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STRATEGY FOR THE DEVELOPMENT OF THE GAS DISTRIBUTION MARKET IN SÃO PAULO: THE ROLE OF THE STATE FROM THE PERSPECTIVE OF ECONOMIC FREEDOM

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Abstract
Objective: This article reports an initiative of the Regulatory Agency for Public Services of the State of São Paulo (ARSESP) to promote the development of the natural gas distribution market in the state and improve the competitiveness of distribution concessionaires.
Methodological approach: This interventionist and applied research focuses on improving and innovating to expand business efficiency and effectiveness. The study adopts methodological procedures typical of projects designed to seize opportunities and solve business problems.
Originality and relevance: The project innovates by stimulating the government to engage in free competition in the market, promoting the market's expansion, benefiting gas distributors and consumers (who gained access to the product in the region for the first time), generating jobs and income.
Main Results: The solution promotes the expansion of the gas distribution network and the consequent development of the natural gas market in the Brazilian State of São Paulo. It offers competitive benefits for distributors and value creation for the granting authority through expanding the natural gas distribution network geographically and increasing the asset base. Also, the solution promotes economic and social development, jobs and income generation, and an increase in tax collection.
Theoretical/Methodological Contributions: The study emphasized the initiative as a learning opportunity for the agents involved, considering the innovative solutions obtained from applying the method to solve problems and seize market opportunities through scientific evidence and focus on business development. The description of the initiative enables replication in similar situations experienced in other regulated sectors and involving other public services.

Keywords: Value creation. Competitiveness. Innovation.

ESTRATÉGIA PARA O DESENVOLVIMENTO DO MERCADO DE GÁS CANALIZADO EM SÃO PAULO: O PAPEL DO ESTADO SOB A ÓTICA DA LIBERDADE ECONÔMICA

Resumo
Objetivo: O texto relata uma ação da Agência Reguladora de Serviços Públicos do Estado de São Paulo (ARSESP), com o objetivo de promover o desenvolvimento do mercado de gás natural canalizado em sua área de abrangência e, assim, proporcionar impacto na competitividade das concessionárias distribuidoras.
Abordagem Metodológica: Estudo intervencionista de caráter aplicado, com foco em melhorias e inovação para ampliação da eficiência e eficácia dos negócios, segundo procedimentos metodológicos típicos de projetos de solução de problemas empresariais e aproveitamento de oportunidades.
Originalidade e relevância: O projeto inova no estímulo do poder público à livre concorrência no mercado, promovendo sua expansão em benefício da competitividade de distribuidoras e consumidores, que passam a ter acesso a um produto outrora não disponível em sua região, e geração de empregos e renda.
Principais Resultados: A solução concretiza o desenvolvimento do mercado de gás canalizado no Estado de São Paulo, com benefícios competitivos proporcionados às distribuidoras, criação de valor ao Poder Concedente pela expansão geográfica de cobertura da malha de gasodutos de distribuição de gás natural e aumento na base de ativos, além da promoção de desenvolvimento econômico e social, pela geração de empregos e renda e aumento na arrecadação tributária.
Contribuições Teóricas/Metodológicas: Além do aprendizado dos agentes envolvidos na concepção e implementação do projeto, pelo exercício de aplicação do método para a solução de problemas e aproveitamento de oportunidades de mercado com fundamentação científica e foco no desenvolvimento de negócios, o projeto envolve soluções inovadoras. A descrição do processo possibilita replicação em situações de natureza semelhante, vivenciada em outros setores regulados e que envolvam outros serviços públicos prestados à sociedade.

Palavras-chave: Criação de valor. Competitividade. Inovação.

ESTRATEGIA PARA EL DESARROLLO DEL MERCADO DE GAS CANALIZADO EN SÃO PAULO: EL PAPEL DEL ESTADO DESDE LA PERSPECTIVA DE LA LIBERTAD ECONÓMICA

Resumen
Objetivo: El texto informa una acción de la Agencia Reguladora de los Servicios Públicos del Estado de São Paulo (ARSESP) con el objetivo de promover el desarrollo del mercado de gas natural canalizado en su área de cobertura y, por tanto, impactar la competitividad de las concesionarias distribuidoras.
Enfoque metodológico: Estudio intervencionista de carácter aplicado, enfocado a mejoras e innovación para incrementar la eficiencia y eficacia del negocio, según procedimientos metodológicos típicos de proyectos para la resolución de problemas empresariales y aprovechamiento de oportunidades.
Originalidad y relevancia: El proyecto innova en estimular al gobierno a la libre competencia en el mercado, promoviendo la expansión del mercado en beneficio de la competitividad de distribuidores y consumidores, quienes ahora tienen acceso a un producto no disponible anteriormente en su región, con generación de puestos de trabajo e ingresos.
Principales Resultados: La solución da cuenta de la expansión de la red de gasoductos y el consiguiente desarrollo del mercado de gas canalizado en el Estado de São Paulo, con beneficios competitivos proporcionados a los distribuidores, creación de valor para la Autoridad Concedente a través de la expansión geográfica de la cobertura de la red de gasoductos de distribución de gas natural y aumento de la base de activos, además a promover el desarrollo económico y social, para la generación de empleos y rentas y el aumento de la recaudación tributaria.
Contribuiciones teóricas / Metodológicas: Se enfatiza el aprendizaje de los agentes involucrados en el diseño e implementación del proyecto, como resultado del ejercicio de aplicar el método para resolver problemas y aprovechar las oportunidades del mercado con base científica y enfoque al desarrollo empresarial, aportando soluciones innovadoras. La descripción del proceso permite replicar situaciones de similar naturaleza, vividas en otros sectores regulados y que involucran a otros servicios públicos prestados a la sociedad.

Palabras clave: Creación de valor. Competitividad. Innovación.

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1 Introduction

In these first two decades of the twenty-first century, several studies have focused on potential benefits arising from the flexibilization of the state's role in the relationship with economic agents, especially concerning the approximation of public management with the private sector. Weber (2003) presents models that combine the conventional bureaucracy characterizing the government with management instruments adopted in the private sector. Bresser-Pereira (2009) discusses the positive aspects when state agencies and markets jointly advance toward the main political objectives in contemporary democratic societies: political stability, freedom, social justice, and economic development.

The structure of the Brazilian public administration has regulatory agencies dedicated to ensuring compliance with public service concession contracts, simultaneously fulfilling the role of improving the services provided, combining quality, efficiency, fees affordability, and protecting users' interests and rights (Aragão, 2013).

Regulatory agents must understand and contribute to the conditions that enable the market's natural virtues, along the lines of the economic freedom advocated by Hayek (1990), Mises (2010), Kirzner (1986), and other exponents of the Austrian school of economics.

This article describes the study that led to the strategies adopted by the Regulatory Agency for Public Services of the State of São Paulo (ARSESP) for the geographic expansion of the availability of natural gas to provide the development of this market. The strategic action described is inspired by the concepts of Johnson, Scholes, and Whittington (2007) and Barney and Hesterly (2011), who consider business development as a result of achieving sustainable competitive advantage.

The study's goal was to create value for gas distributors improving their competitiveness; for new consumers offering access to an efficient and safe energy source; and for the community in the state, which benefits from income and jobs generation and an increase in tax collection.

The methodological proposal was inspired by Aken, Berends, and Bij (2012) and Vandenbosch (2003) and is dedicated to solving business problems and actions to promote organizational development. The procedures presented qualitative, descriptive, and applied nature based on Marcondes, Miguel, Franklin, and Perez (2017).

According to Marcondes et al. (2017), although different from academic studies in administration – which are restricted to expanding theoretical knowledge about the phenomena of administration – practical and applied research also requires a conceptual foundation to allow replicating findings and, therefore, offer a scientific contribution.

The following section presents the literature contribution regarding the analyzed situations and solutions proposed, followed by a section describing the methodological procedures. Subsequently, a discussion of the situation's context, characterized by problems and/or opportunities, is offered. The fifth section analyzes the situation in-depth and offers a diagnosis that leads to the strategies adopted.

The sixth section describes the selection of priorities, the elaboration of the plan of action to accomplish the intended changes, and discusses the intervention and implementation of the strategies and the results obtained. The analysis of results includes the benefits for distributors in terms of competitiveness; for the state in terms of the geographic expansion of the coverage of the natural gas distribution network and an increase in the base asset; and for the community by promoting economic and social development generating jobs, income, and an increase in tax collection. The seventh and last section presents the final considerations.

2 Literature review

This section presents the theoretical-conceptual framework built based on the literature review to propose and justify the strategies designed to achieve the objective of this research.

2.1 Economic freedom and the strategic role of the state

Hayek (2017) notes that commerce has been around longer than the state. Specific individual needs gave rise to the emergence of traders who, with instinct and adaptation to the principles and customs of their social groups, sought conditions to accumulate resources for their own survival. However, rules emerged to the order of the market, rules to which economic agents submitted for the collective benefit, with a possible sacrifice of individual interests to adjust to standards of conduct inherent to the established morality.

Thus, the state emerges with the power to intervene in the name of order, regulating the market based on ensuring its stability and security. In essence, therefore, the state plays much more the role of imposing difficulties than facilitating the market's development. According to Hayek (2017), the main risk generated is the potential vicious circle of intensification of regulatory intervention and the continuous structural growth of market operations in government, with the state taking on the role of producing and offering goods and services that could be provided by the private sector, increasing bureaucracy and inhibiting competitiveness in the production process.

When considering the assumptions about economic freedom put forward by the Austrian School of economic thought, the state faces the challenge of minimally intervening in the market dynamics by promoting regulation. Ideas proposed by authors of this school, such as Hayek (1990), Mises (2010), and Kirzner (1986), emphasize the market's spontaneous self-organization ability, which enables a laissez-faire approach to conduct the economy with minimal intervention and imposition of coercive forces by governmental or corporatist bodies.

However, considering the need for rules providing minimum stability and rights to economic agents, a flexibilization of the state's role in the relationship with these agents is important. The benefits of bringing public management closer to the private sector are highlighted by Weber (2003) and Bresser-Pereira (2009). Their conceptions indicate the positive impacts on the advancement of the market with

the joint support of state institutions. This joint advance involves the main political objectives established by contemporary democratic societies – political stability, freedom, social justice, and economic development (Bresser-Pereira, 2009).

Araújo (2004) indicates that the state acquires fundamental importance in reducing the disparity between the underproduction of merit goods and the overproduction of demerit goods in the market. This can minimize the effects of competition imperfections, abuse of economic power, information asymmetries and inadequacies, the predominance of efficiency over social welfare, transaction costs, and other inhibitors to the offer of solutions by the private sector and distributive rules (Araujo, 2004).

Counter-balancing the forces that cause market failures, state regulation mechanisms are crucial when they do not leave behind the principle that freedom leads to an efficiency of economic activities. They are decisive in stimulating private investment by offering conditions predictability and guarantee that returns on investment and wealth generated will not be expropriated, and there is no excessive tax burden. They offer risks when there are no mechanisms to guarantee property rights and the sustainability of public accounts (Maciel, 2016).

Thus, regulation is necessary but cannot be hostile to market agents, demanding compliance with regulations in private business without subjecting it to transaction costs, complicating entrepreneurship, and posing bureaucratic obstacles focusing on guaranteeing collective benefits (das Chagas Oliveira et al., 2019).

2.2 Creating value and competitive advantage

Magreta and Stone (2002) consider value creation a phenomenon that permeates the entire organizational system, present from access to obtaining resources from external sources through processing, extending to the outputs of products and services and the respective results achieved in the process. Thus, value is created throughout the steps carried out, from the inputs to the return obtained from their processing.

According to Castañeda (2013), value creation can be interpreted according to different approaches. One is the perceived value resulting from offering solutions evaluated in economic, operational, and social value. In addition to creating value perceived by consumers, other agents can perceive value, such as employees, shareholders, and society. Employees see value when they find favorable conditions regarding the quality of life and remuneration in their work. According to Antonik and Muller (2017), shareholders perceive value through return on invested capital, favorable cash flow, and economic added value comparatively superior to other investment options. For society, value can be created through fair tax collection and adequate application of these resources to promote economic community development (Castañeda, 2013).

Differentiation in the offering of products, services, and processes influences the creation of superior value for customers (Yanaze, 2006), as long as they are perceived as better benefits than other

available options (Kotler and Armstrong, 2015). This perception is favored by relationship channels for interaction with consumers, enhancing joint actions to "co-create" value (Prahalad and Ramaswamy, 2011).

Normann and Ramírez (1993) define this co-creation as a result obtained when several agents create value for themselves, intensifying the creation of value through the joint participation of the production chain involved in the process. Pacheco (2017, p. 251) highlights the possibility of jointly creating value, "a market with philosophy." Miguel, Marcondes, and Caldeira (2018) go in the same direction, stating that the combined involvement of consumers and other stakeholders in the organization's value creation process directly or indirectly favors the potential to generate competitive advantage, resulting in business development.

According to Prahalad and Ramaswamy (2004), one way to achieve competitive advantage is to adopt strategies to differentiate from competitors, using interaction with consumers, listening to them in structuring the business, and offering products and services. Barney and Hesterly (2011) argue that competitive advantage stems from actions that generate superior economic value compared to competitors. A superior performance may result from strategies that lead to differentiation due to superior benefits, lower prices, or the fulfillment of specific needs of certain market segments. In addition to the competitive advantage over direct competitors, competitiveness can be favored by cooperation among companies to combine benefits offered to customers.

The following section presents the reasons and processes for identifying opportunities and defining strategies for competitive advantages as a path to business development.

2.3 Diagnostic models and strategic actions for market development

Barney and Hesterly (2011, p. 4, our translation) consider strategic management as a process that includes "a sequential set of analyses and choices that can increase the probability of a company choosing a good strategy – a strategy that generates competitive advantages." The authors emphasize the importance of paying attention to internal and external analysis based on understanding the organizations' mission and objectives.

Johnson et al. (2007) suggested that in such a process, the analysis of possible threats and opportunities in the external environment should be carried out, focusing on how they will affect the market and the organization in evidence. Next, they should identify if the internal structure is adequate to deliver the intended value more effectively than its competitors. This exercise makes it possible to identify the need for adaptations to present competitive differentials. Internal structural elements can be classified as strengths or weaknesses when one seeks to identify aspects that strengthen competitiveness and minimize the effects of those that cause competitive disadvantage.

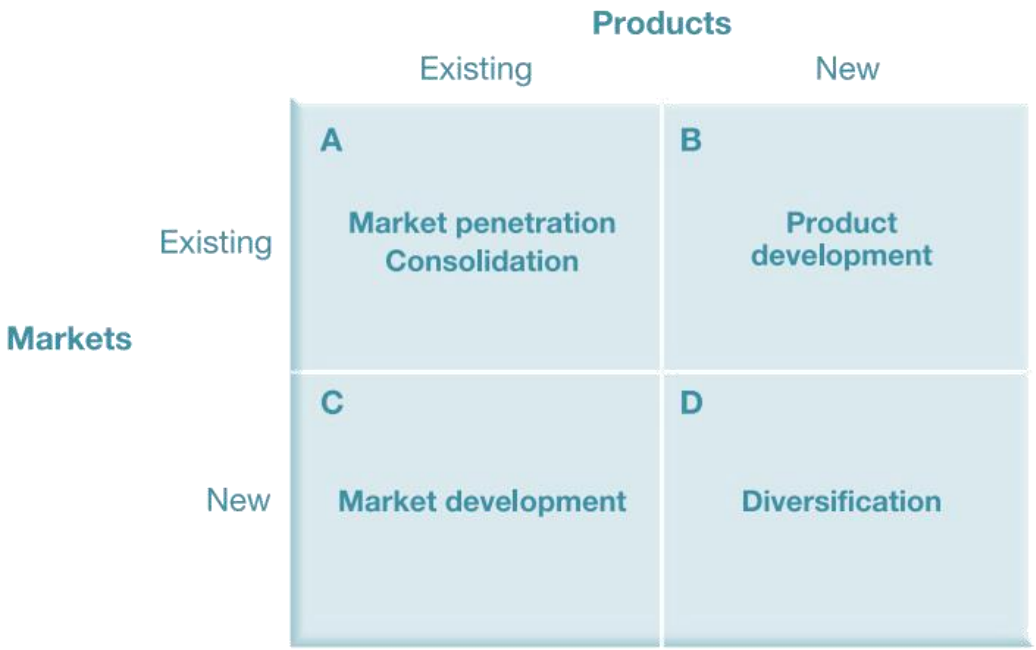
The analysis enables the creation of alternatives and choosing strategies to seize opportunities, mitigate the effect of threats, use strengths, and reduce or neutralize weaknesses. Among the strategic

options resulting from internal and external conditions are those aimed at business growth and expansion, obtained when using the strengths to seize opportunities. Potential weaknesses may require training and investment strategies to take advantage of opportunities. When facing threats, strengths can be used through strategic choices for defense and maintenance or to minimize the effect of weaknesses by applying survival or divestment strategies (Johnson et al., 2007).

Transposing to contemporary reality Carvalho, Bernardo, Sousa, and Negas (2015), describe the strategic directions that can be adopted for business growth and expansion based on Ansoff's product-market matrix interpretative model proposed in 1957, translated by a matrix that became a classic reference for the choice of strategic alternatives, reproduced in Figure 1. They can be determined by criteria that involve the joint vision of opportunities or threats found in the market, in the face of strengths or weaknesses observed in the organization's characteristics, in four options. The first aims to increase market share with existing products, offering them to customers who did not acquire them or did so sporadically. In other words, the strategy is intended to expand penetration in the markets in which it already operates. The second refers to product development, by operating in the same market with products that suit the interests of its customers but were not yet offered. The third category covers market development, searching for new markets, and where to market current products – new geographic regions, new market segments, or new distribution channels. Finally, the category characterized by diversification operates in new markets with new products.

Figure 1

Directions to develop strategies (product-market matrix)



Source: Johnson, Scholes, and Whittington (2007)

Another aspect found in the literature concerning strategic options is the analysis of the market's competitive dynamics. Porter (2008) presents a model that considers the competitive pressures exerted by different agents in a given business sector – pressures that dynamize the sector: Rivalry between competitors, the threat of new competitors, the threat of substitute products or services, suppliers and buyers' negotiation power. The model suggests that competition goes beyond rivalry between direct competitors. New entrants can cause turmoil with investments, novelties, and the desire to gain market share. The reaction of current competitors with defense strategies tends to occur through, for example, price reductions and other barriers to contain the advance of new entrants.

The competition dynamics also give rise to solutions that replace those traditionally marketed by competitors, meeting the same needs or performing an identical function to pressure the sector's profitability and demand adaptations in strategies. Thus, it is possible to consider, for example, that the use of polluting fossil fuel as an energy source can be replaced by an adequate alternative for environmental preservation, as long as it is available in the market.

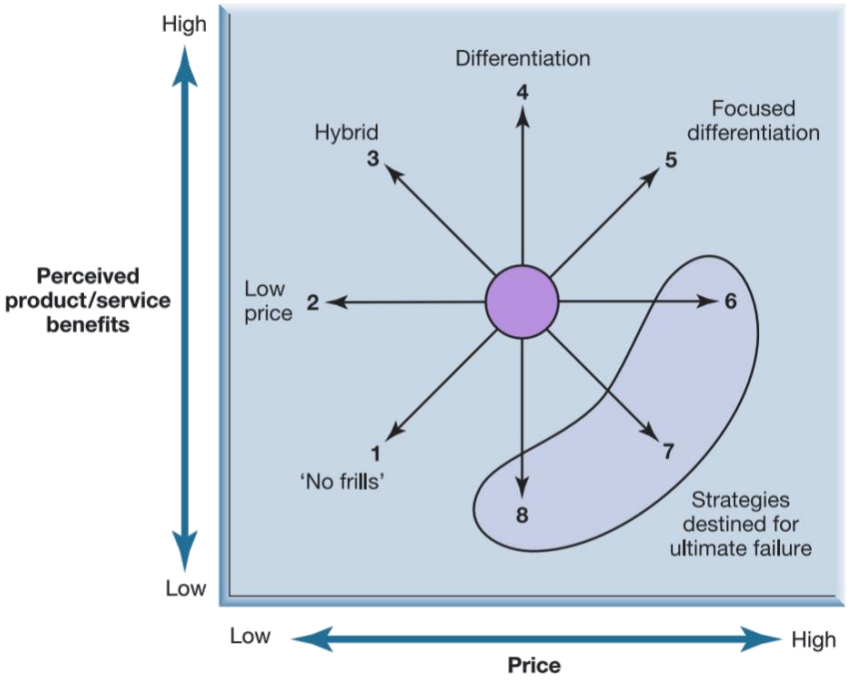
Complementing the forces indicated by Porter (2008), there are influences on the competitive dynamics that result from the power of negotiation with suppliers and consumers. Those who supply raw materials and components can increase prices or deadlines or even reduce the quality of their products to put pressure on aspects such as business profitability and offering value to consumers. On the other hand, the customer can pressure the supplier to reduce prices or increase the quality of products, creating friction between competitors. Porter's (2008) recommendation is to consider the competitive characteristics of the targeted sector, as there may be a more or less favorable option or pay attention to the need for strategic choices that favor the conditions under which such businesses are carried out to deal with competitive dynamics proactively.

Considering that the competitive strategy comprises actions to conquer a favorable position in the sector, Porter (2004) identifies three possible generic strategies to be adopted alone or together. The first is to offer attractive lower prices to consumers. The second considers offering differentiated benefits at prices equivalent to or higher than competitors. The third involves choosing a restricted target to meet the specific needs of a particular segment or group in the market, with unique solutions for consumers.

Johnson et al. (2007) consider that competitive strategies can be used in a hybrid way, counting, for example, on offering more benefits at lower prices than competitors. The authors' suggestion is illustrated in Figure 2, in which, according to the authors, it is possible to see a "strategy clock."

Figure 2

Strategy Clock



Source: Johnson, Scholes, and Whittington (2007).

Associating the conceptual perspectives regarding the benefits of joint action for creating value, competitiveness, and consequent business development and the analysis procedures, the methodological choices for the diagnosis that guided the intervention carried out in this study are reported below.

3 Methodological procedures

According to Rauen (2015, p. 156, our translation), interventionist research are empirical studies in which "the researcher establishes a deliberate interference in reality," in a process that considers the theory applied to practices that occur in the situation that constitutes the object of study. Cyclically, the resulting discoveries tend to expand theoretical knowledge (Westin & Roberts, 2010).

In interventionist research, the researcher's role is not restricted to data collection and interpretation. It extends to direct action in the studied environment to influence the facts (Oyadomari et al., 2014).

The scientific nature of interventionist research can be obtained, according to Gronhaug and Olson (1999), through a script that includes: (i) selection and use of observable data; (ii) interpretation and evaluation of the observations carried out in the light of theoretical concepts; (iii) planning and action suited to the type of study; and (iv) planning, collection, analysis, and interpretation of the data obtained from the results of the actions developed. In line with this proposition, Marcondes et al. (2017) suggest the method defined as a project to solve business problems/seizing opportunities (PSBP/SO),

designed based on procedures adopted in graduate programs in administration at Eindhoven University (Aken, Berends, and Bij, 2012) and in Vandenbosch's (2003) proposal for consulting in planning organizational solutions.

This interventionist study follows the method described by Marcondes et al. (2017) through applied research to build means to improve and innovate, increasing the businesses' efficiency and effectiveness. It started by understanding the situation to establish a diagnosis based on the evidence found, proposing strategies to make it possible to seize identified opportunities. An action plan was devised, initiating the intervention, subsequent evaluation, and formalizing the resulting decisions.

The authors were personally involved with data collection and decisions involving choices of paths to follow to implement the project, acting either as an internal agent linked to the organization or in the simultaneous monitoring of the implementation of the action. The study resorted to descriptions of the current situation and documentary research, accessing records and information made available by the institution, and dialogue with management team members to facilitate the comprehension of the context. This procedure allowed aligning individual perceptions about what could be considered an opportunity. In the phases of diagnosis, proposal of solutions, and intervention, meetings were held with market agents (membership organizations, concessionaires, and consumer protection agencies), aiming at a critical reflection on the demands and expectations of users of piped natural gas that have not yet been met, to identify ways to expand the sector.

The regulatory agenda's priority themes were defined. One of the priorities was the improvement of the regulation of local Network Projects, which gave rise to the procedures described in the next section. The path followed made it possible to fulfill Gronhaug and Olson's (1999) requirements, which offered a scientific character to the interventionist research.

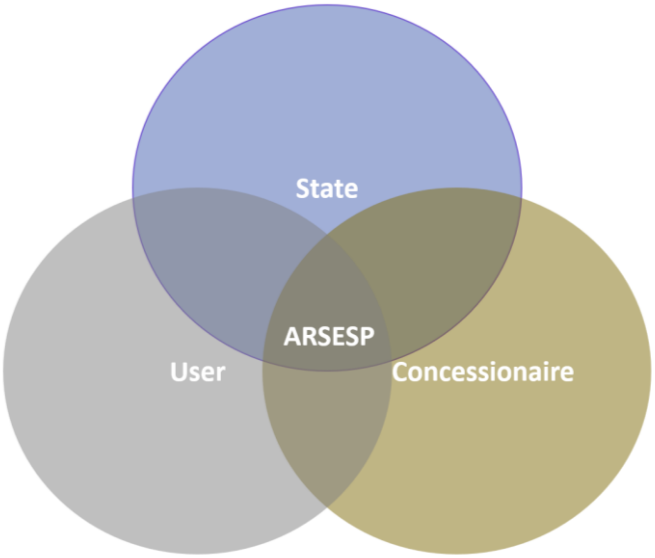
4 Investigated context and reality

ARSESP is an independent public agency (*autarquia*) working under a special regime. According to Aragão (2013), the reason regulatory agencies were classified as such was the need to have autonomy and agility in exercising their functions. The agency was created with the State Complementary Law 1025 of July 12, 2007, which provides: "the legal regime of ARSESP is characterized by decision-making independence, administrative, budgetary and financial autonomy, fixed term and stability of its board of directors, and other conditions that make effective its autonomy within the scope of public administration."

The agency was created to ensure compliance and the economic-financial balance of concession contracts. It must encourage the constant improvement and universalization of the services provided, combining quality, efficiency, reasonable fees, protecting interests and rights, and preventing discrimination against users, respecting the state's and the service providers' rights. Figure 3 shows the interconnection of stakeholders involved in the agency's area of operation.

Figure 3

Main ARSESP's stakeholders – area of natural gas



Source: ARSESP (2021).

Figure 4 represents the supply and value chain of the regulatory agency in the area of natural gas.

Figure 4

Agents of ARSESP's supply and value chain – Area of natural gas

Supplier	Raw material	Manufacturing	Product	Client
State (granting authority)	Concession contract	Regulation	Deliberations	User
Federal government	Technical studies	Monitoring	Technical Note	Consumers and Market Agents
Legislative Assembly	Public consultation	Pricing	Technical Opinion	Concessionaires
Technical Consultants (State Attorney General – PGE)	Public hearings	Asset Management	Regulatory Agenda	State
Consumer Protection Agencies	Complaints	Approval of supply contracts	Notifications	Public Prosecutor's Office (MP)
Ombudsman: Public Prosecutor's office (MP), State Court of Accounts (TCE), Administrative Council for Economic Defense (CADE)	MP/TCE/CADE	Approval of projects of R&D, rationalization and conservation, and local network	Notice of violation	State Court of Accounts (TCE)
				Administrative Council for Economic Defense (CADE)

Source: Elaborated by the authors (2021)

The state (granting authority) is the supplier in the supply chain since it must provide adequate public service, and, in this case, it chose to do that through the concession of the public service (according to Law 8987/95). The concession is characterized by transferring the execution of public service to a legal entity or consortium of companies through a competitive process. The concessionaire has to perform the service at its own risk. The concessionaire's remuneration comes from fees paid by users (the customer). In this configuration, the regulatory agency is an intermediary for the stakeholders.

Natural gas distribution is characterized as a natural monopoly activity, mainly due to the high investment in infrastructure and technical training, environmental and urban restrictions, or the need to use properties and public goods (Schirato, 2011). The gas market in Brazil has a legal regime and mixed jurisdiction at the federal and state levels. Under article 177 of the 1988 Constitution, the exploration, production, processing, import, and transport of natural gas is the federal government's monopoly. The product distribution to points of consumption is a competence of the states, under the terms of article 25 §2, concerning the exploitation of local piped gas services.

Currently, the state of São Paulo has the highest consumption of piped natural gas in the country, generating a business of approximately BRL 8.4 billion per year serving approximately 2.2 million users, with an average consumption of 18 million m³/day, in 21,000 km of the distribution network (ARSESP, 2021). Three privately-owned concessionaires are responsible for distribution: (1) Comgás, serving the state's capital São Paulo and neighboring cities (metropolitan region São Paulo), the region called "ABCD," the cities of Guarulhos and Jundiaí, and the region of Baixada Santista; (2) Gás Brasiliano, serving the state's Northwest region; and (3) Naturgy, which serves the Southern region of the state.

The product is consumed in several sectors with specific purposes. The industrial sector uses it to generate electricity, heat ovens, or as a raw material. It is used for cooking food and heating the environment or water in homes. In transport, it is used as a fuel. In commercial activities, uses include cooking and heating. The largest consumption occurs in the industrial sector, with about 71% of the total, followed by 12% in thermoelectric power generation, and 6% in energy cogeneration. Residential consumption represents 5%, while transport accounts for 4%, and commerce for 3% (SIMA, 2020).

The opportunity identified encompasses different aspects. The first refers to the competitiveness of this input against other fossil energy sources. Santos (2002) considers that natural gas provides gains in efficiency and rationality in thermal use, as the physical-chemical characteristics of the product allow more precise control of temperature and savings in the installation and maintenance of industrial equipment.

Natural gas is also considered safer than other fuels, such as liquefied petroleum gas – LPG, with chemical conditions that make it lighter than air, with more dissipation when leaks occur. Also, it is less flammable than other fuels, with less risk of explosion in accidents or shocks in the transport and handling process (Santos, 2002).

There is also an appeal regarding sustainability. Xu and Lin (2019), Rahman, Cai, Khattak, and Hasan (2019), and Santos (2002), found evidence that the use of natural gas is environmentally advantageous compared to other energy sources, such as oil or coal. In the long term, replacing these sources by natural gas can reduce greenhouse gas emissions by around 20% to 23% compared to fuel oil and 40% to 50% compared to solid fuels, such as coal (Santos, 2002).

Therefore, there is evidence of a strategic gap or something not yet fully met in the market (Johnson et al., 2007). The opportunity to offer stakeholders the benefit of piped gas in regions that were not served before only materializes with the support of the regulatory agency, in line with the premise that the universalization of public services is a duty of the state, with reasonable fees and continuity.

Another aspect to consider as a condition for effective development is the creation of value for the stakeholders involved, according to the process suggested by Miguel, Marcondes, and Caldeira (2018), involving the final consumer and the other stakeholders as a direct or indirect way to generate competitive advantage. Therefore, value can be created through a set of benefits. Needs are satisfied directly with the product and indirectly with intangible benefits related to it, such as status, achievement, and security. From this perspective, expanding the gas distribution market results from increasing product availability.

5 Analysis and diagnosis of the situation

From the reflections and models suggested based on the literature review presented in the second section, the factors that can be considered as opportunities, threats, strengths, and weaknesses in the spectrum of the strategic process were evaluated to understand behavioral trends of the environment, with emphasis on the natural gas market. This analysis also showed a competitive advantage for the natural gas business. Concerning opportunities, the main factor identified was the possibility of expanding the market to cities not yet served by natural gas. The threats included rivalry of replacement products given the existence of several products with different price drivers and the consequent low competitiveness in the residential and commercial market segments. There are also regulatory issues related to natural gas that may cause unforeseen changes and delay in the process of obtaining the necessary environmental licenses for the construction of distribution pipelines.

In the current business model of natural gas, the supply is continuous, distributed in underground pipes, using applied technology, which happens in all modern cities worldwide. Storage is not necessary, making piped gas immediately available. There is competitiveness concerning replacements in the strategic industrial groups as in the processes of burning to generate heat; natural gas demonstrates a more competitive cost than diesel oil, coal, or wood. In addition, sustainability and environmental preservation are other factors mentioned in the list of strengths. Natural gas is considered the cleanest fossil fuel, also recognized as a transition fuel to renewable fuels in a low carbon economy. Safety aspects are also essential, and natural gas quickly dissipates as it is lighter than air. Therefore, safety and

sustainability guarantee the good reputation of the product. Furthermore, the natural gas industry has developed technological know-how.

The high investment cost and the long-term execution of the distribution pipeline construction project are weaknesses, which result in the low capacity to respond to market demands. Figure 5 presents the aspects considered as opportunities, threats, strengths, and weaknesses in the analysis performed. For the purposes of the project, the risks of possible changes in the market due to new configurations of energy matrices, such as the use of hydrogen instead of natural gas, or any supply limitations due to oil reserves and possible shortages in the future were not analyzed.

Figure 5

Business SWOT analysis – Piped natural gas

OPPORTUNITIES	THREATS
Geographic expansion to be explored, a large industrial park in the Brazilian state of São Paulo	Diverse replacement products (diesel, coal, wood, etc.), low competitiveness in commercial and residential market segments, delay in the process of obtaining permits to build pipelines, regulation framework
STRENGTHS	**WEAKENESSES**
Supply availability, competitiveness in the industry segment, security, sustainability, reputation, product technology know-how	High investment costs to build pipelines, long term project execution, low capacity to respond to the demand

Source: Elaborated by the authors (2021).

The study considered internal and external aspects identified in the SWOT analysis, observing the relations among the four elements as follows: (1) strengths and opportunities, devising strategies to use strengths to seize opportunities to expand the business; (2) weaknesses and opportunities, to build strategies related to training and investments to seize opportunities; (3) strengths and threats, to outline strategies to use strengths to address threats; (4) weaknesses and threats, with the elaboration of strategies that allow minimum conditions for project viability in the face of the threats.

According to Johnson et al. (2007), identifying behavior trends in the external environment associated with the analysis of the business' internal conditions constitutes the basis for the strategic diagnosis – the establishment of alternatives for choosing the strategic paths to follow. According to this orientation, the external and internal analysis assumptions were crossed and interpreted as opportunities, with the aspects considered as strengths. This highlights the possibility of strategies for growth and expansion. In this category, there is the possibility of making viable local network projects, which require: (a) low-cost investments; (b) shorter execution period; (c) expansion in specific locations; (d) making direct investments in municipalities in which the stimulus to the demand for piped gas will lead to expansion.

On the one hand, after reaching the maturity of the demand, the high investment in distribution system becomes viable, expanding the networks through projects of the main distribution system with the use of underground pipelines. On the other hand, possible training and investment strategies are identified when confronting weaknesses with opportunities. In this aspect, the factors of competition dynamics require more detailed work, aiming to minimize the entry barriers and competitive rivalry concerning replacements in the commercial and residential segments. In these segments, the most obvious replacement is liquefied petroleum gas, whose price policy is defined at the federal level.

As for the intersection between threats and strengths, which refers to the defense and maintenance strategy, it is necessary to expand the scope of the piped natural gas market of the strategic industrial group, which is made possible thanks to its competitiveness in this segment. The expansion of product supply in the strategic commercial and residential groups is possible thanks to the natural gas' characteristics of sustainability, safety, and availability, which are advantageous when compared to replacements such as liquefied petroleum gas or coal.

Concerning threats combined with weaknesses, there are demands associated with survival strategies. Through commercial and marketing campaigns, it is necessary to continuously value the availability of natural gas, in contrast to the cost factors of implementing projects of underground pipe networks. As seen before, due to the high technology applied, such strategies require: (a) high-cost investments; (b) long construction times; and (c) delay in obtaining permits and authorization to expropriate areas for the construction of gas pipelines in many regions. The strategic alternatives for each combination of internal and internal agents are illustrated in Figure 6.

Figure 6

Strategic diagnosis – Business of Piped Natural Gas

	Strenghts	**Weakness**
	Growth and expansion strategy	**Training and investment strategy**
Opportunities	Making local network projects viable => low investment, less time, flexibility regarding demands, expansion in specific geographic locations	Minimizing factors of competition dynamics => entrance barriers, reduction of competitive rivalry in commercial and residential market segments
	Defense and maintenance strategy	**Survival strategy**
Threats	Expanding the supply of natural gas thanks to competitiveness and sustainability regarding replacements, safety, and availability => Strategic Industrial Group Expanding the supply of natural gas thanks to sustainability regarding replacements, valuing safety, and availability => Strategic Commercial and Residential Group	Valuing the availability of natural gas supply continuously versus underground pipelines, applied technology, high costs, and long construction times. Time-consuming process of obtaining permits to build gas pipelines

Source: Elaborated by the authors (2021).

The strategic diagnosis considers (1) issues related to market expectations in the use of piped natural gas, the strategic gaps that prevent market expansion, and (2) opportunities and threats, and strengths and weaknesses, regarding the generation of value to concessionaires and gas users. For Johnson et al. (2007), in addition to the bases with which a business unit can achieve a competitive advantage in its market, the competitive strategy extends to public service organizations by sustaining the quality of services within the established budget and by the "best value" – the provision of superior quality public service.

Thus, providing "better value," the strategic choice aims to develop the natural gas business through structuring local network projects, which become viable with the improvement of the regulatory framework. From the perspective of this competitive strategy proposal, the evaluation of the regulation area must consider: (a) the identification of a strategic gap that favors the competitiveness of concessionaires; (b) the guarantee of creating value for the gas market, enabling its sustainable use, and (c) meeting the recommendation of Johnson et al. (2007).

As for the structural conditions, the regulation area should provide the "best value" using internal resources, its regulatory capacities, and competencies through studies on regulations oriented to the external environment. Considering Ansoff's product-market matrix presented in Figure 1, identifying possible development directions – the strategic options available to an organization in terms of products and market coverage – is based on an understanding of the strategic position of an organization. The C quadrant of the Matrix is chosen as the direction of the strategy development, searching for new markets for the existing product.

Natural gas is not considered a new product entering new markets, as there are replacement products in these new markets. Therefore, the development of new markets will occur through new territories – municipalities where the product is not yet available and new uses of natural gas in these markets, with new capacities and current expectations with the arrival of distribution pipelines.

The replacement products in a segmented manner in the strategic industrial group are diesel oil, coal, fuel oil, firewood, and LPG. The main industrial segments with replacement products are the chemical, ceramic, textile, food and beverage, iron and steel, and paper and cellulose sectors, reaching an approximate consumption of 2,800 TOE (one ton of energy equivalent) per year (SIMA, 2021).

As the strategy chosen was market development, with natural gas reaching the municipalities not served by the distribution network and taking advantage of the strengths defined in the SWOT analysis, a total potential market equivalent to an approximate consumption of 7,000 TOE was estimated, revealing a space of 66% growth for natural gas in the segment of the strategic industrial group (SIMA, 2021). Therefore, the definition of seizing the opportunity of this project was consolidated: the development of the gas market through projects structuring the local network (structural aspects are presented in the next section).

The distribution gas pipelines are built from city gates, the name of the physical location where the reception, measurement, and start of local distribution occur. Distribution pipelines cover long

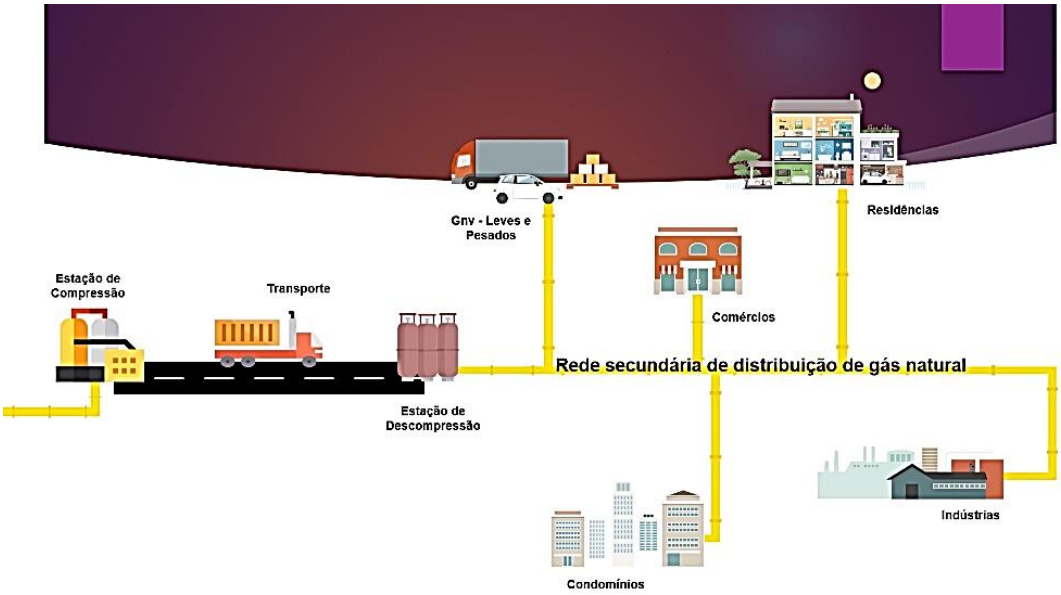
distances, occupy extensive areas, and are subject to environmental protection regulations, which demand large-scale investments and long execution times in addition to the complexity faced. Once the opportunity to develop the gas distribution market was identified, by expanding the geographic scope of the current network, in a given region, an estimate of the investment involved in the extension of the gas pipeline network was prepared, considering the criteria commonly adopted by ARSESP to assess the economic and financial feasibility of the expansion projects presented by the concessionaires.

Aware that this option involves large investments, the study analyzed the organization's discounted cash flow, calculated for a five-year fee cycle, the NPV (Net Present Value), the Internal Rate of Return (IRR), considering the opportunity cost WACC (Weighted Average Capital Cost), and the payback period. It was found that the payback of this investment exceeds the five years projected in the cash flow, with a negative IRR in a 10-year projection, reaching about 2.6% per year for 15 years and 6.5% per year for 20 years, percentages lower than the considered WACC of 8.3%. The NPV also remained negative up to 20 years after the start of the project.

The alternative of expanding the distribution pipeline network through a local network project was considered by the same criterion. This form involved a "set of pipes and other distribution equipment isolated from the main distribution system" (ARSESP, 2021, our translation). In local network projects, a compressor station is installed at a certain point in the main network. From this station, the compressed natural gas (CNG), or liquefied natural gas (LNG), is transported by road to a decompression station. After being subjected to decompression, the gas feeds a secondary local distribution network, reaching the point of consumption of the product. This system is represented in Figure 7.

Figure 7

Local Pipeline Project



Source: Elaborated by the authors (2021)

This alternative requires substantially less initial investment and proved to be significantly advantageous over a 5-year period. The payback occurs in 2.8 years; the IRR reaches 24.2% for the 5-year projection, a percentage higher than the WACC considered to be 8.3%. The NPV, at the end of the fifth year, reached BRL 2.2 million.

Given the findings, in this specific example, it was decided to adopt the structure of local networks as a strategy to expand the geographic coverage of gas distribution in a given region. According to Johnson et al. (2007), as described above, competitive strategy is related to the bases on which a business unit can achieve a competitive advantage in its market. In this sense, the competitive advantage presented in the local network projects – and which enables the supply of natural gas in its market – will be in line with the differentiation strategy, enabling the supply of a product with benefits different from those offered by replacement products, thanks to the availability of supply and security, factors valued by users.

The proposed differentiation strategy aims to (a) achieve a competitive advantage through better products or services at the same price or (b) improve margins thanks to slightly higher prices. For Johnson et al. (2007), the differentiation strategy in public services means achieving a position as the center of excellence, highlighting the importance that these organizations offer perceived benefits. However, who is benefited, the service users or the service providers? In this case of the development of the natural gas market, it is important that all stakeholders are benefited, service users, service providers, and the granting authority (the state). As discussed earlier, several stakeholders will benefit from the project.

6 Intervention and results

Marcondes et al. (2017) state that in executing a project to seize an opportunity, such as the one presented here, the change strategy can include three lines of action: technical, political, and cultural. Within the scope of this work, the performance of the pipeline gas area of the regulatory agency will be carried out in the technical and cultural line. This work does not address issues related to public policies aimed at regional development nor structural aspects of the market, such as the verticalization of the state, forcing citizens to consume public services provided on an exclusive basis since, in this specific case, some products can replace piped gas.

In the project described here, taking advantage of the opportunity to develop the gas market follows the regulatory agency's point of view, not extending to business decisions that are the responsibility of private sector service concessionaires. It is up to them to identify and quantify the potential for expanding the market, the actions to attract customers, and evaluate other investments necessary for the availability and sale of products at new points of consumption. Therefore, concerning the role of ARSESP, the project has already been implemented through the process described below.

The first step took place with the technical study established as the theme of the regulatory agenda for the 2019/2020 biennium, called "Improving the Regulation of Local Network Projects." Then, in line with the statutory rules, the project was the subject of public consultation, according to reference number 16/2019, available on the agency's website. The public consultation is a means that allows stakeholder participation in the natural gas market in the state of São Paulo in the process of validation, adaptation, and improvement, allowing the manifestation of the agents of society that may be affected by the project in addition to providing transparency to the acts of the agency. In this sense, the proposal was presented in the form of a technical note and draft deliberation, prepared by the gas regulation area so contributions and suggestions could be sent within 60 (sixty) days, as of December 27, 2019.

Per the agency's internal regulations, the contributions and suggestions presented were evaluated, and then the detailed report was prepared and disseminated (document RC.G-0001-2020), also available on the agency's website. The project received about seventy improvement proposals presented by different stakeholders since 43% are characterized as economic agents, 29% as consultants, and 28% as representatives of professional organizations and membership associations.

The last phase of the project was concluded with the publication, on October 9, 2020, of ARSESP Resolution 1055 of 2020, approved by the agency's board of directors. It is relevant to emphasize that the agency's resolutions are normative acts of exclusive competence of the board, the result of a structured regulatory process, and enter into force on the date of their publication in the Official State Gazette.

With the previous resolution, new opportunities are created to provide greater competitiveness to piped gas distributors, creating a previously non-existent market, with demand for the product offered

as a replacement for the energy sources available until then. Therefore, the implementation of local networks represents the market development described by Carvalho et al. (2015) based on the Ansoff's matrix, with value created for various agents, such as concessionaires, through increased return and economic added value (Antonik & Muller, 2017) and business development through the achievement of competitive advantage (Johnson et al., 2007; Barney & Hesterly, 2011), and the state, with the increase in the asset base of the state concession and the consequent increase in tax collection.

The main benefits are evident considering the promotion of favorable conditions for economic and social development (Castañeda, 2013) since it offers a clean, practical, and safe alternative energy source, which, in addition to contributing to an increase in the quality of life of the consuming public, expands the potential for generating income and new jobs. Therefore, it is possible to note the effects of creating value from the benefits perceived by customers (Yanaze, 2006), which are better than the options available until then (Kotler and Armstrong, 2015).

7 Final considerations

This article describes strategic action aimed at business development by identifying the opportunity for a competitive advantage for companies operating in gas distribution in regions not yet served, offering the product as a substitute for current energy sources. The solution conceived by the area of regulation of ARSESP's Gas Department is represented by the implementation of the local network project – which creates value for customers and expands delivery capacity in areas not served by concessionaires. The solution's viability is possible due to market development and expansion of the gas pipeline network.

In addition to the competitive benefits provided to distributors, value is created for the state. The expansion of the gas distribution network and the increase in the asset base of the state concession promote economic and social development from direct and indirect jobs, income generation, and an increase in tax collection.

As in the case of private sector organizations, which face competitive challenges, this study was guided by a vision focused on the public services' users, focusing on them as consumers, to make the product viable for the market and offer service universalization and continuity and low fees. Therefore, the objective of promoting the development of the market was accomplished.

As it involves different agents – consumers, private companies, and government agencies – this proposal deals with the typical complexity of the business environment. It emphasizes the agents' learning while engaged in the project's design and implementation, providing innovative solutions by applying a scientific method to solve problems, seizing market opportunities, and focusing on business development.

The project can be replicated in similar situations and other regulated sectors involving other public services (especially due to the methodological procedures adopted, which give the experience a

scientific character). Therefore, the potential for impact is not limited to the specific experience described here. It extends to benefits applicable to businesses and market development and, consequently, to the economy – particularly to society as a whole by providing jobs and meeting community needs.

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