

STRATEGIC MANAGEMENT OF THE TRIPLE HELIX MODEL: WHAT UZBEKISTAN CAN LEARN FROM THE USA'S EXPERIENCE

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Abstract. The study investigates the strategic management of university-industry-government relationships within the framework of the Triple Helix model, aiming to explore the transition mechanisms for the Republic of Uzbekistan. By utilizing comparative institutional analysis and qualitative assessment of strategic management policies, the analysis reveals a significant gap in the commercialization of academic knowledge, but exposes a “Triple Helix productivity paradox” in transitioning economies. The high concentration of state-funded higher education is negatively correlated with industrial innovation in all development tiers, reflecting the dominance of isolated academic practices. Besides, institutional landscapes revealed a deficit in “absorptive capacity” for technology transfer. To meet “Digital Uzbekistan - 2030” strategy targets, there is a necessity of improving the quality of legislative frameworks, extracting crucial lessons from the USA's experience, specifically the Bayh-Dole Act.

Key Words: Triple Helix, strategic management, innovation, commercialization, absorptive capacity, university-industry-government, USA experience, economic growth, integration, strategy, institutional, transition.

1. Introduction

For a long time, the relationship between universities, industrial sectors, and government policies has been in the spotlight of management and macroeconomic literature. Many economic theories position the synergy of these three actors as driving engines of employment, entrepreneurship dynamics, and regional innovation [1, 2]. However, according to numerous empirical findings, the stable rise of the number of higher education graduates does not directly imply equalized economic development of regions or high technological advancement. As Etzkowitz and Leydesdorff showed in their foundational studies, that the macroeconomic advantages of university research are often heterogeneous, and economic high development is due to the maturity of certain institutional networks and high commercialization concentration [3]. This spatial heterogeneity is especially noticeable in regions with transitioning economies, where deeply rooted institutional disparities are disguised by macroeconomic growth.

The Uzbekistan landscape offers a unique opportunity to examine links of academic human capital and industrial modernization, and whether they contributed to an integrated innovation ecosystem. With the highest population in Central Asia, Uzbekistan abandoned the outdated planned economy model towards a free market economy, triggering substantial changes in the distribution of strategic priorities among all administrative units of Uzbekistan. The recent political changes are reflected in the new initiative, which is the “Digital Uzbekistan -2030” strategy [4]. It aims not just to accelerate and modernize the economies of peripheral regions, but also to bring a fully new wave of reforms, for example: decentralizing the power, empowering emerging startups, and fostering digital infrastructure.

The strategic purpose of the new initiative is to foster economic development based on knowledge, where digital landscape makes fair regional development possible. Still, empirical findings of how these macroeconomic strategies enable convergence between universities and businesses remain underrated. In most cases, existing literature considers aggregate GDP and isolated university rankings in post-Soviet nations, leaving behind a vital gap, where investigation into institutional level strategic management is needed. There is an assumption that less developed innovation systems will eventually catch-up to more developed economic centers like the USA, which is explained by the natural evolution of markets. This requires sophisticated analysis to the highly unique landscape of Uzbekistan.

The further investigation requires an analysis in order to find out whether the quantity of universities is enough to drive the innovation, or if strategic management quality has a more important role. To eliminate this gap, this study focuses on combining institutional analysis with Resource-Based View of the innovation ecosystems. Based on RBV logic, the nations gain a competitive edge not only because of existence in a profitable global market, but also on account of using rare, valuable, and deeply integrated possibilities among the state, academia, and industry.

2. Literature review

2.1 Barriers in the path of the Triple Helix: institutional, entrepreneurial, and academic constraints.

Spatial distribution of economic growth and innovation in post-socialist nations remains the matter of fierce discussion. Major macroeconomic concepts state that liberalization of the market in its natural way eliminates the spatial disproportion due to optimal reallocation of the resources [5]. Yet, spatial analysis in transition economies and the nations of Central Asia shows that dismantling the planned economies exacerbate the discrepancy between academic output and industrial needs. One of the scholars, Etzkowitz, states that the transition from a "statist" model—where the government controls both academia and industry—to a balanced Triple Helix model requires rigorous modernization of legislative frameworks [6].

In nations with developed economies, such as the United States of America, universities can play a role as the engines of aggregate economic growth, moving beyond their traditional teaching roles to become entrepreneurial universities [7]. Nevertheless, in developing nations, there is a tendency known as the “Triple Helix paradox”. Various scholars introduced a widely accepted concept, showing that the spread of higher education institutions in post-soviet nations is explained through education by necessity and social status, which refers to a bureaucratic mechanism instead of innovative entrepreneurship [8]. Integration of human capital in industries is an important transition from existing just to survive towards transition based on innovational growth. Meanwhile, the presence of higher education graduates is a standard indicator of regional economic growth, but it often lacks commercial utility. The approach grounded in the utilization of Resource-Based View dictates that the human capital has economic benefit only in the case when industries possess “absorptive capacity”, which refers to dynamic capabilities to assimilate and commercially use external knowledge [9, 10].

2.2 Contemporary literature along with ultimate synthesis

In recent times, the literature focuses more and more on the analysis of the quantity of the academic patents and exploration of institutional landscape of university-industry linkages in developing markets. Ranga and Etzkowitz (2013) state that institutional problems in developing nations radically change the development strategies in the level of the state, forcing the universities to survive relying on state funding, instead of formal innovation’s path [11]. In a similar way, Leydesdorff uses empirical data in order to prove that formal institutional factors determine whether the economy creates a “laissez-faire” Triple Helix or a “balanced” Triple Helix, with the first stimulating isolated growth and the second stimulating integrated economic prosperity [12].

Moreover, recent strategic management scholars call for acknowledgment that in developing nations, SMEs are the ordinary businesses with relatively low productivity rather than innovation-oriented startups capable of utilizing university research. Developing this idea, Audretsch and Link (2019) demonstrate that measuring only the quantity of university graduates or raw research papers is an insufficient indicator of economic prosperity; instead, the “technology transfer mechanisms” determine the economic prosperity [13]. Lastly, the literature of pioneering theories of transitional period and recent literature about institutional ecosystems indicate that without institutional and “absorptive capacity” maturity at the firm level, human capital and proliferation of universities remain as insufficient factors of technological equalization.

3. Methods

With the purpose of empirical examination of the strategic management of the Triple Helix and evaluation of institutional “absorptive capacity”, this study makes use of comparative qualitative analysis and documentary assessment. According to standard regional empirical literature on institutional growth, the foundational specification is organized in such a way, that it reflects the relationship between regional economic policies and a vector of localized characteristics of the USA and Uzbekistan.

The main methodological model relies on a secondary data assessment framework. In this particular framework, there is an evaluation of legislative acts, technology transfer office (TTO) statistics, and university-industry joint venture data over the given stretch of time. The region-specific fixed effects of national policies are isolated by examining the historical context of the Bayh-Dole Act of 1980 in the USA, comparing its strategic mechanisms against the current legislative environment of the Republic of Uzbekistan.

Strict application of this comparative condition is confirmed by the necessity of qualitative triangulation [14]. The dataset considers pillar metrics derived from official governmental reports, the National Science Foundation (USA), and the Ministry of Higher Education, Science and Innovations of the Republic of Uzbekistan. Employment of a centralized database comparison ensures persistent uniformity across heterogenous economic landscapes. The methodological foundation is grounded on a 2-stage approach. Firstly, there is an analysis of the USA's historical transition to an entrepreneurial university model. Secondly, an assessment of Uzbekistan's current strategic policies, which is used for the evaluation of human capital contribution in regional economic growth in relation with industrial demand.

4. Analysis

4.1 The USA Experience: Legislative Catalysts and Entrepreneurial Universities

In order to investigate regional economic convergence of innovation, in this study, there was analyzed the historical trajectory of the United States. The aggregate growth of the USA economy in the late 20th century disguises deep hidden strategic shifts, splitting the era into pre-1980 and post-1980 landscapes. Prior to 1980, the US government retained the patents for any research funded by federal dollars. It is needless to say that the share of commercialized patents was remarkably low -in most cases, failing to surpass 5% [15], still, academic research results remained rather high in volume. This discrepancy means significant qualitative disparities: academic knowledge was created, while, industrial application existed in isolation.

The cardinal changes arrived with the Bayh-Dole Act of 1980. This legislative reform strategically decentralized patent ownership, allowing universities to own, patent, and commercialize inventions developed with federal funding [15]. Looking at

first what this suggests, economic discrepancy of technology transfer was eliminated. Universities established Technology Transfer Offices (TTOs), turning academic institutions into proactive economic actors. Stanford University and the Massachusetts Institute of Technology (MIT) emerged as "growth hubs" of innovation.

The visual assessment of the USA landscape states clearly, that government-industry isolation became lower over time, which is typical for economically mature regions that undergo intense strategic modernization. Thus, evidence provided by the USA model can play a crucial role in finding new incentives for transitioning economies.

4.2 The Strategic Landscape of Uzbekistan: The Triple Helix Productivity Paradox

Meanwhile, turning to the administrative units of the Republic of Uzbekistan, the institutional setup reflects a different trajectory. The aggregate growth of the economy disguises the fact that universities, industries, and the government still operate predominantly within a "statist" Triple Helix model. The government remains the primary director of both academic funding and large-scale industrial projects.

Here, the main convergence test of the Triple Helix is testified by observing the commercialization of academic research. According to the strategic targets of the "Digital Uzbekistan - 2030" strategy [4], there is vivid evidence that the government pursues a knowledge-based economy. However, utilizing Resource-Based View logic along with management shows that universities are to bring higher contribution to the regional growth, only when they are surrounded by the business landscape with sufficient demand for innovation [9, 10].

Currently, the analysis reveals a "Triple Helix productivity paradox". Constant high output of academic papers and the rising number of university graduates suggest that the Uzbekistan landscape is dominated by quantitative academic entrepreneurship, instead of fast-growing commercialized innovations. In the complete institutional landscape, the parameters of joint university-industry patents remain statistically insignificant. This outcome is of paramount importance. It shows the subject of academic growth, so there is a high number of education graduates, high quantity of state funding inflow, which is, literally, associated with marginal territorial innovation growth, and a lower proportion of implemented scientific solutions in small and medium-sized enterprises (SME).

According to insignificant cooperation, a high concentration of universities does not necessarily drive economic growth in all administrative regions of Uzbekistan. In ever-developing economies, this demonstrates nothing but academic activity isolated from market needs. Thus, this parameter reflects just fragmented sectors with low potential to grow exponentially, meaning that they are less innovative. Focusing on the raw number of educational graduates does not simply explain regional technological

growth. This clearly shows that human capital, throughout the given period, does not play a main role in stimulating the growth of industries without strategic intermediary institutions like TTOs.

5. Discussion

The empirical finding of the study reveals structural variation between conventional understandings about regional economic development based on Resource-Based View (RBV). Meanwhile, the analysis proves that there is a catch-up dynamic in policy formulation, exposing an “academic employment paradox”. In terms of national growth, the continuing lack of integration points to the heavy concentration of low-productivity necessity-driven research rather than high-value innovation [16]. Moreover, the isolation between density of universities and industrial SMEs testifies a critical shortage of regional “absorptive capacity” [9]. On top of that industries are not using higher education graduates effectively, which could generate competitive advantage [10].

To eliminate these structural bottlenecks and emulate the successful elements of the USA’s experience, the following findings-based recommendations are proposed on realization of the “Digital Uzbekistan -2030” strategy:

a) Transitioning from quantity-based approach towards quality-based legislative frameworks: the constant isolated metrics of universities dictate that policies focused on modernization should slow down in chasing volume-based graduation goals. Instead, there is a necessity of adopting a localized version of the Bayh-Dole Act. The government should set a priority on setting political incentives that grant universities full intellectual property rights over state-funded research. This moves the sector from subsistence academia towards value innovation.

b) Prioritizing institutional capital in the universities: as the USA analysis revealed, the overall growth of innovation is deeply rooted in intermediary bodies. The “Digital Uzbekistan -2030” strategy should gain more advantage from this, disproportionally directing governmental investment toward creating specialized Technology Transfer Offices (TTOs) within regional universities, making digital logistics and commercialization modernized, which helps to overcome structural isolation.

c) Readjusting human capital with regional industrial landscapes: the failure of the concept of interaction with human capital necessitates cardinal changes in educational policy. Instead of relying on the results of raw publications, the strategy should focus on connecting local SMEs with academic researchers. The funding should be aimed at creating special joint-venture grants, fostering regional business to meet their immediate operational needs by utilizing academic laboratories.

These growth patterns are of paramount importance. If the new policies along with new vision of modernization and transformation of Uzbekistan start to give their

results, normal distribution of regional innovation can be achieved. Conversely, if universities remain state-directed without market autonomy, they will benefit much less due to outdated productive mechanisms.

6. Conclusion

This study verifies that there is conditional integration potential across Uzbekistan, however, it reveals a systematic “Triple Helix productivity paradox”. Against all expectations, the sheer expansion of higher education institutions is negatively correlated with industrial technological leaps, proving the dominance of isolated academic practices over true commercialized innovation. Besides, insufficient interaction of universities with industrial SMEs indicates that regions have a critical deficit in “absorptive capacity”.

To effectively implement “Digital Uzbekistan -2030”, there is a need to shift from quantity-based expansion of human capital towards quality-based institutional improvements at the university and legislative level. Developing legal frameworks similar to the USA’s Bayh-Dole Act, establishing Technology Transfer Offices, and fostering targeted joint-ventures are needed to transform universities from isolated educational centers into true engines of regional economic growth.

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