



# In the Region—for the Region? Different Perspectives on Universities' Engagement in Selected Industrial Regions

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**Abstract** The role of universities in regional development has gained increasing importance in research, particularly regarding their economic and societal contributions. However, there is no consistent understanding on how context factors influence engagement and how these factors are perceived by university stakeholders and their respective collaboration network. Utilizing the theoretical foundations derived from the literature, the study employs a case study analysis of two Austrian universities located in industrial regions, Linz (JKU) and Graz (KFU) with vibrant regional innovation systems. Our research is based on a combined flexible pattern matching analysis (FPMA) and the Gioia methodology. The Gioia method identifies patterns directly from the empirical data which is relevant for understanding stakeholders' perceptions and FPMA involves the iterative matching between theoretical patterns derived from literature and empirically observed patterns. Influenced by various context factors—spatial-relational, organizational, and institutional—the findings reveal, that academic engagement is perceived in two different spheres, the organizational sphere of the university and the regional sphere which allows a differentiated reflection on the existing engagement theory. While university engagement often focuses on knowledge transfer and scientific impact, regional engagement involves broader collaborations with regional stakeholders and is frequently policy driven. Besides organizational influencing factors, such as the founding history, leadership and motivated university actors, the findings reveal that the type of engagement is strongly

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driven by regional networks as well as proximity. Institutional and social proximity coin the university's definition and understanding of academic engagement as well as its implementation in the form of university and/or regional engagement.

**Keywords** Regional engagement · University engagement · Academic engagement · Proximity · Regional networks

## 1 Introduction

Universities have become central actors in regional innovation systems as economies transition toward knowledge-intensive structures, serving as knowledge creators and system transformers (Fritsch 2002; Cooke et al. 2004; Lawton Smith and Bagchi-Sen 2006; Trippi et al. 2015). Early emphasis on knowledge transfer and third mission activities prioritized commercialization, technology transfer, spin-off formation, and technological innovation, consolidating the model of the “entrepreneurial university” (Etzkowitz 2004). More recently, however, universities have been reframed as providers of public goods and basic societal infrastructure tasked with developing socio-technological innovations addressing complex sustainability challenges (Scholz 2020). This shift underpins the “engaged university,” which collaborates with diverse societal actors and contributes to regional networking, policymaking, and agenda-setting beyond institutional boundaries (Chatterton and Goddard 2000; Benneworth, 2018; Pflitsch and Radinger-Peer 2018; Fonseca and Nieth 2021). Yet, as Scholz (2020) argues, they face a crossroad between a commercialization-oriented mission and a broader role in societal and regional sustainability transformations. However, both models, the entrepreneurial as well as the engaged university model, emphasize dependence on collaborations with societal, economic and political actors.

The key role of universities as actors in collaboration networks is highlighted in the entrepreneurial ecosystem and knowledge ecosystem literature (Cobben et al. 2022). In both types of ecosystems universities are seen in facilitative and supportive roles to (a) create economic growth by stimulating entrepreneurship and/or (b) create and disseminate new ideas and knowledge that does not necessarily have commercial value or value-in-use (Baldwin et al., 2024). Furthermore, entrepreneurial or knowledge ecosystems, which in practice may overlap as well, have an explicit regional or place-based focus, as geographical proximity is key for collaborating in these types of ecosystems (Van der Borgh et al. 2012).

Scholarship and policy attention have disproportionately focused on commercialization pathways—supported by institutionalized mechanisms such as technology transfer offices and indicators like patents and spin-offs (Breznitz and Feldman 2012; Perkmann et al. 2013)—and on stakeholder roles in market-oriented engagement (Goldstein et al. 2013; Johnson et al. 2017; Perkmann et al. 2021; Nieth and Radinger-Peer 2023). Although universities are expanding social engagement to demonstrate public value and direct societal contributions, particularly to sustainability (Nieth and Radinger-Peer 2023; Sedlacek 2013; Arbo and Benneworth 2007), there is a persistent gap regarding how organizational peculiarities, the institutional context as well as place-specific regional setting shape the nature, type and scope

of engagement at the individual and university level (Perkmann et al. 2021; Nieth and Radinger-Peer 2023). Similarly, there is limited understanding of how the mentioned influencing factors operate at the regional level and how they are perceived by universities and their collaboration networks (Perkmann et al. 2021).

Consequently, the university-internal and the regional perspective of the collaboration network are elementary in understanding diverse engagement activities and leads to the following research question: How do spatial-relational, organizational and institutional context factors shape and explain the variation in universities engagement at the regional level and how are these factors perceived by stakeholders involved in engagement activities?

Analytically, the study adopts a dual perspective that situates engagement within universities' organizational and institutional contexts and their place-specific relational environments (Perkmann et al. 2021). Empirically, it employs a case study analysis of two research-intensive universities in industrial regions with strong innovation systems engaged in sustainability transitions. The design captures both university and regional viewpoints to identify convergences and divergences in perceived determinants of regional cooperation. Methodologically, the study integrates flexible pattern matching analysis (FPMA) with the Gioia approach, addressing the literature's gap on perceived, context-specific understandings of academic engagement across internal (university) and external (regional) perspectives. In line with calls to broaden attention from "commercially induced impact" to "social impact" (Perkmann et al. 2021), an abductive research design enables iterative theorization grounded in actor-specific perceptions. Our findings indicate that engagement and the expectations towards academic engagement are perceived differently within the organization of the university as well as by the regional collaboration network. Based on these findings, we inductively draw a differentiation of academic engagement into university engagement and regional engagement.

The paper proceeds as follows: Section 2 outlines the theoretical framework; Section 3 presents the methodology; Section 4 reports findings on internal and external engagement perceptions and the roles of relational and organizational contexts; Sections 5 and 6 discuss implications and conclude.

## 2 Literature Review and Conceptual Framework

Academic engagement in its broadest understanding refers to effects and impacts that a university has outside of its organizational or academic boundaries—namely, on its stakeholders, the natural environment, the economy and society (Findler et al. 2018). It thus includes several dimensions which are all important for understanding why and how universities and their regional environment are involved in collaborations and to better understand how engagement contributes to a region's development (see Table 1) (Perkmann et al. 2021). There exists theoretical evidence about these dimensions, however, they have often been considered separately from one another, and this is a gap which the current paper aims to bridge. The conceptual framework is based on organizational, institutional and region specific spatial-relational factors.

**Table 1** Conceptualization of academic engagement (own illustration based on Chatterton and Goddard (2000), Etzkowitz (2004) and Perkmann et al. (2021))

	Academic engagement	
<i>Intention of engagement</i>	Focus on economic activities (commercialization of knowledge)	Broader societal impact
<i>Associated university model</i>	Entrepreneurial university—generative role	Engaged university—developmental role
<i>Characteristics/Activities/Channels of collaboration, knowledge transfer and co-creation and expected impact</i>		
(a) macro level	Supporting innovation and technological development in the region	Supporting sustainable development in the region
	Supporting encouraging university spin-off businesses	Supporting equal opportunity activities in the region
	Supporting regional entrepreneurship	Conflict resolution and consensus building around controversial issues in the region
	Supporting industry cluster formation	Providing lifelong learning opportunities for residents
(b) micro level	Providing managerial or technical assistance to existing businesses	Providing social, health, legal or other social services to families or low-income residents
	Assistance in marketing the region for business development	Providing expertise and know-how to NGOs

## 2.1 Academic Engagement

With reference to the literature on entrepreneurial and knowledge ecosystems, “engagement” refers to the variety of activities, via which universities collaborate or compete with other actors or organizations of their collaboration network (Granstrand and Holgersson 2020). Academic engagement (CIC Committee on Engagement 2005; Perkmann et al. 2021) includes both entrepreneurial (Etzkowitz 2019) as well as social motives and impacts (Fini et al. 2018). At the institutional level universities are interacting with other organizations to create or transfer knowledge and this includes a broad variety of different activities, such as collaborative research, and broader networking activities (Perkmann et al. 2021). The engaged university is based on cognitive rationality and follows the principles of academic freedom while as social institutions universities seek ways to become more relevant and to translate their knowledge in a way that helps to solve social and economic problems and generate therefore broader economic benefits (institutional context) (Breznitz and Feldman 2012). At the university level the organizational context of engagement is characterized by specific organizational as well as network characteristics.

At the individual level researchers are involved in such engagement interactions based on their individual interests and the underlying organizational characteristics (Ankrah et al. 2013; Radinger-Peer 2019; Perkmann et al. 2021). Ankrah et al. (2013) provide evidence about a lack of consideration and understanding of motives of both university and industry stakeholders which supports the inclusion of the

internal and external perspective on engagement applied in our paper. To understand the individual perception of engagement both the organizational context (Huggins et al. 2012; Perkmann et al. 2021) as well as the accessibility and proximity of non-academic stakeholders (Leten et al. 2014; Rossi et al. 2024) are relevant (spatial-relational context).

Academic engagement at the regional level is widely discussed as universities' contribution to regional development (Arbo and Benneworth 2007; Lawton Smith 2007; Goldstein 2010; Goldstein et al. 2013; Sedlacek 2013; Benneworth et al. 2017; Erdős and Varga 2019; McCann and Ortega-Argilés 2019; Fonseca and Nieth 2021) and leads often to the argument that academic engagement is a driver for regional innovation (Etzkowitz et al. 2019). There is related empirical evidence that universities are perceived as key-actors in regional innovation systems (Lawton Smith and Bagchi-Sen 2006; McCann and Ortega-Argilés 2013; Trippel et al. 2015) and therefore creating impact on regional innovation (Arbo and Benneworth 2007; Benneworth et al. 2017; Fonseca 2019). Here the geographical dimension becomes a decisive factor (Feldman 1999) but there is disagreement about the spatial boundedness of the created spillovers (Maier and Sedlacek 2005). Trippel et al. (2015) argue that engagement is not uncontested due to the diversity of organizational and varying factors within the surrounding environment, hence the regional economy. Thus, the proximity to regional stakeholders seems to be an influential aspect of engagement at the regional level (see 2.3). Table 1 summarizes the conceptualization of academic engagement.

Although the literature provides evidence of organizational characteristics, the institutional context and region-specific spatial-relational contextual factors that shape academic engagement, there is still a gap in the literature when it comes to synthesizing these perspectives.

The added value of the present paper lies precisely in this integration of internal organizational factors, the spatial-relational context, and overarching institutional conditions on academic engagement. The three perspectives and their theoretical foundations are then explained in more detail and operationalized for the case study analysis.

## 2.2 Organizational Context

Organization theory is key for understanding the inter-organizational context and the organizational conditions for university engagement and provides insight into organizational structure and behavior (Di Maggio and Powell 1991). In the context of university-industry collaboration, the regional network is defined by the triple helix (Etzkowitz and Leydesdorff 1998, 2000). The triple helix focuses on the network of public, private and university stakeholders all characterized by interdependencies affecting the intrinsic motivation for knowledge creation and development, consequently resulting in innovation (Cao et al. 2023). In the context of an engaged university civil society needs to be included which leads to the quadruple-helix perspective and with the inclusion of the natural environment of society the quintuple-helix is introduced (Carayannis et al. 2022).

The internal organizational components are shaped by university specific characteristics (Mayntz 2002; Bleiklie and Kogan 2007; Lawton Smith 2007; Huggins et al. 2012; Perkmann et al. 2013; Perkmann et al. 2021; Fini et al. 2020; Fonseca and Nieth 2021). Universities regularly experience organizational and managerial reforms which lead to institutional change in these multi-stakeholder organizations. Institutional change is not independent from the overarching institutional context and framework (national regulations and policies, see 2.4) and as Mayntz (2002) elaborates, such institutional changes have led to modified governance structures within European universities, including an increased external influence in university boards. This institutional openness, in conjunction with a more entrepreneurial orientation, was identified by Meyer (2003) as an encouraging factor for academic entrepreneurs. On the other hand, international and national university networks on sustainable development (Bohunovsky et al. 2020; Dlouha et al. 2013; Pflitsch and Radinger-Peer 2018; Schiller et al. 2020) as well as the integration of sustainability related criteria into performance agreements, awards and ranking schemes spur a broader sustainability-oriented understanding of engagement (Atici et al. 2021).

However, there is also evidence that not all universities manage to adapt to these new challenges of effectively transferring knowledge (Huggins et al. 2012). Therefore, the question arises as to which internal organizational settings are more conducive to knowledge transfer.

The organizational status of the university is perceived as an important influencing factor (Huggins et al. 2012), which raises questions about the importance of the founding history of the organization and its embeddedness in the region.

### 2.3 Spatial-relational Context Factors

Universities are complex organizations of loosely coupled entities (Weick 1976) with high autonomy for the individual researchers (Pasternack et al. 2015). Furthermore, engagement is just one of the multiple agendas, activities and incentives influencing universities and university academics, and the regional level is merely one of multiple scales at which the university is active (Benneworth et al. 2017). On the other hand, regions are complex systems too, with their own interests and modes of behavior. The uniqueness of university-region collaborations (Peer and Penker 2015) is therefore largely determined by the extent to which universities are recognized as regional governance stakeholders (Sedlacek 2013) as well as the absorptive capacity of the regional environment (Breznitz and Feldman 2012). The latter refers to the spatial-relational context and includes the available pool of regional stakeholders as well as the ‘proximity’ to these stakeholders.

The proximity of regional stakeholders in its geographical, organizational, social, institutional and cognitive reach is conceptualized by Boschma (2005) and helps to better understand how engagement is structured and how stakeholders contribute to the different types of interactions. These aspects need to be put into the specific regional context where universities are seen as cultural stakeholders fostering and facilitating regional interaction (Reichert 2019).

Geographical proximity in the context of academic engagement is widely accepted as being relevant at the regional level due to universities’ capacity to create,

share and transfer knowledge and contribute to a region's human capital. There is evidence that geographic proximity is a facilitator of interactions, enhancing the likelihood of face-to-face communication and collaboration (Roth and Mattes 2023; Liu et al. 2023). However, in the context of university—industry relations there is contradictory evidence about geographic proximity. Some authors conclude that it significantly influences the formation of industrial symbiotic relationships (Velenturf and Jensen 2016) and it positively impacts the frequency of research collaborations. But there is also evidence that it is limited to key phases like the partner selection phase (Torre and Gallaud 2022) and it weakens the formation of new partnerships when organizations are located in dense clusters or that it is irrelevant if other dimensions of proximity are absent (Korotka 2015).

Looking at the other dimensions of proximity, it becomes evident that geographical proximity is complementary to the other forms. Boschma (2005) defines cognitive proximity as an enabler of effective communication and facilitator of new knowledge absorption, if a certain threshold, leading to cognitive lock-ins and involuntary spillovers, is not exceeded. It enables partners to communicate more effortlessly and align their operations towards common goals (Torre and Gallaud 2022), which are beneficial in case of knowledge exchange. According to Capone and Zampi (2020) there is a risk of a proximity paradox if shared knowledge becomes too similar and subsequently leads to a knowledge lock-in.

Organizational, social, and institutional proximity are interconnected yet contribute uniquely to interactive learning and innovation. Organizational proximity, as defined by Boschma (2005), is about how relations are shared in an organizational setting and includes both intra- and inter-organizational relations. There is evidence that organizational proximity significantly increases the likelihood of inventors forming collaborative ties (Cassi and Plunket 2015; Crescenzi et al. 2016).

Attitudes towards risk tolerance and opportunism, and consequent efforts to control uncertainty, play an essential role in collaborative knowledge creation processes and are partly influenced by institutional and social proximity. Institutional proximity is shaped by the overarching institutional framework, but the norms and values important for collective actions like interactive learning and innovation are expressed through existing organizational relations. It refers to the degree of similarity in formal and informal rules, regulations, norms, and cultural values shared between organizations (Capone and Zampi 2020; Torre and Gallaud 2022).

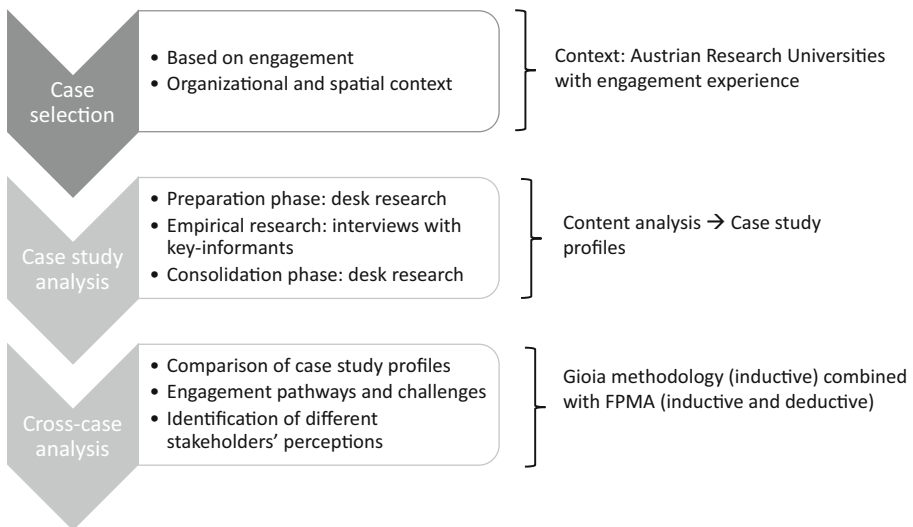
Social proximity is defined as socially embedded relations at the micro level and is therefore trust based. Social relationships facilitate exchange of tacit knowledge and reduce opportunistic behavior but are also influenced by the prevailing organizational arrangements, which are largely defined by the overarching institutional framework. It is dynamic and develops through interactions, often influenced by geographical proximity (Roth and Mattes 2023). Social proximity is seen as a significant aspect especially after the initial network ties are set up and replaces therefore the need for geographical and organizational proximity in fostering additional connections (Cassi and Plunket 2015; Capone and Zampi 2020).

## 2.4 The Role of Institutional Context Factors

The overarching institutional framework is a factor influencing both the internal and the external institutional aspects. Public policies and the underlying regulatory framework are decisive when it comes to university related engagement activities. Perkmann et al. (2013) conclude that more comparative evidence about the role of national policies on academic engagement is needed. In terms of the Austrian federal law, the University Act of 2002 [UG 2002] (BKA 2002) can be seen as heavily influencing the landscape by providing more autonomy to public universities and subsequently opening new opportunities for academic engagement (Goldstein et al. 2019). Thus, the case study analysis is using UG 2002 as an analytic separator for identifying pre- and post-law engagement pathways which allows to see how academic engagement developed over time.

## 3 Methodology

The paper is based on an exploratory case study analysis of two Austrian research universities located in industrial regions featuring vibrant regional innovation systems. The two universities are treated as independent case studies which are compared along a defined set of criteria in a second step. Figure 1 illustrates the applied methodology which will be further described below.



**Fig. 1** Methodology (Source: own conception)

**Table 2** Selection criteria for KFU Graz and JKU Linz (Source: Statistics Austria 2021; Unixdata 2023; KFU 2023; JKU 2022)

	KFU Graz	JKU Linz
<i>Type of university</i>	Major university (6 faculties, 120 study programs)	Major university (4 faculties, 61 study programs)
<i>Size of university</i>		
Student numbers:	29,065 (2022)	24,253 (2022)
Academic personnel:	2885 (2022)	2481 (2022)
Age	Founded in 1585	Founded in 1962
<i>Characteristics of the regional economy</i>		
GDP/capita	41,300€	46,700€
Number of jobs	686,300	835,300
<i>Embeddedness in the region</i>	Perceived as 'regional university' In the provincial capital Graz high percentage of regional students Graz: hub for collaborative research with 23% of all Styrian start-ups Cooperation agreement with the Styrian provincial parliament	Perceived as 'regional university' In the provincial capital Linz high percentage of regional students Linzer Hochschulfonds for financing and operating JKU Linz
<i>Other public universities at the location</i>	Three other public universities	No other public university

### 3.1 Case Study Selection

The universities were selected based on the Austrian definition of research universities from a set of six public universities in Austria<sup>1</sup> with a dedicated strategy for engagement, as evidenced by the knowledge transfer strategies published in their respective mission and vision statements, along with their lists of cooperations with industry stakeholders and other organizations (following the principles of theoretical sampling (Yin 1994; Eisenhardt and Graebner 2007; Bouncken et al. 2021a)). The selected universities—KFU Graz (Karl Franzens Universität Graz) and JKU Linz (Johannes Kepler Universität Linz)—were chosen to strike a balance between commonalities and variations across six selection criteria (type of university, size, age, characteristics of the regional economy, embeddedness in the region, other public universities at the location) and since both are located in regions with a long tradition in initiating and developing cluster initiatives in various industries and are thus experienced in engagement. The focus on only two cases is reasonable due to the in-depth analysis of each case study profile and the extensive cross-case analysis.

In order to safeguard comparability both universities are major public universities covering a broad range of disciplines and both are medium-sized. Age can be considered as an organizational aspect which is strongly related to the status of the organization and has been identified in the literature as an important factor influencing collaboration (Huggins et al. 2012). Thus, the sample includes one old and one very young university. Additionally, the university location is an important influencing factor in terms of proximity (Hewitt-Dundas 2013; Lehmann et al. 2022). Both selected universities are located in an industrial region, and they are perceived as ‘regional’ universities [mentioned by: I2, I5, I6, I7, I9, I11, I13, I14, I15, I16, I17] which is a strong indicator for embeddedness in the region. There is variation in terms of the neighborhood of other universities at the location, one university is unique at its location<sup>2</sup> whereas the other is one out of four public universities. Table 2 presents the data on each selection criterion for both case study organizations.

### 3.2 Case Study Design and Data Collection

The paper aims to explain how spatial-relational, organizational and institutional context factors shape the variation in university engagement at the regional level. The design follows a concept-based approach which is built on the notion of engagement. We hypothesize that a university’s definition and understanding of engagement as well its implementation is highly influenced by its spatial-relational context as well as the prevailing organizational context and institutional conditions. This theoretical proposition in conjunction with the principle of data triangulation (two desk research phases and one interview phase) is applied to strengthening internal validity of the case studies (Yin 1994).

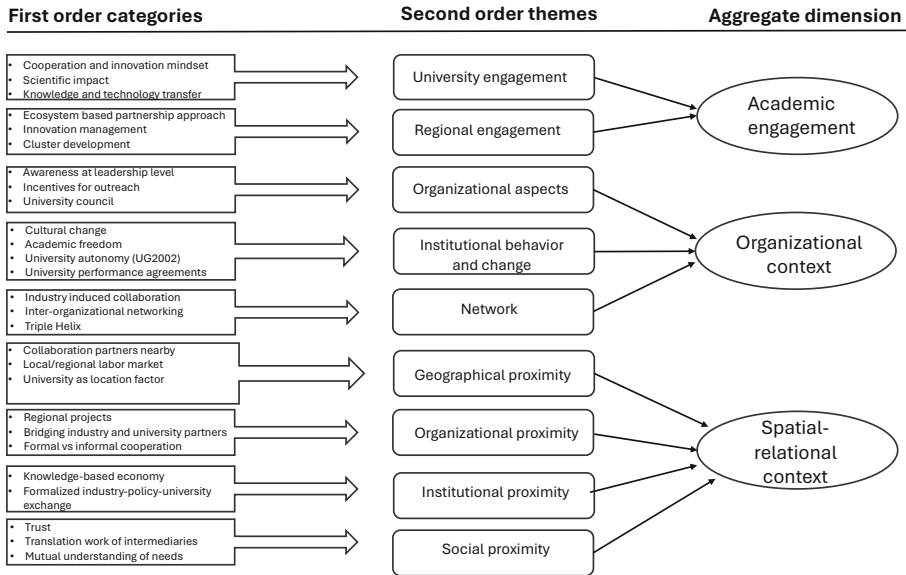
<sup>1</sup> TU Wien, WU Wien, Montanuniversität Leoben, KFU Graz, JKU Linz, Alpen Adria Universität Klagenfurt.

<sup>2</sup> At the time of the selection and when the case study analysis was conducted.

**Table 3** List of interview partners

Interview Partner	Category	Position
I1	Faculty	Head Regional Center of Excellence
I2	University official	Vice-Rector for Research
I3	Faculty	Associate Professor
I4	Administration	Head of Research Transfer
I5	University official	Vice-Rector for Studies and Teaching
I6	University official	Vice-Rector for Finance, Resources and Location Development
I7	Government official (municipal level)	Head of Economic Development and Tourism
I8	Government official (provincial level)	Deputy Director of the Parliamentary Administration
I9	Government official (municipal level)	Director of the Cultural Office
I10	Governmental official (provincial)	President of provincial parliament
I11	Governmental official (provincial)	Head of State Government Office
I12	Governmental official (provincial)	Director of the Parliamentary Administration
I13	Regional organization	CEO of Federation of Austrian Industry (provincial level)
I14	Regional organization	Authorized Officer in charge of 'Economic Development & Public Awareness'
I15	Regional organization	Managing Director of the Federation of Austrian Industries (provincial level)
I16	Regional organization	Chamber of Commerce (provincial level)
I17	Regional organization	Industry representation

The cases are designed to delve into the organization of the universities and their regional cooperation networks. Data collection in both cases includes secondary data, published information and primary data (data triangulation). There were two phases of desk research included (1st for interview preparation; 2nd for interview consolidation) where the main sources of information are the universities' public websites and official published documents at the regional and national level (development plan, cooperation agreements, policy documents, public law documents, etc.) as well as official national and regional statistical data (WIBIS-Steiermark, WKO-Steiermark, WKO-Oberösterreich, Statistik Austria, uni:data). Primary data are collected through face-to-face semi-structured interviews with key-informants within the universities, city and regional governments, semi-public and other intermediary organizations, and industry actors. A total of 17 interviews (see Table 3: six university officials and faculty (I1–I6), six government officials (I7–I12), five



**Fig. 2** Data structure (own concept based on Gioia et al. 2012)

regional organizations<sup>3</sup> (I13–I17)) were conducted following a concept-based interview guideline (incl. open-ended and closed questions related to engagement perspectives; development of academic engagement over 15 years; proximity to regional stakeholders; organizational context; challenges of engagement—see Appendix A1 and A2) tailored to each stakeholder group, with most of the interviews conducted by two interviewers to reduce potential interviewer bias. The interviews lasted 60–75 min and were all recorded and transcribed with the consent of interviewees, who were then sent the transcriptions for final approval. The number of interviews follows the principles of data saturation in qualitative research (Hennink and Kaiser 2022) which is the point at which further data collection would not provide new insights and information relevant to the research question. Besides that, the research team took care of a balanced pool of key-informants in both regions.

### 3.3 Data Analysis

The first phase of analysis concentrated on the challenges of university engagement and led to specific case profiles (as indicated in Fig. 2). The second phase (cross-case analysis in Fig. 2) builds upon the first phase and is presented in this paper. It focuses on the factors influencing engagement activities and applies a combined inductive Gioia methodology (Gioia et al. 2012) and a flexible pattern matching analysis (FPMA) which combines deductive and inductive analyses (Bouncken et al. 2021a, b). As foreseen in FPMA the analysis includes several iterations between the

<sup>3</sup> We combined semi-public and other intermediary organizations as well as industry actors to regional organizations.

existing theories and concepts presented in the literature review and the empirical material which leads to theoretical and observed patterns. The combined FPMA/Gioia approach enhances the exploration of the collected empirical data and the underlying theories.

The transcribed interview data was coded in a first step manually based on the identified patterns in the literature (comparing and contrasting step) and led to a list of In Vivo codes (Saldaña 2016) which are the exact expressions used by the interviewees. The Gioia method is designed to facilitate a systematic analysis of qualitative data while safeguarding the specific perspectives and perceptions of the key-informants by using bottom-up partial pattern matching where patterns emerge directly from the data. In this first round of open coding each interview was treated independently but within the context of the individual case study which led to an extensive number of codes. These codes were then entered into a spreadsheet for clustering the codes into 28 first order categories (see Fig. 2 and details in A3) in relation to the theories and concepts detected in literature which also helps to detect hidden concepts. In a second step of clustering the stakeholder category specific codes were listed and clustered to see differences and commonalities across the stakeholder categories (university officials and faculty, government officials, regional organizations). This clustering is another step of iteration between theories and empirical data where we combined the Gioia methodology with flexible pattern matching. FPMA involves the iterative matching between theoretical patterns derived from the literature and observed patterns emerging from the empirical data (Bouncken et al. 2021a). This step uses axial coding and helps to identify linkages and differences between first order categories and led to the aggregation of nine second order themes (Fig. 2) and the underlying aggregate dimension (Bouncken et al. 2021b). The second order themes are informed by the literature but there are themes identified in the first order categories which deviate from the presented literature (mismatch). Regional engagement, which was explicitly labeled by the interview partners as an additional dimension of engagement next to university engagement consists of first order categories which are not discussed consistently as regional engagement in literature. Furthermore, literature does not explicitly differentiate between regional and university engagement, but university engagement is a well-developed concept while regional engagement leaves room for different interpretations. Thus, it is important to understand it in the context of the specific stakeholder constellations. The data structure follows the Gioia methodology (Gioia et al. 2012) and provides the basis for the presented results in section 4 where we will build upon the identified matches and mismatches.

## 4 Results

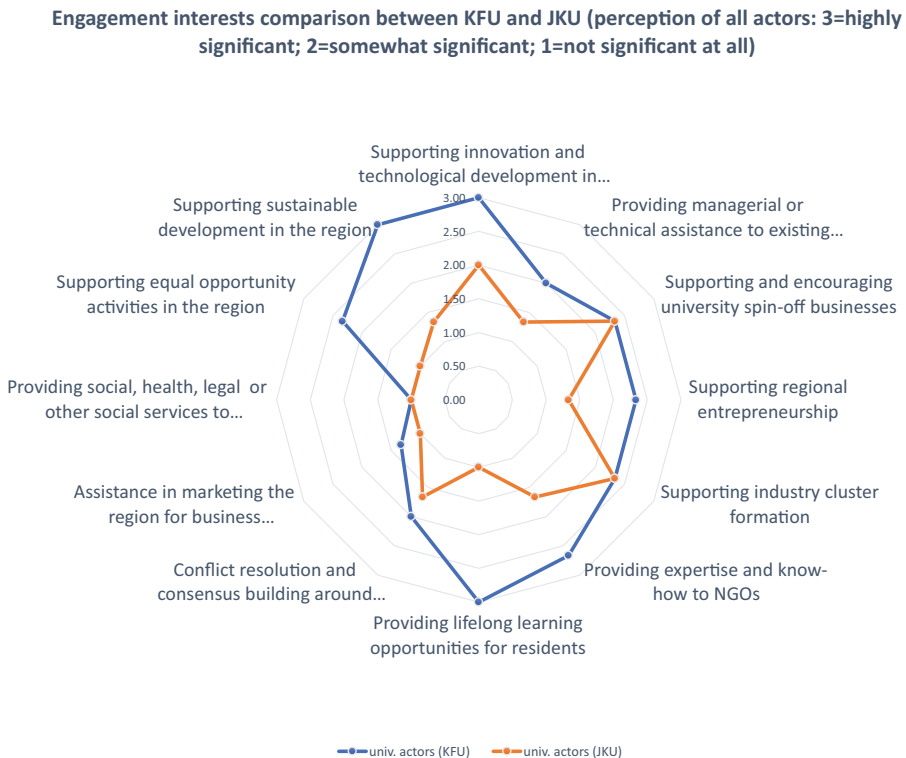
The case study analyses of KFU Graz and JKU Linz provide a detailed understanding of academic engagement by these universities. Both universities seem to be firmly embedded in a regional network of stakeholders working together to contribute to the social and economic development as well as regional sustainability transformations of the respective regions. The results are now presented along the

three theoretical realms (academic engagement, organizational and spatial-relational context, which are the identified aggregate dimensions in the Gioia chart in Fig. 2) identified in literature and included in the underlying research question and follows the proposition that engagement and its different characteristics are influenced by contextual factors and perceived differently by different stakeholder categories.

## 4.1 Academic Engagement

### 4.1.1 The University Perspective<sup>4</sup>

To better understand how universities define engagement, university officials were asked to characterize engagement, to provide insights about its importance for the institution and how it developed over time. These questions were open-ended questions and led to a rich narrative about each actor's individual perspective but are presented here at the aggregate level. Additionally, to better understand the commonalities and



**Fig. 3** Perceived engagement interests of KFU Graz and JKU Linz—university actors (Source: interview data)

<sup>4</sup> In order to better understand the perception of engagement the interview guideline includes a set of open-ended questions as well as list of engagement activities (theory-led) interview partners had to assess on a three-point Likert scale. The presentation of the findings integrates both open-ended and closed questions.

differences between the two universities in terms of their engagement interest, all interview partners were requested to share their perceptions regarding various engagement characteristics. This question was a closed question and interview partners were requested to indicate their preferences on a three-point Likert scale and in addition were invited to provide more information for each of their perceptions. Figure 3 illustrates the perceptions of all university stakeholders (three-point Likert scale) on the universities' engagement interests. There are interesting results regarding the engagement of the two universities, which relate to differences in the organizational status of the two institutions. University stakeholders in Graz perceive KFU to be an institution serving civil society, which is indicated by the most positive assessment of the characteristic “providing lifelong learning opportunities for residents” but also supporting regional economic development (“supporting innovation and technological development in the region”) as well as supporting sustainable development in the region. Overall, the perception of university stakeholders in Linz regarding their interest in academic engagement is characterized by a more entrepreneurial focus with “supporting and encouraging university spin-off businesses” and “supporting industry cluster formation” being the most significant engagement categories (see Fig. 3).

In terms of the retrieved first order categories and second order themes (Fig. 2) we identified a strong attachment of both universities to various components of university engagement. KFU Graz defines engagement as being part of its social contract as a public university and therefore as a voluntary commitment which should not contradict the freedom of academic teaching and research guaranteed in the Austrian Constitution (VfGH 1955) which was in the bottom-up partial pattern matching process assigned to the first order category scientific impact. In contrast, JKU Linz is aware that engagement in their case means satisfying their founding stakeholders, the city of Linz and the province of Upper Austria, since the university would not have been founded without them. In their founding charter of 1962, it is stated that JKU Linz has a clear local and regional development mission (first order category knowledge and technology transfer). Leadership was mentioned in both universities as an important factor, but it is understood as a division of responsibilities for different strategic areas between the rector and the respective vice-rectors (organized in functional management teams).

There are variations in the key informants' perceptions about academic engagement, but many of them mentioned the importance of a specific cooperation and innovation mindset (first order category) which one of the interview partners (I5) commented as “engagement always depends on the interest of certain people in the university, thus the input has to come from those working on the projects” and further “of course the rectorate can shake hands and open doors but the rest has to be done by the researchers” which specifies the universities' understanding of engagement (second order theme). Another interview partner (I4) was clear that “not all are committed to this engagement mission” and “it is evident that you cannot motivate all within the organization” which is a clear indication of a missing cooperation mindset.

The axial coding process revealed the identified distinction between university and regional engagement. KFU understands regional engagement as innovation ini-

tiated and managed by a broader pool of regional stakeholders having a common regional goal in mind and being regionally bound (first order category: ecosystem-based partnership approach). This was emphasized for example by I6: “The regional and city stakeholders here in Graz and Styria know that they depend on a certain extent on the universities being located in the region, this is why they support joint ventures between universities and industries, like with the Komet program.” A further facet, which describes regional engagement at KFU is its contribution to sustainable regional development as well as the provision of expertise and know-how to NGOs (see Fig. 3). In both examples the key-informants emphasized the interdependent regional network.

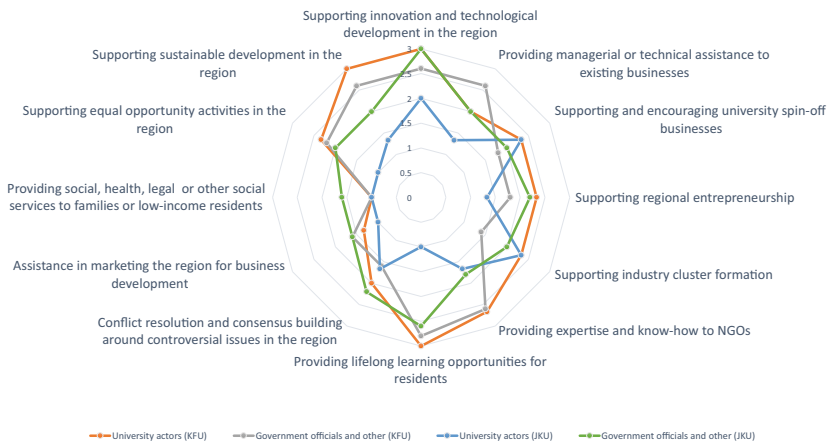
#### 4.1.2 *A Comparison of Internal and External Perspectives On Engagement*

We also asked all other stakeholders (governmental officials and regional organizations, see Table 3) to indicate their perception of how the two universities define university engagement and how it evolved over time (before and after UG 2002 (BKA 2002) which was used as an analytical separator<sup>5</sup>). The interviewed representatives of regional organizations see a close connection between engagement and the respective cluster development (first order category) they were involved in. Thus, they define regional engagement as something initiated by regional policy but embedded in a fully integrated ecosystem-based partnership approach (first order category) with the clear aim of establishing an efficient innovation management (first order category). One interview partner in Graz (I15) indicated that regional institutions started their pioneer work in regional engagement in the mid-1990s when the automotive cluster was created. He specifically mentioned that “in the early days technical universities were more active but KFU with its pro-active rector Prof. Gutschelhofer had already a cooperative mindset (refers to the first order category and relates to university engagement) which incentivized basic research with great scientific impact but practical value for the cluster development” (I15). This was confirmed by an interview partner in a regional organization who added another important aspect of engagement, namely knowledge and technology transfer (first order category) which according to his perception changed within the last 20 years from originally a by-product of research to an integrated element shaped by what he called “engagement mindset” (first order category) (I14). Following these lines the representatives of regional organizations have a much more integrated view on engagement when reflecting their own participation. They see universities as being integrated into an innovation-ecosystem providing their knowledge and expertise to both industry and society.

Figure 4 provides more details for each university by disaggregating the overall assessments into those of internal (university) and external actors, which reveals interesting differences for specific characteristics. One striking difference between

<sup>5</sup> We did not communicate this directly to the interview partners but asked them to assess how the university’s engagement mission evolved over the last 15 years (at the time of the interview). However, since the law and the initiated institutional changes are evident in Austria, all interview partners mentioned UG2002 as game changer.

Engagement interests of KFU and JKU in comparison between internal and external actors (perception of different types of actors: 3= highly significant; 2=somewhat significant; 1=not significant at all)



**Fig. 4** Perceived engagement interests of KFU Graz and JKU Linz by stakeholder group (source: interview data)

the two universities is that internal university key-informants generally provide more positive assessments than external stakeholders for KFU Graz, while the opposite is true for JKU Linz. A further point of difference regards engagement geared at “providing lifelong learning opportunities for residents”: in Graz, both stakeholder groups perceive this as the most significant contribution, followed by “supporting sustainable development in the region” which reflects an understanding of engagement as serving societal interests; less overall importance is attributed to lifelong learning in Linz, which is consistent with the more entrepreneurial interpretation of engagement that has guided JKU Linz since its foundation, although perceptions vary considerably between the lower assessment by university stakeholders and higher rating by government officials.

#### 4.1.3 Empirical Results On the Differentiation Between University and Regional Engagement

Based on the universities’ own perception (see 4.1.1) we identified in the data a clear differentiation between university and regional engagement which is not explicitly discussed in the literature (mismatch between the theoretical patterns and the observed patterns). Thereby university engagement is perceived as various forms of knowledge transfer related to the academic standards of teaching, research and outreach (captured in the first order categories). It is therewith often associated with, but not limited to, the entrepreneurial role of the university with a focus on applied research (and teaching).

Regional engagement, however, involves the all-encompassing regional (economic) ecosystem with a clear focus on innovation as well as sustainable development. Although the channels of teaching and research also occur here the focus is

on outreach activities outside the organizational boundaries of the university which are often associated with the engaged university model. “Regional engagement is mainly initiated from the policy side but there is solidarity needed from policy, industry and all research partners” (I2). Furthermore, the case study universities see themselves as having a profound understanding about regional needs, due to their institutionalized cooperation (e.g. with city and regional governments, chamber of commerce) or their strong ties to alumni of the university. Regional engagement is built on trustful relationships with a broad pool of stakeholders, who share common interest and who aim to achieve a common regional goal.

## 4.2 The Organizational Context

### 4.2.1 Organizational Aspects

University key-informants provided detailed insights about the relevance and influence of organizational aspects on academic engagement. Awareness at the leadership level paired with proactive incorporation of engagement into the universities’ mission are the prerequisites of providing a conducive environment for engagement which is confirmed by the literature. However, our data shows that there is also the perception that universities are complex multi-stakeholder organizations with diverse interests in engagement. There is a different understanding between the two universities of whether the university should incentivize engagement activities. In the case of JKU there are incentives which are explicable since engagement is defined as their ‘institutional DNA’. KFU sees it more as an intrinsic motivation mechanism.

### 4.2.2 Institutional Behavior and Change

In the interview, all stakeholders were confronted indirectly with the notion of institutional change and asked for their observations of how the university’s interest in engagement has evolved over time (without revealing the analytic separator, see 2.4), and their explanation of the reasons for the observed change. The following overview is structured by the internal (university) and external perspectives (following the Gioia data structure in Fig. 2) and summarizes the institutional aspects articulated as playing a role in the respective cases.

In the case of KFU Graz, both stakeholder groups perceive UG 2002 (first order category) as the most influential institutional factor opening a window of opportunity for the university (institutional change). There is a common understanding that the rector who was in charge during this time played an important role by presenting an industry-friendly leadership style (university leadership). Both groups reported the unique mindset of one specific rector, Prof. Gutschelhofer, who had close contacts with industry and the public sector. External stakeholders (I14, I15) also mentioned that he initiated the institutionalized cooperation NAWI (specific institution) between TU Graz and KFU Graz as well as noting that the industrial association IV-Styria had adopted the role of a translator between academia and industry. There is a unified internal view of cooperation as a potential conflict of interest, experienced

as the growing external influence on university activities, whether directly or through University Council members, yet this is not mentioned by external stakeholders.

In the case of JKU Linz, the founding mission is clearly the institutional aspect which is most influential. This long-established orientation is the reason why institutional change is not perceived to play an essential role and why both stakeholder groups conclude that the university is perfectly equipped for industry cooperation. Similarly, the university leadership must be industry-friendly in accordance with the founding mission, which was dictated by the founding and funding organization Linzer Hochschulfonds. Consequently, it is also evident that there is no perceived conflict of interest.

This comparison reveals that the overall institutional framework is important for facilitating cooperation and that its nature depends on institution-specific components which seem to be an important prerequisite for academic engagement. The composition of institutional factors depends, in turn, on the evolution of the university and on individual leadership characteristics which determine whether a window of opportunity can be used or not. On the individual level, however, university stakeholders put more emphasis on conditions provided by the overarching institutional framework (institutional context), like academic freedom which is guaranteed in the Austrian constitution or university autonomy which is provided by the university law. The second order theme 'institutional behavior and change' as informed by the literature deviates partially from the bottom-up partial pattern matching especially in the case of KFU Graz where university key-informants particularly see a potential conflict of interest in institutional openness (Mayntz 2002; Meyer 2003) but at the same time institutional change after the introduction of UG 2002 is seen as an enabler for engagement.

#### *4.2.3 The Role of the Network*

Interview partners associate the network with the triple helix (first order category) model (and not particularly with the quadruple or quintuple helix like discussed in the literature) which according to some interview partners is already in place for 20 years due to the clear shift towards a knowledge-based economy. Especially, non-academic stakeholders in our sample indicated that "the science base in the triple helix is an important element and due to the regional development policy shift towards the knowledge economy the linkages to science have been intensified" (I15). They also agreed that this needs to be understood as inter-organizational networking (first order category) where all involved organizations need to see a benefit in engagement and intermediary organizations are seen as the mediators between industry and academia. Industry-induced collaborations (first order category) were identified by many interview partners as a consequence of well-established network contacts. In the case of KFU Graz the quadruple-helix had been indirectly mentioned by I5: "One way of engaging with the region is opening the university to the public, like we have institutionalized it with the 7th faculty aiming at science communication. One successful example is the Science Busters format which is broadcasted in the Austrian TV and scientists are going public. We as university support this and we see it as a good way to present the university in the public and to engage

with societal actors.” KFU is very engaged in regional sustainable development and hosts the Regional Center of Excellence (RCE), an institution being directly involved in regional sustainability transformations. Network activities are in the case of JKU mainly initiated by the region and their industries which was strongly emphasized by representatives of regional institutions (I13, I16, I17) as well as government officials (I9, I11). In the case of KFU Graz there is, however, more variation in the interviewee’s perception about the initiation of network activities. For example, I5 and I6 both reported about the university’s pro-active approach in opening the university to the region and the public, at the time when the new rector started university—industry networking activities. I1 on the other side sees room for improvement in terms of the effectiveness of the university’s engagement capacities. The second order theme ‘network’ as informed by the literature is confirmed by the bottom-up partial pattern matching.

### 4.3 The Spatial-relational Context

As deduced from the literature, proximity to regional stakeholders is one of the core analytical concepts for assessing engagement and it is related to the network component discussed in 4.3.2. In both universities, the interviewers implicitly introduced the five types of proximity during the interviews without making this explicit to the individual interview partners. Thus, all proximity related results are analytically derived in the FPMA. During the interviews many stakeholders referred to proximity in characterizing cooperation. Even though the different dimensions of proximity are interdependent we disentangle them in the following for analytical purposes but refer to other dimensions in parentheses.

In the case of KFU Graz, university stakeholders identified location development as a new function of the university once the university law allowed more autonomy for universities to define their functions. The interviewed vice-rectors both mentioned location development as a university function bringing university stakeholders closer to external stakeholders. The perception of being a regional university also relates to geographical proximity in that 50% of students come from Styria and 80% are from Austria. The university sees its regional development contribution in providing skilled labor for both the provincial capital Graz as well as the broader Styrian province. This is similar to the perception of JKU Linz’ internal stakeholders, who see their mission as serving regional industry and educating skilled labor. However, they refer to the triple helix as explaining the connectivity between the university and the region (institutional proximity). Specifically, they identify the policy side as the driving force which shaped the triple helix network with the foundation of the university (I2: “Regional engagement is mainly initiated by policy, and it is characterized by specific institutional interests of policy, industry and the university.”). The industry-oriented profile of JKU Linz is supported by specific endowed professorships which serve as bridging elements to the industry. The Linzer Hochschulfonds plays a key role for regional engagement, which underlines the importance of both organizational and geographical proximity.

In the case of KFU Graz, organizational proximity seems to play an essential role in positioning themselves as a key-player for entrepreneurship collaboration.

The university reported that there are highly innovative university spin-offs in the regional networks, while the intermediaries in the region actively set up formal and informal cooperation between spin-offs, KFU Graz and other universities, e.g. a science park run by KFU Graz and TU Graz, the City of Graz and the Federation of Austrian Industries (IV) and the Styrian Business Promotion Agency (SFG) which is a collaborative regional project and helps to form longstanding ties. Similar but more formal regional cooperations were reported by several key-informants in the JKU Linz case, e.g. the Council for Research and Technology Development Upper Austria where several faculty members fulfil advisory roles and build up long-standing ties in the regional network.

The overarching institutional framework plays in both cases a role due to the federal competences in the tertiary educational sector in Austria. The intensification of engagement after the introduction of UG 2002 was accompanied by the knowledge-based focus in regional policy. Almost all interviewees in both cases indicated that the linkage to science intensified due to this policy focus but the changed mind-set induced by the change of the federal law extended the options for various forms of industry-policy-university exchange. I6 specified that: “With the autonomy universities were introduced to performance agreements which opened the door for new engagement activities and a clear need to look for a broader variety of funding.” Thus, there is the perceived understanding that the institutional framework at the regional level accelerated the process of bridging industry and universities which resulted in an institutionalized exchange where both sides induce collaborations for the benefit of the other (which refers also to cognitive proximity).

The partners in the triple helix network surrounding KFU Graz are characterized by a high percentage of industry stakeholders and governmental officials with previous affiliations to KFU Graz which leads to a higher level of trust (social and institutional proximity). As indicated earlier, the triple helix network has played an important role in the Styrian innovation system for more than 20 years, but KFU became active after UG 2002 was enacted. Nevertheless, their role in the triple helix is stable, especially due to the social and institutional proximity of former university members. Additionally, the translation work of intermediaries is important, which has been mentioned by different interviewees in both cases, which is induced by long-standing connections but mainly by direct contacts of intermediaries with industry. Thus, intermediaries gain insights into industrial needs and translate it to universities, which helps “to animate scientists to see what industry needs” (I15) and “to inform university leadership about market development” (I16). In the case of engagement initiatives between the university and government officials, KFU Graz key-informants report about an intrinsic motivation on the government side to develop a mutual understanding of needs to overcome the problem of short political cycles. According to these reports the character of the cooperation will remain if the needs are well communicated and embedded in the cooperation agreements, but it will only sustain if the needs are mutually understood.

**Table 4** Results of the pattern matching approach (own illustration)

Theoretical patterns (derived from literature)	Perception of university and regional actors	Observed patterns (derived from empirical data)	Implications for the aggregate dimensions
<i>Academic engagement:</i> Individual, Institutional	Cooperation and innovation mindset Scientific impact Knowledge and technology transfer Ecosystem based partnership approach Innovation management Cluster development	University engagement Regional engagement	<i>Engagement perceived in two different spheres:</i> Organizational sphere of the university; engagement is defined broader but related to academic standards and transfer channels (research, teaching) Regional sphere: engagement involves the all-encompassing regional (economic and societal) ecosystem with broader (outreach) activities outside the organizational boundary and a clear focus on innovation, clusters and sustainable development
<i>Institutional context:</i> Regulation, public policy (external), Disciplines (internal)	UG 2002	University law Autonomy	The overarching institutional framework is understood as the legal and regulatory context at both the national as well as the regional level. University autonomy is perceived to be the decisive factor for engaging in the region; however, it is perceived as the means for institutional change which bridges to the organizational context
<i>Organizational context:</i> Institutional behavior, Institutional change, Network	Awareness at leadership level Incentives for outreach University council Cultural change Academic freedom University autonomy (UG2002) University performance agreements Industry induced collaboration Inter-organizational networking Triple helix	Organizational aspects Institutional behavior Institutional change Network	The perceptions concur with the theoretical patterns, but university stakeholders put more emphasis on conditions and aspects provided by the overarching institutional framework, like academic freedom which is guaranteed in the Austrian constitution or the university autonomy which is provided by the university law

**Table 4** (Continued)

Theoretical patterns (derived from literature)	Perception of university and regional actors	Observed patterns (derived from empirical data)	Implications for the aggregate dimensions
<p><i>Relational context:</i>                      Proximity approach:                      Geographical, Organizational, Social, Institutional, Cognitive</p>	<p>Collaboration partners nearby                      Local/regional labor market                      University as location factor                      Regional projects                      Bridging industry and university partners                      Formal vs informal cooperation                      Knowledge-based economy                      Formalized industry-policy-university exchange                      Trust                      Translation work of intermediaries                      Mutual understanding of needs</p>	<p>Geographical proximity                      Organizational proximity                      Social proximity                      Institutional proximity</p>	<p>The relational context is perceived as the regional environment which emphasizes the geographical dimension but relates the organizational, social and institutional dimension to accessibility to regional actors, knowledge and understanding</p>

**Table 5** First order categories

First order categories	Definition	Representative quotation	Number of references in the interviews
Cooperation and innovation mindset	Individual characteristics of engagement	"Engagement always depends on the interest of certain people in the university, thus the input has to come from those working on the projects... of course the rectorate can shake hands and open doors, but the rest has to be done by the researchers" (15)	8
Scientific impact	Academic evaluation criterion	"In the early days technical universities were more active but KFU with its pro-active rector Gutschelhofer had already a cooperative mindset which incentivized basic research with great scientific impact but practical value for the cluster development" (115)	6
Knowledge and technology transfer	Knowledge transfer strategies at university level	"Due to the shift towards a knowledge-based economy the linkages to science have been intensified and in the last 20 years knowledge and technology transfer became an important strategic element." (114)	5
Ecosystem based partnership approach	Engagement managed by a broader pool of regional stakeholders having a common regional goal in mind and being regionally bound	"The regional and city stakeholders here in Graz and Styria know that they depend on a certain extent on the universities being located in the region, this is why they support joint ventures between universities and industries, like with the Komet program." (16)	3
Innovation management	Regional engagement involves the all-encompassing regional economic and societal ecosystem with a focus on innovation management	"We [number of regional organizations] started in 1995 with the automotive cluster and it was pioneer work for creating cooperatively innovation in the region." (115)	3
Cluster development	Contribution of universities in developing clusters	"Mechatronics or Chemicals are part of the clusters. If the professor is head of the institute he represents both, an individual and the university... from the point of view of the cluster management he is seen as representative of the university." (14)	5
Awareness at leadership level	Awareness at the leadership level paired with proactive incorporation of engagement into the universities' mission are the prerequisites of providing a conducive environment for engagement	"It is always good if we in the rectorate are informed and even included in order to represent the university." (12)	4
Incentives for outreach	Outreach activities as academic evaluation criterion	"Regional engagement is mainly initiated from the policy side but there is solidarity needed from policy, industry and all research partners" (Quote 12)	3

**Table 5** (Continued)

First order categories	Definition	Representative quotation	Number of references in the interviews
University council	Independent third-party governance body	"In the university council are different interests involved which sometimes lead to conflicts of interest and the university needs to ask themselves where the limits to academic freedom are." (15)	3
Cultural change	Universities had to adapt after they became autonomous	"After the university autonomy the quality of cooperation with university changed and became more trustful, but this had to be built up. Additionally, a new generation of professors came in." (114)	4
Academic freedom	Academic freedom which is guaranteed in the Austrian constitution to safeguard the universities' independence	"There are limits to cooperation for universities in order to safeguard free research and free teaching." (15)	13
University autonomy (UG2002)	Specific law which guarantees the universities' autonomy	"With the university autonomy in 2003 the rectorate became a management team with a clear division of responsibilities and competences." (15)	17
University performance agreements	After the enactment of UG2002 each university needs to negotiate a performance agreement with the ministry in Austria	"With the autonomy universities were introduced to performance agreements which opened the door for new engagement activities and a clear need to look for a broader variety of funding." (16)	5
Industry induced collaboration	Industry is engaging with universities for collaboration projects	"Third-party funds are only a minor benefit of industry-university cooperation. It is a fruitful scientific impact for both sides." (115)	7
Inter-organizational networking	All involved organizations need to see a benefit in engagement and intermediary organizations are seen as the mediators between industry and academia	"Our organization is involved in organizing the regional cooperation related to the science park which is shared by KFU and TU Graz." (115)	7
Triple Helix	Connectivity between the university and the region	"Regional engagement is mainly initiated by policy, and it is characterized by specific institutional interests of policy, industry and the university." (12)	10
Collaboration partners nearby	Accessibility of collaboration partners	"We have many collaboration partners who studied at the university are much more credible than those without such an educational history. It is a matter of knowing and trusting each other" (15)	5
Local/regional labor market	Universities provide skilled labor for the region	"Location development is a new function in the current team of the rectorate. We see our contribution to regional development in the provision of skilled labor."	5

Table 5 (Continued)

First order categories	Definition	Representative quotation	Number of references in the interviews
University as location factor	Universities are seen as an upgrading for the region	"JKU is an important stakeholder in the industrial region and the manifold engagement activities benefit the region." (I13)	6
Regional projects	Projects for the benefit of the region	"We are involved in cooperation projects with provincial government bodies ("Landtag") with the aim to enhance skills of regional actors." (I5)	4
Bridging industry and university partners	Intermediation between industry needs and university capacities	"We are bridging actor between the ministry led programs, like Comet, but we operate at the regional level where we are engaged in bringing together industry partners and universities who work on regional projects." (I14)	5
Formal vs informal cooperation	The role of formal and informal exchange between organizations	"There are intermediaries in the region actively setting up formal and informal cooperation between spin-offs, KFU Graz and other universities." (I6)	4
Knowledge-based economy	Strategic focus on knowledge creation and transfer	"With the knowledge-based economy the science-based approach (triple helix model) became a very important element and since then the linkage to science has been intensified." (I14)	3
Formalized industry-policy-university exchange	Institutionalization of the triple helix	"There is no other university in Austria which is getting so much support from policy and industry in form of the institutionalized regional cooperation (founding mission)." (I13)	3
Trust	Level of trust in relationships	"With the new opportunities for cooperation after the autonomy exchange processes between universities and industry need to be established and further developed. The same accounts for trust within these cooperation projects." (I14)	3
Translation work of intermediaries	Mediating between industry and university stakeholders	"We animate scientists to see what industry needs and we also try to integrate an interdisciplinary focus." (I15)	4
Mutual understanding of needs	Communication of needs	"Cooperation with democratic institutions are difficult of political parties change." (I5)	3

#### 4.4 Results of the Pattern Matching Approach

Table 4 summarizes the steps of the FPMA which guided the empirical analysis and depicts the theoretical patterns identified in the literature with the empirical findings (i.e. perceptions) and the assignment to the second order themes (i.e. observed patterns) which was then referred to the literature. Many of the theoretical patterns match perfectly with the observed patterns, but there is one second order theme which deviates from the academic engagement literature, i.e. regional engagement which was specifically differentiated by the key-informants from university engagement. It is the economic and societal ecosystem in the region which is needed and used for engagement according to university and non-university key-stakeholders, but it seems to be independent from the underlying university model (see Table 1). However, university engagement is related to academic standards and transfer channels and there is a difference between the underlying university model.

### 5 Discussion of the Results

The findings reveal that academic engagement is a multifaceted phenomenon influenced by all the three investigated context factors. The pattern matching approach led to the identification of two separated engagement spheres and the regional sphere is the one where all interviewed stakeholders provided a unified perception. Engagement, how it is presented in theory, could be enriched by incorporating both spheres but not without relating to the three existing context factors. These findings might also be relevant for place-based policy and practice in regional development due to the region-specific aspects that seem to play an important role in regional engagement (Rodríguez-Pose and Wilkie 2017; OECD 2023).

The analysis of the organizational context in both cases is in line with arguments provided by Lawton Smith (2007) and Perkmann et al. (2013) related to the importance of specific university characteristics. But university stakeholders put more emphasis on conditions provided by the overarching institutional framework (institutional context), like academic freedom which is guaranteed in the Austrian constitution or university autonomy which is provided by the university law. The cases reveal the appearance of unique internal and external organizational settings which allow for effective and efficient engagement activities. In the case of KFU Graz these settings were established only after the introduction of UG 2002 which led to the need to change the institutional culture, so that engagement becomes embedded. The 'partner for life' concept at KFU Graz had been established in the early days of engagement to present the university as partner for industry and society. For KFU it is important to be perceived by opinion leaders as a reliable organization in the region. This might be partially induced by the co-existence of other research universities in the region, which certainly influenced the evolution of university-industry cooperation but mainly because the university law opened a window of opportunity for becoming a lifelong educational partner. In the case of JKU Linz the organizational context is a stable variable based on the founding

mission, but UG 2002 provided new perspectives on academic engagement which led to a diversification of engagement activities.

The analysis of the organizational status of the two universities provides evidence consistent with Huggins et al. (2012) since both are regional universities and maintain close contacts to regional actors, while the opportunities for knowledge spillovers resulting from their location in their respective provincial capital aligns with Porter (1990) competitive advantage argument. Both cases provide evidence about the connectivity of university leaders in the region, which is perceived to be an influencing factor for establishing and maintaining stable contacts to the network. There is also an understanding of the importance of forming functional management teams within the university as decision making bodies for engagement (see 4.1.1), alongside the rector's presentation in public settings. However, both internal and external stakeholders in Graz noted that UG 2002 had induced institutional change. Thus, many organizational settings only developed after the introduction of UG 2002 which led to a restructuring process of university engagement and a changed institutional culture. Consequently, KFU Graz incorporated a broader understanding of engagement which also includes many activities leading to social impact, like for example their engagement in regional sustainability (Sedlacek 2013).

The importance of organizational status was underscored by university stakeholders in both cases by mentioning location development as a new function in their management teams. However, the two universities differ when it comes to the integration of policy into university affairs. KFU Graz aims to strictly separating policy from the university agenda, whereas local and regional policy is strongly influential at JKU Linz. This distinction may lead to differences when it comes to the continuity of cooperation with democratic institutions when power shifts between political parties and seems to influence the longevity of established cooperation projects in the case of KFU Graz (long-term agreements between the city and KFU on creating a mutual understanding of cooperation needs; see 4.3). KFU Graz is more careful to disentangle their engagement from policy development. At JKU Linz, where engagement is induced by policy, it shows that knowledge spillovers are likely to be target-oriented and based on the expectations of regional authorities. Fonseca and Nieth (2021) provide similar evidence, but they observe lesser expectations by regional authorities of universities located in peripheral areas. In such cases, the university is not obliged to actively engage with industry, and any such engagement is initiated by regional expectations. Similarly, universities without such a clearly industry-oriented mission need to define their engagement according to their organizational context and their network of stakeholders who have a personal connection to the university (social proximity). The relational context is perceived in both cases as the regional environment which emphasizes the geographical dimension but relates the organizational, social and institutional dimension to accessibility to regional stakeholders and knowledge. Proximity plays a role in both universities, yet the significance of the various types of proximity is perceived differently in each case and by different stakeholders. There seems to be a common understanding about university-industry cooperation as a self-reliant process, which is part of the institutional DNA on both sides, with a heavy emphasis on geographical proximity in terms of regular knowledge exchange and integration into R&D activities. En-

agement is therefore largely driven by perceptions of the government stakeholders which influences the teaching and research portfolio in the case of JKU. Interviewees mentioned, for example, specific endowed professorships financed by industry with the goal of translating industry needs into academic activities. Arguments provided in the literature about universities being interested in proactively expanding their knowledge transfer function to institutionalize engagement therefore need to be scrutinized from the perspective of naturally embedded engagement for cases such as JKU Linz, where knowledge transfer is heavily focused on satisfying industry needs (Perkmann et al. 2013, Etzkowitz et al. 2019).

## 6 Conclusions

Universities are referred to as motor and academic engagement as driver of regional development and regional sustainability transformations. However, they are also open systems (Pinheiro 2011; Radinger-Peer 2019) and as such in lively exchange with their surrounding environment. We therefore hypothesized that a university's definition and understanding of academic engagement as well its implementation is highly influenced by institutional, relational and organizational context factors.

The paper uses the existing theoretical foundations on engagement for identifying and understanding theoretical patterns (see Table 4). Based on theory and the case study analysis of two Austrian research universities KFU Graz and JKU Linz differences of university (internal) and regional stakeholders' (external) perception on university engagement are scrutinized. The case study analysis allows us to infer relationships among certain institutional characteristics of universities, their regional economic environment, individual leadership and a culture conducive for engagement at the regional level. Of foremost and similar influence in both cases was the changing institutional context, first of all the enactment of the Austrian University Law 2002 which allowed more autonomy for the universities to define their functions. For both universities being closely involved in urban and regional development, this offered new opportunities, but it also offered opportunities for the region to involve universities in collaboration projects. Altogether this led to a new understanding of engagement at the regional level as well as institutionalization and professionalization of university-region-policy collaborations.

The main conclusion of this cross-case analysis is that engagement at the regional level is case-specific and thus the regional component needs more attention than it is generally discussed in the literature under academic engagement (Perkmann et al. 2013, 2021). In our cases engagement is perceived in two different spheres, the organizational sphere of the university and the regional sphere. At the university level engagement is defined broader but related to academic standards while regional engagement involves the all-encompassing regional economic and societal ecosystem with a focus on innovation management, cluster and sustainable development. This also relates to the presented results of the relational context factors where the regional environment is perceived to be a predefining aspect for engagement. Accessibility of collaboration partners in the nearby region was mentioned by both universities as well as regional actors. The interesting aspect here is that it is the lo-

cal and regional embeddedness of stakeholders and their educational and affiliation histories that seem to matter most, which again is a case-specific result. Regional collaboration partners who studied at the university and being involved in the respective engagement activity are much more credible than those without such an educational history. Thus, this leads to the conclusion that it is not only the regional network component that is perceived as important but the social embeddedness.

Regarding the organizational context, our case study analysis reveals that the founding history shapes the self-understanding of engagement, however strong leadership, incentive systems as well as organizational changes influence more specifically the universities' stakeholder perception of regional engagement.

Nevertheless, the two case-studies have shown that within universities as 'loosely coupled systems' the steering potential from the top is limited. Both universities are embedded in a very specific spatial-relational context, and our research reveals that this context is essential for the universities' engagement understanding, but it is not independent from the specific organizational context and the institutional conditions. Within our limited pool of case studies, we can therefore conclude that the spatial-relational context is a defining component for engagement and the involved stakeholders perceive these regional factors as being essential for successful collaborations.

Future research would need to collect more case-specific evidence in different types of regions (this study is limited to a specific national context and very specific regional conditions) and different types of higher education institutions (this research includes only research universities) to strengthen the insights provided into regional engagement and to lead to more profound empirical evidence.

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**Data Availability** The interview data of this study is stored on the Modul University shares and cannot be shared due to the consent to only use anonymised data for the analysis. All secondary data sources are provided in the paper.

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