

## Article

# Building a Culture of Entrepreneurial Initiative in Rural Regions Based on Sustainable Development Goals: A Case Study of University of Applied Sciences–Municipality Innovation Partnership

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**Abstract:** The purpose of the study is to provide empirical evidence about the under-researched area of university–government relations in building a culture of entrepreneurial initiatives inside the triple helix model in a rural region. The study deploys a qualitative case study research method based on the content analysis of project documentation and further internal documents both from universities and municipalities. The propositions in the research question are guided by the previous literature and were then analyzed through an “open coding” process to iteratively analyze, verify, and validate the results from the documents against the previous literature. Results presented in the case study are related both to the project of a municipality–university innovation partnership, as well as the historic development of the university in its three missions, and, related to the important third mission, themes relevant for the project. In addition, a “toolkit” of relevant project activities is presented against the major identified themes, major project stakeholders, as well as relevant Sustainable Development Goals (SDGs). Universities should look beyond a purely economic contribution and should augment all three missions (teaching, research, engagement) by considering social, environmental, and economic aspects of its activities. Instead of considering a government’s role solely as that of a regulator, a much more creative and purposeful cooperation between university and government is possible for creating a regional culture of entrepreneurial initiatives in a rural region.

**Keywords:** triple helix; third mission; engaged university; socially engaged university; social innovation; technological innovation; knowledge transfer; transfer office; university–government relations; systemic regional innovation; Maxqda; qualitative research



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## 1. Introduction

Societal changes towards the knowledge and services-based society as well as environmental emergencies have caused a broad discussion in the literature on the role and contribution of the university in the modern economy, environment, and society. However, these discussions have been predominantly theoretical and prescriptive, with little attention to the transformational processes themselves and the lessons learned from applying concepts such as an entrepreneurial university, the third mission of university (TMU), and an engaged university in a rural context or with partners from the governmental sector. Continuing the work on closing the gap between case studies and theoretical considerations in the TMU research [1], this paper seeks to present a research case study. It presents a specific TMU case in relation to the previous literature (both theoretical as well as practical) and discusses how certain theoretical and practical considerations can be integrated in a creative and innovative way for the benefit of both the academia, as well as stakeholders in the regional innovation ecosystem.

The previous literature has demonstrated the importance of university–government relations inside models such as the triple helix [2,3], the third mission of universities [4], and SDG 17 Partnership for the goals [5]. However, much of this research is based on university–industry and start-up relations [5,6], with insufficient understanding on how to build university–government relations as well as a lack of empirical data which could close this research gap. Another very important issue, which has not been researched in the previous literature, is the evaluation of partners and potential partners, as well as their readiness and capabilities in terms of forging fruitful collaboration. This issue is especially relevant for cooperation in rural settings, which is a contribution to the literature on the third mission that this case study attempts to provide. Evaluation of partners and the self-evaluation of activities are two important but neglected fields in the third mission activities. These two aspects are very important and relevant because of the high degree of uncertainty involved in third mission activities, which are less formalized activities from research and teaching.

To address this research gap, the overall goal of the research was to define and explicate the cooperation between a university of applied sciences and a municipality in building a culture of innovation and entrepreneurial initiative in a rural region. The operationalization of the research goal has been conducted in further consultation of the previous literature, where four relevant themes have been identified as relevant for this research goal and then translated into research questions.

The previous research on entrepreneurship and entrepreneurial university appears to be primarily focused on building conceptual foundations for university–industry–government cooperation, where the role of the non-government actors (industry and university) is seen as solely building mutual relations inside the policy stipulated by the government [7]. Although this statist model is not without foundation, especially in the contexts where the role of the state is very strong, recent research has pointed to the possibility of using it as a starting point for developing an engaged university, a regionally engaged university, or even an entrepreneurial university within the triple helix model of university–industry–government relations [3,8]. In order to address this research gap regarding university–government relations for entrepreneurship, the first research question is introduced below.

RQ1: How can entrepreneurship be integrated in the university–municipality innovation partnership inside the triple helix model of cooperation in a rural region?

The previous literature on regional innovation mostly deals with the regional level of government [9,10]. However, a more recent and under-researched field is the (social) innovation together with municipalities [11]. Therefore, the following research question has been posed:

RQ2: How can regional innovation be integrated in the university–municipality innovation partnership inside the triple helix model of cooperation in a rural region?

The previous literature has identified the following five important aspects of a regional sustainability transformation facilitated by a higher education (HE) institution: (1) the identification of regional sustainability challenges, (2) the HE financing structure and independence, (3) the HE institutional organization (4) the level and extent of democratic processes in the region and (5) the cultural and institutional context in the region [12]. The present research has focused on building a culture of entrepreneurial initiative in the rural region based on SDGs; therefore, taking a systemic approach to entrepreneurship and sustainability as two interrelated subjects inside a triple helix mode of cooperation, summarized in the third research question.

RQ3: How can sustainability be integrated in the university–municipality innovation partnership inside the triple helix model of cooperation in a rural region?

The fourth theme is tourism and mobility. The recent literature has recognized the importance of connecting sustainable mobility with sustainable tourism, especially regarding biking mobility and tourism [13]. However, there are no previous findings which integrate

this new mobility research (biking, e-biking, micro-mobility) with tourism and the third mission of universities. Therefore, the fourth research question has been introduced.

RQ4: How can tourism and mobility be integrated in the university–municipality innovation partnership inside the triple helix model of cooperation in a rural region?

The paper firstly presents the literature on the TMU by presenting the four identified most relevant themes for the implementation of the TMU, namely, entrepreneurship support, regional and rural innovation, sustainability, and tourism and mobility. The methodology section presents the qualitative and case study research approach deployed, as well as the procedure involved in collecting and analyzing the data. The results section presents the Municipal Innovation Partnership (MIP) project as a case study background information with descriptive statistics analysis of the key words used in the project. Then, the case study analysis is presented by presenting the occurrence of the major themes from the TMU literature in the project documentation as well as showing whether specific project implementation activities fit with specific project stakeholders, four TMU themes, and specific SDGs. After that, the case study supplementary partner info is provided to give more contextual explanation on major project partners. After that, a discussion regarding the practical and theoretical implications, future research directions, and limitations is presented. The article ends with conclusions where closing thoughts and remarks are presented.

## 2. Literature Review

### 2.1. *Entrepreneurship Support inside the Third Mission of Universities*

Modern higher education, including both universities as well as universities of applied sciences, needs to balance teaching (first mission), research (second mission), and service (third mission) [14,15]. However, there is still much discussion in the literature on how these service activities are to be conducted and what should they encompass [14,16]. One traditional stream proposes the focus on entrepreneurship and supporting the local economic and job growth [17]. Although the third mission of universities today encompass a wide range of activities, entrepreneurship is traditionally thought to be at the center of third mission activities [6]. In this traditional view, the TMU should include following three types of activities: (a) systemic support to entrepreneurial activities, (b) interface creation through a technology and science transfer office, (c) a significant number of staff members to start companies which generate income and support further research at the university [3]. This is a model also known as an “entrepreneurial university”, and has developed primarily in the US, where professors themselves are often entrepreneurs in a temporary-leave status at the university, while in Europe, this model is different in that the students are those predominantly being taught entrepreneurial and firm-formation skills [17]. Having this important distinction in mind, it would be firstly important to point out that there are different types of entrepreneurships, and consequently also entrepreneurship support types. For example, entrepreneurship can be differentiated regarding entrepreneurial opportunity vs. necessity, full-time vs. part-time occupation, novice vs. non-novice experience level, incorporated vs. unincorporated, as well as generational cohort of a founder (Gen S, Gen BB, Gen X, Gen Y, Gen Z) [18]. Apart from these distinctions, there are also international differences in entrepreneurship due to varying institutional contexts in different—purely capitalist—countries, social market economies, socialist market economies, welfare state market economies, as well as a distinction between developed and emerging economies [19,20].

### 2.2. *Regional and Rural Innovation inside the Third Mission of Universities*

The regional innovation perspective has been at the very core of the triple helix approach of the TMU from the very beginning of the concept development, alongside the circulation perspective [3,17]. In this model, the regional perspective points to the independence–dependence aspects of the relations between university, government, and industry as three separate but interconnected actors, while the circulation points to the

dynamic aspects of this relation. However, in some countries, such as the UK, the spatial and regional aspects of TMU are not given special attention to, while in Sweden and Austria, regional innovation appears to be one of the most important aspects of the TMU [21]. In addition, the previous literature has identified increased expectations and the pressure on universities operating in the rural regions to take a prominent role outside academia, given the lack of other knowledge-based institutions in the region [15]. Having in mind that a regional perspective is the key to sustainable development, an active contribution of the TMU to sustainability of the region where it is located can be deemed essential to contributing to global SDGs [22].

### *2.3. Sustainability and the Third Mission of Universities*

In order to address new social realities, the third mission in HE developed from solely entrepreneurship into encompassing the following elements beyond entrepreneurship: human resources, intellectual property, spin-offs, contracts with industry, contracts with public bodies, participation in policy-making, involvement in social and cultural life, and communicating the public understanding of science [23,24]. Some authors even go further to propose the sustainability-related issues as the fourth mission, but the literature still predominantly deals with these aspects as being part of the third mission of universities [25].

Based on the Agenda for Sustainable Development 2030 by the United Nations (UN), the universities and HE administrators are creating concepts of redefining the role of universities as co-creators of sustainable future, and back-casting the steps needed to achieve the 17 sustainable development goals (SDGs) from the Agenda for Sustainable Development, especially SDG No. 4—quality education [26–28]. Some actions are related to a strategic reorientation of the whole university, through instituting sustainability strategies under the SDG No. 4 [29], while others are focused on redefining the university's role in relation to the third mission of universities and beyond to address different MDGs out of 17 in total [30]. There are important findings in the previous research; for example, that an entrepreneurial university on the road to sustainability should define and strategically direct its cooperation with start-ups in relation to three sustainability pillars (environment, economy, society) and possibly understand and optimize modes of cooperation with start-ups dealing with different types of MDGs [5].

TMU activities for regional sustainability can vary from an outreach in the form of taking part in public debates, all the way to multi-stakeholder networks which encompass training, research, and regional development [22]. A recent stream of research, which has focused on universities of applied sciences (UAS), has introduced the concept of sustainability transfer, where an UAS acts as an agent of regional sustainability transformation by providing a specific combination of practical knowledge, strategic, and normative orientation to regional actors, as well as facilitating a bi-directional flow of knowledge, ideas, and technology between academia and practice [14,31]. This concept appears to be similar to the general third stream activities which include both knowledge transferring from university to industry as well as forging close institutional links with industry through third mission activities such as consultancy and contract research, student projects in industry, capacity building, and continuing professional education [16].

### *2.4. Tourism and Mobility in the Third Mission of Universities*

The third mission of universities is normally based on regional and national level government priorities, thereby bringing about the topic of tourism in TMU activities in many developing, tourism-oriented regions, as well as in post-industrial regions transitioning from industrial heritage to service economy [32,33]. Furthermore, TMU activities have been found to have a profound effect on the regional entrepreneurial landscape and ecosystem, especially in the less industrialized areas with a pronounced contribution of tourism [4]. The role of universities in TMU activities related to regional tourism is that of a facilitator and an agent to empower the local stakeholders, e.g., by explaining the concept of the local territorial umbrella brand for bundling the local services sector and opening

it to international tourist markets [34]. On the other hand, regional tourism development or destination development is in need for new approaches to co-create and collaborate to build more sustainable tourism destinations accountable to the local economy, society and the environment [35].

The economy of rural regions has often been characterized by a combination of agri-food, manufacturing and tourism, with occasional science, technology, and innovation centers, which are developed together with universities [15]. Building a regional partnership regarding sustainable tourism between a university—as a part of its third mission—as well as local communities and the economy can help the latter in preserving the local identity, foster traditional know-how, and bring attention to opportunities [32]. For example, one of the major competencies needed for developing a successful tourism offer is the understanding of the emerging source markets, their culture, habits, consumer behavior, etc. [36].

While tourism development has received quite some attention in the previously discussed literature, the question of mobility inside the third mission of universities is still not clearly positioned. There is some mention of these topics inside the third mission of universities related to research regarding a wider energy transition to renewable energy and development of a high-tech green economy [25]; however, there is no mention in relation to the third mission of universities and (sustainable) tourism, except in the research conducted by Nonelli [37], where this link between new green mobility and sustainable tourism inside TMU is obvious. Previous research has also pointed out the link between TMU and the necessity of the university to address pressing traffic problems in urban regions [38].

### 3. Methodology

The research deploys a qualitative case study research method, with an empirical orientation, as a suitable method for researching a contemporary phenomenon of interest for both academic research and practice. It uses secondary data to guide the analysis, both from the project partners as well as project-relevant data. The study has relevant qualities which constitute a case study. According to Yin [39], it empirically investigates a contemporary real-world phenomenon; the researched subject includes important contextual elements not easily distinguishable from the researched phenomenon; deals with a multitude of variables of interest; deploys previous theoretical propositions to guide data design, collection and analysis; and relies on multiple sources of evidence in order to triangulate the data for validity.

The first step in building this case study was consultation of the relevant literature on the third mission of universities to guide data collection, analysis, and interpretation. In the second step, different documents from the project in question, as well as major partners: municipality, university, and the CENTIM institute, were collected. These data are secondary data, collected for other purposes than the study itself. The content of the identified documents was analyzed in light of the identified theoretical propositions. The content analysis of the collected documents for the case study was conducted in Maxqda [40] software for qualitative data analysis. A plugin inside this software, called Maxdictio, was used for creating word frequency and vocabulary analysis as well as a tool for text exploration in order to analyze in detail the occurrence and context of specific words. In the first step of word frequency analysis, words were lemmatized for German language and—only in the last phase—translated to English, as the documentation is originally in German. No differentiation between upper and lower case (same) words was applied. In addition, the stop list was carefully created to exclude irrelevant words (“already”, “better”, “move”, “the”, “through”, and “similar”) and to not exclude all possibly relevant words, especially nouns, which are relevant for building a vocabulary. The same procedure was repeated for all documents, and then for specific document groups (university documents, rural municipality documents, project-related documents). Although the original MaQDA file could not be made available for public access due to the confidentiality of certain

documents used in the analysis, the output tables of the analysis, as in the format of .xlsx spreadsheets, have been made available online, as shown in the end of the article.

The researchers engaged in iterative reading, re-reading, organizing, discussion, verifying, and updating the themes identified, a so-called open-coding process. In the open-coding process, a rigorous constant comparison between the results and the literature ensures verification, correction, and saturation of the presented results [41,42]. The secondary data analyzed are presented in Table 1 below and include twelve regular reports submitted during the project “Municipal Innovation Partnerships”, one report of the umbrella project “Campus to world” of the three five-year university development plans, one ten-year university transfer strategy, documents developed by expert groups of the municipalities’ advisory board, and an external evaluation of the CENTIM institute.

**Table 1.** Documents deployed in the content analysis.

Number of Documents	Type of Document	Entity behind the Document
11	Project reports	Project “Municipal innovation Partnerships”
1	Project output: SWOT Analysis	Project “Municipal innovation Partnerships”
1	Project report	Project “Campus to world”
3	Five-year university development plan	University
1	Ten-year transfer strategy	University
2	Expert report	Expert groups of the municipalities’ advisory board

## 4. Results

### 4.1. Case Study Background of the Information Project on Municipal Innovation Partnerships

Cooperation between the Bonn-Rhine-Sieg University of Applied Sciences (H-BRS), primarily through the CENTIM institute, on one side, and the municipality of Neunkirchen-Seelscheid (NKS) on the other side, started through certain small-scale activities before the project “Municipal Innovation Partnerships” (MIP)—the most exemplary of those was the citizen poll. However, the cooperation received a proper push through the MIP project. This project is a sub-project of a larger initiative on the H-BRS, namely, the “Campus to World” (CtW), which has been financed through an “Innovative higher education” program of the German Federal Ministry for Science and Research and the Common Science Conference. It deals with the exploration of cooperation possibilities between the H-BRS and the community of Neunkirchen-Seelscheid regarding regional innovation. The project duration was set at 5 years and started in 2018. The data collection, which was conducted before the project start, enabled a strategic orientation and planning of the project. The measures which were implemented in the years after the project start and especially in the years 2019–2020, in close coordination with the municipality of NKS, build one of the central outputs of the project—creating of a model Toolkit for municipal innovation partnerships. The Toolkit should serve as a reference point for future projects in this rather new type of third mission cooperation in German HE, and contains formats, activities, and processes for better networking between HE and rural communities. The cooperation—with selected target groups in the economy, government, and society—was initiated and further developed through different activities and formats during the project; these aspects are all brought together in the MIP Toolkit to connect all important aspects of municipality innovation partnerships. The toolkit is presented at the end of this case study.

The goal of the project was to increase the attractiveness of the rural community and the rural area, to find possibilities for cooperation with the rural community, as well as to transfer the advantages of having regionally located campuses to the rural

areas around these campuses. The project aimed at supporting the third mission activity spectrum of the H-BRS through an innovative cooperation with the rural community of NKS, thereby contributing to systemic-oriented sustainable development. The project implementation activities are presented in the next chapter, especially under consideration of the TMU themes identified in the previous literature, relevant SDGs, and the most important project stakeholders.

The researched documentation has been categorized into all documents (18 documents), university-related documents (4 documents), rural municipality-related documents (2 documents), and project documents both from the KIP project as well as from the CtW program (13 documents), as presented in Table 2 below. Generally, “university” is the 1st ranked keyword, while “municipality” is the 3rd one. “Financial surplus” is placed 2nd—this is primarily connected to the fact that this is an important issue in the municipality-related expert reports as the municipality is in a dire financial situation, as many peripheral rural municipalities often are. Further interesting keywords in the sense of TMU are 4th “research”, 11th “transfer”, 15th “responsibility”, and 19th “company”. Comparing the three separate subtypes of documents, the university is concentrated on “university” itself, as well as the three missions: “research”, “department”, “development”, and “goals”. On the other side, rural municipality is mostly concerned with its financial budget planning, naming keywords such as “financial surplus”, “orderly”, “expenditure”, “municipalities”, and “investment activity”. Project documentation is similar to the universities’ own documentation, which is foremostly focused on “university” itself, and then on “project”, “surplus”, “cooperation”, “municipalities”, “regional”, and “development”. It is also worth noting that while the thematic focus of the municipality documents was almost exclusively focused on financial aspects, the universities’ documents demonstrate that it is necessary to address some important further aspects in the TMU (“science”, “society”, “international”, “transfer”, “knowledge”, and “sustainable”), and project documents deal also with important further aspects of the TMU (“public”, “partner”, and “association”).

**Table 2.** The most frequently used words (keywords) in the researched documentation in different categories of documents.

All Documents (18 Documents)			University Documents (4 Documents)		Rural Municipality Documents (2 Documents)		KIP and CtW Project Documentation (13 Documents)	
Rang	Word	Perc.	Word	Perc.	Word	Perc.	Word	Perc.
1	university	1.06%	university	2.30%	financial surplus	1.22%	university	0.81%
2	financial surplus	0.48%	research	1.00%	orderly	0.92%	project	0.60%
3	municipality	0.41%	department	0.89%	expenditure	0.87%	surplus	0.56%
4	research	0.40%	development	0.87%	municipalities	0.86%	cooperation	0.47%
5	measures	0.33%	international	0.87%	investment activity	0.79%	municipalities	0.46%
6	expenditure	0.33%	goals	0.77%	fire brigade	0.62%	regional	0.42%
7	development	0.32%	measures	0.73%	facility	0.46%	development	0.37%
8	goals	0.31%	science	0.73%	annual financial statement	0.46%	partial project	0.37%
9	investment activity	0.29%	society	0.66%	revenue	0.42%	public	0.34%
10	orderly	0.28%	transfer	0.55%	bottom line	0.40%	milestone	0.33%
11	transfer	0.24%	univ. developm. plan	0.49%	purchase	0.35%	project end	0.32%

Table 2. Cont.

All Documents (18 Documents)			University Documents (4 Documents)		Rural Municipality Documents (2 Documents)		KIP and CtW Project Documentation (13 Documents)	
Rang	Word	Perc.	Word	Perc.	Word	Perc.	Word	Perc.
12	fire department	0.24%	responsibility	0.44%	financial contribution	0.33%	event	0.32%
13	department	0.20%	goal	0.40%	real financial surplus	0.29%	analysis	0.31%
14	univ. developm. plan	0.19%	campus	0.35%	administrative activities	0.24%	different	0.28%
15	responsibility	0.18%	students	0.33%	success	0.23%	strengths	0.28%
16	frame	0.18%	support	0.31%	services	0.20%	partner	0.27%
17	structure	0.18%	knowledge	0.28%	municipal utility company	0.19%	implement	0.24%
18	campus	0.18%	innovation	0.28%	losses	0.19%	use	0.24%
19	company	0.18%	partner	0.28%	investment measures	0.18%	association	0.24%
20	annual fin. statement	0.18%	sustainable	0.27%	personnel expenses	0.18%	provision	0.24%

#### 4.2. Case Study Analysis: MIP Project Implementation

Similar to the previous literature on the TMU, the MIP project has conducted activities in relation to entrepreneurship, regional and rural innovation, sustainability, as well as mobility and tourism, as presented in Tables 3 and 4 below. Regarding entrepreneurship, the activities focused on two student practice projects together with two entrepreneurs, where one plans a village shop and the other runs a local bulk and sustainable shop; and an innovation breakfast together with SMEs and start-ups, as well as SMEs and researchers. A large majority of the conducted activities fall under the category of regional and rural innovation (e.g., two out of four student projects, all five innovation breakfasts), as well as sustainability (three out of four student projects, two out of five innovation breakfasts), while activities such as bee meadow development, mobility action with a free trial of an E-cargo bike, and a virtual consultation regarding mobility fall into both categories. The separately identified TMU activities are mobility and tourism, where three out of four student projects fall into this category as well as a virtual consultation regarding mobility and a mobility action for trying out an E-cargo bike.

**Table 3.** Four themes identified in the literature on TMU listed according to the frequency in the analyzed documents.

Theme	Frequency
Sustainability	80
Mobility	44
Entrepreneurship	26
Tourism	5

Table 5 below presents the project activities in relation to the project stakeholders—economy/industry, citizens, government—but also university students, professors and scientific associates, and administration. The first three are recognized inside the quadruple helix of TMU. However, regarding project implementation, the more critical part of the implementation of project activities was the relation of different stakeholder groups from the university to different regional stakeholders, therefore, the differentiation of the universities' own stakeholders to students, professors and scientific associates, and administration. In

addition, in this table, the project activities were also classified regarding the different types of contribution to developing the partnership with municipality itself: consulting services, event formats, office-related arrangements, legal arrangements, and project-related backstopping activities. This framework can be considered a practical toolkit for developing university of applied sciences–municipality partnerships.

**Table 4.** MIP project implementation activities and relevant themes from the third mission of university literature.

	Entrepreneurship	Regional and Rural Innovation	Sustainability	Mobility and Tourism
Student project 1 (Sport association)		x		x
Student project 2 (Village shop)	x		x	x
Student project 3 (Association for the development of municipality partnerships)		x	x	x
Student project 4 (Start-up “Bulk & sustainable shop”)	x		x	
Innovation breakfast 1 (SMEs meet start-ups)	x	x		
Innovation breakfast 2 (Sustainability in the companies)		x	x	
Innovation breakfast 3 (Science meets economy)	x	x		
Innovation breakfast 4 (Digitalization in practice)		x		
Innovation breakfast 5 (Lack of workforce and prevention)		x	x	
Bee meadow development together with Citizen Lab		x	x	
Virtual consultation regarding mobility		x	x	x
Mobility action: free tryout of an E-cargo bike		x	x	x
Company visits and consultations	x	x		

Table 6 below presents the project activities in relation to the selected relevant SDGs (4 quality education, 8 decent work and economic growth, 9 industry, innovation, and infrastructure, 10 reduced inequality, 11 sustainable cities and communities, 12 responsible consumption and production, 13 climate action, 15 life on land, and 17 partnerships for the goals), as well as the type of activity in relation to building the partnership with the municipality, similar to Table 4. In this sense, Tables 5 and 6 build a specific toolkit which can be used in other projects to evaluate and analyze partnership building against major TMU stakeholders (both internal to the HE institution as well as external) and against relevant SDGs.

The presented project implementation results in this case study present both empirical findings relevant for the research field of the TMU and sustainability, and make a practical contribution for practitioners by presenting a toolkit consisting of two connected frameworks. The first part of the toolkit (Table 3) was developed out of a need to identify the activities in relation to the type of their impact on the partnership itself as well as the type of internal stakeholders from the HE institution involved in the project activities. The second part of the toolkit (Table 4) was developed to understand the contribution of activities to the larger umbrella project, H-BRS development plan, and overall SDGs nationally and globally. Both parts of the toolkit (Tables 3 and 4) can be used by future projects dealing with HE cooperation with government or industry, especially with the focus on sustainability-oriented activities.

**Table 5.** MIP project implementation activities in relation to important stakeholders and contribution towards building the partnership with the rural municipality (practical toolkit 1).

		Economy	Citizens	Government	Students	Prof. and Scient. Assoc.	University Administr.
Consulting services for supporting the partnership development	Readiness index			x			
	SWOT analysis	x	x	x			
Event formats for developing a partnership	Student projects	x	x		x		
	Innovation breakfasts	x		x		x	
	Bee meadow development together with Citizen Lab		x			x	
	Virtual consultation regarding mobility		x	x			
	Mobility action: free tryout of an E-cargo bike		x	x			
	Company visits and consultations	x		x		x	
Office-related partnership arrangements	Project office in the municipalities' buildings	x	x	x			
Legal arrangements for supporting the partnership	Letter of intent between the university and the municipality			x			x
Project-related backstopping activities	Newsletter (tourism, sustainability, research, virtual workplace)	x	x				x
	Project marketing (communication through municipality and university websites, flyer, roll-ups, press releases, explanation videos, etc.)	x	x	x			x
	Networking (conferences, fairs)	x	x	x		x	x
	Supporting new project applications	x		x		x	x

#### 4.3. Case Study Supplementary Partner Info: The Rural Community of Neunkirchen-Seelscheid

Neunkirchen-Seelscheid is one of the 19 communities belonging to the Rhine-Sieg County to which the H-BRS also belongs, and which is geographically located around the federal city of Bonn, on the left and right side of the Rhine River and around the confluence of the Sieg river into the Rhine. The community of NKS is located 20 km north-east from Bonn and 35 km south-east from Cologne, in the southern part of the Bergisches Land, a hilly low-mountain range. Besides the two main towns of Neunkirchen and Seelscheid, which both have around 5,000 inhabitants, 57 further bigger and smaller villages belong to the municipality, making a total population of around 20,000 inhabitants.

The municipal area is only partially marked by an agricultural and forest economy, but is primarily focused on small- and medium-sized enterprises. Most workers are commuters, who seek and attend their jobs daily in the metropolitan area of Cologne/Bonn. Because of the Naafbachtal dam and the consequently protected natural areas regarding drinking water, there are significant limitations to the development of the municipality. The municipality is thereby limited in its free spatial development, and in consequence also the enterprises which seek to locate or expand their businesses in the municipality.

The municipality of NKS is not so well positioned regarding business and jobs. This is obvious in the tax income of the municipality. The reasons for the comparatively weak economy in Neunkirchen-Seelscheid are related to the restrictions imposed by natural and environmental law, especially water protection law, which is directly related to the existence of a dam. These legal restrictions led to a situation where the municipality could not and still cannot plan industrial zones in the volume, which would lead to a significantly higher income from business tax.

**Table 6.** MIP project implementation activities in relation to the selected SDGs (practical toolkit 2).

		Quality Education	Decent Work and Economic Growth	Industry, Innov. and Infrastr.	Reduced Inequalities	Sustainable Cities and Commun.	Respons. Consump. and Product.	Climate Action	Life on Land	Partnerships for the Goals
										
Consulting services for supporting the partnership development	Readiness index (assessment of the municipalities' capacities)		x	x	x	x				x
	SWOT analysis (assessment of the municipalities' positions and future outlooks)		x	x	x	x				x
Event formats for developing a partnership	Student projects	x	x	x	x	x	x	x		
	Innovation breakfasts	x	x	x			x	x		
	Bee meadow development together with Citizen Lab	x				x		x	x	
	Virtual consultation regarding mobility	x				x		x	x	
	Mobility action: free tryout of an E-cargo bike		x		x	x	x	x	x	
	Company visits and consultations			x						
Office-related partnership arrangements			x							x
Legal arrangements for supporting the partnership						x				x

Regarding the local infrastructure, the municipality is in a better position. In NKS, there are two secondary-level schools: one comprehensive schools and Antonius college which is a private gymnasium. Apart from that, there is a curative Waldorf School in Seelscheid, where pupils are being taught with various educational foci. A branch office of the professional college from Siegburg offers the possibility to take part in the offerings of the higher trade school—a one- and two-year trade school. Strategic development priorities of the municipality area are: (a) living/residing, (b) care, (c) work, (d) technical infrastructure/mobility, (e) social infrastructure, and (f) intercommunal cooperation.

The cooperation with the H-BRS has the goal to make the municipality attractive for companies—previously, NKS as a location had not been an option, for example, from the high-tech industry. The reason for this is that the few industrial lots which are available in NKS could be used to attract higher-value-added companies. According to this vision, NKS should become a center for innovative start-ups. The transformative process sought after on the part of the municipality also needs scientific guidance on the part of the university, which should continually support and advise the municipality on this road. The cooperation between the municipality of NKS and the H-BRS offers the municipality a unique chance to obtain a specific unique selling point (USP).

#### *4.4. Case Study Supplementary Partner Info: The Bonn-Rhine-Sieg University of Applied Sciences*

The Bonn-Rhine-Sieg University of Applied Sciences (H-BRS) is located in the rural district of Rhine-Sieg, which is located in the area surrounding the federal city of Bonn in the south of the federal state of North Rhine-Westphalia. It has three campuses in different parts of the Rhine-Sieg district: Sankt Augustin, Rheinbach, and Hennef. It was founded in 1995 and has developed rapidly ever since to its current size of 9500 students. It also has over 1000 employees, including 150 professors, 300 research associates, 350 external lecturers, and 220 administrative staff. The H-BRS follows a diverse set of activities in teaching (first mission), research (second mission), and transfer (third mission).

As depicted in the Table 7 below, it is to be observed that the transfer (third mission) activities have a tendency of extending the range and type of activities and becoming increasingly important for the university. Firstly, in 2017, a first separate transfer strategy had been created apart from the regular inclusion of transfer activities in the university development plan. Secondly, in the last university development plan, “third mission” as a concept was introduced for the first time regarding the transfer activities. This primarily meant a reorientation of the transfer activities (both in the university development plan as well as in the transfer strategy) to include and put a stronger focus on regional engagement and social responsibility. The themes of digitalization and internal governance were also mentioned for the first time in the last university development plan.

Regarding the five third mission themes, which were important for the MIP project, only the themes of regional transfer and sustainability were included in all three university development plans (UDP 1, UDP 2, UDP 3) as well as university transfer strategy. The themes of start-ups, entrepreneurship, and cooperation with local communities are included in the UDP 1, UDP 2, and a UTS. Regarding mobility and tourism, the theme of mobility was mentioned in the UDP 2 and UDP 3, but not in the UDP 1 and UTS. The theme of tourism had not been included in any of the UDPs nor in the UTS, giving it extremely low relevance in the third mission of H-BRS, but was also expected, as it was not included in the first nor the second mission of the university.

#### *4.5. Case Study Supplementary Partner Info: Center for Entrepreneurship, Innovation, and Small- and Medium-Sized Enterprises (CENTIM)*

The Center for Entrepreneurship, Innovation and Small- and Medium-Sized Enterprises (CENTIM) is a central institution of the H-BRS and a coordinating point for teaching, research, and transfer in the field of management. CENTIM also acts as a consultant for municipalities and companies regarding transformation processes, supports spin-off start-ups

from the university in the national and international context, and runs a newly founded (in 2020) start-up center of the H-BRS.

**Table 7.** University development plans and a transfer strategy.

	2010–2015 University Development Plan (UDP 1)	2016–2020 University Development Plan (UDP 2)	2021–2025 University Development Plan (UDP 3)	2017–2025 University Transfer Strategy (UTS)
Major themes in the plan/strategy	- Internationality - Innovation - Networking - Sustainability	- Innovation, - Networking - Internationality - Tradition - Social responsibility - Sustainability	- Digitalization - Internationality and diversity - Social responsibility - Sustainability - (Internal) governance	- Knowledge and technology transfer - Regional engagement - Social responsibility
	Reference to third mission themes of relevance to MIP project			
Transfer	yes	yes	yes	yes
Third mission	no	no	yes	yes
Cooperation with local municipalities	no	yes	yes	yes
Start-up und entrepreneurship	no	yes	yes	yes
Regional transfer and innovation	yes	yes	yes	Yes
Sustainability	yes	yes	yes	yes
Mobility and tourism	no	yes (only mobility)	yes (only mobility)	no

With the project “Campus to World” and the subproject “Municipal innovation partnerships”, the CENTIM traced a novel mechanism of dialogue with social groups, with the goal of translating the citizen’s questions regarding grand challenges in the society as well as to feed the results of the research back into the society. For this purpose, CENTIM established new formats, providing answers for citizen science, business ethics and responsibility in the transfer, research, and teaching. A special focus was on the involvement of students in these activities.

CENTIM also acts as a link between the H-BRS and the start-ups, as well as SMEs from the region. In this sense, the CENTIM has the following missions:

- Supporting the process of starting up a business through sensibilization of potential founders, teaching courses related to start-ups, and competent scientific support of potential founders in science and technology-oriented start-ups.
- Supporting a culture of entrepreneurship and innovation in companies, organizations, and the university.
- Offering a wide range of solutions, from research and consulting services in the field of innovation and technology management, over to the chances and risk management, all the way to the diffusion processes through the marketing of innovation.

## 5. Discussion

All the four identified TMU themes (entrepreneurship, regional and rural innovation, sustainability, mobility, and tourism) have been integrated into the presented case of university–municipality partnership, demonstrated by the qualitative analysis of the planning documents from both the university as well as municipality. Sustainability appears to be the key theme there, followed by mobility, entrepreneurship, and in much lesser extent, tourism. However, other important considerations which this study uncovered inside the TMU include international orientation (“international”), focus on the society and responsibility—not only the economic growth contribution (“society”, “responsibility”,

“association”), as well as knowledge-related activities (“knowledge”). The importance of the socio-economic link inside the TMU has already been noticed by some other case studies of the TMU in Italy [43]. These results as a whole also confirm the relatively disproportionate sidelining of environmental aspects in modern TMU partnerships, as identified in the previous literature [44]. In this sense, there is a need to go beyond the university–entrepreneurship–economic growth complex which currently dominates the literature. The importance of “knowledge” as a keyword confirms the well-established findings on the knowledge-based regional development inside the third mission, as described in the previous literature [45–47].

In contrast to the well-researched area of the TMU impact measurement as a part of the overall university impact measurement [48–50], this case study presents evidence on how to successfully implement the triple helix partnership by focusing on an under-researched link between university and government, or in this case, municipality. The results of the case study demonstrate that the governmental actors are not necessarily to be understood exclusively as a framework setting for university–industry collaboration, but can be engaged in a meaningful way, especially at the grassroots level of local and regional authorities.

A major contribution of the present research is the presentation of a unique case study in the triple helix and the TMU literature, since a university’s partner in developing entrepreneurship is a municipality coming from the governmental sector; in addition, the setting of the researched cooperation is rural. While the latter has been researched by a handful of studies [9,15,31,34,51–53], the former has not been mentioned in the previous literature in the sense of an action-oriented working relationship, although it has been mentioned in the theoretical postulation of the third mission. For example, Etzkovitz and Zhou [3] notice that one of the most regarded innovation regions—Silicon Valley, developed from a Stanford engineering school—was initially located in the rural region. On the other hand, while making university–government relations an important part of a triple helix, the authors present only two small examples—a municipality-run incubator in Brazil and the development of a high-tech region in North Carolina. There is no other mention of the cooperation between a university and government or municipality in the literature, which is a surprise, having in mind the importance given to the triple helix relationship building inside the third mission of universities. This study closes this research gap by presenting a TMU case study focused specifically on a project of university–municipality cooperation to engage entrepreneurs and create a culture of entrepreneurial initiative.

The theoretical contribution of the presented research to the field of entrepreneurship development inside the third mission of universities is primarily focused on the role of social entrepreneurship, small business entrepreneurship, and scalable start-up entrepreneurship, which were defined by [54] as two different types of entrepreneurship. However, the research deploys a different approach than the previous literature in the field of entrepreneurial university, which is mostly concerned with theoretical models with (three or more) helixes of cooperation or (three or more) university missions [23,25,55,56]. Instead, the present research provides a rich illustration of the application of these well-established concepts in practice and provides ample evidence that entrepreneurship should be seen as a much wider phenomenon than only a contribution to economic growth to create a culture of entrepreneurial initiative.

The results of the present study contribute to the literature on the spatial and regional aspects of the third mission of universities in rural regions, acting as a primary and often only knowledge-based institution in the rural setting [15,21]. The presented case study specifically presents a cooperation arrangement between a university of applied sciences and a municipality in creating a culture of entrepreneurial initiative in a rural setting through innovation. The presented case study’s major contribution to the literature on regional innovation is in outlining a partnership between a municipality and university of applied sciences in a rural region. Both the regional perspective as well as partnerships for cooperation are considered to be cornerstones of implementing global SDGs [22]. The

case study presents lessons learned and tools used to develop this partnership, thereby providing implications for future research on the third mission of universities in a regional context, as well as the practice of building strong regional innovation ecosystems.

Previous findings regarding sustainability-led initiatives and start-ups at a university focus on university–industry collaboration, while not providing enough evidence on the third important actor in the triple helix model: the government [5]. The present research builds on these previous findings and extends them to present the partnership between university (in this case UAS) and government (in this case municipality) rooted in SDG 17 (partnerships for the goals), which engages with industry and start-ups in a more holistic way. In addition, results of the present study imply a broader approach to entrepreneurship than the previous research, and therefore, includes both start-ups as well as SMEs and social entrepreneurs in building a regional culture of entrepreneurial initiative.

Previous research into sustainability as a part of the third mission of universities emphasize UAS as an agent and facilitator of regional sustainability transformation, where a bi-directional flow of knowledge, ideas, and technology is enabled [14,31]. However, this very flexible approach of sustainability transfer appears to be suitable for informal contexts—it involves not offering answers on sustainability transfer conceptualization in more complex environments of big, research-oriented universities and corporations, where no flow of codified knowledge is allowed to flow from industry to academia in an organized manner because of patent rights and commercial interests. Therefore, this position of non-university UAS in a German context can be classified as similar to the position of the college in terms of close industry relations in the U.S. American context, as defined by Etzkowitz and Zhou [3]. The present research builds on the previous research of Demele et al. [31] and Nölting et al. [14], extending this research stream by providing practical evidence on the cooperation between a HEI, government, start-ups, and established SMEs in order to bring forward sustainability-oriented concepts and transfer in a more systemic way. The contributions of the study in terms of the importance of social entrepreneurship for sustainability transformation as a part of the third mission of universities are relevant—both for sustainability research as well as for defining the role of sustainability inside the third mission of universities.

The study offers several important implications for the practice. It demonstrates the importance of having a balanced and collectively exhaustive approach to entrepreneurship in all its facets and types: from start-ups, to SMEs, to social entrepreneurs, and on to intrapreneurship in corporations. Furthermore, a cooperation between university and start-ups is very important, but even more important is the cooperation in the triple helix model, where setting the right incentives in the triangle between university, government, and industry provides the best overall results. Only when a university is able to provide systemic, knowledge-based concepts to entrepreneurship and the cooperation between all three parties in the triple helix and is functional, can the culture of entrepreneurial initiative be institutionalized and personified in the regional governance structures and in the regional human capital. Practical implications of the study related to sustainability are mostly related to the implementation of different SDGs and the provision of a toolkit for municipality–university innovation partnership, but also regarding green mobility and tourism. The toolkit can be of use to project managers and business developers looking for suitable action-oriented formats and activities which fall under certain SDGs.

Future research should deal with conducting a more rigorous methodological approach, either qualitative or quantitative. There is an abundance of theoretical concepts in the third mission of universities, but detailed operationalizations and reliable feedback data from empirical research are missing in the field. More detailed, qualitative, grounded theory case studies and questionnaires with quantitative data analysis would be of use to provide more academic rigor and value into the research field of the third mission of universities and the triple helix of innovation, including the emerging sub-field of sustainability transformation. This research field currently offers a plethora of theoretical discussions, but is rather limited in terms of valuable empirical research. It would be of

particular importance for the research field on the third mission of universities to deploy a transdisciplinary approach and include concepts both from political sciences as well as from economic geography and regional innovation systems to explain and interpret the phenomena pertaining to building a successful and sustainable triple helix cooperation between the actors. Future research on green mobility and tourism in the rural regions should adopt a unified approach to green mobility infrastructure planning, connecting green infrastructure with green tourism offers in the regions, and understanding how the synergetic effects of connecting the two concepts can be utilized.

The major limitations of the study are the use of secondary data on which the results of the qualitative analysis are based. On one side, this provides a rich contextual narrative, but it also limits possible generalizations or usability in different contexts. In addition, the number of documents is relatively modest, which presents another limitation which could not be overcome in this research due to the novelty of the research field. Another limitation of the presented study is its case study approach—it is well suited for researching recent phenomena, but the boundaries between the phenomenon (building a culture of entrepreneurial initiative) and the context (cooperation between Bonn-Rhein-Sieg University of Applied Sciences and a municipality of Neunkirchen-Seelscheid) may be blurred.

## 6. Conclusions

All four identified TMU themes which relate to the research questions have been integrated into university–municipality partnership in this case study. Sustainability appears to be the key theme there, followed by mobility and entrepreneurship, and to a much lesser extent, tourism. However, other important considerations which this study uncovered inside the TMU include international orientation, focus on the society and responsibility—not only economic growth contribution, as well as knowledge-related activities.

The results of the study provide a contribution to the literature on entrepreneurship development in a regional rural context with a sustainability framework and principles at its core. Having in mind the scarcity of TMU research in a rural region setting as well as a complete lack of research on government–university relations inside the TMU, the article makes an important contribution to the TMU literature by closing this research gap. It appears that a final missing block in the research on the postulated triple helix has thereby been put in place and can provide fertile grounds for increasing our understanding on these types of cooperation and its impact on the whole triple helix configuration.

The results of this study seek to advance both the theory and practice of the triple helix relations for the third—as well as second and first—mission of universities. The case presented involves a German HE institution which is not a typical university but a university of applied sciences, which tend to be oriented towards applied research. The case of the municipal innovation partnerships contributes to the research on building a regional culture of entrepreneurship and innovation in rural regions—a wide field of research containing numerous subfields. However, our contributions focus on the following four: entrepreneurship, regional innovation, sustainability transformation, and mobility and tourism as an interconnected field of research. The research has demonstrated the importance of leveraging university–government relations of the triple helix theoretical model in supporting entrepreneurship and innovation, an approach rather novel to the previous literature on entrepreneurship development. However, the research in the field has not kept up with the entirety of the postulated theoretical concepts in the field of the triple helix, a research gap which this article has attempted to close. The previous literature almost exclusively focused on university–industry relations of the triple helix, while university–government relations have been neglected. This article has identified four relevant themes for the university–government cooperation: entrepreneurship, regional innovation, sustainability, and tourism and mobility.

Based on the results of the present study, the role of the TMU should be to encourage open innovation, as a firm-oriented perspective to innovation, but at the same time, to enable the shift for the regional firms from a shareholder-oriented to stakeholder-oriented

mode of operation or form of capitalism. In this sense, it is of particular importance that our case study is located in Germany, which is known for its well-developed stakeholder capitalism [57], thereby rendering the results of this study relevant for researchers wishing to dig into the successful models of the TMU in a stakeholder-capitalism country. It appears that the triple helix model still has relevance, with the civic society at its center—only the nature of civic society and its priorities have changed significantly with the UN agenda 2030, compared to previous UN programming periods. In this sense, the sustainable development goals have become more inclusive of environmental issues. The main actors in the triple helix model (industry, government, university) and their partner relations are still very relevant today.

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