepreneurial ideas. The Young Innovation program provides a personal payment for two years, sponsors materials and covers investment spending's up to 20.000 Euros. The program requires the university to provide a good resource infrastructure and high-quality equipment for the start-up teams and provide further educational trainings on business related topics up to 5.500 Euros (Generator HdM Startup Center n.d).

Another funding method introduced by the Start-up Center at the University of Media is the so called MikroCrowd which combines crowdfunding with loans. It is a collaborative project between the Start-up Center at the university, the University of Media

itself, the Ministry of Economic Affairs, Employment and Housing, the Startup BW as well as Startnext and the L-Bank. The MikroCrowded funding procedure involves three steps. First, students need to contact a so called CrowdLotsin which is Nisha Munzing. During this meeting, Ms Munzing examines the feasibility and the suitability of the project concerning the crowdfunding process. If the project is being approved, the start-up team will be supported by the MikroCrowded-Team in developing the business idea and creating a campaign. During the second step, the students need to present their crowdfunding campaigns in front of the online platform Startnext. The students hereby learn how to attractively present their innovative business ideas to gain the attention of the audience. Moreover, as the students present it in front of the Startnext network, they can directly convince future customer and see how their ideas are being received on the market. During the third and last step, students receive up to 10.000 initial capital of the L-Bank. The only requirement is that students need to reach their financial goal through the crowdfunding presentation on Startnext (Generator HdM Startup Center n.d).

### **Cooperation´s**

The University of Media itself provides different opportunities to bring the companies and the students together. They offer corporate research projects as well as professional development trainings. Moreover, they offer a great amount of outstanding applied research projects which are supported by the regional government and several governmental EU projects (Hochschule der Medien 2018, p. 2).

The embedded Start-up Center at the University of Media has several cooperation´s with different consulting institution, venture capitalist, financial companies, founder intuitions, guarantee banks, patent institutions and chambers and associations. Moreover, they give students the opportunity to take part in several competitions and visit several business fairs (Generator HdM Startup Center n.d).

Cooperative consulting institutions are as follows (Generator HdM Startup Center n.d):

- Portal für Gründung und Unternehmensnachfolge des Landes Baden-Württemberg
- Beratung speziell für Grüner der IT + Medienbranche aus BW
- Medien- und Filmgesellschaft Baden-Württemberg

- PUSH!
- RKW e.V. Baden Württemberg
- Steinbeis-Stiftung
- Technologie-Lizenz-Büro der Baden-Württembergischen Hochschulen
- Publikationen, Downloads etc. vom Bundesministerium für Wirtschaft und Technologie

The venture capitalists which are cooperating with the Start-up Center are (Generator HdM Startup Center n.d):

- Bundesverband deutscher Kapitalbeteiligungsgesellschaft
- Business Angels Region Stuttgart

Financial resources are provided by (Generator HdM Startup Center n.d):

- Kreditanstalt deutscher Kapitalbeteiligungsgesellschaften
- L-Bank

Cooperative founder institutions are (Generator HdM Startup Center n.d):

- Arbeitskreis Gründerinnen Region Stuttgart
- Bundesweite Gründerinnenagentur bga
- HiTurs

The guarantee banks which operate with the Start-up Center are as follows (Generator HdM Startup Center n.d):

- Verband der Bürgschaftsbank
- Bürgschaftsbank Baden-Württemberg

The patent institutions are (Generator HdM Startup Center n.d):

- Informationszentrum Patent
- Signo Patentförderung

Chambers and associations which take part in the Start-up Center are (Generator HdM Startup Center n.d):

- IHK Region Stuttgart
- Handwerkskammer Region Stuttgart
- Landesverband der Baden-Württembergischen Industrie
- Fachverband Medientechnologie, Kommunikation, Information und Bürowirtschaft Südwest
- BioRegio Stern

Students have the option to participate in different competitions which are as follows (Generator HdM Startup Center n.d):

- Deutscher Gründerpreis
- cyberOne – Der Hightech Award
- Innovationspreis- IT
- Baden- Württembergischer Landespreis für junge Unternehmen
- Ferchau Innovationspreis

Nevertheless, the Start-up Center does not only cooperate with different companies, institutions and associations, they are also involved in a numerous of regional as well as European wide projects, namely (Generator HdM Startup Center n.d):

- CERlecon
- COCO4CCI
- Entrepreneurial Brains Made on Campus (EBMC)
- IN SITU
- SANDBOX
- Spinnovation
- Usability and User Experience (UUX)

### **Projects and Examples**

The Start-up Center was introduced in 2009. Due to the high entrepreneurial culture at the university and the established Start-up Center, several impressive business ideas

had been introduced to the market. The following part represent selected examples of start-up companies which have been developed at the University of Media.

The first start-up, named Projecker, was founded in 2015. It is an online software for companies particularly working in the digital industry. The start-up team aims to simplify the establishment of contact between project managers and their customers. All three entrepreneurs already worked in the project management field and experienced that project managers want continuous transparency and feedback. Nevertheless, due to great time pressure customers can't deliver a detailed report to their managers. Hence, Projecker enables customers to provide constant feedback in a short time frame (Generator HdM Startup Center n.d).

Another successful start-up idea was introduced in 2016 namely, Spikee. It represents an online software which provide endurance athletes the opportunity to efficiently schedule their needed recovery phase. The three entrepreneurs aim to reduce a decline of efficiency and performance as well as reducing the risk of injury (Generator HdM Startup Center n.d). Due to an integrated heart rate variability measurement, Spikee adapts to individual requirements. This start-up is funded and supported by EXIST, the ministry of economic affairs and energy, Europäischer Sozialfonds für Deutschland (ESF) as well as the European Union (spikee n.d.).

VirtualQ is another patented Start-up which was developed at the University of Media. Three entrepreneurs found a way to reduce the time of customers in call-center queues. They developed a software for call-centers which allow their customers to see online or in an app how long their respective waiting time will be. Moreover, they can digitally queue in line and will be notified whenever a worker is ready for the them. This start-up company was founded in 2014 (Generator HdM Startup Center n.d). It is a very successfully business idea and was very well received in the market. VirtualQ customer base consists of a number of known firms, for instance, HanseMerkur, Gothaer, Albatros Schwäbisch Hall and many more. It is supported be the EXIST program as well as the ESF, the European Union, federal ministry of economics and technology and the German accelerator. Moreover, VirtualQ won the Gründerszene Wachstumspreis in 2018 and represent the tech start-up of the year (VirtualQ n.d.).

Pag.es represents another start-up company which was developed by two entrepreneurs. It is a publishing system where you can easily create digital and interactive magazines which are compatible with all devices and all different kinds of platforms. The start-up company was founded in 2014. It is available in several app-stores as well as on the web. Publisher companies can easily integrate this system and use present sources from its editorial system. Pag.es uses intelligent templates which automatically adapt the file to the used platform requirements. With the software pag.es, the two founders guarantee that publisher can reduce their amount of work by 50% (Generator HdM Startup Center n.d). This start-up is supported by several institutions namely, the ministry of economic affairs and energy, the EXIST program, the European Union, ESF, the ministry of finance and economy of Baden-Württemberg and Junge Innovatoren (Pag.es n.d.).

## **Conclusion**

The University of Media with its well embedded Start-up Center can be seen as a role-model concerning the Third Mission of universities. The entrepreneurial culture provided by the university gives young entrepreneurs the possibility to work continuously and efficiently on their business ideas. An encouraging, supporting and motivating environment empowers students to create innovative approaches.

Moreover, the universities key principle represents entrepreneurship which they successfully implemented in their respective study fields. Right from day one, students will be informed about the Start-up Center as well as all seminars and workshops. They can easily learn more about entrepreneurial activities and are highly encouraged to take the plunge into the world of entrepreneurship. Additionally, all seminars as well as workshop provided by the Start-up Center are accepted by the university as extra courses, meaning students are able to gain extra credit points.

However, the reason for the great success of the Start-up Center at the University of Media is not only given due to different seminars, workshops and lectures. The university maintains a large number of collaborations and participates in several projects around Europe. This gives students the opportunity to meet new people, to exchange experience with different entrepreneurs and enables start-up teams to establish contact with companies, all based on an international basis. Moreover, financial as well as

research resources, high-qualified equipment, facilities and professional advisors are available for all students.

#### **4. Conclusion**

Innovative inventiveness along with an entrepreneurial mind generates strong and sustained economic growth and enhances social life. Entrepreneurship is the driving force of innovation as it represents the main source of change which initiates new opportunities. Hence, an entrepreneurial mindset possesses the ability to provide value-adding solutions which are advantageous for the economy as well as the society. Nevertheless, entrepreneurship is being associated with high risk and uncertainty. Hence, the main question is how to enhance and sustain the start-up ecosystem (Bundesministerium für Bildung und Forschung 2017, p. 2).

The Third Mission can be reflected as a part of the answer. Establishments of higher education represent a potential source of innovation and entrepreneurship. Hence, implementing a Third Mission and expanding the educational framework represents a change in the common educational system which generates opportunities. Furthermore, implementing and anchoring a Third Mission in an educational system enables universities to create an entrepreneurial culture which favorably minimizes the element of uncertainty. Hence, higher education institutions have the potential to become the main future source of innovation and entrepreneurship.

Moreover, the Third Mission does not only promote entrepreneurship itself. It also represents a mission of cooperation while creating networks which enables technology- as well as knowledge-transfer. Hence, regional enterprises, institutions and the community as a whole benefit from local universities which are able to provide value-adding solutions, strategies or methods (Jaeger and Kopper 2013, p. 1).

Hence, the Third Mission has the ability to enable regional value creation, it creates new job opportunities and reinvigorate the local economy. Moreover, entrepreneurial activities at local universities maintain highly-skilled and talented junior employees in the respective region (Alexander Knuth 2008, p. 1). Consequently, entrepreneurship is not only generating national development but also regional development.

The Third Mission exceeds the general duty of internal education at higher education institutions. Particularly, this mission goes beyond the university, it connects internal operations with the external environment and enables the mutual transfer of knowledge and value. The benchmark analyse also demonstrates the success and the value creation which can be achieved due to several local as well as national cooperation's.

Entrepreneurship is of utmost importance as both, the economy and the society, obtain significant benefits. It enables growth, change and creates entirely new opportunities and possibilities. In future, innovation and change are going to be fundamental success factors, whether regionally or nationally. Hence, the mission for the Hochschule Furtwangen is not simply to educate and train the junior manager anymore, it is to create an entrepreneurial mindset and to encourage and support young students' inventiveness.

## **5. Summary**

The implementation of the Third Mission is becoming one of the main objectives of the universities of applied sciences. Opening HEIs to the public by involving HEIs in entrepreneurial activities is beneficial not only for external third parties, as the society. Also, the UAS benefit as various research initiatives can improve financial indexes. The role of the HEIs has evolved and nowadays they are supposed to contribute to the sustainable development. In order to implement these incentives in Germany, UAS receive financial support from state funds and ministries and cooperate with various third parties, i.e. local businesses. Therefore, they create an agile working network and collaborations between governmental authorities.

The analysis in this paper provides a comprehensive overview of the activities, cooperation's and funding of the Third Mission of universities of applied sciences. Based on the gained information, it is possible to suggest measures and initiatives in order to promote the Third Mission implementation. Consequently, it can contribute to a regional sustainable development in a larger extent.

### **State Subsidies**

Universities which mission statement includes entrepreneurial activities and embedded entrepreneurship in the respective educational program possess a great potential

in terms of possible state subsidies. One of the main prerequisites for participation is the availability of various laboratories, in addition to the developed research resources available for students. In order to be able to participate in the program, the respective authorities have to create more working spaces, where students would be able to take part in various projects. The Hochschule Bonn Rhein Sieg may serve as an example of the UAS activity in terms of creating such facilities, which allow participating in different programs.

## **Centers**

In order to strive for the Third Mission implementation and to create new connections in the industry, universities should create centers for development, as the examples of analyzed universities of applied sciences stated. Nevertheless, in order to achieve the main objective of supporting students and scientists in starting research, funding and facilitating contacts of interested companies, some measures still need to be taken. Therefore, it would be reasonable to create the Center for Science and Technology Transfer, analogously to the one created in Hochschule Bonn Rhein Sieg, which has proved its efficiency by providing an excellent service in the areas of project management and legal issues of commercialization. Nowadays there is lack in these areas at many universities. Thus, the creation of the following center would allow strengthening universities abilities in terms of Third Mission implementation.

The German economy is mainly dependent on the small and mid-sized companies, which are the representatives of Deutscher Mittelstand (engl. SMEs). Therefore, it is extremely important for the university of applied sciences to establish and maintain relationships with local SMEs in order to be able to keep in touch with local businesses, know their demands and offer services, especially in terms of technology transfer and commercialization. Thus, it would be reasonable to establish a center, which would allow developing UAS relationships with local businesses and therefore increasing the engagement of both. This kind of center was created at Hochschule Bonn Rhein Sieg and has attracted the interest of various stakeholders, which are looking for running the joint projects. One unique feature of this center is that it encourages young entrepreneurs to bring their own companies to the stage of a middle-sized companies.

Start-up activities have been developing in the last decades and nowadays play an urgent role in the economy of developed and developing countries. Therefore, HEI are

putting a lot of effort in the development of Start-up centers, which contribute to the promotion of start-up activity. The example of Start Up Center at the University of Media is a powerful tool, which allows establishing and maintaining relationships with various stakeholders like venture capitalists, financial companies, guarantee banks, patent institutions and associations, which are able to foster start up-activities at university. Moreover, the center would allow conducting various start-up ideas competitions. Thus, the establishment of a center of such nature would allow to foster the students' engagement into the start-up activity.

The establishment of regular workshops and presentations regarding innovative activity are other initiatives would be reasonable to improve the entrepreneur spirit at respective campuses. This practice is highly developed in one of the analyzed UAS, namely at Hochschule Pforzheim. These workshops and workspaces allow not only improving the spirit, but also share multidisciplinary ideas and receive support from professors and other stakeholders.

The analyzed universities cooperate with various stakeholders on the basis of centers created by university. For instance, the Hochschule Pforzheim created the Institute for Human Engineering and Empathic Design (HEED), where entrepreneurs and external experts give business talks and provide support for students who are motivated in becoming entrepreneurs. This partnership allows valuable information provided by real entrepreneurs, which ultimately provides the experience and understanding for students of starting an own start-up.

## **6. Outlook**

Based on the created benchmarks this paper suggests reconsidering the whole system of start-up support at German universities. The following recommendations may be considered:

- Creation of a Center for Science and Technology Transfer
- Creation of a Center for Entrepreneurship, Innovation and Mid-Sized Companies
- Creation of Start-Up Center
- Institute for Human Engineering and Empathic Design

These recommendations would shape the innovative image, create a stronger infrastructure, which is needed for research, development and start-up promotion. Moreover, this would allow attracting more investments from external stakeholders and contributing to the regional sustainable development of the federal state Baden- Württemberg. The commitment of students will also increase, as the new working spaces would offer more capacity to implement ideas. The suggested initiatives as well as the active implementation of the Third Mission could increase technology commercialization rates, improve social networking, conduct foresight sessions, provide social dialogues and create a stronger networking between state, university and industry.

## **7. Limitations**

Although the selection of the UAS for benchmarking was made very thoroughly and on the basis of various criteria, there are some limitations in current research. Due to the great number of HEIs in Germany it is difficult to analyze the entire environment, initiatives, cooperation's, funding sources and projects of individual universities. Therefore, it is possible that some UAS were overlooked, according to the criteria and thus additional initiatives could not be analyzed.

The report concentrates mainly on the UAS, and the comparable small institutions for benchmarking. The size of classic universities and UAS differs considerably in Germany. Therefore, current research is focused on universities of applied sciences, which may lead to limitations in the search for more intensive collaborations, centers and projects to implement the Third Mission.

Moreover, there is no available published information regarding the profitability of the initiatives in the analyzed universities. Therefore, it is impossible to assess the commercial part of the projects and investments.

## 8. Bibliography

- Albulescu, Litra, Neagu (2014): The “Third Mission” of universities and some implications. U.P.B. Sci. Bull., Series D, Vol. 76, Iss. 2, 2014. ISSN 1454-2358
- Alexander Knuth (2008): Gründungsnetzwerke im Wissenschafts- und Hochschulbereich. Herausforderungen für die Wirtschaftsförderung. Gabler | GWV Fachverlage GmbH. Universität Potsdam. Available at: <https://link.springer.com/content/pdf/10.1007/978-3-8349-9964-1.pdf> [Accessed 30 June 2019].
- Bonn/Rhein-Sieg, I. (2019). IHK Bonn/Rhein-Sieg. [ihk-bonn.de](http://ihk-bonn.de). Available at: <https://www.ihk-bonn.de/fachbereiche/unternehmensfoerderung/existenzgruendung/gruenderstipendiumnrw.html> [Accessed 30 May 2019].
- Bonn-Rhein-Sieg. (2019). Hochschule Bonn-Rhein-Sieg - 596 Bewertungen zum Studium. Studycheck. Available at: <https://www.studycheck.de/hochschulen/hs-brs> [Accessed 29 May 2019].
- Bundesministerium für Bildung und Forschung (2017): Mehr Chancen für Gründungen. Fünf Punkte für eine neue Gründerzeit. Bundesministerium für Bildung und Forschung (BMBF). Bonn. Available at: [https://www.bmbf.de/upload\\_filestore/pub/Konzept\\_5\\_Punkte\\_Gruenderzeit\\_mit\\_IHV.pdf](https://www.bmbf.de/upload_filestore/pub/Konzept_5_Punkte_Gruenderzeit_mit_IHV.pdf) [Accessed 30 June 2019].
- Bundesministerium für Wirtschaft und Energie (2019): Das ist EXIST 2018. Bundesministerium für Wirtschaft und Energie (BMWi). Berlin. Available at: [https://www.exist.de/SharedDocs/Downloads/DE/Mediathek/Das-ist-EXIST-2018.pdf?\\_\\_blob=publicationFile](https://www.exist.de/SharedDocs/Downloads/DE/Mediathek/Das-ist-EXIST-2018.pdf?__blob=publicationFile) [Accessed 24 June 2019].
- Bundesverband der Deutschen Industrie e.V. (ed.). (2018). Die größten Familienunternehmen in Deutschland. Unternehmensbefragung 2018 – Kooperationen mit Start-ups . Berlin. Available at: <https://bdi.eu/publikation/news/die-groessten-familienunternehmen-in-deutschland-i2018/>[Accessed 23 June 2019].
- CENTIM - Entrepreneurship. (2019). CENTIM - Entrepreneurship. Available at: <https://www.centim.org/aktivitaeten-entrepreneurship.html> [Accessed 30 May 2019].
- CENTIM - Innovationsmanagement. (2019). CENTIM. Available at: <https://www.centim.org/aktivitaeten-innovation.html> [Accessed 30 May 2019].
- Centre for Science and Technology Transfer at HBRS. (2019). Centre for Science and Technology Transfer (ZWT) | Hochschule Bonn-Rhein-Sieg (H-BRS). Available at: <https://www.h-brs.de/en/centre-science-and-technology-transfer-zwt> [Accessed 29 May 2019].

- Centre of Applied Research of HBRS. (2019). Centre of Applied Research (ZAF) of Hochschule Bonn-Rhein-Sieg University of Applied Sciences | Hochschule Bonn-Rhein-Sieg (H-BRS). Available at: <https://www.h-brs.de/en/centre-applied-research-hochschule-bonn-rhein-sieg-university-applied-sciences-zaf> [Accessed 29 May 2019].
- Centrum für Entrepreneurship und Innovation und Mittelstand. (2019). CENTIM - Centrum für Entrepreneurship und Innovation und Mittelstand. Available at: <https://www.centim.org/> [Accessed 29 May 2019].
- Chiara Rinaldi and Alessio Cavicchi, Universities' Emerging Missions to Foster Sustainability of Rural Areas: Multiple Case Studies From The Marche Region, Agriculture and Agricultural Science Procedia, 8, (725), (2016).
- Das Zentrum für Angewandte Forschung. (2019). Das Zentrum für Angewandte Forschung. Available at: [https://www.h-brs.de/files/related/flyer\\_-\\_kooperieren\\_mit\\_der\\_hochschule\\_bonn-rhein-sieg\\_-\\_das\\_zaf.pdf](https://www.h-brs.de/files/related/flyer_-_kooperieren_mit_der_hochschule_bonn-rhein-sieg_-_das_zaf.pdf) [Accessed 30 May 2019].
- de la Torre, Eva M.; Pérez-Esparrells, Carmen; Casani, Fernando (2018): The policy approach for the Third Mission of Universities: the Spanish Case (1983 – 2018). In Regional and Sectoral Economic Studies 18.
- Die Förderangebote der KfW für Unternehmen. (2019). Die Förderangebote der KfW für Unternehmen. Available at: <https://www.kfw.de/inlandsfoerderung/Unternehmen/index-2.html> [Accessed 30 May 2019].
- Dr Marianne Kulicke (2014): 15 Years of EXIST "University-based start-up programmes". Development of the EXIST funding programme between 1998 and 2013. Fraunhofer-Institut für Systemund Innovationsforschung ISI. Karlsruhe. Available at: [https://www.exist.de/SharedDocs/Downloads/EN/15-years-EXIST-University-based-start-up-programmes.pdf?\\_\\_blob=publicationFile](https://www.exist.de/SharedDocs/Downloads/EN/15-years-EXIST-University-based-start-up-programmes.pdf?__blob=publicationFile) [Accessed 15 June 2019].
- Entrepreneurs Pforzheim. (n.d.). Entrepreneurs Pforzheim . Available at: <https://entrepreneurs-pforzheim.de> [Accessed 11 June 2019].
- Federal Ministry for Economic Affairs and Energy (BMWi) (2015): EXIST Transfer of Research. EXIST – University-Based Business Start-Ups. Berlin. Available at: [https://www.exist.de/SharedDocs/Downloads/EN/Exist\\_Transfer\\_Of\\_Research.pdf?\\_\\_blob=publicationFile](https://www.exist.de/SharedDocs/Downloads/EN/Exist_Transfer_Of_Research.pdf?__blob=publicationFile) [Accessed 16 June 2019].
- Federal Ministry for Economic Affairs and Energy (BMWi) (2016): EXIST Business Start-up Grant. EXIST – University-Based Business Start-Ups. Berlin. Available at: [https://www.exist.de/SharedDocs/Downloads/EN/Exist\\_Business\\_Start\\_Up\\_Grant.pdf?\\_\\_blob=publicationFile](https://www.exist.de/SharedDocs/Downloads/EN/Exist_Business_Start_Up_Grant.pdf?__blob=publicationFile) [Accessed 15 June 2019].
- Federal Statistical Office (Statistisches Bundesamt). (2012). Monetäre hochschulstatistische Kennzahlen, Fachserie 11 Reihe 4.3.2 -2010. Wiesbaden: Statistisches Bundesamt.).

Generator HdM Startup Center (n.d): Hochschule der Medien Stuttgart. Stuttgart.  
Available at: <https://startupcenter-stuttgart.de/> [Accessed 23 June 2019].

Göhring, A., Theobald, A., Engeln, W., & Hensel, T. (2017). HEED – Institute for human engineering & empathic design. (Rektor der Hochschule, Ed.) Konturen, pp. 68-69.

Gruenderstipendium.nrw. (2019). Gründerstipendium NRW. Available at: <https://www.gruenderstipendium.nrw/> [Accessed 30 May 2019].

Gründerwerk. (2019). Startup Summer Camp '19 Sustainable Innovation. Available at: [https://www.hs-pforzheim.de/fileadmin/user\\_upload/uploads\\_redakteur/Gruenderwerk/Startup\\_Summer\\_Camp\\_\\_19/GruenderWERK\\_StartupSummerCamp19\\_Flyer.pdf](https://www.hs-pforzheim.de/fileadmin/user_upload/uploads_redakteur/Gruenderwerk/Startup_Summer_Camp__19/GruenderWERK_StartupSummerCamp19_Flyer.pdf) [Accessed 11 June 2019].

Hachmeister, Cort-Denis; Roessler, Isabel; Scholz, Christina (2017): Schlussbericht des Projektes FIFTH: Facetten von und Indikatoren für Forschung und Third Mission an Hochschulen für Angewandte Wissenschaften. CHE Centrum für Hochschulentwicklung. Gütersloh. Available at: [https://www.tib.eu/de/suchen/download/?tx\\_tibsearch\\_search%5Bdcid%5D=TIBKAT%3A1024005879&cHash=f73afe0ea04748b74071e214110c88ea#download-mark](https://www.tib.eu/de/suchen/download/?tx_tibsearch_search%5Bdcid%5D=TIBKAT%3A1024005879&cHash=f73afe0ea04748b74071e214110c88ea#download-mark) [Accessed 26 June 2019].

HADAD, Shahrazad (2017): Knowledge Economy: Characteristics and Dimensions. In MDKE 5 (2), pp. 203–225. DOI: 10.25019/MDKE/5.2.03.

High-Tech Gründerfonds. (2019). High-Tech Gründerfonds. Available at: <https://high-tech-gruenderfonds.de/de/> [Accessed 3 June 2019].

History of Hochschule Bonn-Rhein-Sieg. (2019). History | Hochschule Bonn-Rhein-Sieg (H-BRS). Available at: <https://www.h-brs.de/en/history> [Accessed 29 May 2019].

Hochschule der Medien (2018): KOOPERATIONSMÖGLICHKEITEN FÜR UNTERNEHMEN. Hochschule der Medien. Stuttgart. Available at: <https://www.hdm-stuttgart.de/download> [Accessed 23 June 2019].

Hochschule der Medien (2019): Step\_In. Hochschule der Medien. Stuttgart. Available at: <https://www.hdm-stuttgart.de/download> [Accessed 23 June 2019].

Hochschule Pforzheim. (2017). Höhle der Löwen: Rafy Ahmed stellt Sportlabel MOROTAI vor. Available at: [https://designpf.hs-pforzheim.de/aktuelles/detailansicht/news/1710hoehle\\_der\\_loewen\\_rafy\\_ahmed\\_stellt\\_sportlabel\\_morotai\\_vor/](https://designpf.hs-pforzheim.de/aktuelles/detailansicht/news/1710hoehle_der_loewen_rafy_ahmed_stellt_sportlabel_morotai_vor/) [Accessed 11 June 2019].

Hochschule Pforzheim. (n.d.). What is PRME?. Available at: [https://businesspf.hs-pforzheim.de/en/about\\_us/prme/what\\_is\\_prme/](https://businesspf.hs-pforzheim.de/en/about_us/prme/what_is_prme/) [Accessed 11 June 2019].

- Hochschule Pforzheim . (n.d.). Gründerwerk - Zentrum für Unternehmensgründung der Hochschule Pforzheim. Available at: [https://www.hs-pforzheim.de/studium/im\\_studium/gruenderwerk/das\\_gruenderwerk/](https://www.hs-pforzheim.de/studium/im_studium/gruenderwerk/das_gruenderwerk/) [Accessed 11 June 2019].
- Hochschule Pforzheim . (n.d.). HEED - Vom Hörsaal in die Werkstatt. Available at: <https://www.hs-pforzheim.de/forschung/institute/heed/> [Accessed 11 June 2019].
- Hochschule Reutlingen. (n.d.). Center for entrepreneurship. Available at: <https://www.reutlingen-university.de/nach-dem-studium/center-for-entrepreneurship/wettbewerbe/> [Accessed 23 June 2019].
- Hybrid-KEM. (2019). Hybrid-KEM | Hochschule Bonn-Rhein-Sieg (H-BRS). Available at: <https://www.h-brs.de/de/hybrid-kem> [Accessed 30 May 2019].
- IHK Schwarzwald-Baar-Heuberg. (n.d.). IHK Starterpaket. Available at: <https://www.schwarzwald-baar-heuberg.ihk.de/Gruender/ihk-starterpaket> [Accessed 23 June 2019].
- IHK Schwarzwald-Baar-Heuberg. (n.d.). Seminar Fit für die Existenzgründung. Available at [https://www.ihkakademie-sbh.de/kursdetails/?tx\\_akademie\\_akademie%5BeventId%5D=2069&tx\\_akademie\\_akademie%5BparentId%5D=177&tx\\_akademie\\_akademie%5Baction%5D=seminarDetail&tx\\_akademie\\_akademie%5Bcontroller%5D=Events&cHash=0c33884480ab56f4e7caa141f5fc2e6b](https://www.ihkakademie-sbh.de/kursdetails/?tx_akademie_akademie%5BeventId%5D=2069&tx_akademie_akademie%5BparentId%5D=177&tx_akademie_akademie%5Baction%5D=seminarDetail&tx_akademie_akademie%5Bcontroller%5D=Events&cHash=0c33884480ab56f4e7caa141f5fc2e6b) [Accessed 23 June 2019].
- Industrie- und Handelskammer Hochrhein-Bodensee. (2014). IHK Hochrhein-Bodensee. Available at: [https://www.konstanz.ihk.de/servicemarken/ueber\\_uns/wir/Filme](https://www.konstanz.ihk.de/servicemarken/ueber_uns/wir/Filme) [Accessed 23 June 2019].
- Jaeger, Angelika; Kopper, Johannes (2013): Measuring the regional "Third-Mission-Potential" of different types of HEIs. Niederrhine Institute for Regional and Structural Research (NIERS). Hochschule Niederrhein, Mönchengladbach. Available at: [https://www.researchgate.net/publication/282571047\\_Measuring\\_the\\_Regional\\_'Third-Mission-Potential'\\_of\\_Different\\_Types\\_of\\_HEIs](https://www.researchgate.net/publication/282571047_Measuring_the_Regional_'Third-Mission-Potential'_of_Different_Types_of_HEIs) [Accessed 30 June 2019].
- Jana Krčmářová (2011): The third mission of higher education institutions: conceptual framework and application in the Czech Republic, *European Journal of Higher Education*, 1:4, 315-331. <http://dx.doi.org/10.1080/21568235.2012.662835>
- KOVEOS, PETER (2016): THE IMPORTANCE OF ENTREPRENEURSHIP. In *Journal of Developmental Entrepreneurship* 21 (3), p. 1. DOI: 10.1142/S1084946716010032.

- Leydesdorff, Loet (1995): The Triple Helix - -University-Industry-Government Relations: A Laboratory for Knowledge Based Economic Development. In Glycoconjugate Journal - GLYCOCONJUGATE J 14.
- LOS. (2019). LOS | Hochschule Bonn-Rhein-Sieg (H-BRS). Available at: <https://www.h-brs.de/de/los-led-ozon-sensor> [Accessed 30 May 2019].
- Ministerium für Wirtschaft, Arbeit und Wohnungsbau Baden-Württemberg. (n.d.). Startup BW- 90 Sekunden Pitch auf 246 Metern. Available at: <https://www.startupbw.de/news/meldungen/90-sekunden-pitch-auf-246-metern/> [Accessed 23 June 2019].
- Ministerium für Wirtschaft, Arbeit und Wohnungsbau Baden-Württemberg. (2018). Membratex GmbH aus Pforzheim gewinnt regionalen „Start-up BW Elevator Pitch“. Available at: <https://wm.baden-wuerttemberg.de/de/service/presse-und-oeffentlichkeitsarbeit/pressemitteilung/pid/wettbewerb-start-up-bw-elevator-pitch-regional-cup-pforz-heimnordschwarzwald-membratex/> [Accessed 11 June 2019].
- Ministerium für Wissenschaft, Forschung und Kunst Baden-Württemberg. (n.d. ). Förderlinie 3 " Gründungskultur" . Ministerin Bauer im Gespräch mit Wissenschaft und Wirtschaft. Available at: <https://mwk.baden-wuerttemberg.de/de/hochschulen-studium/erfolgreiches-studium/fonds-erfolgreich-studieren-in-baden-wuerttemberg-fest/foerderlinie-gruendungskultur/> [Accessed 11 June 2019].
- Molas-Gallart, J., Salter, A., Patel, P., Scott, A., & Duran, X. (2002). Measuring third stream activities: Final report to the Russell Group of Universities. SPRU, University of Sussex.
- Morotai GmbH. (n.d.). About . Available at: <https://morotai.de/about/> [Accessed 11 June 2019].
- Mugabi, Henry Kahigiza. "Institutionalisation of the 'Third Mission' of the University: The Case of Makerere University." (2014).
- Munck, Ronaldo (2010): University Strategic Planning and the Foresight/Futures Approach An Irish Case Study. In Strategic Planning.
- Nakwa, Karantarat; Zawdie, Girma (2016): The 'third mission' and 'triple helix mission' of universities as evolutionary processes in the development of the network of knowledge production: Reflections on SME experiences in Thailand. In Science and Public Policy 43 (5), pp. 622–629. DOI: 10.1093/scipol/scw030.
- Neue Wettbewerbsrunde. (2019). Neue Wettbewerbsrunde für Hochschul-Start-ups | Hochschule Bonn-Rhein-Sieg (H-BRS). Available at: <https://www.h-brs.de/de/news/neue-wettbewerbsrunde-fuer-hochschul-start-ups> [Accessed 30 May 2019].

- Nutztierstrategie. (2019). Nutztierstrategie | Hochschule Bonn-Rhein-Sieg (H-BRS). Available at: <https://www.h-brs.de/de/nutztierstrategie> [Accessed 30 May 2019].
- Pag.es (n.d.): Digital Magazine Publishing System. Stuttgart. Available at: <http://www.pag.es/> [Accessed 24 June 2019].
- Partner des CENTIM. (2019). Partner des CENTIM. Available at: <https://www.centim.org/centim-partner.html> [Accessed 30 May 2019].
- Piirainen, K.A., Andersen, P.D., Andersen, A.D. (2016). Foresight and the third mission of universities: The case for innovation system foresight. *Foresight*, Vol 18, Iss. 1. <http://dx.doi.org/10.1108/FS-04-2014-0026>
- PRME. (n.d.). Six Principles. Available at: <http://www.unprme.org/about-prme/the-six-principles.php> [Accessed 11 June 2019].
- Promotionsstipendienverfahren at HBRS. (2019). Promotionsstipendienverfahren 2019 | Hochschule Bonn-Rhein-Sieg (H-BRS). Available at: <https://www.h-brs.de/de/gi/promotionsstipendienverfahren> [Accessed 29 May 2019].
- Rade, K. (2016). Struktur- und Entwicklungsplan 2016 - 2020 . Hochschule Pforzheim - führend durch Perspektivenwechsel. Available at: [https://www.hspforzheim.de/fileadmin/user\\_upload/uploads\\_redakteur/Dokumente/Grundordnung\\_ua/StEP\\_HSPF\\_verabschiedet\\_15\\_01\\_2017.pdf](https://www.hspforzheim.de/fileadmin/user_upload/uploads_redakteur/Dokumente/Grundordnung_ua/StEP_HSPF_verabschiedet_15_01_2017.pdf) [Accessed 11 June 2019].
- Ranga, Marina; Etkowitz, Henry (2013): Triple Helix Systems: An Analytical Framework for Innovation Policy and Practice in the Knowledge Society. In *Industry and Higher Education* 27 (4), pp. 237–262. DOI: 10.5367/ihe.2013.0165.
- Roessler, Isabel (2015): Teaching, Research and more!? Achievements of Universities of applied sciences with regard to the society: Third Mission at UAS.
- Schönfelder, B. (2019). Ein Blick zurück . Available at : [https://designpf.hspforzheim.de/ueber\\_die\\_fakultaet/geschichte/](https://designpf.hspforzheim.de/ueber_die_fakultaet/geschichte/) [Accessed 11 June 2019].
- Scott, J. (1990) *A Matter of Record: Documentary Sources in Social Research*, Polity Press.
- Selbstständigkeit und Unternehmensgründung. (2019). Selbstständigkeit und Unternehmensgründung | Hochschule Bonn-Rhein-Sieg (H-BRS). Available at: <https://www.h-brs.de/de/selbstaendigkeit-und-unternehmensgruendung> [Accessed 30 May 2019].
- spikee (n.d.): TRAIN HARD RECOVER SMART. Stuttgart. Available at: <https://spikee.de/#!/schneller-werden> [Accessed 24 June 2019].

- Startup Angels Alb-Bodensee e.V. (n.d.). Available at: <https://startupangels.de/zollernalb-startups.html?language=de#about> [Accessed 23 June 2019].
- Startup Angels Alb-Bodensee e.V. (n.d.). Towerpitch. Available at: [https://startupangels.de/files/downloads/2019%20Flyer\\_StartupAngels\\_TP\\_ElevatorPitch.pdf](https://startupangels.de/files/downloads/2019%20Flyer_StartupAngels_TP_ElevatorPitch.pdf) [Accessed 23 June 2019].
- Start-up Transfer. (2019). Förderung von Gründer/Innen durch "Start-up Transfer" | Hochschule Bonn-Rhein-Sieg (H-BRS). Available at: <https://www.h-brs.de/de/isi/news/foerderung-von-gruenderinnen-durch-start-transfer> [Accessed 30 May 2019].
- Statistisches Bundesamt. (2019). Hochschulen nach Hochschularten. Available at: <https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bildung-Forschung-Kultur/Hochschulen/Tabellen/hochschulen-hochschularten.html> [Accessed 15 May 2019].
- Steinbeis Stiftung. (2018). Facts and Dates (2018). Available at: <https://www.steinbeis.de/en/steinbeis/about-steinbeis/facts-and-dates.html> [Accessed 23 June 2019].
- Steinbeis Stiftung. (2018). Steinbeis Kompakt . Available at: <https://www.steinbeis.de/de/publikationen/unternehmenspublikationen.html> [Accessed 23 June 2019].
- Steinbeis Stiftung. (n.d.). Setting up a Business with Steinbeis . Available at: <https://www.steinbeis.de/en/steinbeis/setting-up-a-business-with-steinbeis.html> [Accessed 23 June 2019].
- Studium an der Hochschule Bonn-Rhein-Sieg. (2019). Studium | Hochschule Bonn-Rhein-Sieg (H-BRS). Available at: <https://www.h-brs.de/de/studium> [Accessed 29 May 2019].
- Tag der Forschung. (2019). Tag der Forschung 2019 | Hochschule Bonn-Rhein-Sieg (H-BRS). Available at: <https://www.h-brs.de/de/termin/tagderforschung2019> [Accessed 29 May 2019].
- Trencher, G.; Yarime, M.; McCormick, K. B.; Doll, C. N. H.; Kraines, S. B. (2014): Beyond the third mission: Exploring the emerging university function of co-creation for sustainability. In *Science and Public Policy* 41 (2), pp. 151–179. DOI: 10.1093/scipol/sct044.
- Unger, Maximilian; Polt, Wolfgang (2017): The Knowledge Triangle between Research, Education and Innovation – A Conceptual Discussion. In *Foresight and STI Governance* 11. DOI: 10.17323/2500-2597.2017.2.10.26.

- Veugelers, R., Del Rey, E. (2014). The contribution of universities to innovation, (regional) growth and employment. EENEE Analytical Report No. 18, January 2014 (Prepared for the European Commission). European Expert Network on Economics of Education (EENEE). <http://www.eenee.de/eenee-Home/EENEE/Analytical-Reports.html> (accessed May 12, 2019)
- VirtualQ (n.d.): THE WAITING SERVICE. Stuttgart. Available at: <https://virtualq.io> [Accessed 24 June 2019].
- Volksbank Stuttgart eG (2015): VR-Future. Das Magazin für Junge Erwachsene. Volksbank Stuttgart eG. Stuttgart. Available at: [https://startupcenter-stuttgart.de/wp-content/uploads/2016/02/2015\\_01\\_VR-FUTURE\\_Magazin\\_Startup.pdf](https://startupcenter-stuttgart.de/wp-content/uploads/2016/02/2015_01_VR-FUTURE_Magazin_Startup.pdf) [Accessed 23 June 2019].
- Wallisch, M., & Hemeda, A. (2018). Mittelstand meets Startups 2018. Potentiale der Zusammenarbeit. Eschborn. Available at: <https://www.rkw-kompetenzzentrum.de/gruendung/studie/mittelstand-meets-startups-2018/> [Accessed 23 June 2019].
- Wirtschaft.NRW. (2019). Landesregierung weitet Förderung von Start-ups an Hochschulen und Forschungseinrichtungen in Nordrhein-Westfalen aus | WIRTSCHAFT.NRW. Available at: <https://www.wirtschaft.nrw/pressemitteilung/landesregierung-weitet-foerderung-von-start-ups-hochschulen-und> [Accessed 30 May 2019].
- Wissen für die Wirtschaft. (2019). Available at: [https://www.h-brs.de/files/related/brs\\_17\\_01\\_broschure\\_wissen\\_fuer\\_die\\_wirtschaft\\_rz4\\_web.pdf](https://www.h-brs.de/files/related/brs_17_01_broschure_wissen_fuer_die_wirtschaft_rz4_web.pdf) [Accessed 30 May 2019].
- Wrobel, M., Schildhauer, T., & Preiß, K. (2017). Kooperationen zwischen Startups und Mittelstand. Learn. Match. Partner. Berlin: Alexander von Humboldt Institut für Internet und Gesellschaft gGmbH.
- Wurmseer, Grit (2016): Third Mission als Auftrag für Universitäten? Die Hochschule : Journal für Wissenschaft und Bildung. Leibniz. Available at: <https://www.pe-docs.de/volltexte/2019/16204/pdf/t2329.pdf> [Accessed 30 June 2019]
- Zawdie, Girma (2010): Special Issue : Knowledge Exchange and the Third Mission of Universities. In *Industry and Higher Education* 24 (3), pp. 151–155. DOI: 10.5367/000000010791657437.