

From National Scenarios to Local Actions: The RTC Method for Long-Term Strategic Planning in Smart Cities

Clarice Miyaco Okano Kobayashi Fernando Mário Rodrigues Marques

INSPRO

Instituto Prospectiva

Sao Paulo, Brazil

ckobayashi@inspro.org.br

INSPRO

Instituto Prospectiva

Sao Paulo, Brazil

fmarques@inspro.org.br

Marcelo Schneck de Paula Pessoa

LCTU-Conectividade Polytechnic School

University of Sao Paulo

Sao Paulo, Brazil

mpessoa@usp.br

Abstract—Municipal planning frequently lacks a long-term perspective, as planning instruments are typically limited to four-year political cycles. Moreover, local plans are often developed with limited alignment with state and federal strategies, which weakens territorial coordination and long-term policy coherence. This article proposes the RTC method as an approach for developing long-term municipal planning aligned with national-level scenario studies. The research is based on a qualitative action-research approach and includes a case study conducted in the municipality of Piedade, São Paulo, Brazil. The study adopts the Brazil 2045 Scenarios as a macro-level reference and combines the analysis of socio-environmental indicators with participatory workshops involving representatives from local government, the private sector, academia, and civil society. During the process, four projects aligned with the principles of smart, sustainable, and resilient cities were collaboratively developed and discussed. The results suggest that translating national future scenarios into local planning processes can strengthen futures-oriented thinking, promote collective learning among stakeholders, and support the development of long-term territorial strategies.

Index Terms—Strategic Prospective, Futures Literacy, Territorial Governance, Municipal Planning, Smart Cities

I. INTRODUCTION

Local governments face increasingly complex and interdependent challenges related to economic development, social cohesion, environmental sustainability, and the population's quality of life. Although such challenges require integrated and long-term responses, decision-making at the municipal level is often constrained by short political cycles, fragmented institutional structures, lack of alignment with state and federal spheres, and limited strategic capacity.

This mismatch between the structural nature of territorial challenges and the temporal logic of public action contributes to the predominance of reactive governance practices and short-term planning models. As highlighted by Ansell and Gash [1], the absence of institutional mechanisms capable of promoting coordination and collective learning tends to limit the implementation of long-term territorial strategies.

In recent years, concepts such as strategic foresight, futures literacy, and anticipatory governance have gained prominence in international debates on innovation and long-term planning in the public sector. Strategic foresight, as discussed by Godet [2], allows for broadening the time horizon of decisions and exploring alternative futures. The concept of futures literacy, developed by Miller [3], refers to the capacity of individuals and institutions to use the future as a tool for reflection, learning, and decision-making in the present.

Despite the growing recognition of these approaches, their practical integration into local territorial governance remains limited. In many municipalities, formal planning instruments remain disconnected from institutional routines and political agendas, resulting in low levels of social appropriation and limited implementation capacity. In this context, it is important to understand how foresight and futures literacy tools can contribute to strengthening territorial governance and municipal strategic planning processes.

This article examines how strategic foresight and futures literacy approaches can be operationalized as mechanisms for innovation in municipal governance through the application of the Transition Pathways and Capacity Building (RTC) methodology in the municipality of Piedade (SP). The study takes as a reference the scenarios presented in Scenarios Brazil 2045 [4]. Attention is given to the chapter Cities of the Future [4] as a governance innovation mechanism applied at the local territorial level.

The choice of the municipality of Piedade is justified by the fact that it presents demographic characteristics that reflect the prevailing profile of Brazilian municipalities. Approximately 88.2% of Brazil's 5,570 municipalities have populations below 50,000 inhabitants. With a population between 53,000 and 55,000 inhabitants, Piedade closely matches this profile, making the applied methodological model potentially replicable for many Brazilian cities.

The research provides two main contributions to the literature on territorial governance and foresight-based planning.

First, it proposes a methodological approach for translating national scenarios to the municipal level, connecting long-term strategic visions with local territorial planning processes. Second, it presents empirical evidence of the application of the RTC methodology in a Brazilian municipality, illustrating how strategic foresight and futures literacy can contribute to strengthening institutional capacities and fostering innovation in municipal governance.

II. THEORETICAL FRAMEWORK

Strategic scenario analysis is grounded in the idea of reframing how decision-makers perceive their environment, a concept associated with the literature on strategic foresight [5] [2] [6] [7]. From this perspective, scenarios function as learning tools that broaden decision-makers' field of vision and enable the exploration of plausible future pathways.

Strategic foresight has evolved from a practice initially oriented toward formulating conjectures about the future to an approach centered on organizational learning and the collective construction of meaning. According to Godet [2], the objective of foresight is not to predict the future, but to explore possible futures and support strategic decision-making in contexts of uncertainty.

The concept of futures literacy expands this perspective by emphasizing that the future is used in the present as a cognitive and social resource. Miller [8] [3] argues that developing futures literacy means expanding the capacity of individuals and institutions to imagine, explore, and use possible futures as tools for learning and transformation.

In the contemporary urban context, these approaches have been associated with the concept of anticipatory governance, understood as the institutional capacity to incorporate long-term visions into public decision-making processes.

Innovation in governance is not limited to the adoption of new technologies. It involves transformations in decision-making processes, institutional coordination mechanisms, and forms of social participation [7] [9]. The literature on public governance highlights that institutional transformations often emerge from processes of collective learning and procedural innovation rather than from isolated structural reforms.

In this sense, the creation of organizational knowledge becomes a central element in processes of institutional innovation. Nonaka and Takeuchi [10] demonstrate that knowledge is produced through interactions between tacit and explicit knowledge within dynamics of socialization, externalization, combination, and internalization. In the context of territorial governance, such processes are fundamental for transforming knowledge dispersed among local actors into collective capacities for action.

III. METHODOLOGY

This study adopts a qualitative approach based on action research [11], using the municipality of Piedade as the unit of analysis. The choice of the city of Piedade (SP) is justified by its characteristics, which are representative of small and medium-sized Brazilian municipalities, as well as by the fact that it was the site where the Transition Pathways and Capacity Building (RTC) methodology was applied within the context of the Scenarios Brazil 2045 study.

The research combined different methodological procedures, including: • A survey of the municipality's socioeconomic and territorial indicators. • An analysis of documents produced during the development of the workshops. • Observation of participatory workshops conducted with local actors.

IV. THE RTC METHOD

The RTC method - **Transition and Capacity-Building Routes** - was developed with the objective of creating long-term planning for a municipality or region based on the country's macro-level long-term planning, thereby ensuring natural alignment among the different levels of governance in the country.

RTC structures a participatory territorial planning process oriented toward the long term, integrating tools from strategic foresight, collective learning, and coordination among local actors, allowing empirical observation of how futures literacy approaches can be operationalized within municipal and regional governance contexts.

RTC functions as a governance innovation mechanism by integrating three main analytical dimensions: strategic anticipation, collective learning, and institutional coordination. **Strategic anticipation** derives from the literature on foresight and scenario building [2] [6]. The **collective learning** dimension relates to processes of organizational knowledge creation [10], while **institutional coordination** connects to the literature on collaborative governance and innovation in public policy [7] [1]. The integration of these dimensions allows long-term visions to be translated into participatory processes of territorial planning and action (see Figure 1).

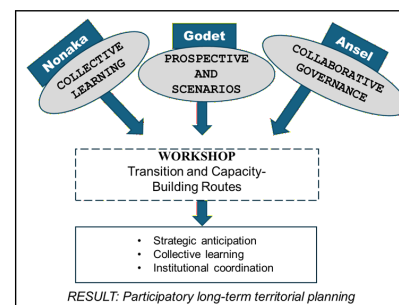


Fig. 1. RTC methodology (elaborated by authors)

The RTC process is operationalized through a structured sequence of activities:

- Identification of representatives from different sectors of society and experts in planning methodologies.
- Distribution of background materials for prior reading about the target territory.
- Organization of participatory workshops with stakeholders, including:
 - understanding the macro long-term scenario
 - discussing the implications of the scenarios for the local context
 - identifying priority projects to transform the territory from a long-term perspective
- Preparation of a technical-scientific report presenting the results.

The expected outcome is the transformation of workshop results into projects to be adopted by the municipality or region, with monitoring by civil society. The value of this method lies in capacity building and knowledge creation through participants' appropriation of knowledge, encouraging long-term thinking, anticipation of positive developments, mitigation of potential risks, and the involvement of civil society in defining and monitoring the future trajectory of the territory.

V. APPLICATION OF RTC IN PIEDADE

The RTC methodology was conceived as a mechanism for transitioning from strategic vision to territorial action. Its structure is based on three main stages: sensitization, awareness-building, and mobilization.

The initial sensitization phase aims to broaden participants' time horizons and stimulate reflection on long-term structural challenges. The awareness-building phase involves the analysis of trends, uncertainties, and territorial assets relevant to local development. Finally, the mobilization phase translates these reflections into strategic agendas and priority projects.

The choice of the municipality of Piedade as the location for applying the methodology is justified by the fact that it represents the predominant profile of Brazilian municipalities. The participatory workshop brought together 41 participants from different sectors — public administration, the productive sector, academia, and civil society — fostering an environment of dialogue and collective knowledge construction. The workshop was conducted by Inspro – Instituto Prospectiva, together with researchers from the Research Group of the Laboratory of Cities, Technology and Urbanism – Conectividade, University of São Paulo.

The connection between the scenarios projected for Brazil in 2045 and the local reality of Piedade enabled the adaptation of national strategic visions to the specific characteristics of the territory.

Participants used the four archetypal scenarios proposed in the Scenarios Brazil 2045 study:

- Global Leadership – a desirable future marked by innovation, inclusion, and sustainability.
- Inclusion without Ambition – characterized by strong social policies but persistent technological dependence.
- Islands of Development – marked by uneven growth and low territorial integration.
- Adrift – an undesirable scenario associated with institutional crisis and increasing social exclusion.

These scenarios served as a reference for reflecting on the municipality's challenges and opportunities.

Based on these discussions, key structural factors of municipal development were identified, including challenges related to education, public management, and innovation in agribusiness, as well as opportunities linked to bioeconomy and modernization of agricultural activities.

In the final stage of the process, participants structured project proposals using the 5W2H planning tool [12], enabling strategic reflections to be translated into concrete action plans.

The projects developed by participants aligned with the Global Leadership scenario, considered the most desirable future in the Scenarios Brazil 2045 study [4], characterized by innovation, social inclusion, and sustainability. Four projects were identified:

- Monitoring of Public Policy Indicators
- AgroTech Piedade 2030
- Strengthening of Cooperatives
- Efficiency in Public Management

These projects were consolidated into a technical-scientific report [13]. The most prominent initiative was the Agro Tec Piedade 2030 program, which seeks to connect the municipality's agricultural potential with bioeconomy and technological innovation initiatives.

The experience conducted in Piedade demonstrates that the use of long-term scenarios combined with participatory processes structured through the RTC methodology enables reflections about possible futures to be transformed into concrete territorial planning initiatives, strengthening institutional capacities and improving the quality of municipal governance.

The application of RTC in the municipality of Piedade also made it possible to empirically observe how participatory foresight processes can strengthen local territorial governance.

Beyond the producing of formal plans, the methodology applied helped strengthen institutional capacities and promote collective learning among the actors involved. This process can be interpreted as a practical way of developing futures literacy, insofar as participants began to use long-term scenarios as a tool for reflecting on present decisions. In this sense, the prospective exercise functioned not only as a planning tool but also as a mechanism for collective learning and for strengthening the institutional capacity for anticipation [8]. Three important processes were observed:

- Cognitive reframing of local challenges.

- Strengthening of interdisciplinary dialogue among institutional actors.
- Emergence of medium-term strategic alignments.

These results support the hypothesis that governance transformations can emerge from structured processes of collective learning [5].

The results also indicate that approaches based on strategic foresight and futures literacy can contribute to strengthening the institutional capacity of local governments. By promoting collective learning and coordination among actors, such tools help reduce the gap often observed between strategic vision and public policy implementation.

Among the pillars identified for Piedade's desirable future, the following stand out:

- Participatory governance is based on multisectoral coordination.
- Monitoring territorial indicators, including the Social Progress Index (SPI) and international standards for sustainable cities.
- Strengthening an institutional culture of anticipation and long-term planning.

VI. CONCLUDING REMARKS

This study analyzed how strategic foresight and futures literacy approaches can be operationalized as instruments for innovation in municipal governance. The experience conducted in the municipality of Piedade demonstrates that the Transition Pathways and Capacity Building (RTC) methodology can function as a mechanism of anticipatory governance, capable of articulating participatory processes of collective learning, strategic planning, and institutional coordination.

The results indicate that translating national scenarios to the municipal level represents a promising strategy for connecting long-term visions with concrete territorial planning processes. By fostering futures literacy among local actors, the methodology contributes to expanding the institutional capacity of municipal governments to deal with contexts of uncertainty and complexity.

By translating the challenges of national scenarios to the municipal scale, the study conducted in Piedade identified structural shortcomings that reflect the reality of many Brazilian municipalities, as illustrated by the projects presented:

- Inefficient public management, due to the insufficient use of data science and limited transparency in monitoring public policy indicators.
- Low-quality education, associated with an educational gap that hinders human capital formation and the development of local technological hubs.
- Innovation in agribusiness, given the challenge of modernizing traditional agricultural activities through the incorporation of bioeconomy principles and more advanced production technologies.

The analyzed experience suggests that the RTC methodology can be applied in other Brazilian municipalities, particularly in small and medium-sized cities that face institutional limitations and strategic planning challenges.

By bridging national scenario exercises and local participatory planning, the RTC methodology illustrates how foresight practices can strengthen collective learning and expand the anticipatory capacity of municipal governance.

Future research may explore the replication of the methodology in different territorial contexts, evaluating its impacts on public policy formulation and on the consolidation of anticipatory governance practices.

REFERENCES

- [1] C. Ansell and A. Gash, "Collaborative governance in theory and practice," *Journal of public administration research and theory*, vol. 18, no. 4, pp. 543–571, 2008.
- [2] M. Godet, "The art of scenarios and strategic planning: tools and pitfalls," *Technological forecasting and social change*, vol. 65, no. 1, pp. 3–22, 2000.
- [3] R. Miller, "Futures literacy: A hybrid strategic scenario method," *Futures*, vol. 39, no. 4, pp. 341–362, 2007.
- [4] E. Marcial, M. Gimene, and M. José Pio. (2025) Cenários Brasil 2045. [Online]. Available: https://socialport.com.br/wp-content/uploads/2025/07/Livro_Cenarios_Brasil_2045_web.pdf
- [5] J.-P. Bootz, "Strategic foresight and organizational learning: A survey and critical analysis," *Technological forecasting and social change*, vol. 77, no. 9, pp. 1588–1594, 2010.
- [6] R. Slaughter, *The foresight principle: Cultural recovery in the 21st century*. Praeger, 1995.
- [7] J. Hartley, "Innovation in governance and public services: Past and present," *Public money and management*, vol. 25, no. 1, pp. 27–34, 2005.
- [8] R. Miller, *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. UNESCO Publishing, 2018.
- [9] S. P. Osborne and L. Brown, "Innovation, public policy and public services delivery in the uk. the word that would be king?" *Public administration*, vol. 89, no. 4, pp. 1335–1350, 2011.
- [10] H. Nonaka, T. Takeuchi, *Transforming the future: Anticipation in the 21st century*. Oxford University Press, 1995.
- [11] A. C. Gil, *Pesquisa qualitativa básica*. Editora Vozes, 2025.
- [12] J. Paul and R. P. S. Kaurav, "Research methods in a nutshell: what, why, when, where, who, and how?" *International Journal of Consumer Studies*, vol. 49, no. 6, p. e70134, 2025.
- [13] M. Pessôa, C. Kobayashi, and A. Colletto. (2025) Caminhos para uma cidade inteligente: Município de Piedade - SP. [Online]. Available: <https://doi.org/10.13140/RG.2.2.28159.68007>