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Tourism Development in the city of Rio de Janeiro: Application of Prospective Scenario with the Momentum Method

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Abstract

After the end of the COVID-19 Pandemic, some sectors of the economy have gradually resumed their activities and Tourism has not been different. Thus, Tourism has once again been explored as a means of raising funds and socioeconomic development. In this sense, this study presents an interesting proposal to Public Managers in the city of Rio de Janeiro. Thus, this study aims to present an improvement proposal for the development of Tourism in the city of Rio de Janeiro. To achieve this objective, the Prospective Scenarios approach was used through the Momentum Method. A Framework was used for the practical application of this method. As a result, it was found that this method was able to present prospective scenarios with optimistic, trending and pessimistic approaches in relation to the various variables raised in this study. Therefore, this study achieved its objective of proposing improvements for the development of Tourism in the city of Rio de Janeiro, thus helping Public Managers in decision-making.

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1. Introduction

Tourism is used by several cities as a means of local development. According to [1], representations of tourism as a phenomenon of socioeconomic development is a theme that has received attention since its rise in national higher education in 1971. To foster this development in cities, public managers must create public policies that can promote this development in a sustainable way.

One of the ways to create these scientifically based public policies is by using Operational Research methods already established in the literature. According to [2 - 20], Operations Research is seen as an effective management tool in the most diverse contexts. In this sense, the Operations Research covers the following areas: Mathematical Programming, Game Theory, Simulation and Discrete Events, Graph Theory, Queuing Theory, Multicriteria Decision Support (MCDM), Data Envelopment Analysis, Prospective Scenarios among others [21- 36].

Thus, this article aims to carry out a study of Prospective Scenarios with 3 scenarios (Pessimistic, Tendency and Optimistic) for the development of Tourism in the city of Rio de Janeiro through the operational research method of Prospective Scenarios known as Momentum Method.

This article is divided into 5 Sections. The first section is the Introduction. The second section is the Theoretical Foundation. The third section is the conceptualization of the Momentum Method with the Methodology. The fourth section is the Case Study. Finally, the last section is the Final Considerations.

2. Theoretical Background

The definition of Tourism is wide and comprehensive and, depending on who defines it, it can vary immensely due to some specificities. According to the UNWTO, tourism comprises activities carried out by people during their trips and stays in places other than their usual environment, for a consecutive period of less than one year, for leisure, business or other purposes [37].

Among these activities cited by the UNWTO are economic activities and they play an important role in defining tourism. Thus, among these various dimensions of tourism, economics has been highlighted for its magnitude and priority for the current global management system, based on the neoliberal mode of production that always favors the interests and effects of and for financial capital [38]. Thus, still according to the same author, analyzed in isolation, the tourist activity results from the action of only a few social agents: businessmen and public authorities. The other agents, including tourists, are included, and considered only as secondary stakeholders, something like customers without a voice. Given this, it appears that public power, in a macro way, and businessmen play a crucial role in the development of tourism in a city.

Thus, to develop tourism in a city, it is necessary to have a strategic plan that includes studies that prepare the city for possible future situations. Thus, according to [39], prospective studies are not intended to predict the future, but to study the various possibilities of existing plausible futures and prepare organizations to face them, or even create conditions for them to modify the probabilities of occurrence of uncertain situations or minimize their effects.

Within prospective study is the concept of scenarios. Thus, a scenario is a way of predicting the future, guiding the present through all possible and desirable futures [40]. In the same sense, the study of prospective scenarios has achieved significant progress, providing relevant advantages and knowledge to those who are using it. Scenarios are not predictions about what will happen, but descriptions, supported by plausible hypotheses, of what could happen within a studied context [41 - 43].

To facilitate the development of prospective scenarios with practical and theoretical applications, Professor Doctor Carlos Francisco Simões Gomes created the Momentum method, which is widely used by researchers from different areas. According to [44 - 47], Momentum is a method that integrates the design of the main prospective methods in the literature.

According to [44], the moment method proposes a hybrid approach, seeking to unify the concepts presented in various methods of prospecting consecrated scenarios present in the literature. Thus, the method approach is structured in thirteen steps, where the first eight operates scenarios and the other five operates multi-criteria analysis:

- | | |
|-------------------------------------|---|
| 1. System overview; | 9. Definition of criteria; |
| 2. Mapping of relevant actors; | 10. Survey of alternatives; |
| 3. Identification of variables; | 11. Define the importance (weight) of each criterion in all scenarios; |
| 4. SWOT analysis of the system; | 12. Evaluate the alternatives from the point of view of each criterion. |
| 5. Elicitation of uncertainties; | This must be done for all criteria and all scenarios; |
| 6. Selection of relevant variables; | 13. Application of the algorithm on the collected data. |
| 7. Definition of key indicators; | |
| 8. Design of prospective scenarios; | |

This work presents a practical application of the use of the Momentum Method for the creation of Prospective Scenarios that aim to assist public managers in the city of Rio de Janeiro in the development of public policies for the development of local tourism. Therefore, this study regarding the approach to the problem can be classified as quantitative and, in addition, it can be classified as applied in nature, as it aims to show a practical application.

In this sense, this study followed the following methodological steps: Introductory part of the subject to be addressed; Theoretical foundation; use of the Momentum Method; Case study involving the first eight steps of the Momentum Method and use of the Framework developed for this method; and Final Considerations.

3. Case Study

3.1. System overview

The city of Rio de Janeiro is one of the most important in Brazil and is among the most visited in the world. With this, the development of tourism in the city of Rio de Janeiro must be prioritized among the public policy actions of the Federal, State and Municipal Governments. For this tourism development to happen in a sustainable and agile way, it is necessary that the Municipality of Rio de Janeiro seeks to achieve the concept of Smart Cities. In this context, according to [47], the concept of smart cities, from the point of view of sustainable smart cities, is defined in 10 key sectors:

1. Environment;
2. Urbanization;
3. Water and waste management;
4. Transport;
5. Energy;
6. Economy;
7. Education-culture;
8. Science, health and safety;
9. Governance and citizen involvement;
10. Information and communication technologies.

In addition, the same author cites three categories of impact (environmental, economic, and social sustainability) in order to guide decision-making and evaluate the development of actions related to the design of a smart and sustainable city [47]. Therefore, this study sought to analyze the scenarios and find data and information that could be used in the development of the research.

In this sense, a study carried out by Urban Systems and Necta since 2015, called Ranking Connected Smart Cities [48], created a platform for discussion and business on Smart Cities. This study shows that in 2022 the city of Rio de Janeiro ranked 10th in the General Ranking.

3.2. Mapping of relevant actors

The second stage of applying the Momentum Method consists of mapping relevant actors, which are defined, according to [41] as organizations or entities that can significantly influence a given system or field of activity. Within the context of tourism, the following actors were considered, as shown in Table 1.

Table 1. Relevant Actors

Framework of relevant actors
Ministry of Tourism
Municipal Secretary of Tourism
Municipal Secretary of Health
Secretariat of Environmental Sanitation
Department of Urban Mobility
Department of Public Safety
Infrastructure Secretariat
UNWTO (World Tourism Organization)
World Travel and Tourism Council (WTTC)
Workers Union
Class Associations (workers, entrepreneurs)

3.3. Identification of variables

After careful analysis, the most relevant variables were identified and directly related to the development of tourism in the city of Rio de Janeiro, that is, the variables that directly impact the growth of tourism in this city: a) Tourist Services; b) Economy; c) Urban Mobility; d) Health; e) Basic Sanitation; f) Public Safety; g) Environment.

3.4. SWOT analysis of the system

Through a careful analysis and strongly based on the study carried out by Urban Systems and Necta (Ranking Connected Smart Cities), the elements of the SWOT Analysis were defined:

Table 2. SWOT Analysis

Forces	Weaknesses
Urban planning	Accessibility
Tourist services	Health
Technology and innovation	Governance
	Environmental sanitation
Opportunities	Threats
Local culture	Financial crisis
Economy	Political instability
Urbanism (natural beauty)	Security
Mobility	Environment
Events	Regulatory Changes
Improve Infrastructure	
Sustainability	

3.5. Elicitation of Uncertainties

The following uncertainties were raised:

- I1 – Political instability due to elections for president and governors.
- I2 – Post-pandemic economic growth.
- I3 – Decrease of infections due to COVID-19.
- I4 – International crisis due to the war between Russia and Ukraine.
- I5 – Growth of post-pandemic national tourism.
- I6 – Increase of Gross Domestic Product per capita of cities with economic growth.
- I7 – Increased awareness of the environment with public sustainability policies.
- I8 – Increase in crime.

3.6. Selection of relevant variables

The following variables were identified:

- V1 – Average occupancy rate of hotels; (tourist services)
- V2 – Average monthly proportion of room nights; (tourist services)
- V3 – Gross Domestic Product per capita; (Economy)
- V4 – Dollar Exchange Rate; (Economy)
- V5 – Average daily movement of passengers on road, rail, waterway, and air transport systems; (Urban mobility)
- V6 – SUS hospital admissions; (Health)
- V7 – Public garbage collected; (Basic sanitation)
- V8 – Water Supply; (Basic sanitation)
- V9 – Incidence of thefts; (Public security)
- V10 – Intentional homicide, theft from a passer-by; (Public security)
- V11 – Greenhouse Gas Emissions (GHG). (Environment)

After identifying the relevant variables, the cross-impact matrix was structured, where: 0 (No impact); 1 (Low impact); 2 (Medium impact); 3 (high impact); and 4 (Very expressive impact).

With the degree described according to its legend, the pairwise score of each cell of the cross-impact matrix was estimated with the help of a tourism professional (trained and active in the area) who, for reasons of confidentiality, will not have your name disclosed. Figure 1 presents the results.

Nº	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	
V1	-	4	3	0	3	2	2	1	3	2	2	22
V2	3	-	1	0	2	1	2	1	3	2	1	16
V3	4	2	-	0	2	2	3	3	2	3	3	24
V4	0	0	0	-	3	1	2	1	1	1	1	10
V5	3	2	3	3	-	3	4	2	4	3	4	31
V6	3	2	1	1	3	-	1	0	1	1	0	13
V7	3	2	2	1	4	1	-	2	0	0	2	17
V8	3	2	1	0	3	1	1	-	0	0	1	12
V9	3	2	3	1	4	1	0	0	-	3	0	17
V10	3	2	2	1	3	2	0	0	3	-	0	16
V11	4	3	3	2	3	0	3	1	0	0	-	19
	29	21	19	9	30	14	18	11	17	15	14	

DEPENDENCY

IMPACT

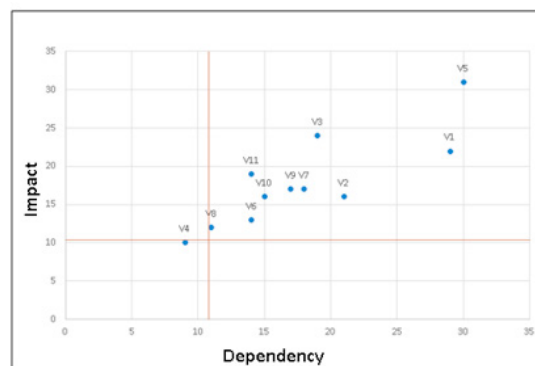


Fig. 1. Matrix of Crossed Impacts and Relationship between Variables

3.7. Definition of key indicators

With the analysis of the variables carried out, it was possible to notice that the key indicators are the variables identified in item 4.6, with the exception of variable V4. This variable was disregarded because it falls into the lower left quadrant, which includes variables with low impact and low dependence, therefore, little relevance.

3.8. Design of prospective scenarios

Table 3. Variable History

	V1	V2	V3	V5	V6	V7	V8	V9	V10	V11
Minimum	51,9	59	48.528,00	2.763	362.601.752	848.699	6.366.564	67.230	6.778.998	18.716.099,00
Average	62,2	61	51.428,00	3.198	406.782.720	970.752	6.557.190	82.641	6.785.313	20.567.015,40
Maximum	72,4	63	54.328,00	3.633	450.963.688	1.092.804	6.747.815	98.052	6.791.627	22.417.931,00

The study was carried out from the perspective of three scenarios: Optimistic, Trend and Pessimistic. Thus, the information collected in Table 3b was inserted in each of these three scenarios, as shown in Table 4. In this table, the cells in red represent the pessimistic scenario. The cells in orange represent the Trend scenario. The cells in green represent the Optimistic scenario.

Table 4. Historical data of indicators with allocation in scenarios

Indicators	S1	S2	S3
Average hotel occupancy rate	<51,9	51,9 – 72,4	>72,4
Average monthly proportion of room nights	<58,7	58,7 – 63,2	>63,2
Gross Domestic Product per capita	<48.528,00	48.528,00 – 54.328,00	>54.328,00
Average daily movement of passengers on the road system: Bus	<2.763	2.763 – 3.633	>3.633
Average daily movement of passengers on the rail system: Metro	<841	841 – 942	>942
Average daily movement of passengers on the rail system: Train	<449	841 – 661	>661
Average daily movement of passengers on the rail system: Tram	<0,3	0,3 – 1,1	>1,1
Average daily movement of passengers in the waterway system	<53	53 – 101	>101
Average daily movement of passengers in the air system	<62	62 – 73	>73
SUS hospital admissions	<362.601.752	362.601.752 – 450.963.688	>450.963.688
Public garbage collected	<848.699	362.601.752 – 1.092.804	>1.092.804
Water Supply	<6.366.564	6.366.564 – 6.747.815	>6.747.815
incidences of theft	<67.230	67.230 – 98.052	>98.052
Manslaughter, theft from a passer-by	<6.778.998	6.778.998 – 6.791.627	>6.791.627
Greenhouse gas (GHG) emissions	<18.716.099	18.716.099 – 22.417.931	>22.417.931

The Optimist scenario is the one that every Mayor of a tourist city, like Rio de Janeiro, wants. Analyzing Table 5, it is observed that if this Optimistic scenario were achieved in all its indicators, the development of Tourism in Rio de Janeiro would be the best possible.

Regarding the Pessimistic scenario, this would be the one that would least bring development to Tourism in the city of Rio de Janeiro, as this scenario is analyzed from the perspective of indicators that brought poor results for the development of the city.

Regarding the Trend scenario, if it were achieved, the development of Tourism would be stagnant or there would not be a significant improvement. With this, it is observed which variables of the trend scenario are closer to the Optimistic scenario, and which are closer to the Pessimistic scenario, indicating possible points of attention.

4. Conclusion

From the present study, it was possible to illustrate the value of the parameters that make up each prospective scenario, providing inputs that can be decisive in choosing a future investment in the sector. In addition, the variables raised allow for better guidance on what should be considered for such an action. With the prospected scenarios, it is possible to create action plans according to each one of them, helping to prevent the worst scenario and enhancing the results in an optimistic scenario.

Another important point to note is that the use of a Framework facilitates the application of the Momentum Method and was very useful in the practical application of this research. It should be noted that the Framework is in the process of being improved and, in the future, will provide the basis for carrying out the morphological analysis of the Momentum method as well.

Finally, it can be concluded that the study was able to comply with what was established in its objective, in addition to opening up room for the application of other Operations Research tools to further support decision-makers, such as multicriteria decision support methods.

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