

## Article

# No Interaction, No Problem? An Investigation of Organizational Issues in the University–Industry–Government Triad in a Transition Economy

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**Abstract:** Transition economies, on the one hand, grapple with a communist legacy; on the other hand, they seek the optimal institutionalization for knowledge generation, dissemination, and commercialization to compete globally. However, the incumbent knowledge of certain aspects of their innovation systems remains very limited. In particular, intra-organizational cultural relics of the past and their inter-organizational and, consequently, systemic implications require research. This study examines how interaction barriers among universities, industry, and government, stemming from intra-organizational cultures, impact structural change in the innovation system of Azerbaijan. Utilizing the TH model, interviews with 59 participants revealed that a “Statist” TH model in Azerbaijan hinders organic cultural development within organizations, leading to interaction issues among TH actors. Moreover, problems in inter-organizational communication pave the way for a systemic failure that necessitates government intervention, strengthening the “Statist” TH model. The findings increase the context sensitivity of the TH framework by exploring an understudied context and provide valuable insights relevant to other transition economies facing similar institutional legacies.

**Keywords:** academia–industry–government relations; Azerbaijan; transition economies; Triple Helix; university–industry



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## 1. Introduction

Transition economies, where massive alterations in the social, political, and economic configurations took place, are in need of institutionalization for the generation, dissemination, and commercialization of new knowledge in the era of intense global competition (Aliyev et al. 2023). The task of implementing innovation and fulfilling the economic transition of a country requires actions on a large scale, thus, calling for multiple and diverse actors to bring “collective, collaborative and coordinated effort”, transcending beyond their organizational and institutional boundaries if they want to succeed (Ferraro et al. 2015; George et al. 2016, p. 1881; Martí 2018; Dentoni et al. 2021). In the Triple Helix framework of innovation (TH), these actors are academia, industry, and government (Leydesdorff and Etzkowitz 1998). However, an inherently collaborative challenge for all organizations is embedded in the systemic nature of innovation, including public–private collaborations (Drejer and Jørgensen 2005). This challenge could be ascribed to numerous factors, such as internal and managerial issues on sustainable innovation (Cillo et al. 2019), which are related to internal innovation processes (Ketata et al. 2015) and the divergent organizational culture of each TH actor (Erosa 2012). In fact, the organizational culture aspect itself within TH studies requires further research (Erosa 2012), as each helix consists of an inner core

and outer field dynamics separately (Etzkowitz and Zhou 2007), implying that internal 'rules of the game' that are settled over time could have system-level consequences (Aliyev et al. 2023).

In transition economies, the intra-organizational challenges are amplified by their communist past. Transition strategies inherently suffered from the deficiency of negligence of historical trajectory-related factors, as such institutional inertia (Neuber 1993), generating a discrepancy between newly established formal institutions (i.e., organizations, laws, and property rights) and cultural legacies of communism evincing as deeply ingrained intra-organizational inertias, rigid hierarchical structures, and state-centric governance. Thus, standard transition prescriptions provided to rapidly transform knowledge-generating organizations demonstrated counter-productive effects in the post-Soviet higher education and research system (Johnson 2008), leading to the emergence of tension between "old" and "new" rather than the gradual replacement of the former by the latter (Silova 2009). Another policy embodiment of this approach in transition economies manifests as an overemphasis on establishing links between innovation actors that are "weak" and "unreformed" (Radosevic 2011, p. 376). Against this background, the up-to-date literature is also devoid of empirical knowledge to explain the impact of the Soviet past on the current innovation systems (Mussagulova 2021) in terms of intra-organizational cultures and their implications from a systemic perspective (Aliyev et al. 2023). This study argues that interaction barriers among universities, industry, and government (U-I-G) emanating from the operational culture of each organization impact structural change of the innovation system in a transition economy.

Driven by the above-mentioned purpose, we deployed the Triple Helix model, given its expedience in examining the systemic relations between innovation actors (Ranga and Etzkowitz 2013; Cai and Amaral 2021). While TH has been previously employed in the context of transition economies (for Russia, see (Bychkova et al. 2015; Dezhina 2015; Balzer and Askonas 2016); for Ukraine, see Yegorov and Ranga (2014); for Kazakhstan, see Colapinto (2020); for Armenia, see Inzelt (2015)), no analogous research has been undertaken in the Azerbaijani context to study U-I-G relations from organizational culture dimension and discuss its implications for a structural change within the national innovation system (Aliyev et al. 2023). Post-Soviet Azerbaijan has much to offer to the TH literature in light of efforts to construct a national innovation system concomitant to decades-long economic transition. On the one hand, the country has implemented ambitious policy initiatives aimed at fostering the generation, dissemination, and commercialization of new knowledge. On the other hand, organizational legacies from the Soviet era still persist among TH actors, creating a disconnection between policy and practice. This gap highlights the challenges of transforming policies into actionable innovation, where ingrained institutional behaviors slow progress. Understanding this complex nexus sheds light on the ideal configuration for an innovation system in transition economies, which must balance inherited structures with the demands of a modern, competitive market economy. Thus, we conducted interviews with 59 participants, including top-level representatives of the Azerbaijani academia, public and private sectors, and international experts. Our objective is to link the micro-level mechanisms within each TH organization to meso-level interaction problems and to the macro-level innovation system dynamics to provide an answer to the following question: *"How do interaction barriers among universities, industry, and government stemming from the intra-organizational cultures affect structural change in the innovation system of a transition economy?"*

Our study makes several contributions. Firstly, our results increase the context sensitivity of the TH by examining contextual effects and idiosyncratic elements (Cai 2014) within the Azerbaijani innovation system. Secondly, we identified the existence of a "Statist" model of the Triple Helix (TH) in Azerbaijan, which prevents each TH organization from developing its own organic culture. This condition leads to interaction issues among universities, industry, and government, such as tight hierarchies, inadequate resources, and mismatched expectations. These interaction problems pave the way for systemic failure in

the innovation system, necessitating government intervention and further reinforcing the “Statist” TH model.

This paper is organized as follows. Section 2 examines the relevant aspects of the theoretical and empirical literature. Section 3 presents the research design of the study and the research context, Azerbaijan. The penultimate section performs an analysis of the data and presents the results. The paper concludes by positioning the key findings of the paper within the TH theory, discussing the wider significance of the research, and suggesting possible directions for future investigations together with limitations.

## 2. Research Background

### 2.1. Triple Helix Model of Innovation

Interactions across sectorial boundaries hold promise if heterogeneous actors can share complementary skills and perspectives, thereby paving the way for synergistic efforts (Drejer and Jørgensen 2005). The relationship between universities, government, and industry is a powerful source of economic growth, innovation, and social progress. Universities are hubs for the creation and transmission of new knowledge, innovations, technologies, and discoveries that can potentially give rise to paradigm shifts (Freitas et al. 2013; Miller et al. 2014). Governments with policy-level measures and directionality can foster disruptive innovations in the private sector (Mazzucato 2013). The private sector can transform new knowledge into marketable products and services.

Pioneered by Etzkowitz and Leydesdorff in the mid-1990s with inspiration from Georg Simmel’s sociological concept of triads, the Triple Helix approach incorporates three pillars, *academia* as novelty producer, *industry* as wealth generator, and *government* as normative controller, to display the interplay and synergy between these actors in the knowledge-intensive economies (Etzkowitz and Leydesdorff 1995; Leydesdorff and Etzkowitz 1998; Leydesdorff and Meyer 2006; Etzkowitz 2008; Galvao et al. 2019). The mainstay of TH is constituted upon the heightened role of the universities on a par with robust industry and government spheres and their enhanced interaction capabilities (Etzkowitz and Klofsten 2005; Etzkowitz and Dzisah 2008; Cai and Etzkowitz 2020). This element distinguishes TH from previous approaches (e.g., National Innovation Systems) that envisage a leading role for the firm or government–firm interactions in innovation (Etzkowitz and Leydesdorff 2000; Cai and Etzkowitz 2020). Triple Helix as a system extends to encompass the broader functions of generating, disseminating, and utilizing knowledge and innovation within a collection of *Components* (institutional spheres of university, industry, and government), *Relationships between components*, and *Functions* (competencies of the system components) as delineated by Ranga and Etzkowitz (2013, p. 238). Hence, as an analytical framework, TH can be deployed to examine the relationship of innovation actors at the system level (Ranga and Etzkowitz 2013; Cai and Amaral 2021).

The meteoric rise of the popularity of Triple Helix and its unprecedentedly rapid infusion into the policymaking landscape has left a number of important theoretical lacunae. The conventional call on the proponents of TH emanating from the criticisms was the consideration of strengthening the model’s theoretical pillars (Shinn 2002; Cooke 2005). In correspondence to criticisms of this kind, several scholars, including the founders of TH, endeavored to advance and expand the theoretical arsenal of the model from neo-institutional, neo-evolutionary, and institutional logic perspectives (Cai and Lattu 2022). Still, the necessity of a clear articulation of the concept and specification of the conditions and ways that the different types of TH arrangements may operate is salient (Benneworth et al. 2015). Perhaps this is partly due to the scant research on the micro-level management challenges pertinent to managerial issues within helices, such as in academia (Sekerbayeva and Tamenova 2021). The investigation of different national-level cases also preserves its relevance to increase the sensitivity of TH toward contextual effects and elements (Cai 2014).

## 2.2. Variations in Triple Helix Due to Institutional and Organizational Factors

Historical pathways, as well as institutional and organizational arrangements, yield a profound impact on the way an innovation system operates (Inzelt 2015; Kimatu 2016). Organizations are the manifestations of “explicit rule systems and implicit value clusters” (Suddaby and Greenwood 2009, p. 177). This is in line with North (1990, 1991)’s categorization of institutions as formal (organizations, laws, and property rights) and informal (sanctions, norms, unwritten rules, taboos, traditions, and codes of conduct). Institutions of both kinds mold organizational cultures, making them of paramount importance for inter-organizational interactions. Acknowledging possible variations, Etzkowitz and Leydesdorff (2000) propose three kinds of Triple Helixes: (1) “Statist” model: Government is ascendant in this model, encapsulating industry and academia; (2) “Laissez-faire” model: Industry serves as the primary driving force, while universities and government function as supporting structures; (3) “Interactive” model: A balanced model, where three actors interact and generate knowledge and innovation (Etzkowitz and Leydesdorff 2000; Etzkowitz 2008).

Heterogenous formal and informal institutions across the globe are accountable for Triple Helix variations. For instance, a “Statist” model of TH exists in transition economies, where “government plays the lead role, driving academia and industry, but also limiting their capacity to initiate and develop innovative transformations” (Ranga and Etzkowitz 2013, p. 239). Such institutionalization impacts organizational culture and ultimately shapes the type and extent of inter-helical interactions. Referring to “shared perspectives of employees regarding what is important in the workplace and how things ought to be done at work” (Kwantes 2015, p. 1), organizational culture is decisive in organizational success (Marker 2009).

In the Triple Helix interactions context, organizational culture is an understudied aspect and requires further research (Erosa 2012), especially in transition economies (Aliyev et al. 2023). In transition economies, there has been a policy overemphasis on establishing links between innovation actors that are “weak” and “unreformed” (Radosevic 2011, p. 376). However, Cai (2013 as cited in Cai 2014) identifies four stages in Triple Helix development, and bridging organizations is positioned as the third step: (I) Realization of the needs; (II) Intra-organizational transformation; (III) Interactions between organizations in the three sectors; (IV) Institutionalization of the Triple Helix model.

The above-mentioned stages, highlighting the evolution of TH as a result of processes related to internal culture, affirm the necessity of research in this direction. The up-to-date literature identifies divergence in the working culture of each organization as a hindrance to an operational TH (see Razak and White 2015). However, the literature is devoid of insights into scenarios where the working cultures are extremely similar, particularly in post-Soviet innovation systems, where academia, industry, and government institutions often exhibit mimetic characteristics due to their communist past. To underpin our theoretical basis, several caveats are worth mentioning regarding the organizational culture of innovation actors in transition economies. Firstly, organizational culture consists of practices deeply engrained over time, and past research highlights the difficulty of altering them (see Sandfort 1999). Transition economies have long grappled with intra-organizational institutional legacies in light of relentless efforts to build a national system of innovation. Secondly, institutional stability, as a part of organizational culture, is dependent on mental models. Thus, “[i]rrespective of whether there are more efficient alternatives or not, self-enforcing institutions [...] will resist change and therefore exhibit inertia” (Rosenbaum 2021, p. 377). Consequently, path dependences in terms of the persistence of a specific type of organizational culture encompassing imprints of the erstwhile regime and relevant interaction issues stemming from the mentioned culture necessitate investigation.

## 2.3. Triple Helix Barriers in Developing Countries and Post-Soviet Geography

Rife institutional voids, fragmentations, and rigidities in the developing regions of the globe confine the volume of interaction between Triple Helix actors and allow a relatively



limited space for innovation (Saad and Zawdie 2011; Choi et al. 2015). Several developing-countries-related studies revealed that the degree of knowledge transfer from research institutions to the industry and knowledge exchange between knowledge-intensive industries are inadequate (Mihyo 2013; Daka and Toivanen 2014) and the engagement of the industry sectors in academic publications, solely or jointly with university scholars, is infrequent and almost rare (Choi et al. 2015), intersectoral mobility is low (Dezhina 2015), and there is a necessity for the development of a 'Triple Helix culture' (Saad and Zawdie 2005). Other studies investigating issues in academia–industry–government relations in developing countries reported short-term oriented, incidental cooperation that is devoid of planning and structure (Brundin et al. 2008), government failure to spur innovation due to coordination and coherence constraints in policy design and implementation (Isabel and Vargas 2011), and unsatisfactory financial support and incentives for partnerships (Dzisah 2011; Irawati 2011; Mihyo 2013). In addition, Razak and White (2015) stress operational culture differences among universities, industry, and government as an impediment to a working TH.

Although Triple Helix emphasizes the vital role of the universities (Etzkowitz and Klofsten 2005), in general, the status of universities in developing countries is problematic. They are inflexible in structural terms, have restrained research capability, funding, and commercialization potential, are embroiled in strict bureaucracy, and adhere to the traditional philosophy (Ranga and Etzkowitz 2011; Razak and White 2015). The role ascribed to universities in developing countries is constricted to teaching, and university innovations are not utilized by industries, as universities are stigmatized as 'skilled workforce producers' (Etzkowitz and Dzisah 2008; Nwagwu 2008). Even when adequate research capacity existed in the universities, the priority was given to importing technologies instead of stimulating endogenous innovations as a reflection of the colonial and neo-colonial mentality (Etzkowitz and Dzisah 2008). Consequently, Fussy (2019) reported the fragmented relations among Triple Helix actors as the main factor undermining the research process in Tanzanian universities. Issues regarding the overall governance quality (e.g., corruption) are also identified as a major factor that dissuades involvement in joint research initiatives (Nwagwu 2008).

The above-discussed instances are relevant for transition economies as well. While transition economies share many characteristics with developing countries, they are distinct due to the political economy of the Soviet Union and the historical absence of a private sector (Ofer 2001; Keren and Ofer 2007). It is worth noting that case studies on transition economies in the TH literature are underrepresented (see Galvao et al. 2019), and the existing post-Soviet TH research is dominated by Russia (see Bychkova et al. 2015; Dezhina 2015; Grasmik 2015; Balzer and Askonas 2016), leaving the rest of the post-Soviet context mostly unexplored for TH research. However, the incumbent review of the sparse literature reveals further barriers, such as the perpetuation of Soviet-like, linear, top-down innovation practices (Agapitova and Watkins 2004; Varblane et al. 2008) and asymmetric representation of stakeholders and decision-making issues (Chekanov 2022).

In light of the call of (Razak and White 2015) on the identification of further barriers to a working TH, our study explores post-Soviet Azerbaijan, which hitherto been outside the scope of scholarly inquiry in TH literature.

### 3. Materials and Methods

#### 3.1. Research Strategy and Case Selection

Through this study, our intention is to investigate the interaction barriers in U-I-G relations stemming from intra-organizational cultures and how this affects structural change within the innovation system of a transition economy. Driven by the essence of this inquiry, we have taken Azerbaijan as a representative case study. Azerbaijan has a communist past and, in recent years, has devised ambitious innovation policies but has never been subject to the research TH literature (Aliyev et al. 2023). Therefore, it provides a fertile ground to conduct research in line with the central aim of this study.

Since the research context was previously under-investigated, the research espoused an exploratory approach. The research inquiry, evincing the “how” question, guided researchers to adopt a qualitative case study approach (Yin 2003). A case study is “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident [and] relies on multiple sources of evidence” (Yin 1994, p. 13). Deploying the qualitative case study approach equipped researchers with essential analytical tools to thoroughly examine contextual conditions and provide a comprehensive view of the investigated phenomenon (Stake 2005; Bryman 2016). Previous studies have also integrated a qualitative exploratory approach to study the academia–industry–government interactions at national and regional levels (see Lundberg 2013; Mascarenhas et al. 2020).

### 3.2. Data Collection and Analysis

We conducted semi-structured interviews with 59 participants, consisting of top-level stakeholders from Azerbaijani academia, public and private sectors, and international experts (See Table 1). Of these, 48 were males, and 11 were females. All participants had at least six years of experience in their respective fields. In addition, 28 of the interviewees held PhDs, and 21 had master’s or bachelor’s degrees. This range of qualifications provided a comprehensive set of perspectives and expertise relevant to the study.

**Table 1.** Profile of the research participants.

Occupation	Position
ACADEMIA (HEI)	University Rector (4); Vice-rector (5); Director of the Research Center (3); Executive Director (2).
INDUSTRY (IND)	CEO (1); Founder (2); Manager (1); Member of the Board of Directors (1); Member of the Audit Commission (1); Branch Manager (1); Director (5); Head of the Department (3).
GOVERNMENT (GOV)	Member of Parliament (2); Chairman of the Board (2); Deputy Chairman of the Board (2); Head of the Department (2); Head of the Sector (2); Head of the Division (2); Manager (1); Director (1).
EXPERTS (EXP)	Director (1); Professor (2); Associate Professor (2); Assistant Professor (2); Consultant (1); Researcher (6); Head of the Division (1); Head of the Department (1).

Source: Authors’ elaborations.

Interviews enhance the researcher’s understanding of the research domain and facilitate establishing the atmosphere (see Fontana and Frey 2000; Richards 1996). After the ethical approval of the research, one of the two authors contacted and arranged online and face-to-face meetings in Azerbaijan between February and May 2023. The sampling strategy adopted a purposive approach. This sampling process is best suited to obtaining rich information about respondents’ experiences and understanding and allows for explaining the complex reasons underlying how barriers are perceived and resolved (Patton 2002; see, for example, Abuhussein and Koburtay 2021). Purposive sampling is a non-random technique that deliberately chooses the participants that are relevant to the research for their characteristics (Etikan et al. 2016), given that “a small number of well-informed informants are, in fact, a better sample than much larger samples of minimally involved subjects” (Harper 2001, p. 27). Our aim is to achieve a deeper understanding of the phenomenon under study and not saturation for statistical power analysis (Miles and Huberman 1994; Etikan et al. 2016).

The interviews were established in a semi-structured way to gain a better understanding of the complex research inquiry while allowing the participants to express their feelings and perceptions (Meyer 2001; Oun and Bach 2014). We developed an open-ended interview protocol with open-ended questions. The interview questions were cautiously drafted, edited, pretested, and polished (W. C. Adams 2015). The questions were asked

in the Azerbaijani language. Example questions include: “*In your opinion, which actor is currently dominant in academia-industry-government relations in Azerbaijan?*”, “*Do you find the level of interaction among academia, industry, and government organizations satisfactory? Why or why not?*”, “*How do you assess the impact of the Soviet legacy on present-day relations within the academia-industry-government triad?*” All interviews lasted between 60 and 80 min and followed the protocol. We assured anonymity throughout the interviews. The interviews were either recorded as per the consent of the participants or written word by word. Afterward, the recorded interviews were transcribed. We also took detailed notes during the interviews and stored all the data (Yin 2018).

The analysis of data was commenced once the whole interviewing process was completed. The gathered textual data in the Azerbaijani language were analyzed by a researcher who is a native speaker of Azerbaijani, and then the relevant data were translated into English. Throughout the analysis, we first analyzed the interview texts in correspondence to theory, employing a qualitative approach (Dubois and Gadde 2014). Authors underwent multiple rounds of reading of the interview materials (transcripts and notes) for familiarization with the text and to identify patterns and variances (Larkin and Thompson 2012).

Thematic analysis was deployed during the data analysis. Thematic analysis is “a method for identifying, analyzing and reporting patterns (themes) within data”, and it allows to purvey of a nuanced account of data (Braun and Clarke 2006, p. 79). This method further assisted in revealing patterns from data related to the research question (to view the data analysis structure, please refer to Appendix A). The data were categorized beneath themes and subthemes by latent coding, which “goes beyond the descriptive level of the data and attempts to identify hidden meanings or underlying assumptions, ideas, or ideologies that may shape or inform the descriptive or semantic content of the data” (Byrne 2022, p. 1397). We also checked that our interpretations were grounded in the participants’ experiences and understanding without influences and considered all statements as equally important (Sandberg 2005).

### 3.3. Research Context

Azerbaijan, the first secular democracy in the Muslim and Turkic worlds, had been a part of the Soviet Union for 70 years and embarked on the transition path to the market economy in 1991. The initial years of independence are marked by severe economic turbulence and a total decline in economic activity due to the loss of economic links with the former Soviet Republics, domestic political instability, and armed conflict (Cornell 2015). In statistical terms, the cumulative real GDP of the country dropped by 61% between 1990 and 1994, and in 1994, hyperinflation measured by the Consumer Price Index (CPI) skyrocketed by 1,664% (International Monetary Fund 1995). The Azerbaijani economy entered a recovery stage in 1994, as its oil industry revived (Cornell 2015). The oil industry played a crucial role in the erstwhile communist regime (T. Adams 1999; Cornell 2015), and its revival led to the oil boom of 2005–2014 (Aliyev and Gasimov 2018). The consequences of severe politico-economic conditions in the first year of independence had also oriented economic priorities. Namely, building a national innovation system remained out of the agenda (Aliyev et al. 2023). At the same time, this condition provided space for path-dependent tendencies in numerous spheres. Therefore, the impact of the Soviet legacy, which is “the legacy that had to be overcome” (Meyer-Sahling 2010, p. 203), is still relevant within the politico-economic landscape of Azerbaijan, especially in the sense of informal institutions (Cornell 2015; Aliyev 2015; Sayfutdinova 2017).

Despite several state programs, such as the “National Strategy on Information and Communication Technologies for the Development of the Republic of Azerbaijan (2003–2012)” and the “National Strategy for the Development of the Information Society in the Republic of Azerbaijan for 2014–2020”, created to make rapid strides toward the transition to a knowledge economy, the current research structure and R&D expenditures in Azerbaijan resembles the Soviet system. Both public and private sector investments in R&D remain minimal. The Azerbaijani private sector ranks in the lowest place in the South Caucasus for

the percentage of firms invested in R&D (Kuriakose 2013). Consequently, funding of the existing R&D expenditures (86%) comes from the government, with state budget allocations for R&D being approximately 12 times below the OECD average since 2015 (United Nations Economic Commission for Europe 2021; Kheyfets and Naqvi 2018). A total of 70% of these expenditures are salary payments (United Nations Economic Commission for Europe 2021). Against this background, the research system is bifurcated, and a centralized and inefficient National Academy of Sciences remains (Lovakov et al. 2022). Universities primarily focus on teaching and make a limited contribution (9%) to the overall R&D activity (Streitwieser and Valehov 2022; Aliyev et al. 2023).

#### 4. Analysis

We interviewed four distinct groups of informants—representatives from higher education institutions (universities), government officials, industry leaders, and experts in innovative collaboration—to explore the challenges they faced in adapting the university–industry–government (U-I-G) relationship in Azerbaijan. Our inquiry began by identifying the specific role each organization plays within this triadic structure. We then examined how the organizational cultures within these entities influence their operations. Following this, we analyzed how these cultural characteristics shape interactions among the three groups. Finally, our data analysis revealed how these interaction problems contribute to systemic failures within Azerbaijan’s innovation ecosystem.

##### 4.1. Centralized Innovation System

Our interviews with representatives from higher education institutions, government officials, industry leaders, and experts in innovative collaboration revealed a recurring theme: the dominance of the government in shaping innovation processes. This centralized control establishes a “Statist” model of the Triple Helix (TH) in Azerbaijan, where the government holds the predominant role in driving interactions between academia and industry, “*I would say the government is the dominant actor in the academia–industry–government relations*” (GOV-4).

Another reflection was the reliance on state-driven initiatives, which can restrain the development of a more balanced and dynamic collaboration between TH actors. Universities, in particular, may struggle to take proactive initiatives that align with their institutional goals, further solidifying the position of the statist structure.

*“Most of our projects happen with the initiative of the government. At least in our context, from the three organizations you mentioned, the government has a larger role”.* (HEI-9)

An expert representing a segment of opinion within the data supported the view that government leadership is often seen as necessary and pointed to global examples such as China. This approach reflects a perception that innovation cannot advance without government intervention, reinforcing a top-down innovation system.

*“Well, indeed, government leads. I think there always should be a leading actor. There are global examples. Take China; their research is world-class, and the state leads all the processes”.* (EXP-5)

##### 4.2. The Organizational Culture Issues

The longstanding dominance of the government conditioned a situation within each organization in which they are unable to develop an organic culture of their own in correspondence to the mission and vision. Therefore, a kind of mimetic institutionalization, where organizations emulate the government’s hierarchical approach, has been observed.

*“It is not a long time ago that we all were employed in the government. I am talking about the Soviet Union. When the Union was dismantled, some remained in government offices, some went to universities, and some started their own businesses. Of course, those who went to university and business took the philosophy of the state there with them. It is no coincidence that even today, you can hear young employees referring to people in the*



*workplace who are very conservative as ‘Soviet men’. This might remain as a nickname, however, this nickname is given to an approach”. (IND-4)*

*“Besides my current position in the ministry, at the moment, I am a part-time instructor at a university. I don’t see any difference between these organizations when it comes to the way both execute day-to-day operations”. (GOV-7)*

These reflections suggest that despite decades of transition, as a residual of the Soviet era, a government-like institutional culture prevails, stifling innovation and adaptability. The Soviet legacy is particularly entrenched in business practices, as well.

*“It has been more than thirty years since our independence, and I have been in the consulting business for almost two decades. Our middle-size firms have especially started to fully adopt market principles in the last ten years. Previously, I have heard this a lot: we’ll set the price as low as we can and will not care about the rest, and people will buy the products we produce. This was exactly the same mentality within the Soviet state-owned enterprises. Hit the targets and don’t care about the quality. [. . .] Even today, we have much to do in business functions such as marketing, R&D, and quality control [. . .]”. (EXP-4)*

Mainly, there was a consensus among participants that Azerbaijan’s innovation aspirations will remain unfulfilled without deliberate efforts to move beyond these outdated practices.

*“Our past, especially our experience with the Soviet Union, affects the way that our institutions operate and interact today. We must break this path. Otherwise, the ‘Where is our Silicon Valley?’ question will remain topical for Azerbaijan in the following decades”. (EXP-10)*

*“A mediator mechanism beyond some outdated endogenous practices of each organization is necessary to establish a working innovation system. Otherwise, these endogeneities will continue to incarcerate the interactions with solid boundaries”. (EXP-1)*

Inevitably, the problematic aspects of intra-organizational cultures lead to interaction problems, especially in academia.

*“When we say research in Azerbaijan, everyone will understand it as writing and publishing a paper. Researchers don’t think about commercialization or the practical implications of their research. I think this is partly attributable to the environment that they work. We need more encouraging ecosystems, this can stimulate mutual learning as well”. (HEI-8)*

#### 4.3. Interaction Issues

##### 4.3.1. Hierarchy

According to the governors and managers of the universities, interaction problems could be explained by several factors. In their view, the main problem in interaction lies in the bureaucracy, which is also a residual of the Soviet era.

*“Why can we not train our own engineers and experts? The answer partially lies in bureaucracy. It prevents undertaking result-oriented activities”. (HEI-1)*

*“Sometimes contacts happen in the academia-industry-government triangle, but I don’t know whether we can define it as interaction”. (HEI-2)*

*“There is an obvious problem in interacting with other organizations, even for the basic things”. (IND-6)*

*“We [universities] are subordinate to the Ministry in launching new programs. Most of the time, they are not considering our request for the programs but opening entirely different ones”. (HEI-6)*

*“The roots of the problems regarding knowledge generation and dissemination in Azerbaijan can be traced back to the USSR. The serious influence of the experience left over from*

*the Soviet Union is actual today. Some formal and informal traditions even continue today". (HEI-7)*

The role of hierarchy also resonates in both the government and industry sides. When asked about the greatest difficulties in the generation of innovation, government officials and business leaders answered in line with the HEIs. Firstly, the background for this collaboration is hampered by decades of hierarchical organization.

*"Every organization has its own culture and internal practices that accumulated over decades. The government is embroiled in bureaucracy, the private sector acts for its own sake, and the universities are governed like administrative organizations. These realities prevent effective communication". (GOV-10)*

Secondly, such rigid structurization paves the way for coordination issues. "[T]here is a clear coordination problem, which affects the capability-building process of all relevant organizations" (IND-3).

#### 4.3.2. Insufficiency

The other line of concern is the lack of the resources, capabilities, and equipment required to fulfill the task. Here, the given statements aim at the outdated technical basis and infrastructures. Without modern resources, the academic actors in the TH triad struggle to keep pace with global standards, which inevitably undermines their efforts to engage in innovation. *"The condition of the workplace in terms of equipment is not satisfactory. Our computers do not fully meet modern requirements. We do not have access to international databases" (HEI-7).*

Additionally, the insufficiency in terms of the absorptive capacity of private sector actors was highlighted. The limited capability of the private sector to engage with science or innovation diminishes the potential for productive collaboration. *"Which private company needs science or innovation in Azerbaijan? ... [T]he capacity of our private sector is minimal" (HEI-13).*

Similarly, the insufficiency of the resources in terms of capabilities (e.g., human capital and labor force) for spurring innovation is widely acknowledged.

*"Apart from one or two universities, resources are not coordinated towards investment in human capital and other value-added capabilities". (GOV-11)*

*"Incompetent human resources exist in almost every organization. Especially in the complex tasks, the result of the work they are performing is a failure". (EXP-3)*

*"[T]he majority of the labor force does not meet modern requirements in the labor market". (GOV-11)*

*"Global competition is based on technology nowadays. Artificial intelligence or biotechnology with current human resources? No, it is too far for us". (IND-5)*

Even when individuals invest in their education and acquire the necessary skills, inadequate financial incentives often push them to seek opportunities abroad. This "brain drain" further weakens the country's capacity to build a fully operational innovation system. *"Although people invested in themselves in the sense of education get employment, after a while, they don't find the financial remuneration enough and migrate abroad". (GOV-15)*

#### 4.3.3. Misconception

The feeling of distrust is widely diffused in the industry. The business enterprises of Azerbaijan complain about the inability of universities to train the personnel needed for the industry, for example, with competencies regarding the current trends of technological innovations and with the skills that are supposed to shape the identities and attitudes of entrepreneurs, like creativity. As this discontent reflects the mirror sentiment of universities concerning the industry's openness to academia, it reflects a broader distrust about the partners' role in the relationship. Because of incommunicable needs or misalignment of goals between the parties, the collaboration is doomed to fail.

*“In fact, universities cannot train personnel. The organization I lead needs engineers. While hundreds graduate from the engineering faculties every year, I can’t find human resources with the required skills”. (IND-1)*

*“Innovation, entrepreneurship, these are matters of creativity, worldview, knowledge, and experience, of course. In the Soviet times, there was no such profession as called ‘entrepreneur’. It was an element of capitalism, and we had our communist norms. However, in one night, everything had changed, we were supposed to produce innovative products and ideas”. (IND-13)*

*“They [private sector] think that a new university graduate shall be fully competent and experienced to solve all the work-related tasks. It is simply impossible”. (HEI-4)*

*“The private sector simply has no belief that interacting with universities can give them something monetizable”. (HEI-14)*

Indeed, misconceptions exacerbate the divide between the expectations of business enterprises and the actual outcomes of the Triple Helix (TH) collaboration. This growing rift often results in the formation of stereotypes toward other actors in the system.

*“We have talented researchers, but again, certain stereotypes build a wall on them”. (EXP-2)*

*“Specific stereotypes regarding each organization also play a role in hindering relations, which can generate and diffuse knowledge”. (EXP-3)*

*“Sparse institutionalization brings distrust”. (EXP-8)*

*“Universities are not treated as serious organizations; their graduates are not considered competent, and even their research results with some potential are neglected. It discourages future endeavours and preserves status-quo”. (EXP-16)*

*“Yes, there is an incompetent segment in the labor market. But do we even fully utilize the competent ones?”. (EXP-9)*

The minimal extent of the alignment between expectations and reality in academia-industry relations could yield profound consequences. Such a mismatch could lead to the underutilization of the human resources.

*“In the sense of university-government-industry relations, a new graduate can remain unemployed due to failure in coordination even though relevant jobs exist. This stimulates brain drain”. (GOV-8)*

#### 4.4. Systemic Failure

The failure in collaboration among TH actors generates a systemic effect. As a result, the activities geared toward innovation remain at a very early stage.

*“We have global innovation indexes on hand, and obviously, they are not satisfactory. I think we can do a lot better than that. We have to somehow identify why our outputs are lower than inputs. If we answer this question, we’ll also handle failures”. (HEI-3)*

The systemic failure not only creates a stasis in the innovation system but also stimulates path-dependent tendencies of government intervention in the innovation system, which is identified as the “Statist” model of TH in previous responses.

*“I believe rather than working particularly on organizations, we have to work on ecosystems. In my view, the basic ‘demand-supply’ relations could help us to move beyond failures. I mean, if there is, say, a startup ecosystem, firms will invest in them and demand universities to provide knowledge and human resources. Universities will start to compete and even could ask for more funding to enhance their performances. Consequently, all these organizations will be stakeholders in that startup ecosystem. Otherwise, every organization will continue to act on its own with inertia, and the government will again be obliged to coordinate all in terms of innovation”. (EXP-9)*

## 5. Discussion

We interpreted the interviews to understand how respondents from (1) higher-education institutes (HEI), i.e., universities, (2) industry (i.e., business enterprises), (3) the government, and (4) experts in the university–industry–government relationship reflect on the difficulties in advancing innovation. In the same fashion as [Lenfle and Söderlund \(2019, p. 1723\)](#) did on large-scale innovative projects, our scope is to investigate “*how coordination and communication among the individuals involved in such [triple-helix innovative] projects unfold*”. Our objective was to link the micro-level mechanisms within each TH organization to the meso-level interaction problems and to the macro-level innovation system dynamics ([Cai and Etzkowitz 2020](#)).

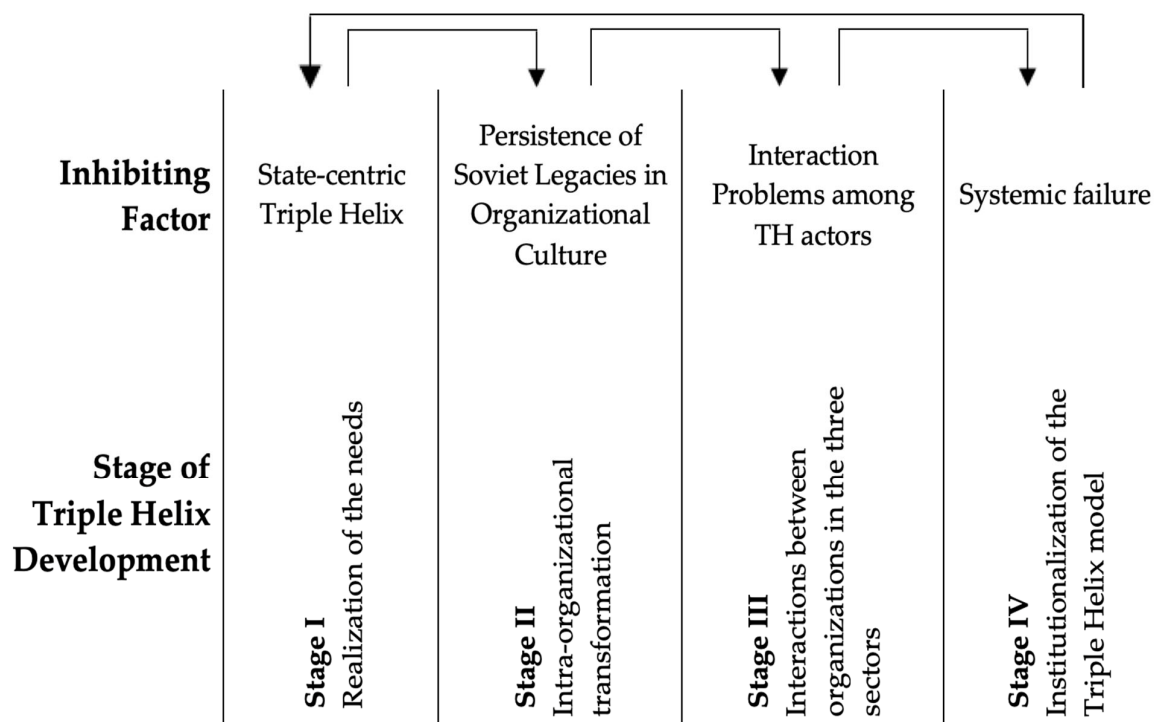
While TH has been previously employed in the context of transition economies (for Russia, see [Bychkova et al. 2015](#); [Dezhina 2015](#); [Balzer and Askonas 2016](#); for Ukraine, see [Yegorov and Ranga 2014](#); for Kazakhstan, see [Colapinto 2020](#); for Armenia, see [Inzelt 2015](#)), no analogous research has been undertaken in the Azerbaijani context to study U-I-G relations from the organizational culture dimension and discuss its implications for a structural change within the national innovation system ([Aliyev et al. 2023](#)). Hence, by examining contextual effects and idiosyncratic elements of the Azerbaijani innovation system, we increase the context sensitivity of TH ([Cai 2014](#))

Our first observation from the interview statements regarding the role of the actors displays that there is a “Statist” model of TH that exists in Azerbaijan. In this model, “government plays the lead role, driving academia and industry, but also limiting their capacity to initiate and develop innovative transformations” ([Ranga and Etzkowitz 2013, p. 239](#)). This perspective is affirmed by our results as well. The noted factor prevents the evolution of new organizational cultures, therefore leading to the preservation of the government-like mimetic institutionalization and intra-organizational relics of the Soviet past. By investigating the organizational culture aspect in post-Soviet Azerbaijan, we developed the work of [Erosa \(2012\)](#). Contrary to [Razak and White \(2015\)](#), who identified different work cultures among universities, industry, and government as an impediment to the Triple Helix model, we found that extreme cultural proximity among these organizations appears to exacerbate interaction problems.

We also identified that as a result of the influence of the “Statist” model of TH on organizational culture, three interaction problems arise. The first one refers to the burden of a tight hierarchy in the interactions between the universities and the other actors in the collaborations. The second refers to the inadequacy of resources or equipment to properly fulfill the mission for which the actors are called to collaborate, which results in poor innovative performance. The third relates to the mismatch between the reciprocal expectations of the actors taking part in the collaboration for what concerns the capabilities of the partners. We labeled them as *hierarchy*, *insufficiency*, and *misconception*. The first deals with the notions of the Soviet legacy on the Triple Helix relationship, the second is the limited endowment of the singular actor, and the third is the overestimation of the partners’ contribution to the collaboration and its outcome. The interaction-related three sub-themes highlight the burden of the past, i.e., the Soviet legacy, that affects the premises of the Triple Helix collaboration, the misalignment with the real possibility of interactions with the other partners of the collaborative relationship, and the inadequate juxtaposition of resources and tasks that hamper the relations and is a bridge between the other two sub-themes as it is the result of the rigid and planned economy and the cause of the mutual misalignments between needs and resources, so to elude an efficient integration. By explaining the impact of the Soviet past on the current innovation systems, these insights add to the work of [Mussagulova \(2021\)](#).

The interpretation of interviews further revealed that interaction problems condition dysfunctions in the innovation system of Azerbaijan and lead to systemic failure. Such a systemic failure creates a basis for excessive government coordination in the innovation system, which is defined as “Statist” TH. Our conceptualization of the impediments to the evolution of the innovation system in a transition economy extends beyond the current state

of knowledge. As illustrated in Figure 1, a recursive cycle inhibits the 4-stage evolution of the Triple Helix (TH) proposed by Cai (2013 as cited in Cai 2014) in Azerbaijan. Innovation policies in transition economies have overemphasized the establishment of links between innovation actors that are “weak” and “unreformed” (Radosevic 2011, p. 376), resulting in a lack of substantial progress. Our framework sheds light on the root cause of the paralysis in Azerbaijan’s TH system, revealing that merely pushing for connections between these actors will remain ineffective without addressing the underlying issues identified by this research. To overcome the noted systemic barriers within Azerbaijan’s innovation system, several actions are necessary. Decentralization should be prioritized to depart from the state-centric Triple Helix (TH) model, allowing TH actors to independently recognize and meet their specific needs. This will facilitate the evolution of new organizational cultures within academia, industry, and government, driven by a new generation of professionals with modern mindsets. In parallel, capacity-building initiatives are vital to enhancing the competencies of these actors, bridging the current gaps between policy and practice. Public–private partnerships should also be strengthened to reduce distrust and encourage more effective collaboration among TH actors. Finally, while the government will still play a significant role, it should focus on providing enabling conditions for innovation, including policy reforms, R&D incentives, and support mechanisms for intellectual property rights, rather than maintaining central control over innovation processes.



**Figure 1.** The Cycle of Impediments to TH Development in Azerbaijan. *Source:* Authors’ interpretation of Cai (2013 as cited in Cai 2014).

### 6. Conclusions

Our study is one of the few to link the micro-level mechanisms within each TH organization to the meso-level interaction problems and to the macro-level innovation system dynamics to study Triple Helix in a transition economy. As the triangle of academia, industry, and government is key in today’s innovation landscape, the matter is even more urgent for countries that need innovation to transform their socio-economic system. However, the TH must first free itself from the burden of the past. The legacy of the earlier economic regime, in the case of Azerbaijan, the Soviet era, resonates through the years and has left a trace in the hierarchical and top-down governance of the innovation system.



The evolution and persistence of the “Statist” model of TH acts as a hindrance to the inception of the emergence of organic intra-organizational cultures through the preservation of state-like mimetic institutionalization and residuals of the past. This is reflected in the interaction issues underpinned by several sub-themes or factors that we documented. For instance, bureaucracy is indeed a core concern for universities that are trying to innovate their attitude and their scope. The difficulties of universities are reflected in the paucity of resources, an insufficiency that is shared with industry, causing a lack of the minimum skills, resources, capabilities, and technologies to catch innovation trends. Another interaction-related sub-theme of insufficiency is partly the result of bureaucracy and of the late conversion to innovation, again a legacy of the Soviet era. The consequence of this is found in the third interaction-related sub-theme, misconception, which sums together mistrust and misalignment with the partners in the collaboration. Actors expect too much from their counterparts and tend to become disaffected by the collaboration. The source of these is in the common past of hierarchical control and insufficiency of resources.

In this perspective, the innovation process is not hampered by a too-wide distance between academia and industry, but it is instead the common issues that make the partners too similar and with not enough different resources to combine. As a result, a systemic failure in the innovation system of Azerbaijan becomes inevitable, which necessitates government intervention to coordinate innovative activities, strengthening the “Statist” model of TH.

#### *Recommendations for Future Research and Limitations*

While there is widespread recognition that innovation is essential for addressing the challenges of transition economies, tackling the structural issues within the innovation process itself is critical. This study contributes to the literature by shedding light on the barriers to innovation in transition economies, particularly those shaped by institutional legacies. However, several limitations must be acknowledged.

First, the findings of this study are based on the specific case of Azerbaijan. Although they offer valuable insights into the obstacles faced by Azerbaijan’s innovation system, more research is necessary to verify the applicability of these results to other transition economies. Comparative studies that examine similar economies could help identify commonalities and differences, providing a broader understanding of how institutional barriers impact innovation in different contexts. Such research should also aim to identify actionable solutions to invigorate the Triple Helix (TH) mechanism and suggest novel strategies to foster innovation in these economies.

Additionally, this research adopted a qualitative approach. While this method provided rich, contextual insights, future research would benefit from the use of quantitative methods, such as surveys and inferential statistical analyses, to test and generalize findings across larger samples. Quantitative research could also help clarify the degree to which various barriers impede innovation and explore potential correlations between institutional structures and innovation outcomes.

Finally, future studies should consider incorporating the *Civil Society Helix* into the TH model, particularly by employing the Quadruple Helix framework. This would broaden the scope of the research by including civil society as a key player in innovation ecosystems, especially in terms of social innovation and sustainable development. Understanding the role of civil society in shaping the innovation landscape could offer valuable insights for policymakers and stakeholders seeking to create more inclusive and dynamic innovation systems.

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## Appendix A

**Table A1.** Structure of data analysis. *Source:* Authors' elaborations.

Themes Subthemes	Representative Quotes
Centralized Innovation System	<p>"I would say the government is the dominant actor in the academia-industry government relations". (GOV-4).</p> <p>"Well, indeed, government leads. I think there always should be a leading actor. There are global examples. Take China; their research is world-class, and the state leads all the processes" (EXP-5)</p> <p>"Most of our projects happen with the initiative of the government. At least in our context, from the three organizations you mentioned, the government has a larger role" (HEI-9)</p>
Organizational Culture Issues	
State-like mimetic Institutionalization	<p>"It is not a long time ago that we all were employed in the government. I am talking about the Soviet Union. When the Union was dismantled, some remained in government offices, some went to universities, and some started their own businesses. Of course, those who went to university and business took the philosophy of the state there with them. It is no coincidence that even today, you can hear young employees referring to people in the workplace who are very conservative as 'Soviet men'. This might remain as a nickname, however, this nickname is given to an approach" (IND-4).</p> <p>"Besides my current position in the ministry, at the moment, I am a part-time instructor at a university. I don't see any difference between these organizations when it comes to the way both execute day-to-day operations" (GOV-7)</p>
Intra-organizational residuals of the past	<p>"It has been more than thirty years since our independence, and I have been in the consulting business for almost two decades. Our middle-size firms have especially started to fully adopt market principles in the last ten years. Previously, I have heard this a lot: we'll set the price as low as we can and will not care about the rest, and people will buy the products we produce. This was exactly the same mentality within the Soviet state-owned enterprises. Hit the targets and don't care about the quality. [...] Even today, we have much to do in business functions such as marketing, R&amp;D, and quality control [...]" (EXP-4)</p> <p>"Our past, especially our experience with the Soviet Union, affects the way that our institutions operate and interact today. We must break this path. Otherwise, the 'Where is our Silicon Valley?' question will remain topical for Azerbaijan in the following decades". (EXP-10)</p>

Table A1. Cont.

Themes Subthemes	Representative Quotes
<b>Interaction Issues</b>	
Hierarchy	<p>“Why can we not train our own engineers and experts? The answer partially lies in bureaucracy. It prevents undertaking result-oriented activities” (HEI-1)</p> <p>“We [universities] are subordinate to the Ministry in launching new programs. Most of the time, they are not considering our request for the programs but opening entirely different ones” (HEI-6).</p> <p>“Every organization has its own culture and internal practices that accumulated over decades. The government is embroiled in bureaucracy, the private sector acts for its own sake, and the universities are governed like administrative organizations. These realities prevent effective communication” (GOV-10)</p> <p>“[T]here is a clear coordination problem, which affects the capability-building process of all relevant organizations” (IND-3)</p>
Insufficiency	<p>“The condition of the workplace in terms of equipment is not satisfactory. Our computers do not fully meet modern requirements. We do not have access to international databases”. (HEI-7)</p> <p>“Which private company needs science or innovation in Azerbaijan? . . .[T]he capacity of our private sector is minimal” (HEI-13)</p> <p>“Universities, for instance, are stuck to the inertia and continue to operate on this basis. As a result, human capital prepared by the university is not meeting the expectations” (GOV-12)</p> <p>“Global competition is based on technology nowadays. Artificial intelligence or biotechnology with current human resources? No, it is too far for us” (IND-5)</p>
Misconception	<p>“In fact, universities cannot train personnel. The organization I lead needs engineers. While hundreds graduate from the engineering faculties every year, I can’t find human resources with the required skills”. (IND-1)</p> <p>“They [private sector] think that a new university graduate shall be fully competent and experienced to solve all the work-related tasks. It is simply impossible” (HEI-4)</p> <p>“Yes, there is an incompetent segment in the labor market. But do we even fully utilize the competent ones?” (EXP-9)</p>
<b>Systemic failure</b>	
	<p>“We have global innovation indexes on hand, and obviously, they are not satisfactory. I think we can do a lot better than that. We have to somehow identify why our outputs are lower than inputs. If we answer this question, we’ll also handle failures” (HEI-3)</p> <p>“I believe rather than working particularly on organizations, we have to work on ecosystems. In my view, the basic ‘demand-supply’ relations could help us to move beyond failures. I mean, if there is, say, a startup ecosystem, firms will invest in them and demand universities to provide knowledge and human resources. Universities will start to compete and even could ask for more funding to enhance their performances. Consequently, all these organizations will be stakeholders in that startup ecosystem. Otherwise, every organization will continue to act on its own with inertia, and the government will again be obliged to coordinate all in terms of innovation” (EXP-9)</p>

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