

# The Sábato Triangle and the Triple Helix: two Cornerstones of Tourism Engineering

Claudia Tusell-Rey, Ricardo Tejeida-Padilla



**Abstract:** *Tourism Engineering has had times of great development thanks, in part, to the contributions of thinkers around the world. Among the main contributions to this interesting branch of human activity, two cornerstones can be mentioned: The Sábato Triangle and the Triple Helix. The present study intends to clarify the concepts related to these two cornerstones of tourism engineering, especially the interrelations between two impressive contributions to the culture of world tourism. First we will discuss the conceptual work of the Argentine teacher Sábato, and then establish some digressions about the magnificent work of the American thinker Etzkowitz. To conclude, we will establish interrelations that have occurred between two viewing angles for tourism. We will also develop our conclusions on this beautiful subject, and we will propose to the readers some lines of action to make the most of these great ideas, in the daily activities related to tourism professionals, worldwide.*

**Keywords :** *The Sábato Triangle, the Triple Helix, Tourism Engineering, innovation in tourism.*

## I. INTRODUCTION

More than half a century ago, Jorge Sábato and Natalio Botana published an article called "Science and technology in the future development of Latin America" [1]. There, these two Latin American thinkers raised the genesis of a very unique concept, which is currently referred to in the sources of information as "THE SABATO TRIANGLE." It is a triangle of relations between government, science-technology and productive structure, which the authors proposed as a conceptual explanation to the possibilities of innovation in science and technology for Latin America, with a view to the arrival of the Third Millennium.

On the other hand, and as a complement to the Sábato Triangle, "THE TRIPLE HELIX" is an innovation model, whose origins date back to a work by the American thinker Etzkowitz [2]. The concepts were refined with the collaboration that was given between this researcher and Leydesdorff in two works, where they established relations between universities, industry and governments, to promote the economic and social development of the peoples [3, 4].

Both the Sábato Triangle and the Triple Helix have to do with innovation in general,

and in particular scientific and technological innovation and its relationship with companies, with the government, with institutions and is of interest to many professionals in the world. Its relationship with the tourism. Innovation is closely linked to change, as organizations use innovation as a tool to influence an environment or due to their changing environments (internal and external). Some authors suggest that the role of innovation in economic development is closely related to knowledge, consumer goods development, manufacturing work and research. Thus, there is a feedback process, in which as innovations are used, knowledge is updated, and it is possible to foster new innovations.

The effects of innovation in society can be positive or negative, depending on whether or not certain policies are implemented. What is relevant is the mechanisms for adopting, absorbing and adapting innovations, as fundamental processes when designing policies, which in turn feeds the agent's innovative behavior.

The present study intends to clarify the concepts related to these two cornerstones of tourism engineering, especially the interrelations between two impressive contributions to the culture of world tourism.

First we will discuss the conceptual work of the Argentine teacher Sábato, and then establish some digressions about the magnificent work of the American thinker Etzkowitz.

To conclude, we will establish interrelations that have occurred between two viewing angles for tourism. We will also develop our conclusions on this beautiful subject.

## II. RESULT AND DISCUSSION

This section is the most relevant of the present study. In the first two subsections, we will present the central concepts related to the two main themes: the Sábato Triangle and the Triple Helix; and the third and last subsection will be devoted to elucidating the interrelationships between these two relevant models for international tourism.

### A. The Sábato Triangle

According to Alonso [5], the reasoning behind this concept "is as simple as realistic: if a country encourages and develops knowledge and, through it, reaches cutting-edge technologies, in the end it will always be on a competitive stage higher."

The initial work of 1970 was extended by the principal author, Jorge Alberto Sábato, in later years; In this context and supported on some occasions by other authors, he published important works that enriched the concept and brought novelties to his approach, in line with the social movements of Latin America and the world,

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such as defense and the importance of achieving technological autonomy at the level from each country [6-10].

When scrutinizing in various sources, the reader realizes that Jorge Alberto Sábato (1924-1983) is a notable character in his native country, Argentina. According to the magnificent narration of das Neves & Bagattolli [11], at age 18, Sábato begins his work as a teacher of basic education, and then be a physics teacher, journalist and author of textbooks. Then, he works in metallurgy and his performance is such that he is appointed director of the Metallurgy Department of an important advisory company of the National Atomic Energy Commission of the Argentine government. But he continues his professional evolution until he becomes President of Electric Services of Greater Buenos Aires. As if that were not enough, he traveled to England and France where he studied two doctorates, one in metallurgy and the other in Economics and Business Administration; He also taught at universities in England, Canada and the United States, as well as a consultant to international organizations such as UNESCO, the IDB and the OAS.

In this context of deep technological and scientific preparation, the distinguished character begins to reflect from a Latin American perspective and in his thinking permeates the issue of dependence and technological backwardness of Latin American countries. These reflections and ideas are shared, in a certain way, by a group of intellectuals, academics and technologists from Latin America, of which the PLACTED is part: "Latin American thought in science, technology and development" [12].

The three vertices of the Sábato triangle are related to the government, the productive sector and the scientific-technological complex, respectively. Sábato & Botana [1] clearly state that the insertion of science and technology in economic development means, nothing more and nothing less than: knowing where and how to innovate; This is achieved through the coordinated action of the three vertices of the triangle, as a representative model of technological development that allows diagnosing the status of the system of actors involved with scientific-technological development in a given context [13].

The first central concept that emerges from this reading is that the process of technological innovation is closely linked to three factors (which are precisely the three vertices of the Sábato Triangle): the government, the productive structure and the scientific-technological infrastructure.

A second central concept has to do with the consequent position of Sábato before the processes of technological independence of each country in a local way, in front of the great world-wide technological empires. That critical thinking was refined, in its active participation in world bodies such as UNESCO and the OAS.

And a third central concept of this reading is related to the defense that we should all make of technological independence and the importance of achieving technological autonomy, with the undeniable advantage that it means for developing countries.

It is important to note that some authors call the IGE Triangle the Sábato Triangle (I: Scientific-technical infrastructure; G: Government; E: Production structure); In addition, they relate it to a concept called "Porter's

Competitive Diamond" [14, 15].

### B. The Triple Helix

The authors Etzkowitz & Leydesdorff emphasize that the relationships between universities, industry and governments, promote the economic and social development of peoples form a triple helix (the triple helix), which becomes a kind of social laboratory to achieve the economic development of knowledge-based countries [3].

According to das Neves & Bagattolli [11], the triple helix of Etzkowitz & Leydesdorff is a model very similar to the Sábato Triangle, in regard to the interpretation of innovation in the context of a kind of conceptual triangle; the difference is that Etzkowitz & Leydesdorff directly involve universities, while Jorge Sábato and Natalio Botana, in their article [1], consider the relations between government, science-technology and productive structure.

However, both works try with their models to give a conceptual explanation to the possibilities of innovation in science and technology for countries, emphasizing Latin American countries in the case of the Sábato triangle.

Etzkowitz & Leydesdorff [4] start from the premise that universities are living their second academic revolution, by incorporating economic and social developments as part of their mission (in the first revolution research was incorporated as part of the life of university work, according to them).

This results in universities incorporating economic development as another function, apart from their academic and teaching functions; in this way, knowledge is capitalized [16].

This occurs in a complex network of interactions between universities, industry and government, which the authors represent with a "Triple Helix" of "university – industry - government" relations. With this, they analyze the adjustments that are manifested at the institutional level in the model [16].

In this context, Castillo [17] affirms the Triple Helix allows an approach on the importance for the companies, the government and the university of this link for the creation of new knowledge, and of innovation activities for the development of a country.

The author concludes that there is a wide range of studies that contemplate the Triple Helix as a model that is being developed both in Latin America, Asia and Europe. It considers that technological change is necessary so that there is a greater participation in the market and the relationship between the University and the Company is further developed. It also emphasizes that Etzkowitz, through its multiple contributions, generates a conceptualization of the hybrid organization, where the relations of relationship must be specified in actions and projects that meet both the needs of the university, the company and research and development that Present the organizations. [17].

The first central concept that emerges from this reading is that the process of technological innovation is closely linked to three factors (which precisely forms the triple helix): university, business and government.

A second central concept has to do with the authors' position that the triple helix becomes a kind of social laboratory to achieve the economic development of countries, based on knowledge [3].

And a third central concept of this reading is related to the fact that, as Etzkowitz & Leydesdorff [4] affirm, universities are living their second academic revolution, by incorporating economic and social developments as part of their mission, given that in the First revolution research was incorporated as part of the life of university work.

### C. Interrelations between the Sábato Triangle and the Triple Helix

The idea of representing the relations between the government, the productive sector and the scientific-technological complex as a triangle, seems very right to us. Both the initial work of Sábato & Botana [1] and the later works where Sábato refines and extends the concepts related to the triangle, are a sample of the clear and nationalist thinking of Sábato and his co-authors.

The similarities between the two central models of this article, the triple helix of Etzkowitz & Leydesdorff and the Sábato Triangle were masterfully evidenced by das Neves & Bagattolli [11]. They base their analysis in regard to the interpretation of innovation in the context of a kind of conceptual triangle. But they also have notable differences. The difference is that Etzkowitz & Leydesdorff directly involve universities, while Jorge Sábato and Natalio Botana, in their article [1], consider the relations between government, science-technology and productive structure.

Sábato & Botana do not defend the idea of the triangle as their origin, but refer to other thinkers as the original generators of the idea of the triangle; However, the way of conceiving the relationships of factors so relevant to the life of a country is so pragmatic that the underlying ideas allow us to capture the essence of innovation in the economic development process of the different countries that make up Latin America. It is in this context that the active participation of the members of the PLACTED group in the substantive discussions of crucial aspects for Latin American development in the 1970s can be understood.

Unlike Sábato, which represents the relations between the government, the productive sector and the scientific-technological complex as a triangle [1], the work of Etzkowitz & Leydesdorff, with the idea of the triple helix, directly involves universities as an important linkage and innovation factor.

We think it is very relevant that researchers and thinkers of such diverse backgrounds, in the background think similarly and express their torias with small variants.

The purpose of Sábato & Botana [1] is to technological independence, while Etzkowitz & Leydesdorff intend to explain and base the economic development of the peoples as an evolving helix.

### III. OUR PROFESSIONAL EXPERIENCE

The author's professional experience, conceptually shared by the other author, has been located in the field of tourism in Cuba, which is a communist country. In that country, everything is governed by the State and productive activities

in any sector, including tourism, are clearly regulated by state guidelines.

Therefore, it is not easy for us to relate these macro concepts such as the Sábato triangle (which involves the government, the productive sector and the scientific-technological complex) with the daily activities as a professional tourism. However, we can attest to the relevance of innovation in the processes of the tourism industry in any country, regardless of its political system.

From there, we can assume that I am located in one of the vertices of the Sábato triangle, having actively participated in some Cuban tourist operations.

In the the triple helix of Etzkowitz & Leydesdorff case, it is easier for us to relate these concepts of the triple helix with everyday activities as a professional tourism, because universities are involved, and in all our professional tourism life we have had relations with universities. The university activity combined with the tourist work, are closer to the triple helix than with the Sábato triangle (which involves the government, the productive sector and the scientific-technological complex).

Both authors are currently working very seriously on a new research path: the clear and forceful fusion of tourism engineering, with Machine Learning concepts [18, 19]. Specifically, we are exploring the inclusion of themes on the associative models, which so many applications have had in recent years, on various topics of human activity. We are already working on a new model of intelligent tourism engineering, and for this we are formulating the problems of tourism generation with the formalism of intelligent associative models [20-41], as well as concepts such as the Sábato Triangle and the Triple Helix.

### IV. CONCLUSION AND FUTURE SCOPE

It is very encouraging for authors to nurture new ideas, new concepts, which allow us to broaden our vision on such relevant issues as technological innovation. It is very pleasant to know that there have been valuable Latin Americans such as Sábato and his colleagues in the PLACTED group, who had a critical thought about the attacks of the imperialist countries, and published nationalist ideas for the scientific-technological development of Latin America.

As with the Sábato triangle, it has been very encouraging for me to nurture myself with new ideas, new concepts, which allow me to broaden my vision on such relevant issues as technological innovation. It is very pleasant to know that researchers agree on theoretical concepts that can explain the relations of innovation between government, companies and universities.

As future work we propose to carry out actions to deepen these very relevant concepts the Sábato Triangle and the Triple Helix. In addition, we suggest the interested reader to take seriously the relationship with other topics very interesting in tourism engineering and scientific and technological innovation.



We invite the reader to get involved in relevant topics such as the pioneering works of regional innovation systems, where organization and knowledge are considered central elements for the evolutionary trajectory of capitalism; In addition, market success depends on the growing specialization and development of a more effective industrial organization. In contrast, some of the industrialized countries of today, based on their industrial development on a national innovation system, which included the entities of the education system and companies.

Regional processes foster the growth of economies, based on the generation of scientific knowledge, technological development and the crystallization of efforts aimed at innovation processes. A regional innovation system should not be considered as a small national innovation system, because the main difference between the two entities is that an essential characteristic for a regional innovation system, the embedding is almost impossible to present in a national innovation system, due to the large number of factors involved there.

The future of the evolution of innovation processes in the countries of the world depends on how regional innovation systems respond to the territorial challenges of creating synergies; those that will correspond to the needs of generation of technological knowledge and will help produce territorial innovation networks. On the other side, regional innovation systems it is essential to develop typologies that recognize diversity and allow to distinguish between different types of regions, in order to find out how they work and how well they are doing it, in the national innovation system this development of typologies is not required.

All the concepts raised in the previous paragraphs have a close relationship with the triple helix of Etzkowitz & Leydesdorff and the Sábato Triangle, but also with a very important concept: the Porter's Competitive Diamond.

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