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How to acquire legitimacy and become a player in a regional innovation ecosystem?

The case of a young university.

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Abstract

Universities are recognized as a particular type of public organization. Due to the important role they are acquiring in the development of regional economies, universities are facing significant pressures to become more entrepreneurial and similar to private sector organizations. This new role requires universities to engage in substantial change activities in order to get legitimacy from their ecosystem. Change management literature has mainly assumed that changes in public-sector organizations are the result of top-down initiatives as well as the exercise of political clout. Instead, the role of agency and bottom-up dynamics in explaining change in public-sector organizations is still overlooked. Based on a longitudinal case study of a young university in Italy, this research explores its bottom-up process of internal transformation to become more entrepreneurial and fully legitimized in its local innovation ecosystem. In doing so, we contribute to existing literature in several ways. First, we add a process lens for understanding the transformation of a public actor not from the perspective of environmentally imposed changes processes, but through proactive interactions, role definition and activities. Second, we demonstrate that the entry of a key actor in a regional system unfreezes the existing equilibrium, by changing the distribution of competences and the awareness of other actors' activity. Third, we show that bottom-up processes favouring bandwagon effects are particularly appropriate for change processes of public institutions that are not affected by a substantial crisis (as usual trigger for change processes).

JEL: O30; L32; I23

Introduction

The Nineties' mode of knowledge creation, diffusion and use in contemporary society – described in Gibbons et al. (1994) – has significantly changed during the past two decades, resulting in a deep transformation of the role of universities around the world. The establishment of a more complex "entrepreneurial" model stresses the key role that universities can have in the development of local and regional economy (Clark, 1998; Bergmann et al., 2016), for instance, through the management of incubators and science parks, the provision of new entrepreneurial activities and training to private companies (Cesaroni and Piccaluga, 2016; Clarysse et al., 2014). Universities are recognized as a particular type of public organization. According to their traditional function of providing qualified personnel to local firms and public organizations, they have been acknowledged to have a fundamental role in the ecosystem where they are settled in (Clarysse et al., 2014). In light of their changing role, the production of innovation outcomes in local contexts is more and more explained in terms of university-industry collaborations and the academic role in entrepreneurship (Mercan and Goktas, 2011). This new role requires universities to engage in substantial change activities. Although universities, as public organizations, are facing significant pressures to adapt to important changes in the external environment, and their systems are transforming significantly to become more like the ones of private organizations (Perkmann et al., 2013; Bergmann et al., 2016), the deep change processes recently undertaken by universities to become more entrepreneurial remains under-represented within the overall change management literature.

Change management literature has become particularly prolific in describing the attempt of different organizations trying to align their operations with a changing environment, in order to sustain their success and existence (Stouten et al., 2018). Existing literature has shown that forms of change in organizations can be various and characterized by multiphase processes or one-shot interventions (Stouten et al., 2018). Third, public organisations generally lack typical incentive or sanction structures that favour change in terms of crises (Dixit, 1997).

Change in public-sector organizations is particularly challenging to implement. First, it requires

distancing from existing, legitimated institutions and persuading other members to adopt new practices that break with well-established patterns (McNulty and Ferlie, 2004). Second, taking into account the specificities of public-sector organizations and the unique mission they have (Tsoukas and Papoulias, 2005; Kuipers et al., 2014; Perry and Porter, 1982), public organizations confront wider and more conflicting expectations from external constituencies. Accordingly, public-sector organizations – more than private ones – need to obtain legitimacy from the public in order to avoid eroding public and private confidence in their operations (Schraeder et al., 2005). While much attention has been paid to highly innovative contexts characterised by cutting-edge technologies (such as the Silicon Valley) (Kenney et al., 2014), the change undertaken by less established universities within isolated and less innovative regions, characterised by family-owned firms, difficult university-industry collaborations, has remained very much underexplored (De Massis et al., 2015). Thus, we want to explore the process of internal transformation of a young university in its attempt to become entrepreneurial and fully embedded in its local innovation ecosystem (IE), working alongside the other public and private actors. Accordingly, our study aims at answering the following research question: *Which is the bottom-up process of internal transformation of a young university to become entrepreneurial and fully legitimated in its local innovation ecosystem?*

Based on a longitudinal case study, we look at the internal change process initiated by a young university in its effort to become more entrepreneurial by disseminating knowledge, building external relationships and, in general, manifesting its academic engagement for the establishment of external collaborations intended to foster innovation in the region. By distancing from the mainstream perspective of change management literature, which considers change in public-sector organizations mainly driven by top-down drivers, such as financial crises (Hendriks and Tops, 2003), sectoral reforms (Hansen and Jacobsen, 2016), new regulations implemented by central governments (De Boer et al., 2007) and political involvement (Weissert and Goggin, 2002), we start from the analysis of the system of activities initiated internally at the University with the aim of

diffusing an entrepreneurial functioning mode, more involved in the interaction with local players, and legitimated both internally and externally.

From a theoretical standpoint we contribute to existing literature in several ways. First, we add a process lens for understanding the transformation of a public actor not from the perspective of environmentally imposed changes processes, but through proactive interactions, role definition and activities (Stouten et al., 2018; Kuipers et al., 2014). The process dimension detects a shift from individual relationships and external regulation of actions, to institutionalised relations and internal regulation by each actor through a legitimation dynamic. Three steps are identified. In step 1 different actors became more connected thanks to the initiation of individual relationships, which become formalized through formal agreements in step 2. This formalization allowed identifying clear action spaces in which the University found its specific role. Finally, in step 3 the increasing embeddedness of actors in the ecosystem resulted in reduced action autonomy and more obligations, due to greater specialization. Second, our study demonstrates that the entry of the university as a key actor in a regional system unfreezes the existing equilibrium with respect to innovation activities (Thompson et al., 2018; Spigel, 2017) and may vary from region to region according to the distribution of competences and the awareness of other actors' activity. Third, the process of university legitimation highlights that the community of specialized and complementary actors that enable network formation in the local ecosystem is extremely important. Indeed, the higher the mutual awareness of roles, the stronger the system will be (Wooten and Hoffman 2008) and the more recognised its actors are. Fourth, with our case we show that bottom-up processes favouring bandwagon effects are particularly appropriate for change processes of public institutions that are not affected by a substantial crisis (as usual trigger for change processes).

Theoretical background

Change in public-sector organizations

Most of the literature dealing with change in public organizations describes change either in terms of a third-order nature – indicating external forces, such as public service reforms and sector-specific reforms (Battaglio and Condrey, 2009; Askim et al., 2009) as the main drivers – or, even without political intervention, as a planned, top-down process initiated internally by the top management and then imposed to the rest of the organization (Higgs and Rowland, 2011; Karp and Helgø, 2008; van der Voet, 2014). Indeed, the two most employed theoretical perspectives in studying organizational change in public organizations have been change management theory and institutional theory (Kuipers et al., 2014). Whereas the former highlights rational-adaptive schemes and the role of leading actors in promoting change through well-defined steps (Barton Cunningham and Kempling, 2009), the latter has for a long time argued that change is imposed by the environment and organizations need just conform to the environmental pressures they perceive (DiMaggio and Powell, 1983). Both have in common to view change as a necessity rather than an opportunity. Whatever the theoretical perspective adopted, prevailing accounts suggest that, when change in public-sector organizations does occur, it is driven and managed by top-down mechanisms (Sminia and Van Nistelrooij, 2006; Van der Voet, 2014). Accordingly, these accounts provide a relevant role for the external environment, as well as for managerial leadership, in understanding how established activities change (Reay et al., 2006).

Ferlie et al. (1996, p. 86) described the management of change in public-sector organizations as "top-down radical shock strategies and the exercise of political clout". Van der Voet (2014) in studying an organizational change within a Dutch public organization showed the important contribution that a transformational leadership behavior of managers had during processes of change (see also Van der Voet et al., 2016). Similarly, Schraeder and colleagues (2005) reported the experience of cultural change of a department in a public organization initiated and promoted by a manager through leading by example. Pollitt and Bouckaert (2004), instead, adopting the idea of organizational conformism to environmental pressures, defined the most significant external forces driving change in public organizations: political system, socio-economic forces, elite decision-

making, and change events such as scandals. Barton Cunningham and Kempling (2009) recognized the introduction of provincial legislation requiring greater accountability and the arrival of a new city administrator as the impetus for the change implemented in the municipality of Saanich.

However, the distinction between planned versus emergent change in the public sector change management literature (Van der Voet et al., 2016; Stouten et al., 2018) poses the problem of the recognition of the role of human agency in change processes (Reay et al., 2006). By focusing mainly on the roles and behaviors at the top of organizations, the literature has somehow obscured the dynamics of the front line and the role of individual actors in change processes. To date, little is known about changes "made by and within organizations", instead of changes "made to organizations" (Kuipers et al., 2014). Accordingly, there is a need to better accommodate agency and bottom-up dynamics in longitudinal studies of change in public-sector organizations (Stouten et al., 2018). Our study about the change initiated in a public university, based on a bottom-up approach, aims to add in this direction.

Getting legitimacy from the ecosystem

With respect to private organizations, public organizations have a larger diversity of internal and external stakeholders, a multitude of decision-makers, and different organizational dynamics that account more for a bureaucratic system (Sminia and Van Nistelrooij, 2006). These characteristics make the need of external acceptance for public-sector organizations more significant. Accordingly, the quest for legitimacy by public organizations becomes more urgent and significant (Kuipers et al., 2014). Thus, whether better understanding the role of agency in bottom-up processes of change in public organizations represents a valuable effort for advancing change management literature, it is also important to know how the change initiated within the organization is then accepted within and legitimized outside the public-sector organization. In this respect, the analysis of change in public organizations cannot overlook the actions undertaken internally, which are intended to get the necessary legitimacy from the actors in the environment (McNulty and Ferlie, 2004; Battilana

and Casciaro, 2012).

Methods and data

The setting

Our case concerns a young university (hereafter referred to as University) settled in South Tyrol, in the North of Italy, which has been part of significant changes in the last years. The University has five faculties (i.e., Education, Economics and Management, Computer Science, Design and Art, and Science and Technology), two research centres, 4,050 students and 130 tenured professors and researchers. The teaching profile consists of 12 bachelors, 15 masters and 6 PhD programs. The University has currently 219 research projects of which 47 European projects and research contracts. 917 are the research projects completed and the internal budget of current research projects is of 7.2 million Euro. 56% of contracts with third parties are with local companies/organizations. The context in which this 20-year old University is situated consists almost exclusively of family firms that are poorly engaged in innovation-related activities.

Such a context is usually characterised by a lack of relations between different stakeholders, which also leads to a lack of reciprocal legitimacy-granting. Legitimacy can be understood as the community's perception that an actor's actions will be acceptable and useful for the community (Suchman, 1995). The capacity for an actor to interact with other members of the ecosystem depends on the actor's acknowledged legitimacy within the ecosystem itself (Battilana et al., 2009). The University has for a long time focused exclusively on first and second mission (i.e., research and teaching), without making any evident effort in initiating relationships with external actors through third mission activities. The change process towards a more entrepreneurial approach has started a few years ago in the effort to imitate more consolidate experiences around the country. Understanding the drivers of the change process, as well as the subsequent sources of legitimacy (Deephouse and Suchman, 2008) and legitimation processes (Greenwood et al., 2002), offers the potential to advance research into change management literature in public-sector organizations.

Research design and case selection

With the aim of providing a better understanding of the bottom-up change process initiated by a university (i.e. a public organization) in its effort to become more entrepreneurial and embedded in the IE it is settled in, we used an inductive, longitudinal and ethnographic field-based case study, which is judged as appropriate for grounded theory building (Glaser and Strauss, 2017; Eisenhardt 1989). Whereas a single case study somehow limits the generalisability of the findings, it also provides a great opportunity to really go in-depth in understanding the phenomenon of interest, especially when it aims at describing how a process dynamic unfolds. This methodology was particularly suitable for the purpose of our study for a series of different reasons: (a) it enabled us to closely investigate the different stages of a very complex phenomenon; (b) it was absolutely suitable for our purpose of building theory about an unaddressed problem that deserves more attention from extant literature; (c) the focus on a single case was much more helpful compared to other possible research designs considering that we were interested in the temporal dimension of the phenomenon and its evolution over a long period of time (Langley, 1999). Since our objective was theory elaboration and extension (Eisenhardt, 1989), we did not define any theoretical concepts or assumptions at the very beginning of the study, but we repeatedly returned to the literature after each round of data collection in order to establish a connection between the findings and existing theory.

The case under investigation was chosen for three main reasons: (a) the case proved to be such a 'revelatory, extreme case' (Yin, 2003; Eisenhardt, 1989) for the observation of theoretical issues connected to bottom-up change process in public-sector organizations located in provincial, low-tech, and low-innovative areas; (b) the authors were personally in charge to follow the process initiated at the University for getting more entrepreneurial and involved in the activities undertaken in the South Tyrol region. Accordingly, they have access to all the relevant information and data and can be considered among the most informed people on the activities initiated at the University in this respect; and (c) the selection of the case was perfectly in line with the idea of investigating a

change process of a public organization from its very beginning, since at the time we started our study nothing existed in terms of structurally organized technology transfer and innovation activities linked to the local area.

In order to improve the validity of our study, we adopted some strategies commonly used in longitudinal qualitative research. First, we triangulated data coming from different sources: individual interviews and focus groups; documents; and personal observation of the processes and activities taking place from 2014 to 2018 (Eisenhardt , 1989; Yin, 2003). Second, we collected data at different stages of the process in order to avoid retrospective bias and other possible respondents' bias by comparing the answers at each stage and among different stages.

Data collection

Data collection started in November 2014 with a focus on a specific project labelled "*Knowledge Transfer Platform*" (hereinafter KTP) – submitted to a competitive selection by one of the authors and finally financed – which was intended to initiate technology transfer activities between the University and the local environment. The process of data collection followed three interconnected and recurring steps, and came to an end at the beginning of 2018. In the first step, we gathered information in order to have a deep knowledge of the history of the University, its activities, evolution and vision, as well as of the local context in which it operates. It was at this stage that we tried to better understand its internal functioning at a general level, and to detect possible relations with external stakeholders. In the second step, the focus was much more at the individual level, and we collected data both from internal and external key informants. In this case, our interest was essentially devoted to identifying the specific mechanisms at play within the University with respect to technology transfer activities, and to discover existing research-oriented collaborations with external partners or even nascent contacts. In the final step, we made an effort in gathering data at the group level with the aim of observing the interactions between different points of view and

catching norms and practices governing the internal functioning of Faculties and external opinions by industrial and administrative representatives.

We relied on five different data sources in order to get reliable and objective information (Lincoln and Guba, 1985): 1) documentary external and internal data about technology transfer processes and ongoing collaborations from 2013 to 2018; 2) semi-structured interviews during the period 2014-2018; 3) focus group sessions mainly with internal stakeholders; 4) field observations by both researchers in the period from November 2014 to February 2018; 5) written feedback from relevant stakeholders collected at the beginning of 2018. We ended up with more than 400 pages of material, including archival data and notes from field observations, 77 interviews with internal and external people, 15 focus groups, and 25 written feedbacks from internal and external stakeholders. All interviews were recorded and transcribed. The duration of the interviews ranged from 30 to 60 minutes. Most of the informants were interviewed more than once during the period of investigation, both to get clarifications and look for changing opinions and practices. We followed an interview protocol that was adapted to the characteristics of different informants and adjusted according to emerging theoretical constructs (Patton, 2002). The general and open approach adopted at the very beginning was more and more customised during the process to take into account changing conditions and to progressively identify and include all the people actually involved in the change process. Instead, focus groups were designed in a way to have people from the same research area and/or the same sector together, with the aim to better grasp the specific ideas they had about the functioning of the University and future orientations. This approach was very helpful in complementing and validating our understanding on the information received from individual interviews. As another source of information, we also relied on the hundreds of informal meetings and talks with people personally or indirectly involved with knowledge transfer and innovation issues. Finally, we also collected written feedback from internal and external players involved at different levels in the many activities developed during this four-year process. At this stage the questions were mainly related to investigating how the University affected the

establishment of contacts with previously unknown partners, the beginning of new collaborations and future expectations about the role of the University within the territory.

Therefore, a combination of different perspectives on the change process initiated at the bottom of the University and then diffused, accepted and legitimized also by external actors was utilized in order to ensure the reliability and validity of the research. Table I provides details on our data sources.

Insert Table I around here

Data analysis

Consistent with the objective of identifying the change process initiated at the bottom of the University for becoming more entrepreneurial and its following legitimation, two analyses were critical: the construction of the issue's history as depicted in activities, actions, and events from 2014 into 2018, and the use of theme analysis to explain the change in people's behaviours and approaches over time. It is worth highlighting that both the authors were parte of the KTP and were personally involved in many of the activities carried out during the process of change.

Temporarily bracketing approach. We applied a *temporarily bracketing strategy* (Langley, 1999) in order to decompose the huge amount of longitudinal data into successive adjacent periods characterised by stable activities and linear patterns within each period, and by discontinuity and change from one period to another. This type of analysis was quite helpful in our case for identifying key temporal blocks, each of them characterised by a specific approach towards change in terms of innovation activities and collaborations with external actors. This was useful in making sense of the change in the activities carried out at the university level and at the context level, but also in making sense of the different behaviours and actions observed in this evolutionary process by the diverse stakeholders. At the end of this analysis we were able to identify three main temporal phases. In the first phase, "*resources audit and shaping minds from the bottom*", in the period 2014-

2015, we found a small group of people inside the University trying to sensitise the academic community to an innovation culture and to promote the importance of collaborations with enterprises so as to increase the economic and social impact of the research performed. We identified a second phase, "*enlarging the base and getting legitimacy from the top*", that evolved throughout 2016 and reported a shift in the approach used by the University at the central level, which became more directly and institutionally involved in those activities envisaging a connection with the external environment both in terms of particular joint research projects, but also with respect to more practical initiatives. The last phase, "*external legitimation of the new role of the University*", was initiated in 2017 and is still in progress. The approach adopted by external relevant players in the environment towards university-industry collaborations and the opinion they had about the skills and competences inside the University changed significantly. This was the phase where the push-based approach characterising the second phase started to transform in a combination of push- and pull-based systems, where the new role of the University begun to get the necessary legitimacy from external players.

Grounded theory approach. Following common practice in qualitative management research (Strauss and Corbin, 1990), we coded interviews and documents inductively with the aim of identifying important relationships between data, emerging themes and the existing literature. In particular, we used the grounded theory approach to identify, on one hand, the changing process of the University towards a more entrepreneurial approach and, on the other hand, the changing behaviors of external partners towards the University, proving the recognition of its legitimacy. While the objectives of the first strategy was to individuate the different phases of the changing process, and differentiate them according to the different activities being initiated by different players, the purpose of this strategy was to focus on the evolving, changing behaviours of those players and connect them to the different phases identified with the temporarily bracketing approach. Therefore, whereas in the first step we focused on the activities carried on by different players at different levels with the aim of changing existing approaches, in this second step of

analysis we focused more on actors' attitudes and behaviours that explain better the pattern of historical interpretation over time. We applied a grounded theory strategy to all three temporal phases and, again following standard practice, we conducted the data analysis in each phase in a number of stages.

Following Corley and Gioia (2004), we often used in-vivo or first order codes (Glaser and Strauss, 2017) drawn from the lexicon used by the respondents or an evocative phrase when no in-vivo code was available. This open coding was refined over time, as we read and reread the transcripts, creating new, more precise codes and adjusting the existing ones. Through a comparative analysis of the text, the objective of the second phase was to give the same code to events, acts or happenings that share common characteristics. These codes were identified as first-order codes. We then proceeded from raw data and first-order codes to second-order categories. The second-order categories or theoretical themes differentiate from first-order codes, as they are positioned at a higher level and are more relevant from a theoretical point of view. In sum, we proceeded from "organizational categories" (Maxwell, 2008), which represent the broad subjects around which we organised our interviews/meetings, to substantive categories that constitute the first, descriptive segmentation of data, and, finally, to an abstract framework for outlining conclusions. We used tables to organise the data (Miles and Huberman, 1994) in order to facilitate the analysis during the identification of patterns and to minimize the likelihood of making a mistake in translating information. Moreover, throughout the analysis we triangulated interviews with archival documents so as to avoid possible bias during data analysis and to ensure a deeper understanding and reliability of results (Maxwell, 2008).

Thus, the application of a grounded theory approach for the analysis of the first phase, 2014-2015, followed all these steps mentioned above and was specifically intended at understanding the opinions and ideas of different internal and external stakeholders with respect to University's activities at the time when we started our analysis. This starting point was absolutely crucial for catching subsequent changes. The second-order codes linked to this phase are "*strong detachment*

from technology transfer activities", "*mistrust with respect to University activities*", and "*independence between University and politics*". Taking advantage of the fact that this approach permits the constitution of comparative units of analysis for the exploration and replication of theoretical ideas, the same steps of analysis also were applied to the second and third temporal phases. The purpose of each of these two phases was to identify the changes undertaken with respect to the immediately antecedent period. In both cases we were able to define second-order themes. Whereas "*University support for technology transfer activities*", "*University as a possible collaborator for regional development*", and "*synergies between University and politics*" characterised the second phase, 2016, "*University clearly positioned itself*", "*a regional innovation system*" and "*network approach*" depicted the third phase started in 2017-2018. The resulting data structure is presented in Table II.

Insert Table II about here

Findings

Actions and behaviours in the process of change towards a more entrepreneurial University

Although we present the different phases of change as separated one from another, they are very much interrelated and sometimes merged into each other. The path that we present below should be thought of as an evolving history of interpretations, actions and behaviours, which offers important insights into the process initiated at the University for getting more involved in the activities carried on in the region and becoming an important, legitimized actor in fostering innovation South Tyrol.

The three temporal periods are described in terms of two main components: *key actions undertaken* and *behaviours*. The key events and actions of each phase represent the most important elements for comprehending how the process of change was initiated at the University and, consequently, the approach adopted in this respect. We avoid making a causal inference between actions and behaviours, since this would imply a systematic connection between the two and the

causal path was not always very clear in terms of what caused what. However, we also wanted to observe the change in stakeholders' behaviours, in order to give further evidence of the change process, better identify the different phases, and put emphasis on the recognition of legitimacy from outside. Our final objective was to provide a relatively complete description of how actions and behaviours coevolved over time from the bottom, leading to a more entrepreneurial University.

First period, 2014-2015: Resources audit and shaping minds from the bottom

Key actions undertaken

2014 started with the application made by one of the authors for funding a three-year project intended to create a "*Knowledge Transfer Platform*", whose objective was to establish technology transfer competences at the University level and start a dialogue between the University and the external environment. This should be considered as the very first attempt to include technology transfer into the strategic plan of the University. The project was finally founded and a team of 5 people, including the two authors, was in charge of it. The team basically acted as an independent unit, almost completely detached from the University's central administration. At that point, the team divided itself into two sub-groups, the first one responsible for dealing with people inside the University, and the second one in charge of establishing some external connections, both with enterprises and institutional organisations. As a result, two main activities were initiated towards both directions: *individual interviews* and *focus groups*.

Individual interviews were organised around common topics, such as previous experience in university-industry collaborations, involvement in technology transfer activities and application of research results to the entrepreneurial context. The main purposes of this initiative was, on one hand, to acquire knowledge on the specific skills and capabilities at the individual level for the different research groups working in the five Faculties (i.e., Engineering, Economics and Management, Design, Informatics, and Education) and, on the other hand, to understand the specific needs, in terms of technology and innovation, by the side of external partners operating in

the external context. While two people of the Knowledge Transfer Platform team carried out 43 interviews with academics, the other two people took care of the interviews with some entrepreneurs and institutional players, such as the President of the Chambers of Commerce, the Regional Innovation Office, the Regional Technology Incubator and some other people dealing with innovation issues at the Province level. 34 interviews were finally carried out with external stakeholders (i.e., entrepreneurs and representatives of local institutions). A huge amount of work was necessary for identifying those people to be included in this first step. From an internal point of view, we took advantage of a program used by internal staff for uploading research activities and projects. An accurate scanning process allowed identifying those projects having a higher impact on society and, therefore, potentially reaching greater interest from outside. The process took a couple of months, and the 43 academics involved in these projects were identified as the most interesting interlocutors at this stage. As for the interviews with external players, the KTP team started from the general topics identified with the previous step and, accordingly, tried to look for those enterprises operating in the same sector. In this respect, we mainly relied on information owned by the Chamber of Commerce.

It is worth noting that the KTP team acted independently at this stage, without receiving any form of support from the University – as an institutional player – at this stage. This meant that a small group of people had to motivate people to participate in this initiative individually, by sponsoring the Platform as a special and innovative mechanism for helping the enactment of third mission activities. The effort made was huge, especially taking into account the skepticism and resistance found as a first step. In this respect, the answer that the team received from an academic researcher when he was contacted for scheduling an appointment is quite interesting:

> *The activities you're planning are very interesting, but I was wondering whether the University has any sort of interest in what you're doing.*

Focus groups represented the second activity developed by the KTP team. Whereas individual interviews were intended to collect individual experiences and points of view about past

collaborations with enterprises and the attitude towards the possibility of initiating future technology transfer projects, the focus groups were mainly driven with the idea of fostering innovative thinking through the comparison of similar experiences and expertise. The KTP team actually tried to exploit the common technological knowledge present in the different research groups in order to stimulate discussion and brainstorming. The final purpose was that of enhancing awareness and commitment in an open way towards technology transfer issues and university-industry collaborations that were never treated at the University level in a systematic way. The 15 focus groups were organized in all the Faculties, and they involved from a minimum of 4 to a maximum of 7 people. The KTP team selected the groups, paying attention to their fields of expertise in order to make sure that the people included in each focus group were all from the same research area. This was a very important condition at that time, as the purpose was to mix more and less experienced researchers with respect to external collaborations, without making the level of communication among them too difficult. The KTP was in charge of coordinating the meetings. Each focus group started with a brief presentation made by each participant about previous experiences in research projects with external partners and, after that, an open discussion on related issues was stimulated by the two people of the Platform team attending the meeting. Examples of some topics treated are the following: visual communication and design in city areas, climate and ecosystems change, mountain technologies, private finance and social housing, etc. Also, in this case the KTP did not receive any form of support from the University. A similar activity was also carried out with external players.

Behaviours

The widespread set of activities initiated by the KTP in this 2014-2015 phase were of great importance in capturing opinions and behaviours on the part of internal researchers and external players about knowledge and technology transfer. What the team observed was an attitude of clear detachment from the topic and strong scepticism towards the real benefits that such collaborations would have brought in terms of intrinsic and extrinsic rewards. A full professor during an interview

at the beginning of 2015 said:

> *How can I convince my post-docs and junior researchers that starting research projects in collaboration with enterprises is a rewarding idea? I had some experiences of external partnership, but none of them really successful. At the moment, my interest in the region is just because it provides those natural resources that allow me doing my research on the mountains and publishing. External actors, being them enterprises or institutions, are not very interesting at this point…*

This represented a common point of view reported by researchers inside the University. More specifically, the authors observed a general tendency of avoiding collaborations with external partners, which were not directed by personal relations. Two aspects were highlighted as the main reasons for adopting this behaviour: a) lack of administrative support at the University level (i.e., an associate professor participating in a focus group in mid-2015 stated: "*I would have dozen interesting collaborations waiting to be started. But, if I follow all the administrative stuff required for getting the documents ready and the collaboration started, I stop doing research. Honestly, this is a very huge barrier in this University*"); and b) lack of a university culture incentivizing and recognising the importance of these activities (i.e., a professor interviewed by the Platform team in 2014 said: "*technology transfer is not really a strategic issue inside the University; we neither have internal legislation in this respect, nor we have a structured office taking care of these activities. Why I should devote effort to technology transfer?*").

The same critical attitude was observed by other players in the region, however from a different perspective. Institutional organizations, like the Chamber of Commerce, and entrepreneurs stressed the absence of cooperation with the University and the poor presence of the University within the local environment. Basically, there was a significant detachment between the entrepreneurial activities developed in the territory and the research activities carried on by academics. In 2015, the owner of an important family enterprise noted:

> *The University is very young but we expected much more in terms of collaborations and joint activities. Indeed, most of the students – after their graduation – look for a job in the region and it would be very useful for both parties to start a dialogue for improving the fit of profiles and analyse*

innovative cooperation paths.

Summing up, this phase was characterised, on one hand, by the absence of a strategic vision on technology transfer issues as well as by a lack of any administrative support by the side of the University, and, on the other hand, by strong mistrust by internal and external players towards possible joint collaborations. These behaviours were reinforced even more by the fact that a clear idea on the different possibilities for undertaking technology transfer and innovation activities was missing at all levels. However, these activities initiated from the bottom by the KTP, and intended to increase awareness and diffuse a new point of view on the role that the University could have in the region, started to spread a lot of curiosity and interest among academics on future developments.

Second period, 2016: Enlarging the base and getting legitimacy from the top

In 2016 relevant changes occurred both in terms of activities promoted at the University and in terms of stakeholders' behaviours with respect to initiatives aiming at increasing innovation impact. These changes were substantially due to a general increased awareness of the importance of technology transfer as a strategic aspect for making the role of the University more determinant and legitimized by other institutional and entrepreneurial players in the region. Accordingly, the change could be attributed mainly to the recognition that technology transfer activities extend far beyond a general theoretical idea.

The activities carried out by the KTP team in 2014 and 2015 represented an important antecedent factor fostering the subsequent evolution of activities performed in this second phase. The most important evidence, at this stage, was the ability of the few individuals of the KTP to mobilize and involve other internal people in order to enlarge the base and increase the impact and the resonance of the activities promoted.

Key actions undertaken

In this second phase, the University central administration started to consider technology transfer

issues and relationships with external stakeholders with a more informed and engaged approach. The turning point actually could be identified at the beginning of 2016, when the President and the Rector of the University asked for a meeting with the Knowledge Transfer Platform team in order to discuss the activities they had organised and future developments in this respect. Based on the information that the KTP provided with respect to (a) the criticisms raised by the researchers within the university, (b) the points of view of external partners, and (c) the multitude of resources available internally and exploitable for enhancing the innovative potential and the impact of the University in the region, the University undertook an important legitimisation process at the institutional level. Several actions were initiated by the KTP, all supported by the University top level. We describe in the following the most important two: the *design of a legal framework for technology transfer* and the *organization of several matching events*.

The *legal framework* was intended to provide standardised guidelines for intellectual property (IPR) rights and for the creation of spin-off companies originated from academic inventions. The mandate for the completion of this framework was given to the Platform, under the supervision of the general manager of the University and the head of the central Research Office. For the first time the University was officially and formally involved in the implementation of actions addressed to the establishment and diffusion of a technology transfer culture. The IPR regulation was developed in a 6-month period through a complex process of repeated meetings with the general manager, external advice from experts in the field, and consultation with internal parties interested in the output. It was a highly inclusive process in which different people at different levels within the University were involved at different stages. At one point, for example, expert advise was needed on specific technical aspects related to the establishment of different committees in charge of following the IPR registration process. It was decided to have the point of view of one of the main experts in Italy on this issue, and three people went to visit him in Bologna. The central level of the University pushed very much to have a person from the central administration participating in the meeting; this was a clear sign of the new trend initiated at the University with

respect to technology transfer matters. Even the Rector was involved in revising the document, with the aim of improving some specific aspects strictly related to the specific academic context. In 6 months the KTP team, by attracting the interest of other colleagues in the different Faculties and involving employees at the University's central administration, was able to develop a formal document for IPR guidelines, get it approved by the University Council and have it ready for application. Even though the commitment of the administrative level was significantly important in making this step, it is worth highlighting that this was a chain process started at the very bottom that, thorough a widespread work of information and diffusion in all the Faculties, was able to attract other people, enlarge the base, and finally have a huge resonance, so that the activities carried on cannot be overlooked more by the University top level.

Matching events were the second type of action stimulating greater openness towards technology transfer activities at the University level. The idea underlying these events was that of gathering together academics, entrepreneurs and representatives of local institutions for the purpose of fostering a discussion on topics of common interest. Four different matching events were organised on renewable energy, big data and data science, wine and the wine business and publishing. Each followed the same format, with 5-7 researchers selected from different Faculties, 5-8 external partners, and a professional moderator. Four hours were devoted to each matching event, with a first session organised around a brief presentation from each participant, a second part managed by the moderator and centred on finding the most innovative thoughts, approaches and strategies for dealing with the topic under investigation, and a third session in which different round tables were arranged to make academic researchers and external stakeholders interact more closely. These events were intended to diffuse a twofold message: on one hand, there was the idea to push academic researchers towards a more open approach, aiming at initiating third mission activities, at this stage fully supported by a University strategic vision and, on the other hand, there was also the effort to communicate to entrepreneurs and local institutions the intention of being more present in the region for joint activities.

As for the legal framework, in this case the University central administration also acted as a key player in the organisation and promotion of the events. The joint work with the Knowledge Platform team was very helpful in ensuring the success of the matching events. The opening of each event was made by the Rector in person, who highlighted the importance of improving university-industry collaborations and of making technology transfer the most promising means for enhancing innovation in South Tyrol. Three matching events were attended also by the University general manager. The commitment manifested from the top level of the University had a strong influence on the diffusion of a technology transfer mind-set and, as a consequence, internal people who also started to be involved in external activities were no longer perceived as "off-air" researchers.

Behaviours

The implementation of the legal framework at the University, together with the matching events and other minor widespread activities organised during 2016 greatly increased University commitment towards technology transfer activities and also enhanced the importance assigned to these activities by internal and external members. We observed a significant change in the approach used by academic researchers in dealing with technology transfer issues. For example, a professor of informatics spontaneously contacted the members of the KTP to discuss and ask for advise about the possibility of patenting and founding a spinoff based on inventions derived by the research he was conducting. An extract of one email he wrote to a member of the Platform is as follows:

> *Suddenly, it seems that also the University has started to consider technology transfer as an important strategic asset for its mission…the effort you* [the Knowledge Transfer Platform] *made in the last years for diffusing this culture has been finally repaid* […] *Do you have time to discuss about some ideas that I go to discuss them with the Rector and the Director?*

This changed behaviour with respect to technology transfer issues on the part of the University was observed and recognised by many internal and external stakeholders. Some colleagues from different Faculties started to ask, in an autonomous way, about the possibility to organise and participate in a matching event on their area of expertise. Also, the indifference of

academics that was observed during the first stage changed towards a clear willingness to better understand the relationship between the Knowledge Transfer Platform and the University. Some researchers approached members of the Platform at the canteen in order to ask if pushing and supporting technology transfer activities at the administrative level was something in which the University wanted to really invest in in the future. This new interest manifested by many researchers clearly originated because the University started to recognise the importance of technology transfer activities as a third mission mechanism for contributing to the external environment in a formal way and, therefore, to allocate internal resources to this purpose. A professor form the Faculty of Economics and Management reported the following during a matching event:

> *After many years, I am really happy that the central administration has finally understood that technology transfer activities deserve greater attention if we want to establish our University as a reference point for innovative projects in the region.*

The same change in behaviours was observed with respect to external stakeholders. All the external partners participating in the matching events were very much surprised that, eventually, the University opened its doors to local firms and institutions to start a discussion on topics of common interest, and expressed interest for the whole region. An entrepreneur in the wine sector said:

> *It is really a pleasure to be here today because the perception in the region has been for a long time to have a good University in providing knowledgeable graduates, but completely close and detached from the environment. I think that starting discussion and collaboration could bring to even more effective results due to a better matching between competences and specific needs.*

It was at this stage that (a) the University, as an institution, started to look outside into the environment to better position itself in the local context and offer support for technology transfer activities internally, (b) a great number of researchers became more interested in technology transfer activities as possible source of research funds and innovative outcomes and (c) external institutions began to consider the University as a partner for improving entrepreneurial competences

in the region.

Third period, 2017-2018: External legitimation of the new role of the University

In 2017 the new approach of the University, envisaging its changing role in the region, started to get legitimized from external players. The greater commitment and interest showed by the University towards technology transfer activities was perceived in a positive way by local institutions and enterprises, allowing innovative and collaborative initiatives to be initiated in a more structured and formal manner. This third phase showed a completely new trend from the side of the University: much more open to the external context and intended to contribute in a real way to the advancement of knowledge within the local society. In reaction, external stakeholders started to recognize the University as a key actor in the IE and manifest their interest in beginning joint activities that increased their impact and visibility, as well as their innovative relevance in the region.

Key actions undertaken

Starting from 2017, the University supported and participated in many initiatives aimed at establishing new links between different actors in the area. There was formal recognition at the central level that innovation is facilitated when new links are formed, ideas and information circulate within a network, and new possibilities are investigated through collaborative projects. Accordingly, a series of relevant actions were put in place with a direct and huge impact on previous regional dynamics.

BITZ Fablab, established by the University at the end of 2017, is a space for meetings and collaboration that is open to a wide range of people, including students, professionals, artists, researchers, private citizens, and entrepreneurs. It is located in the city centre and occupies a space of 300 square metres. The idea leading to the establishment of the Fablab was to provide an open space where everyone can manufacture models and prototypes through digital technologies and manual processes. Promoting the interaction among different players with different skills and capabilities has been considered a key step towards the generation of innovative ideas and the

diffusion of a new approach in discovering innovative solutions to complex problems. Fablab is not only the place where people from different fields can pose a question hoping to find a new answer, but it is also the place for increasing competencies through ad-hoc and specialised training courses. It has stimulated great curiosity among citizens, and local stakeholders use Fablab's spaces daily for their activities.

Beyond direct interaction and collaboration, Fablab has started to promote a series of initiatives intended to combine new ways of working and incentivize innovative thinking. A workshop, "Hands On", was organised by Fablab at the beginning of April 2018 to explore new ways to create knitted wool accessories, combining them with simple electrical circuits. Citizens of all ages, designers, engineers, artists and researchers participated in the event to produce wearable prototypes and explore new potential applications. In May 2018, different activities aiming at supporting social interaction were organised, one of them being "Arduino Day" where, in addition to learning about this successful case, participants could bring and present their projects for collective discussion. Fablab is equipped with at-the-vanguard machines, such as 3D printers, laser cutting machines, milling machines, cutting plotters, and many others. The University thus, for the first time, made possible the creation of a physical space whose specific objective was the establishment of a network of different local actors and stakeholders interested in knowledge exchange for innovation purposes.

NOI (Nature Of Innovation) Techpark was inaugurated in October 2017. It represents the most evident recognition from external institutions that the University has to have a key role in the innovation processes promoted and developed in South Tyrol. NOI is the very first combined attempt made by different local stakeholders to have a shared place for their activities. University, research institutes, companies, local and international start-ups work and innovate closely, increasing the potential for innovative discoveries. The idea behind NOI Techpark is to focus mainly on those sectors that are considered excellent in South Tyrol, in which the University has enough competencies and in which entrepreneurs have established businesses (i.e., renewable

energy, alpine technologies, food technologies and ICT and automation). In this environment, companies are able to exploit synergies with the University and five other research institutes: Fraunhofer Institute Italy, Eurac Research, Laimburg Centre, Eco Research and CasaClima Agency. Moreover, IDM Alto Adige, an agency of the Autonomous Province of Bolzano and the Chamber of Commerce, helps in the management of more than 20 research laboratories.

The University established itself as a fundamental partner for the achievement of this outcome, as it was responsible for establishing those labs where business-relevant research is conducted. This, of course, involved the extension of those technology transfer mechanisms set up during the previous phases described above. As for May 2018, more than one hundred University researchers and technicians work daily at NOI Techpark. The main objective is to attract all companies that want to develop innovative ideas in synergy with the local environment.

There, science and industry have finally found the way to work together with the aim of fostering knowledge transfer mechanisms and enhancing cross-field collaboration for the development of new products, services and processes. Huawei, for example, has already established a technological cooperation with Alperia – a local public institution for energy provision – and the University for the elaboration of ICT infrastructures in the fields of safe and smart cities, as well as in the Internet of Things.

Behaviours

This phase made clearly evident the new entrepreneurial approach undertaken by the University, as well as the legitimacy that this approach obtained from local stakeholders. A relevant example showing the recognition of this legitimacy has been the proposal of the President of the Chamber of Commerce to adopt the scheme of the "matching events" to be reproduced in his institution. This open behaviour of making the University part of activities organised by the Chamber of Commerce was never observed before. Even more, previously, it was absolutely inconceivable to consider the University's initiatives as good practices to be copied and supported. The President of the Chamber of Commerce told us:

> *We would have never thought to take some activities organized by the University as a best practice for improving the services that we offer to local enterprises. The University has always fed the image of an institution completely detached from the concrete problems of this territory. It seems that in the last period this approach has changed considerably and greater effort has been made to give voice to external actors' needs. This is not just our opinion but we have now many feedbacks in this respect also from our associates. There have really worked in the direction of building and strengthening the relationship between different players here.*

The important change in external and internal behaviours was also proved with the *25 written feedbacks* that were collected at the beginning of 2018. An entrepreneur who participated in the matching event on 'Big data and data science' reported the following in his feedback:

> *In our case, the University acted as an important intermediary for making possible the collaboration with important local firms. After the matching event, we started collaborations with 3 firms and relevant cross-sector, applied projects have been initiated with very high innovative potential.*

Similarly, an internal researcher wrote:

> *We are assisting to a sort of "revolution" in the approach used by the University with respect to technology transfer activities… the internal environment is incredibly more open and supporting for those researchers who decide to invest in this direction. In this sense you are much more incentivized, also because entrepreneurs have changed their opinion about the University and are more willing to establish relationships. I can say that the whole local context is going in the same direction …*

It is clear that the different stakeholders have learned that a collaborative approach, rather than an individualistic one, is more likely to lead to innovative outcomes. The change of the University's perspective and the promotion of activities intended to meet external requirements, as well as to open up to other people's ideas, played a huge role in getting the University legitimized as a key player in the region. Within this ecosystem, each actor has now a more defined position and is much more connected with the other nodes present in the local environment. Strengthening the network has also meant putting effort into reinforcing every day trust and reliability in each relationship. This demanding process initiated by a small group of people a few years ago – with very low expectations – which has led, instead, to the diffusion of a completely different image of

the University. A manager of the Autonomous Province of Bolzano explained:

> *The "optimal" innovative processes needs to adapt to the surrounding environment, and not vice versa, exploiting the strengths of South Tyrol and starting from the skills already present in the area. For many years the problem has been that of having the skills, but keeping them separate. The University made a huge work in this respect and, you know, when something starts to move, then everything is moving. We have now a strong network in terms of private and public competencies for innovation.*

From the feedback we collected, we learned that local institutions are asking more and more for formal University support and collaboration for strengthening their relationships with local enterprises.

We report in Figure 1 the bottom-up process model about the change of the University towards a more entrepreneurial approach and its subsequent legitimation.

Insert Figure 1 about here

Discussion

How does a legitimate actor in an IE emerge? And what if it is a public actor, whose central mission is research and education but not necessarily ecosystem participation as in the case of a young university? The general assumption in the respective literature is that IE do exist. This means that they are comprised of different actors, different material, cultural and relational resources and that they are more than the sum of the actors and elements involved (Thompson et al., 2018). Indeed, the functioning of IE depends on the contingencies of actions by these different players and their embeddedness in the IE. Therefore, IE cannot be reduced to an isolated study of actors and their resources, as the relational social aspect becomes essential in understanding them (Adner, 2017; Spiegel, 2017). But, the presence of the relational dimension is not sufficient per se. The actions of the various actors need to be regulated in order to achieve the system's inherent goals (Cooke et al., 1997). Regulation is to be understood from a system's perspective, meaning that the actions and behaviour of an element are modified by information provided within the system (Luhmann, 1995).

However, regulation also requires that an element is recognised as a legitimate actor.

In our case, the question concerned a young university that internally was not prepared to be an actor and, as a consequence, not even recognised externally as an appropriate actor within the IE. So, in the first place, internal changes in accordance with the external environment were necessary. The general approach adopted so far for describing the emergence of ecosystems has been based on top-down processes with varying degrees of authoritative action (by governments or powerful other actors), where the necessary actors were already present in the concerned region (Mack and Meyer, 2016). This literature falls short in explaining the emergence of new actors and practices of interactions between actors that are not driven by top-down policy interventions (Thompson et al., 2018). Accordingly, the emergence of new actors requires understanding IE as a complex, organized field, and, therefore, paying in-depth attention to relational ties, the type of regulation of actors' behaviours and actions and the main mechanisms for structuring it, potentially represents an important contribution to existing literature on the topic.

A significant point in this regard relates to the recognition of the role of the university within the IE. Whereas the university sees itself as part of it from the very beginning, this might not be the point of view of the other actors. Looking at the university as something distant from practical issues, other players actually have a different perception about it, and this different view constitutes the basis of the first important actions that the university has to undertake in order to gain recognition within the territory (Cesaroni and Piccaluga, 2016; Spigel, 2017). The starting point in the case of the ecosystem analysed in our study was a situation of systemic inertia: a region with low levels of innovation activity (lack of culture), and a single public actor put in charge to act as the technology incubator for start-ups, innovation coordinator and finance provider (lack of actors), leading to a context in which interdependencies between activities and actors were not yet generally recognised, and thus characterised by low connectivity (lack of relations). It is exactly from this starting condition - i.e., lack of culture, lack of actors, lack of relations - that we can reflect on the emergence of a (young) university and its journey to become a recognised actor

The three steps described below discuss our findings at a higher level of abstraction, by highlighting the *bottom-up process* of the emergence of the University as an actor in the IE (Thompson et al., 2018). As a consequence, whether or not these three steps have to be intended as strictly linked to the different phases described in the findings, they are logically independent and separated. They are grounded on our empirical evidence, but they build a more general framework for understanding the different steps included in the purposeful process initiated by a university. In any case, since the IE cannot be reduced to actors in isolation (Luhmann 1995), the following arguments need to be seen in their contingencies.

How does the university emerge as a player: a process perspective

Step 1: Individual relationships and institutional void. This step represents the very early moment in the change process. It is the moment when the institutional level is completely absent and the willingness to change things is left to the initiative of single people. This is the case of our small KTP team at the University in charge of organising TTO-activities. At this stage there was neither an officially communicated endorsement by the University to its members, nor to external stakeholders about the role of this group. The group acted basically autonomously in a sort of institutional void. Accordingly, relationships inside and outside the University are established on an individual, dyadic level but not on an institutional level. All the activities intended to build new and reinforce existing relationships are driven by single projects and do not refer at all to an official, institutional mission. Relationships are established on the basis of the shared idea to promote actions that favour innovation and technology transfer aspects on institutional settings. This first step is an indication of how the university can emerge as an actor within the IE through a bottom-up approach (Thompson et al., 2018).

At this stage, the engagement of more actors and the creation of more relationships are both a matter of explicit self-selection and the exclusion of individuals. When asked about the approach adopted, the Head of the KTP team noted that: "*there are believers, agnostics and atheists. We will*

get the believers on board as the pioneers; we will mix them with the agnostics with the hope to transform some of them into believers. We will not waste our time with the atheists". This approach is favoured by the institutional void: rules and institutions are based on generalised expectations and, thus, complete inclusion through setting standards (e.g., standards for publications are designed to make all Faculty members publish at least according to the standards, unless exceptions are specified). Therefore, this is the stage where it becomes important to just focus on those who strongly believe on TTO-activities in order to attract an initial set of dedicated actors, while excluding all the others both inside and outside the University. The initial self-selection is based on the willingness to participate rather than on the level of reputation. This is why, for example, in our case most of the deans of the different faculties did not participate in the initial activities and events, but a variety of junior and senior faculty did. Some individuals openly opposed joining and questioned the project's reason for existence. Important aspects at this stage are trying to attract interests, receiving support and stimulating interaction. Accordingly, the lack of institutional commitment and the voluntarily nature of people-to-people relationships make it impossible for negative voices to have a place to voice protest, signal disengagement and build resistance. Shielded from negative forces, the group of 'believers' has more resources for attracting 'agnostics' and get them involved with the hope of transforming some of theme into committed actors. This finally leads to the recognition that an institutional void allows getting more actors involved, by facilitating the creation of more spontaneous relationships. Top-down approaches assume that change can be initiated by fixing an organisational objective, i.e. by authority assuming that the average resistance to change is moderate and can be surpassed by environmental conditions that create a substantial crisis (Pollitt and Bouvkaert, 2004). Becoming a recognised actor within an IE, however, does not represent a substantial crisis (lack of enrolled students would be), so the usual triggers of change are absent. The condition of the case University was characterised by strong ties within the institutions (based on a traditional model of functioning) and basically absence of ties between institutions: this condition has been associated in the literature with collective action

failure inhibiting change (Macy, 1991). However, the theory of bandwagon effects assumes that change as a form of collective behaviour does not so much depend on the average level of resistance to change, which are called thresholds, but by the distribution of these thresholds (Granovetter, 1978). Threshold models explain why collective action can happen despite general unfavourable preferences (Granovetter 1978): by starting with those individuals that have low thresholds and connect them with actors who have discrete lower thresholds that will join once that the first group has already done it; this creates a bandwagon effect.

The setup of activities and events needs also to be negotiated with individuals outside the university, even in the absence of an institutional engagement by the university. For instance, in order to develop the matching events, the organisers need to rely on the willingness of outside actors to participate (managers, public servants, etc.), as well as their availability and willingness to share data and personal contacts. The issue about who to include and who not, very much relies on the distinction between believers, agnostics and atheists: whether or not believers' support has be examined in order to incentivise positive word of mouth and, therefore, approach new actors, agnostics and atheists has to be avoided in order to keep negative preconceptions and thoughts from circulating around. This is why, for example, the attentive selection of people to be included in the focus groups and in the matching events helped to reinforce the existing relationships, spread communication and increase the potential contagion for future events, taking advantage of a grass roots marketing approach. This goes exactly in the direction of understanding how different actors start developing shared understandings and doing things together (Thompson et al., 2018; Ventresca and Kaghan, 2008) This finding refines the view that collective beliefs emerge through interactions (Hinings et al. 2003), as it shows how not only the selection but also the explicit exclusion of interaction partners facilitates the emergence of these collective beliefs. Underlying this process are again bandwagon effects of distributed thresholds (Valente, 1996).

Step 2: Institutionalising relationships and formal regulation. Step 1 in the change process observes an increase of individual, connected actors within the University and across different institutions.

The institutional void at the University excludes pursuing other options. We have seen that relying on people-to-people interactions, individual relationships, and believers' commitment, allow the number of people who organise or are involved in an increasing number of activities and events (focus groups, matching events, start-up weekends, global entrepreneurship week, etc.) to increase.

Going ahead in the process, in a second step actions and behaviours get institutionalised moving up the level of interaction from dyadic and individual to institutional in a transition phase (Padgett and Powell, 2012). In our case, this is when internal rules and directives for intellectual property rights, technology transfer and external research collaborations were developed and approved by the University council, the highest governance body. The existence of many others who had already participated and the communication of these participants, combined with an institutional endorsement, might be an effective means to capture other followers in order to enact change. Also, larger internal projects that involved all faculties, and that were officially endorsed by the University's top management, were launched under the interim leadership of the KTP team. The University's Fablab is one example of these projects. Thus, whereas the first step is usually characterised by a certain focus on speed to action, in this second step we observe long and open discussion and negotiations with the governing bodies of the University concerning the appropriate governance of the activities and their integration within the official rules and directives of the University. For the BITZ Fablab, for example, a structure of official ambassadors of each Faculty was established, formal academic leadership was eventually allocated to one Faculty and the operations were institutionalised as an administrative service with formally approved regulations.

Thus, within the second step activities and projects related to innovation become institutionalised after lengthy processes of negotiations and adjustments. While we can describe Step 1 as boundary-less, in Step 2 the scope of actions and responsibilities are established, boundaries are drawn and action spaces delimited on the basis of negotiations with internal stakeholders. This institutionalisation process actually moves the relational level from individual to institutional, through a process of legitimation. Going forward, meeting with external institutions is

based on formally delegated roles and responsibilities. For instance, for the FabLab the general director of the University, as its official representative, met in the first place with the general director of the technology incubator, and memorandums of understanding were drafted. At this stage, the scope of activities and the action spaces start to be negotiated with the other members of the ecosystem. Again, in the case of the Fablab, after an initial attempt to develop a common Fablab with the regional incubator (that already had one), the University decided to run its own. This decision exactly addressed an initial need for roles definition and delimitation: while the University Fablab was mainly targeted to students and citizens, for non-commercial use, the Fablab of the regional incubator was enlarged, but mostly focused on targeting firms, industrial uses and more sophisticated prototyping. This negotiation process reached even down to the selection of the machines in order to assure complementarity. Similar 'negotiations' occurred for the definition of other entrepreneurship and innovation activities and events with other institutions, such as the Chamber of Commerce, the regional incubator, the regional innovation office – for finance support – and an emerging business angel network.

In sum, in this second step, we observe, in line with other research, a significant shift in relations from an individual to an institutional level as a necessary condition for the emergence of a legitimate actor within the ecosystem (Thompson et al., 2018). This implies a subsequent definition of organisational boundaries, as well as the scope of actions of the actors, in a process of negotiation with internal and external stakeholders (Hoffman and Ventresca, 2002). This means that the elements of the IE are externally regulated on an institutional level, in a way that the behaviour of each actor is mutually adjusted by looking at what others do. The emergence of the University as a new institutional and connected actor leads to a modification not only of its own scope, but also to a modification of the action spaces of the other actors of the ecosystem. Accordingly, the University is formally acknowledged as an actor of the IE for its proactive and determinant role in the creation and institutionalisation of relationships.

Step 3: External recognition, legitimacy and specialisation. With step 3, the roles and actions

defined in step 2 become structured and defined within ecosystem, with a subsequent decrease in the degree of discretion of each actor for what concerns negotiations and actions to be undertaken. Given their increasing embeddedness, the relational obligations of actors increase (Burt, 2009). This implies that the action space becomes much more delimited and the role specialisation of each actor much higher. Whereas in step 2 we observe a process through which roles and action spaces start to be defined over time through interactions (Hinings et al., 2003), in step 3 increasing institutional agreements constitute the basis for defining the activities to be carried out by each player, by recognizing their role as legitimate (Hoffmann and Ventresca, 2002). Indeed, it is at this stage that much more attention is being paid to the optimisation of functions within the University and between actors of the ecosystem, by avoiding duplication of roles and the ineffective replications of actions among the different actors.

With step 1 an increasing number of actors from different sectors and institutions become connected according to individual relationships; then, in a second stage these connections start to be organised around more formal agreements, which begin to define clearer action spaces, even though the level of action autonomy of the actors remains relatively high. The adjustment of roles actually validated the University as a recognised actor. In this sense, not only the attempt to establishing a joint project but, almost more importantly, the correlated negotiation of boundaries legitimises the University as an actor. Negotiation capacity of University's members is thus key for the emergence as a recognised actor. Only at the end of the process, with step 3, does the increasing embeddedness of the actors lead to binding obligations and reduced action autonomy (Burt, 2009). Therefore, the big change from step 2 to step 3 actually relates to the different regulation of actors' actions (Luhmann, 1995): the increasing embeddedness, together with a precise definition of the roles, brings a greater specialisation that in turn leads each actor to auto-regulate. In our case, for instance, the activities carried on by the University Fablab are directed towards increasing the number of students and citizens using it, without taking into account the actions and activities of the other actors within the ecosystem. This finding complements recent findings about IE (Thompson et al.,

2018) as it links increasing actor embeddedness to institutionalised expectations of behaviour (Suchman, 1995), reduced action autonomy (Burt, 2009), and to a phase transition (Padgett and Powell, 2012) towards internal regulation of actors (Luhmann, 1995).

Conclusions

How can a young university initiate a change process and become a legitimated actor within its ecosystem? We have identified three separated but interrelated steps through which a young university moves from being a disregarded actor in the region, to developing its reputation by personally promoting activities related to innovation and technology transfer, and finally making its role accepted and legitimated within the IE. While the bottom-up process that we have described might be atypical (Thompson et al., 2018), a few implications can be drawn.

First, the entry of the university as a key actor in a regional system potentially unfreezes the existing equilibrium with respect to innovation activities when the university increases social interactions with the other actors of the IE (Thompson et al., 2018; Spigel, 2017). We show that the emergence and role of the university in an IE depends on the spaces already claimed by the other actors and by its negotiation potential. In other words, it depends on the distribution of competences and may vary from region to region. In any case, the university's potential for changing established relationships, creating new ones and, thus, playing an active role in the ecosystem through shifting collective understanding is also functional for its legitimacy (Wooten and Hoffman, 2008).

Second, we add a process lens for understanding the transformation of an actor not from the perspective of environmentally imposed changes processes but through proactive interactions, role definition and activities, that reshape the IE. Accordingly, an increase of individuals within the university and individual relationships is critical in this first phase of the process. We found that an institutional void – which potentially seems a disadvantage – turns out to be an advantage in allowing the gathering of dedicated individuals to the overall project by favouring bandwagon effects (Valente, 1996). Thus, the institutional void reduces barriers of adoption otherwise created

by institutional obligations. Only subsequently, institutionalisation sets in motion a negotiation and adjustment phase over the activity spaces of the actors present within the IE. Actions and behaviours of actors are mutually influenced and, therefore, largely externally regulated. Once the roles of actors are largely defined, additional institutional regulations are facilitated, but role renegotiation is limited. This allows actors to focus on the real mission and to optimise their activities and marks the end of a substantial change process. Thus, the process dimension detects a shift from individual relationships and external regulation of actions, to institutionalised relations and internal regulation by each actor (as displayed in the process showed in Figure 1). Our research complements and extends theory of change in public organisations from an organisational field perspective (Thompson et al., 2018). We do not only explore in more depth bottom-up approaches but also argue that top-down processes might be detrimental at the beginning in certain contexts, since a focus on average thresholds instead of threshold distributions might inhabit the set-in of bandwagon effects.

Third, the community of specialised and complementary actors that enable network formation in IE is extremely important. Negotiation processes create the basis for the mutual awareness of actors' respective roles (Adner, 2012; Gulati et al., 2012). In this sense, common goals emerge, and the evolution of institutional relationships is strictly interrelated with the development of IE and the emergence of legitimate actors. Institutional theory (DiMaggio and Powell, 1983) assumes that organisations become structurally more similar either because the environment selects those actors that fit best with it, or because of isomorphism, since actors copy legitimacy-granting procedures and structures. As IE are made up of socialised and complementary actors, they and their actors need to co-evolve and adapt, which at times requires the mutation of individual actors through negotiation processes (Hoffman and Ventresca, 2002). Thus, we conceive IE as the sum of specific and complementary actors bounded together by mutual awareness driven by durable interactions (Dorado, 2005). The higher the mutual awareness of roles, the stronger the system will be (Wooten and Hoffman 2008) and the more recognised its actors are.

A fourth implication is that an individual actor has self-interest in maximising complementarity. Specialisation can be a path to increased complementarity when an IE comprises a high number of other specialised actors. Diversification can be another path in the case in which certain activities are not performed by other actors. Complementarity is therefore related to activity spaces created by the other members of the ecosystem. Accepted roles of an actor are related to filling an appropriate activity space in mutual awareness of other actors' activity spaces. This proposition is novel, as acting in self-interest (maximising complementarity), leading also to internal regulation of actions and behaviours of an actor in an IE, is usually not considered as driving change processes within an IE (Hoffman and Ventresca, 2002).

The notion of internal and external regulation of an IE is an additional contribution as current research considered the increase in durable interactions, the shift from an individual level to an institutional level of the interaction, as vital for a functioning IE (Thompson et al. 2018). From a system perspective, a system is successfully designed and functioning if all elements become self-regulated (Luhmann 1995). We therefore propose that external regulation is a necessary process for creating mutual awareness, while, once established, internal regulation of actors' activities increases the value and function of the IE as well as the actor's legitimacy.

Finally, we argue that bottom-up processes favouring bandwagon effects are particularly appropriate for change processes of public institutions that are not affected by a substantial crisis (as usual trigger for change processes). The implications of our research need to be understood in light of its limitations. Case studies allow theoretical knowledge to be extended but not tested. Our analysis was limited to a single case in a specific region and is thus context specific. Future research could provide more comparative investigation. Our analysis was also actor specific, investigating the specific role of the University. In order to understand processes of mutual adjustments, research on IE could focus more on dyads and triads and study specifically the mutual influences between players.

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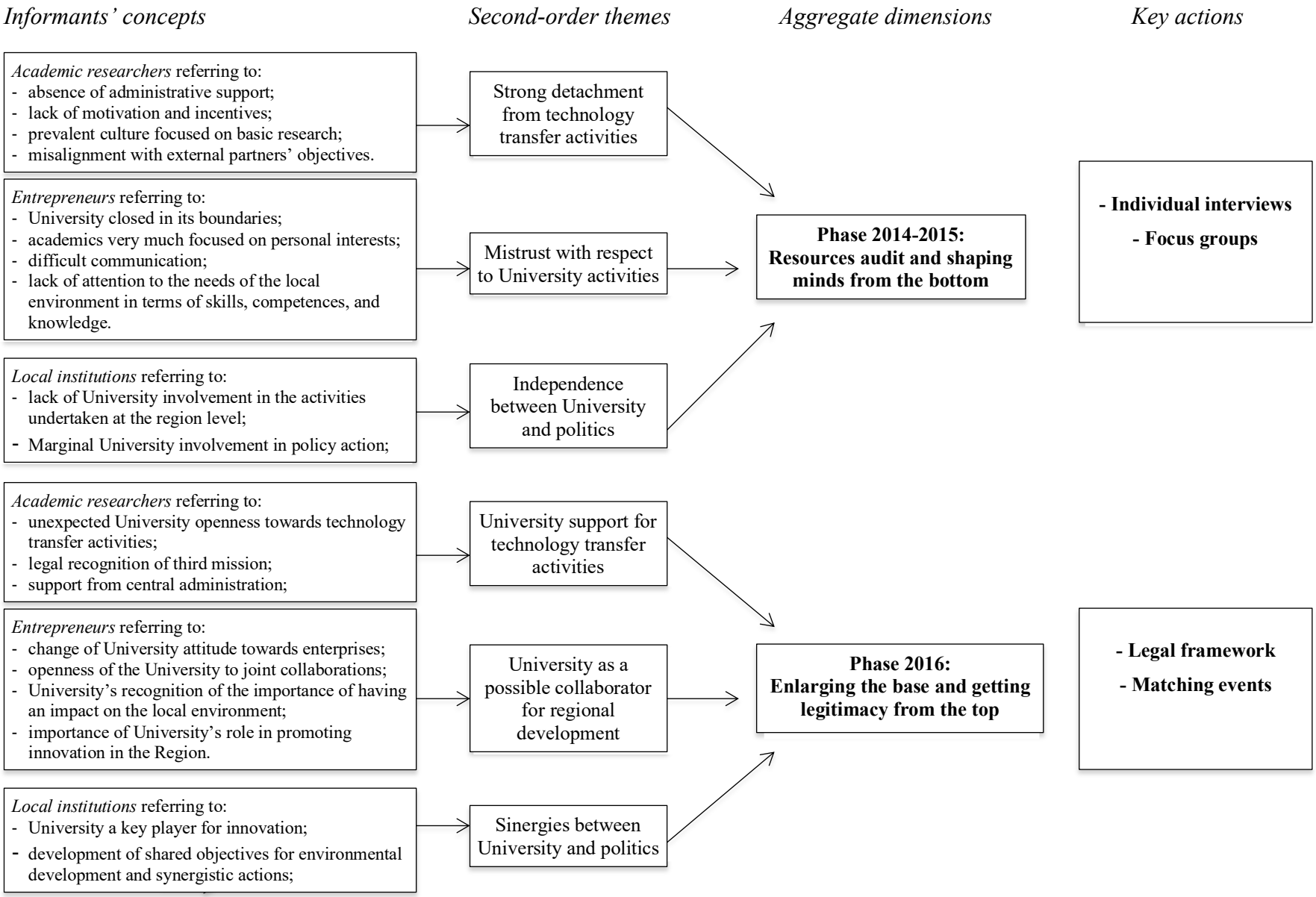
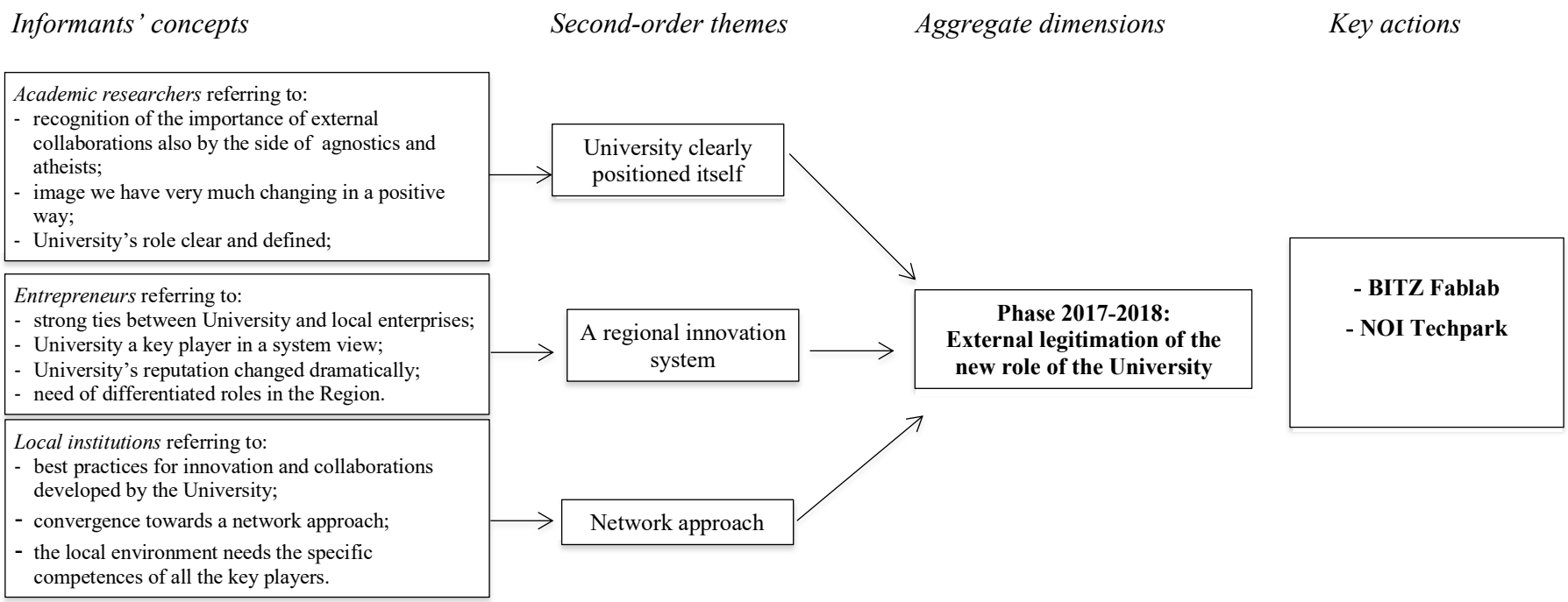
Tables and Figures

Table I. Data sources and their use

Sources	Typology of data	Data use
Interviews in 2014-2018 *431 pages double-spaced*	*Semi-structured interviews (43)* with academic researchers in all the Faculties	To understand their perceptions and behaviors with respect to technology transfer and innovation activities
	Semi-structured interviews (25) with entrepreneurs	To understand their perceptions and behaviors with respect to technology transfer and innovation activities
	Semi-structured interviews (9) with representatives of local institutions	To understand their perceptions and behaviors with respect to technology transfer and innovation activities
Focus groups *55 pages*	*Minutes and field observation (15 focus groups)* with 4-7 participants each	To put around the same table people with similar background but heterogeneous experiences to foster discussion and stimulate original thinking
Matching events *37 pages*	*Minutes and field observation (4 matching events)* with 10-15 participants each (academics and external actors)	To foster university-industry interaction and stimulate joint collaborations for innovation
Written feedbacks *30 pages*	*Written documents (25)*	To collect opinions, perceptions and experiences about interactions and collaborations with external players (for academics) and with academic researchers (for enterprises).
90 pages	*Documents* about previous university-industry collaborations, ongoing projects, etc.	Triangulate data and support information obtained through the other sources

Table II. Data structure




Informants' concepts
Second-order themes
Aggregate dimensions
Key actions
Academic researchers referring to:
- recognition of the importance of external collaborations also by the side of agnostics and atheists;
- image we have very much changing in a positive way;
- University's role clear and defined;
Entrepreneurs referring to:
- strong ties between University and local enterprises;
- University a key player in a system view;
- University's reputation changed dramatically;
- need of differentiated roles in the Region.
Local institutions referring to:
- best practices for innovation and collaborations developed by the University;
- convergence towards a network approach;
- the local environment needs the specific competences of all the key players.
University clearly positioned itself
A regional innovation system
Network approach
Phase 2017-2018: External legitimation of the new role of the University
- BITZ Fablab
- NOI Techpark

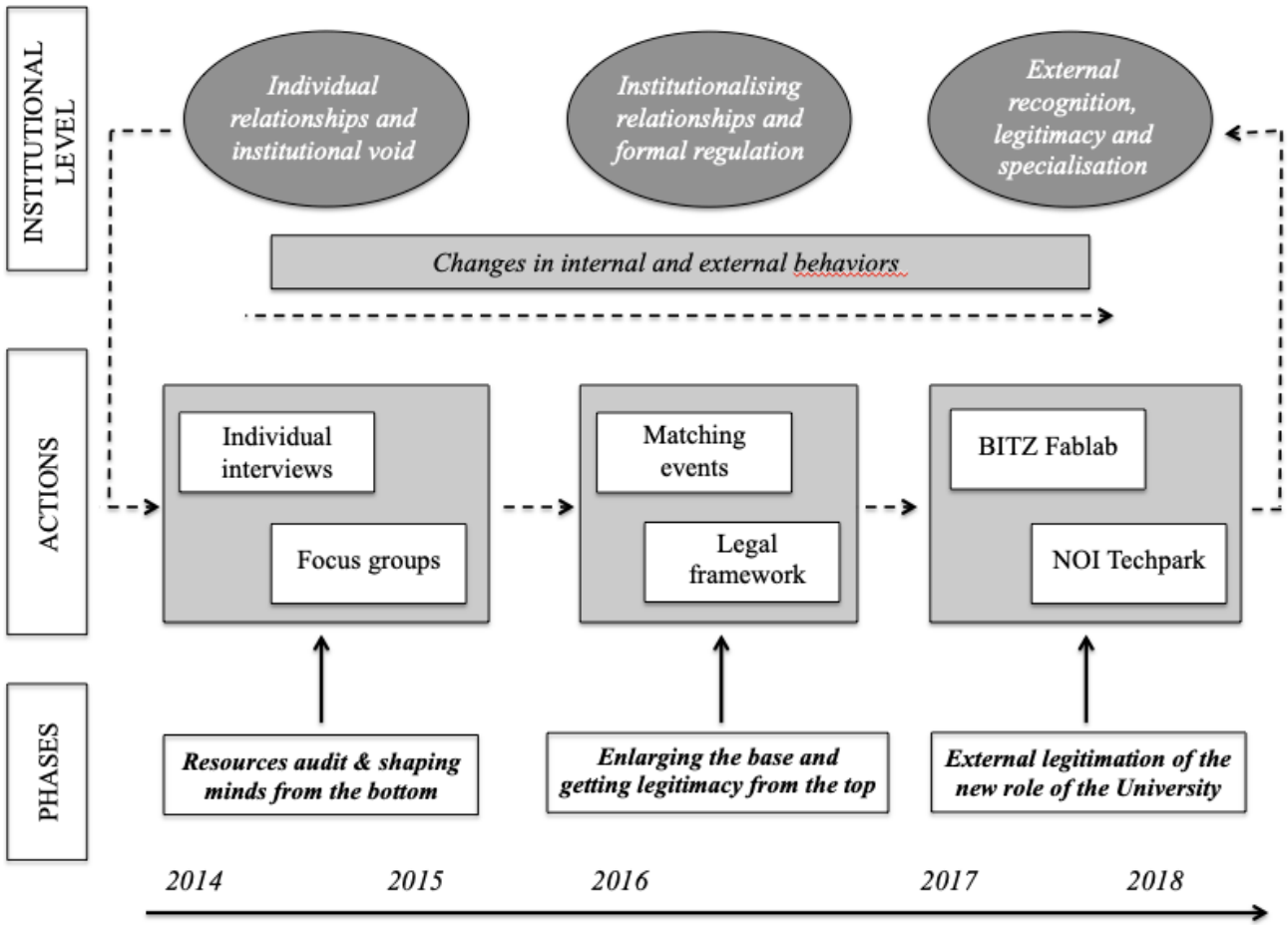



Figure 1. The process model about the bottom-up transformation of a young university to get legitimacy