

Case for Teaching

BRK Ambiental Sumaré: Operational Excellence and Continuous Improvement



BRK Ambiental Sumaré: Excelência Operacional e Melhoria Contínua

Discipline: Operations Strategy
Subject: Strategic Alignment
Industry: Utilities, Water and Sewage Management
Geography: Sumaré/SP, Brazil

Juliana Bonomi Santos*¹
Rafaela Scorsatto Lange²
Carlos Eduardo Lourenço¹

Rafaela Scorsatto, operations manager of the Sumaré unit at BRK Ambiental, was thinking about how to make her case for the position of regional operations director when the phone rang. It was Fernando Mangabeira, the chief operating officer, who was designing a proposal to win the concession for water supply and sewage collection and treatment in the municipality of Maceió.

“Rafaela, it is essential for BRK to win this concession as it will allow us to consolidate our position in northeast of Brazil.” Indeed, Maceió could become a showcase where other municipalities in the states of Paraíba, Pernambuco, Sergipe, and Alagoas could get to know the company and its services. Despite the bidding procedures, public procurement is considerably influenced by public managers’ experiences with similar services.

BRK Ambiental is the largest private sanitation company in Brazil, specialized in the management of water supply and sewage treatment for municipalities. Rafaela and Fernando worked together at BRK’s Sumaré unit when the company was awarded responsibility for the municipality’s water supply and sewage treatment services in 2015. At the time, the more than 280,000 inhabitants of the municipality had only 14% sewage coverage. In addition, although 90% of the population had access to water, citizens faced frequent supply problems. However, thanks to several measures, in less than six years, BRK Sumaré was able to double sewage coverage, bring water to the entire municipality, and significantly reduce supply problems.

* Corresponding Author.

1. Fundação Getúlio Vargas, Escola de Administração de Empresas de São Paulo, São Paulo, SP, Brazil.
2. BRK Ambiental, São Paulo, SP, Brazil.

Cite as: Santos, J. B., Lange, R. S., & Lourenço, C. E. [2023]. BRK Ambiental Sumaré: Operational excellence and continuous improvement. *Revista de Administração Contemporânea*, 27(3). e220097. <https://doi.org/10.1590/1982-7849rac2023220097.en>

Published as Early Access: March 07, 2023.
Assigned to this issue: April 25, 2023.

of invited reviewers until the decision:

	1	2	3	4	5	6	7	8	9
1 st round	X	X	👤	👤					
2 nd round	👤	👤	👤	👤					

JEL Code: M110.

Editor-in-chief: Marcelo de Souza Bispo (Universidade Federal da Paraíba, PPGA, Brazil)
Associate Editor: Paula Castro Pires de Souza Chimentil (Universidade Federal do Rio de Janeiro, COPPEAD, Brazil)
Reviewers: Júlia Monteiro (Universidade Federal do Rio de Janeiro, COPPEAD, Brazil)
Gustavo Nobre (Universidade Federal do Rio de Janeiro, COPPEAD, Brazil)

Peer Review Report: The Peer Review Report is available at this [external URL](#).

Received: March 31, 2022

Last version received: January 05, 2023

Accepted: January 18, 2023

Notes: This case combines true information about the BRK Ambiental Sumaré operation and fictitious narrative elements. The case was created in Portuguese and was translated for the EFMD Case Writing Competition. The original Portuguese version can be accessed [here](#).

The Sumaré experience, however, did not seem to reassure Fernando Mangabeira, who sounded worried on the phone. “Rafaela, Maceió is very different from Sumaré. The municipality is much larger and fairly well supplied already. I don’t think the same strategies we used in Sumaré will work there.” After explaining the situation, Fernando sent Rafaela the bidding documentation, and asked her to create the operational plan for the proposal. As soon as she hung up, Rafaela thought, “The operational dimension will be key to winning the bid. If my proposal is spot on, I’ll get the promotion for sure.”

BRK AMBIENTAL’S HISTORY

BRK Ambiental is the largest private sanitation company in Brazil. With around 5,500 employees, it provides services that benefit more than 15 million people in 100 Brazilian municipalities. Its focus is the management of water supply systems, from abstraction to distribution, and the management of sewage collection, conveyance, treatment, and final disposal. BRK Ambiental operates under different contract models, which determine the scope of the services provided to the population. Concessions and public-private partnerships are the most common arrangements. In these, the company operates the water or sewage services as determined by the municipality within the contract limits and under the supervision and regulation of the conceding authority and the regulatory agency. Therefore, it assumes responsibility for planning the services, funding, building, operating, and maintaining the necessary infrastructure, and it receives service tariffs in full.

The company was born in April 2017, when Brookfield Asset Management, a Canadian firm with operations in more than 30 countries, bought 70% of the company’s shares. Before 2017, the company was known by the name Odebrecht Ambiental, a spin-off of the environmental business unit of Odebrecht created in 2008. From 2008 to 2016, Odebrecht Ambiental won several concessions, such as Limeira (SP), Rio Claro (SP), Mairinque (SP), and Recife (PE). Annex 1 shows the sequence of contracts won by the company over the years.

With the change of shareholders, organizational changes also took place. After taking control of BRK Ambiental, Brookfield diffused its managerial philosophy in the company. In addition to orientation to results, respect for people, and the commitment to the customer and to safety, the company emphasizes the need to pursue operational excellence to increasing the value of the firm’s assets and producing solid returns for shareholders.

OPERATIONAL EXCELLENCE: A VALUE OF THE COMPANY

To move closer to the goal of operational excellence, BRK implemented the program *Criando Valor* (Creating Value), which includes the firm’s productivity project. The central goal of this project is to identify opportunities and implement measures to reduce costs and increase operational efficiency. Over the nine years of operation under management of Odebrecht Ambiental, the various business units developed their own ways of providing their services considering the particularities of each municipality. The productivity project aims to identify best practices and replicate them in other company units.

To implement them in new units, the project team visits the units, accompanies field teams, talks to everyone involved in the process to understand the different perceptions and opinions, and analyzes service and cost data to gain understanding of the unit’s situation. Based on this pool of information, it proposes practices that are suitable to the unit’s needs. To minimize impacts to the operation, pilots are carried out. In addition, the project team puts managers from different operations in contact so they can jointly assess the benefits of adopting the new practice, as well as adaptation needs.

OPERATION OF WATER AND SEWAGE SERVICES

In the units where BRK Ambiental is responsible for water and sewage management, the main operational processes are water abstraction, treatment, and distribution, and sewage collection and treatment.

The water abstraction process depends on where the water comes from. It may come from underground or surface sources. In the former case, it is abstracted by wells through a pumping system and then undergoes a disinfection and fluoride addition process. In surface abstraction, after water is adducted from rivers and streams, it is directed to water treatment plants (WTP).

At WTPs, water passes through physical-chemical treatments until it is ready for consumption. To guarantee the operation of WTPs and monitor water quality, it is necessary to have specialist teams working 24 hours a day. Once treated, water can be distributed to end customers. Constant maintenance and investments in water mains, pipes, and connections are necessary to ensure that water reaches the customer with the same quality as in the treatment process and with adequate pressure.

In turn, sewage is collected and conveyed to sewage treatment plants (STP) through a set of collection networks, outfalls, and interceptors. Sewage lifting stations (SLS) are normally used along this course to pump sewage from lower areas to STPs. Teams working 24 hours a day are necessary to guarantee the operation of STPs and monitor the treated effluent.

Water pipes' intrinsic conditions, such as their age and material, are central, since old networks can cause constant ruptures and affect water quality, due to factors such as incrustation. In addition, the overall volume of treated water that is lost throughout the supply process has negative impacts on society, the environment, and the company's revenue. Therefore, control and loss reduction measures are necessary.

The maintenance of sewage networks is also essential and requires preventive cleaning to avoid blockages and overflows. It reduces the demand for corrective and unblocking services, as well as repairs to connections and collection networks. Thus, two processes of extreme importance to guarantee the efficiency of the operation are electromechanical maintenance and water and sewage quality control.

The electromechanical maintenance area is responsible for the management of assets 24 hours a day (Annex 2 shows the installed infrastructure). These assets (e.g., compressors, pumps, boosters, WLSs, SLSs, cabins, and circuit breakers) are monitored throughout the water and sewage treatment processes. To ensure their full operation, it is necessary to perform preventive and predictive maintenance. Maintenance teams must also be available 24 hours a day to respond to emergencies.

Water and sewage quality control carries out processes to ensure that water and sewage are treated in accordance with the guidelines defined by the Ministry of Health and CETESB. Quality control must be present in all water and sewage management processes. Physical-chemical and bacteriological laboratories are necessary to carry out analyses on the samples collected in reservoirs and distribution networks.

BRK AMBIENTAL SUMARÉ: EVOLUTION OF THE OPERATION

The Sumaré concession contract was signed in 2015. At this unit, BRK Ambiental is responsible for water supply and sewage collection and treatment in the entire municipality. Despite a troublesome start, after six years, the unit managed to become a model of operational excellence. This trajectory can be divided into three phases.

Phase 1 - Concession and beginning of operation (2015 to 2016)

When BRK Ambiental took over the concession from the old sewage and water department (DAE) of Sumaré in 2015, the company was going through a delicate moment. The municipality had only 14% sewage coverage. Water coverage was 90%; however, the situation was also critical. Water shortages and pressure reduction were frequent, and — at times — up to 50 neighborhoods were without water at the same time. Daily water production capacity was limited at the WTPs, adduction was insufficient for water distribution, and equipment breakdowns and network leaks were frequent. The population of the municipality was extremely dissatisfied with the service provided by the old DAE and expected BRK Ambiental to solve the problem immediately.

However, immediate solutions were beyond the company's reach for several reasons. Many problems were caused by the precarious infrastructure left by the DAE administration. Investments were necessary for expanding and modernizing the city's water supply and sewage systems. However, such investments took time to implement, and to make matters worse, works had to be carried out in parallel with the service provision. "It was like changing a tire in a moving car," remembers Rafaella.

Another aggravation was the political context. The concession was won still under the name Odebrecht Ambiental. Due to political scandals associated with its former parent company, when the concession began, BRK Ambiental was unable to execute the investments at the pace required.

Information about the operation was also lacking. For example, many technical records with the location of the main networks and accessories were not transferred from the DAE to BRK Ambiental. This lack of information about the location of manholes made difficult to plan the cleaning and maintenance of the water and sewage network, as well as performing diagnoses on it. Former DAE employees who joined the BRK Ambiental Sumaré team were also resistant to sharing information and adopting new procedures. It was necessary to learn how to work with them or dismiss the most resistant ones.

Despite this troubled scenario, the company was able to make several investments. From the outset of the concession in 2015, large investments were made that allowed the resumption of normal water supply in several neighborhoods of the city, such as *Parque Dante Marmirolli*, *São Judas*, *Aclimação*, *Área Cura*, and *João Paulo II*. The main investments carried out by the company are listed in Annex 3. In the first years of operation, BRK Ambiental invested

BRL 96 million to improve and expand the infrastructure of the Sumaré unit.

Phase 2 – Recovery and learning (2017 to 2019)

Despite the investments made, the company entered 2017 still facing problems related to water availability. The infrastructure for the provision of services improved, but the call center received around 1,238 complaints a month for lack of water or loss of pressure, with some neighborhoods being more severely affected than others. In addition, the firm faced difficulty meeting the water quality guidelines defined by the Ministry of Health and CETESB. The water compliance rate was around 80%, and the company was able to carry out preventive cleaning for only 7.42 km of pipes per year.

From 2017 to 2019, new investments were made, consolidating the water abstraction, production, and distribution infrastructure (Annex 3). This period was also marked by the creation of operational practices to improve the quality of the service provided, which was made possible by the team's increased knowledge of how the Sumaré operation worked.

In addition to the implementation of a people development program, procedures were created to improve water quality. Among these procedures were the redistribution of sample collection points, the daily monitoring of water quality and pipe discharges, the implementation of preventive collection through a mobile laboratory to rapidly assess changes in water samples, and the execution of weekly laboratory tests to monitor algae in springs.

The Sumaré unit also developed strict controls to reduce losses in water distribution. A team dedicated to identifying water leaks during the night and managing water pressure was created. A methodology called 'know your DCM' was also implemented to monitor the volume of water available. The Sumaré team also developed a periodically updated technical register with maps of the entire water and sewage network and structure.

In addition to aiding maintenance planning, this register provides data for statistical analysis and modeling used to improve water flow and pressure across the network. Finally, the company invested in two information systems. One system allowed the front-office maintenance employees to access customers' complaints and orders online (MOBTeam) and the other provided remote access to the technical register of water supply and sewage collection systems (ArcGIS), which enabled greater maintenance agility.

In 2018, operational problems in the filters at WTP I reduced the unit's distribution capacity by 20%, leading to a 15-day water distributions rationalization in the central region of Sumaré. The management of this crisis created important lessons learned at BRK Ambiental Sumaré, such as the need to maintain certain reservation levels in order to avoid impacts on supply, as well as the importance of having pre-established corrective measures in case of occurrences that exceed operational safety margins (e.g., sending water trucks, strengthening field teams, and immediate communication with the population).

The efforts made during this period were essential to promote a significant improvement in the level of service provided to the population. The results began to appear significantly from 2018 onward (Annex 4).

Phase 3 – Consolidation and pursuit of operational excellence (from 2020 onward)

Having consolidated its operation, BRK Ambiental Sumaré entered a new phase. The operation needed to generate the return the company expected. The population was very sensitive to the tariffs as it still had memories of supply problems, and municipal elections were drawing near. Rafaella then sought support from the corporate team related to the productivity project. "It's our opportunity," she thought, "to get an outside view, bringing in new practices from other units and competitors."

Together, the teams identified seven initiatives that could leverage the productivity of the Sumaré operation and generate potential savings of BRL 3.27 million by the end of 2021. These measures involved the reduction of overtime, allocation of maintenance teams according to the location of customers and types of service rendered, implementation of new procedures to reduce field visits, substitution of the heavy fleet used in field maintenance, and insourcing in key services.

The organizational structure was also altered to eliminate duplicated processes and increase operational synergies (Annex 5). It centralized water and sewage collection and treatment areas into one, concentrating on it the responsibility for managing the unit's infrastructure. A network and reservation area was created, unifying the maintenance planning activities previously carried out by different areas. Maintenance services for water networks were divided into light repairs (e.g., valve adjustments, repairs to meter stands, and inspections) and heavy repairs (e.g., repairs to water mains and connections), thus allowing a specialization of the technical teams.

Finally, the new structure created a strategic planning area, responsible for monitoring performance indicators. The team generates 68 indicators to monitor the operation and issues tracking reports. In addition to daily water production bulletins, the team produces a monthly booklet with operation indicators. A dashboard was created to facilitate the periodic updating of indicators, and TV screens and management panels were installed in visible positions, allowing the entire team to monitor the performance of the operation and identify improvement needs. The performance measurement system laid the foundation for the continuous improvement of the unit.

THE PROPOSAL FOR THE MACEIÓ CONCESSION

A week after Fernando Mangabeira's call, Rafaella Scorsatto had already analyzed all the bidding documentation and other internal reports sent by Fernando. Despite being larger, the Maceió operation was similar to that in Sumaré regarding the processes of water and sewage distribution and treatment. The installed infrastructure was consistent with the size of the municipality and was not neglected like the one in Sumaré in 2015. Compliance rates and water and sewage supply were also reasonable.

On the other hand, the municipality was imposing aggressive targets in water waste reduction and customer service improvement. In a later meeting, Fernando told her that customer service was done in person during business hours at two branches that served the entire municipality. "These branches, Rafaella, they are in upscale neighborhoods... That sends the wrong message to the public, the mayor is not happy about it," said Fernando.

The water waste issue was also complex. Fernando explained to her that there were problems of reservation level, leakages, and low water pressure. Recently, a fire in the file room had damaged many control sheets used in those processes. Besides, Fernando seemed concerned about the population's water wasting behavior. "The population pays little for water, Rafaella. I can't remember how much now... but a fixed value per month... The waste is huge. People washing sidewalks and sweeping leaves away with a water hose... It's ludicrous! But I don't know how much we will get to change the amount users pay."

After the meeting with Fernando, Rafaella had five more days to send him the operational plan for validation and inclusion in the official concession proposal. She sat down in front of her computer and started to think about what to put in the proposal.

ANNEX 1

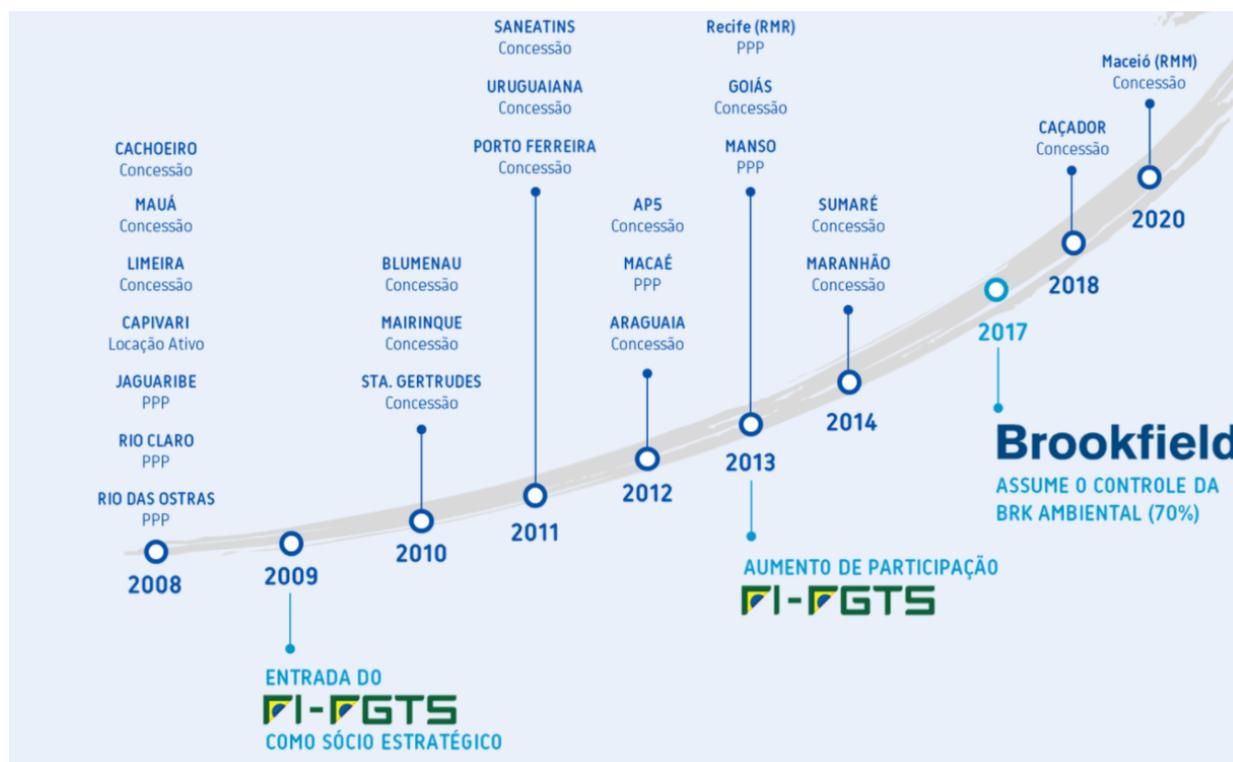


Figure A1. BRK Ambiental's evolution.

Translation of terms in the figure: concessão = concession; PPP = public private partnership; locação ativo = asset lease; Entrada do FI-FGTS como sócio estratégico = Entry of FI-FGTS as a strategic partner; Aumento de participação FI-FGTS = Increase in FI-FGTS participation; Brookfield Assume o controle da BRK Ambiental (70%) = Brookfield takes over control of BRK Ambiental (70%).

ANNEX 2

O SISTEMA DE PRODUÇÃO E DISTRIBUIÇÃO DE ÁGUA DE SUMARÉ

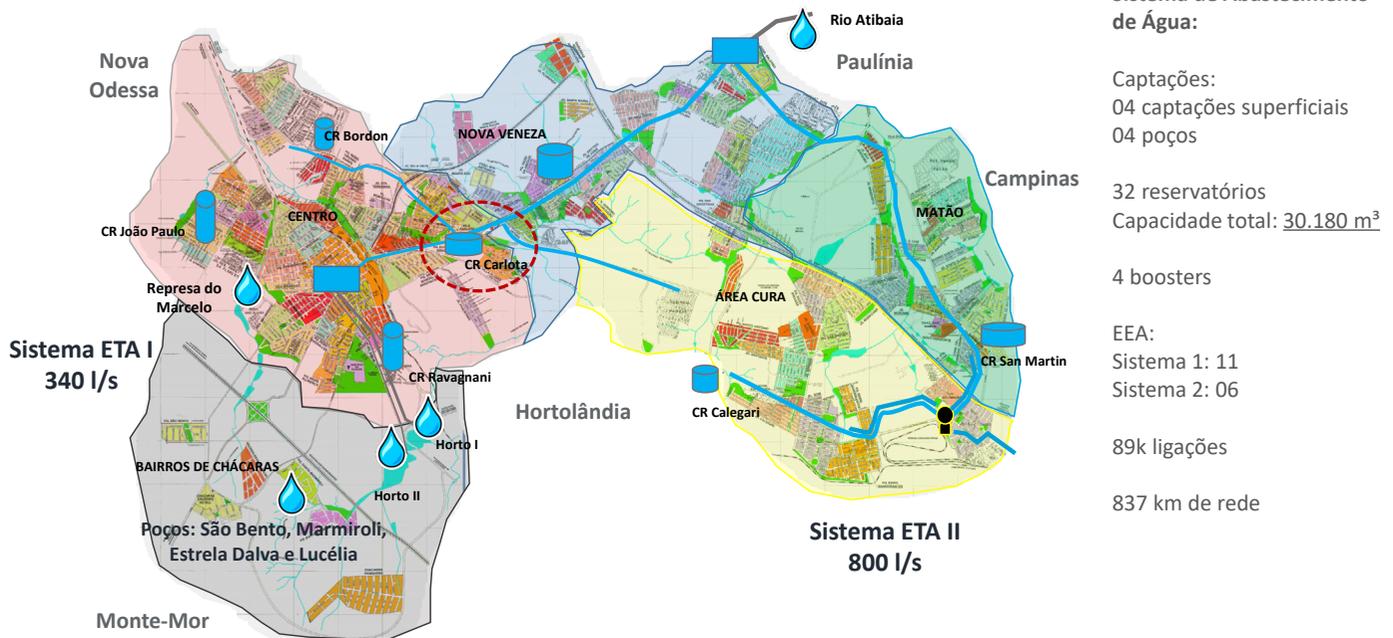
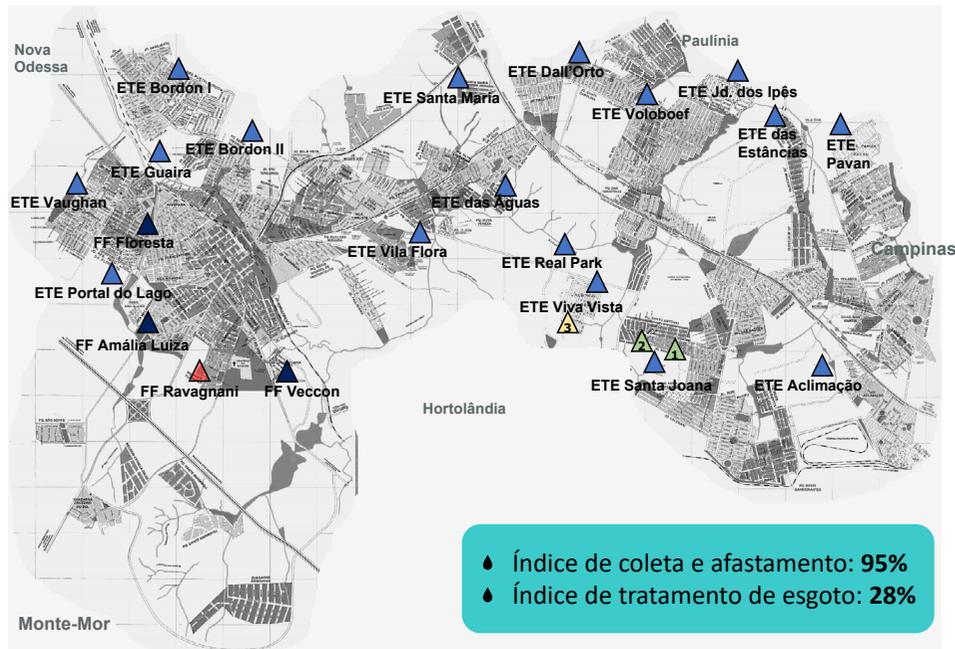


Figure A2. Sumaré installed infrastructure.

Translation of terms in the figure: O SISTEMA DE PRODUÇÃO E DISTRIBUIÇÃO DE ÁGUA DE SUMARÉ = THE SUMARÉ WATER PRODUCTION AND DISTRIBUTION SYSTEM; Sistema ETA I 340 l/s = WTP System I 340 l/s; Sistema ETA II 800 l/s = WTP System II 800 l/s; Rio Atibaia = Atibaia River; CR Bordon = RC Bordon; CR João Paulo = RC João Paulo; CR Carlota = RC Carlota; CR Ravagnani = RC Ravagnani; CR San Martin = RC San Martin; CR Calegari = RC Calegari; Represa do Marcelo = Marcelo dam; CENTRO = DOWNTOWN; ÁREA CÚRA = ÁREA CÚRA; BAIRROS DE CHÁCARAS = COUNTRYSIDE NEIGHBORHOODS; Poços: São Bento, Marmiroli, Estrela Dalva e Lucélia = Wells: São Bento, Marmiroli, Estrela Dalva, and Lucélia; Sistema de Abastecimento de Água = Water supply system; Captações = Abstraction points; 04 captações superficiais = 4 surface points; 04 poços = 4 wells; 32 reservatórios = 32 reservoirs; Capacidade total: 30.180 m³ = Total capacity: 30,180 m³; 4 boosters = 4 boosters; EEA = WLS; Sistema 1: 11 = System 1: 11; Sistema 2: 06 = System 2: 06; 89k ligações = 89 k connections; 837 km de rede = 837 km network;

O SISTEMA DE TRATAMENTO DE ESGOTO DE SUMARÉ



Sistema de Esgotamento Sanitário:

- ▲ ETE's de pequeno porte em operação: 17 unidades
- ▲ Fossas: 3 unidades
- ▲ Fossa Inoperante: 1 unidade
- ▲ EEE's em operação: 2 unidades
- ▲ EEE em processo de doação: 1 unidade
- 85k ligações
- 733 km de rede



Figure A3. The Sumaré sewage treatment system.

Translation of terms in the figure: O SISTEMA DE TRATAMENTO DE ESGOTO DE SUMARÉ = THE SUMARÉ SEWAGE TREATMENT SYSTEM; ETE Bordon I = Bordon STP I; ETE Bordon II = Bordon STP II; ETE Guaira = Guaira STP; ETE Vaughan = Vaughan STP; FF Floresta = Floresta FC; ETE Portal do Lago = Portal do Lago STP; EF Anália Luiza = Anália Luiza FC; FF Ravagnoli = Ravagnoli FC; FF Vecon = Vecon FC; ETE Santa Maria = Santa Maria STP; ETE Dall'Orto = Dall'Orto STP; ETE Voloboef = Voloboef STP; ETE Jd. dos Ipês = Jardim dos Ipês STP; ETE das Estâncias = Estâncias STP; ETE Pavan = Pavan STP; ETE Vila Flora = Vila Flora STP; ETE das Águas = Águas STP; ETE Real Park = Real Park STP; ETE Viva Vista = Viva Vista STP; ETE Santa Joana = Santa Joana STP; ETE Aclimação = Aclimação STP; Sistema de Esgotamento Sanitário = Sanitary sewage system; ETE's de pequeno porte em operação: 17 unidades = Small STPs in operation: 17 units; Fossas: 3 unidades = Cesspits: 3 units; Fossa Inoperante: 1 unidade = Inoperative cesspits: 1 unit; EEE's em operação: 2 unidades = SLSs in operation: 2 units; EEE em processo de doação: 1 unidade = SLSs in donation process: 1 unit; 85k ligações = 85 k connections; 733 km de rede = 733 km network; Índice de coleta e afastamento: 95% = Collection and conveyance rate: 95%; Índice de tratamento de esgoto: 28% = Sewage treatment rate: 28%.

ANNEX 3

Infrastructure improvement over time

- 2015 — Construction of new abstraction wells and water mains, and interconnection of existing systems in order to increase the availability of water for the region.
- 2015 — Modernization of the water treatment process and increase in water production capacity through investments in WTPs I and II.
- 2015 — Implementation of compact STPs, increasing effluent treatment capacity to more than 18,000 inhabitants.
- 2016 — Expansion of the supply network system, modernization of WTPs, construction of new abstraction wells and new water pumping stations.
- 2017 — Investments in network expansion in 38 districts of the municipality, including Jardim Paulistano, Parque Itália, Jardim Amélia, and Viel.
- 2018 — Improvements to the Atibaia abstraction system and WTPs I and II (remodeling of filters and improvement in the treatment process, expansion of treated water production).
- 2019 — Completion of the new raw water main that conveys water from the Marcelo dam to WTP I, comprising 1.3 km of 400-mm-wide networks. The water main benefited 80,000 residents of 55 neighborhoods in the central region of Sumaré.
- 2019 — Replacement of 6 km of networks in the municipality, starting with the Jardim Dall'Orto neighborhood.
- 2019 — Expansion and improvement of WTP II and a 25% expansion of abstraction capacity in the Atibaia system.



Figure A4. WTP expansion and improvement.



Figure A5. Atibaia abstraction expansion.

- 2020 — Construction of the new Bandeirantes-Calegari main, improving the Calegari reservoir's storage level and the availability of water for the Área Cura and Nova Veneza neighborhoods.
- 2020 — Beginning of construction of the Tijuco Preto STP, which will raise the sewage treatment rate to 65%, with improvements on other types of treatment, including reduced implantation area, low energy consumption, and reduced odor generation, besides ensuring high treatment efficiency, superior to conventional systems.

ANNEX 4

Número de Reclamações de Falta de Água/Pressão

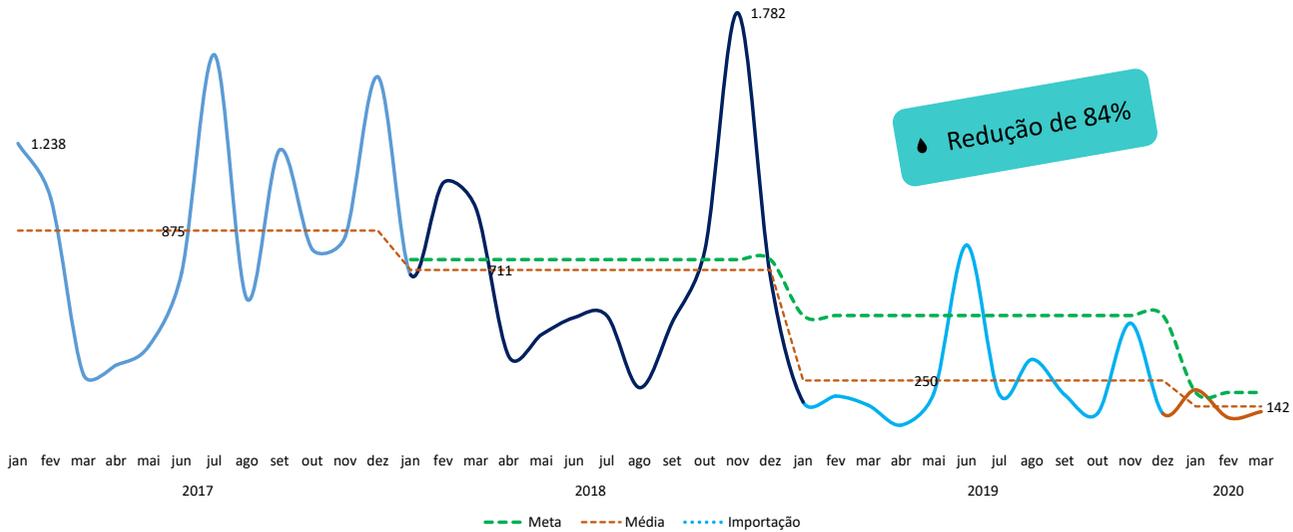


Figure A6. Performance indicators since 2017.

Translation of terms in the figure: Número de Reclamações de Falta de Água/Pressão = Number of lack of water/pressure complaints; Redução de 84% = Reduction of 84%; 1.283 = 1,283; 1.782 = 1,782; jan = Jan.; fev = Feb.; mar = Mar.; abr = Apr.; mai = May; jun = Jun.; jul = Jul.; ago = Aug.; set = Sep.; out = Oct.; nov = Nov.; dez = Dec.; Meta = Target; Média = Average; Importação = Import.

Índice de Conformidade de Água (IC)

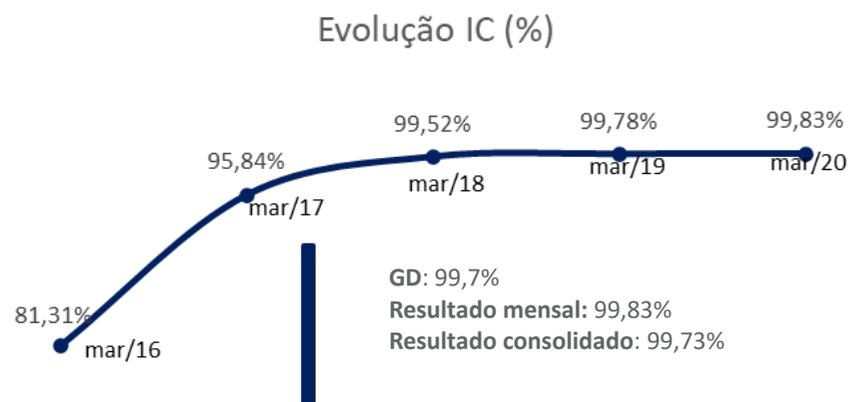
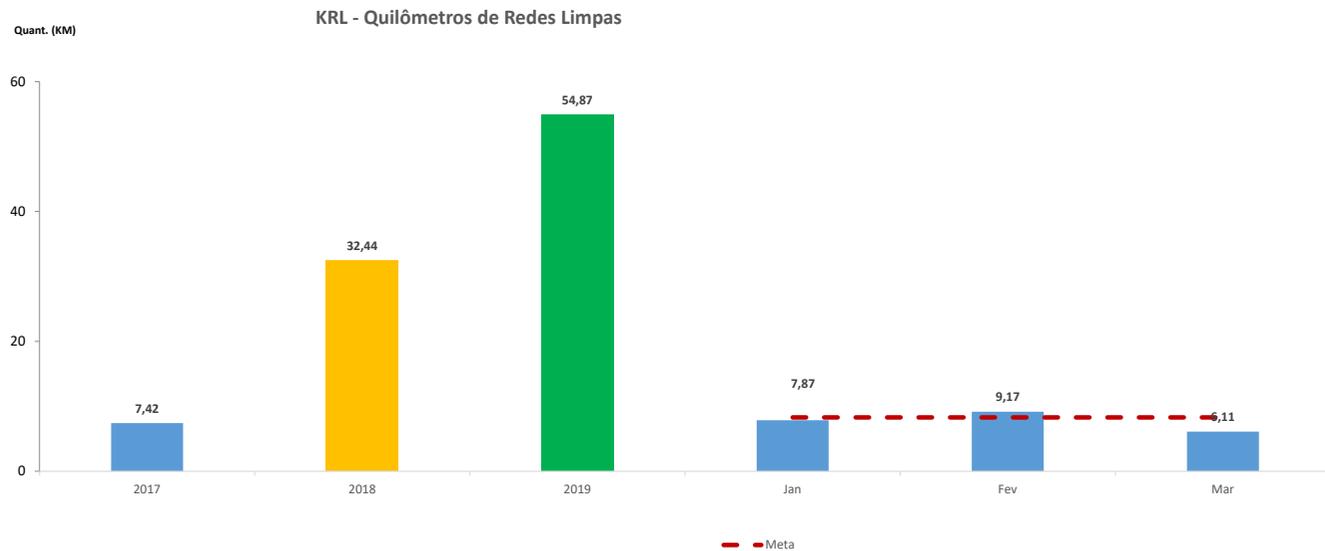


Figure A7. Water compliance rate (CR).

Translation of terms in the figure: Índice de Conformidade de Água (IC) = Water compliance rate (CR); Evolução IC (%) = CR evolution (%); 81,31% = 81.31%; 95,84% = 95.84%; 99,52% = 99.52%; 99,78% = 99.78%; 99,83% = 99.83%; mar/17 = Mar./17; mar/18 = Mar./18; mar/19 = Mar./19; mar/20 = Mar./20; GD: 99,7% = DG: 99.7%; Resultado mensal: 99,83% = Monthly result: 99.83%; Resultado consolidado: 99,73% = Consolidated result: 99.73%.

Limpeza preventiva



8



Figure A8. Preventive cleaning and network blockages.

Translation of terms in the figure: Limpeza preventiva e entupimentos em rede = Preventive cleaning and network blockages; Quant. (KM) = Quant. (Km); KRL — Quilômetros de Redes Limpas = KCN — Kilometers of clean networks; 7,42 = 7.42; 32,44 = 32.44; 54,87 = 54.87; 7,87 = 7.87; 9,17 = 9.17; 6,11 = 6.11; Jan = Jan.; Fev = Feb.; Mar = Mar.; Meta = Target.

ANNEX 5

Organizational structure change in Sumaré

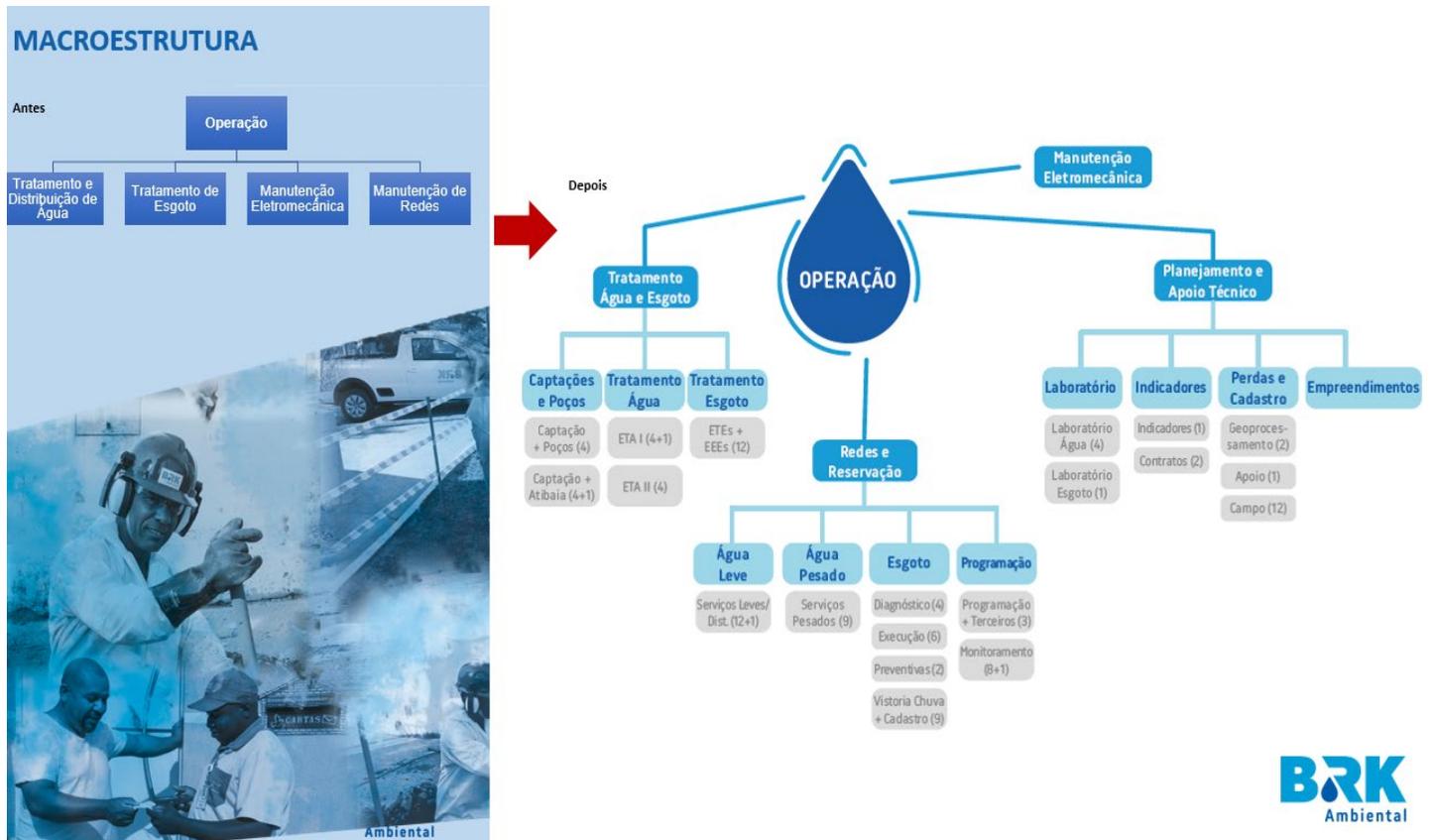


Figure A9. Macrostructure.

Translation of terms in the figure: MACROESTRUTURA = MACROSTRUCTURE; Antes = Before; Operação = Operation; Tratamento e Distribuição de Água = Water treatment and distribution; Tratamento de Esgoto = Sewage treatment; Manutenção Eletromecânica = Electromechanical maintenance; Manutenção de Redes = Network maintenance; Depois = After; OPERAÇÃO = OPERATION; Tratamento de Água e Esgoto = Water and sewage Treatment; Captações e Poços = Abstraction points and wells; Captação + Poços (4) = Abstraction + Wells (4); Captação + Atibaia (4+1) = Abstraction + Atibaia (4+1); Tratamento Água = Water treatment; ETA I (4+1) = WTP I (4+1); ETA II (4) = WTP II (4); Tratamento Esgoto = Sewage treatment; ETEs + EEEs (12) = STPs + SLSs (12); Redes e Reservação = Networks and reservation; Água Leve = Light water; Serviços Leves/Dist. (12+1) = Light services/Dist. (12+1); Água Pesado = Heavy water; Serviços Pesados (9) = Heavy services (9); Esgoto = Sewage; Diagnóstico (4) = Diagnosis (4); Execução (6) = Execution (6); Preventivas (2) = Preventive (2); Vistoria Chuva + Cadastro (9) = Rain inspection + Register (9); Programação = Schedule; Programação + Terceiros (3) = Schedule + Third parties (3); Monitoramento (8+1) = Monitoring (8+1); Manutenção Eletromecânica = Electromechanical maintenance; Planejamento e Apoio Técnico = Planning and technical support; Laboratório = Laboratory; Laboratório Água (4) = Water laboratory (4); Laboratório Esgoto (1) = Sewage laboratory (1); Indicadores = Indicators; Indicadores (1) = Indicators (1); Contratos (2) = Contracts (2); Perdas e Cadastro = Losses and register; Processamento (2) = Processing (2); Apoio (1) = Support (1); Campo (12) = Field (12); Empreendimentos = Developments.

Teaching Notes

■ ABSTRACT

The case portrays the dilemma of Rafaella Scorsatto, operations manager at the Sumaré unit, who needs to propose an operational plan to win the concession for water supply and sewage collection and treatment in the municipality of Maceió. Rafaella managed the process of operational improvement in the Sumaré unit when the company took over the concession in 2015. Despite a troubled start, in less than six years, the Sumaré unit has become a reference in operational excellence within BRK Ambiental. This achievement was possible because, in three different moments in time, the unit was able to understand the main demands of users and public authorities and align its operational resources with them. The case was designed to show students the elements of operations strategy (market demands and operational decisions), the need for alignment between these elements, and the importance of adapting operational practices as new demands arise. To achieve this purpose, the case describes the latent demands of each phase and the operational practices adopted to meet them. By understanding the need for alignment and how each operational decision helps in delivering market demands, students acquire conditions to help Rafaella propose a plan with the potential to win the concession in Maceió. The use of this case is recommended in operations strategy undergraduate and graduate courses, especially at the beginning of the course.

Keywords: operations strategy; service operations management; public services; operational alignment.

■ RESUMO

O caso retrata o dilema de Rafaella Scorsatto, gerente de operações da unidade de Sumaré da BRK Ambiental, que precisa propor um plano operacional para ganhar a concessão dos serviços de abastecimento de água e coleta e tratamento de esgoto do município de Maceió. Rafaella coordenou o processo de melhoria da gestão operacional que ocorreu no município de Sumaré, SP, quando a empresa assumiu a concessão em 2015. Apesar de um início conturbado, em menos de seis anos, Sumaré tornou-se uma referência em gestão operacional dentro da BRK Ambiental. Isso porque, em três diferentes fases, a unidade foi capaz de entender as principais demandas dos usuários e poder público e alinhar seus recursos operacionais com elas. O caso foi pensado para mostrar para os alunos elementos da estratégia de operações (demandas de mercado e decisões operacionais), a necessidade de alinhamento entre esses elementos e a importância da adaptação das práticas operacionais à medida que novas demandas surgem. Para isso, o caso descreve as demandas latentes de cada fase e as medidas operacionais adotadas para atendê-las. Ao entender a necessidade de alinhamento e como cada medida operacional auxilia a entrega das demandas de mercado, o aluno adquire condições para ajudar Rafaella a propor um plano com potencial de ganhar a concessão do município de Maceió. O uso deste caso é recomendado em cursos de graduação e pós-graduação de Estratégia de Operações, principalmente no início do curso.

Palavras-chave: estratégia de operações; operações de serviço; serviços públicos; alinhamento operacional.

DIDACTIC OBJECTIVES

This case aims to highlight the need for alignment between market demands and operational decisions, a central aspect to operations strategy. The case presents elements that show the main categories of operational decisions that need to be made to configure any operation (people, processes, infrastructure, and information). It does so in the context of utility operations, which contains some specific demands.

The case gives an account of how BRK Ambiental managed to achieve operational excellence at the Sumaré unit after winning the water and sewage services concession in 2015. The account is divided into three phases. In each of them, the case presents the most conspicuous market demands and the operational decisions made to manage water supply and sewage collection, conveyance, and treatment. At the end, Rafaella's dilemma involves using the logic of strategic alignment to think about how to meet the demands related to the Maceió concession. Based on this, the case allows identifying:

1. The elements of operations strategy (market demands and operational decision-making) contextualized for utility operations;
2. The need for alignment between the operation and market demands;
3. The need to adapt operational practices as new demands arise — in this case, when some problems were solved, new demands became critical.

This case is recommended for use in operations strategy courses at undergraduate and graduate levels. More specifically, it is recommended for use at the beginning of the course, when students are approaching the definition of the operations strategy elements and their main factors.

The case should be used to acquaint students with market demands and to discuss decisions related to the four dimensions of operational resources management (people, processes, infrastructure, and information). It can also be used to explore how the organization needs to align

operational decisions and market demands (Figure 1). In more in-depth discussions, the instructor can explore how changes made by BRK over time generate new demands, as well as the need for continuous adaptation of operational resources. Over time, this dynamic process allows achieving significant improvements in the operation. In this respect, it is important to highlight the way in which the four dimensions are interrelated. That is, at a certain point, there is no use investing further in infrastructure if the processes are not working, and so forth.

Because the case concerns a public service, it can be used to explore market demands in this context, which

differ from demands related to for-profit manufacturing operations. Thus, instructors can explore the need for equity in the provision of public services (i.e., all citizens are entitled to the same service) and the need to seek balance between public authorities' and citizens' demands to arrive at value added service. The idea of value is used here precisely to adapt the concept of market demands from the traditional operations literature to the context of public services. This was necessary as public services imply several customers for a single service (taxpayers, public managers, users), with different demands that need to be considered.

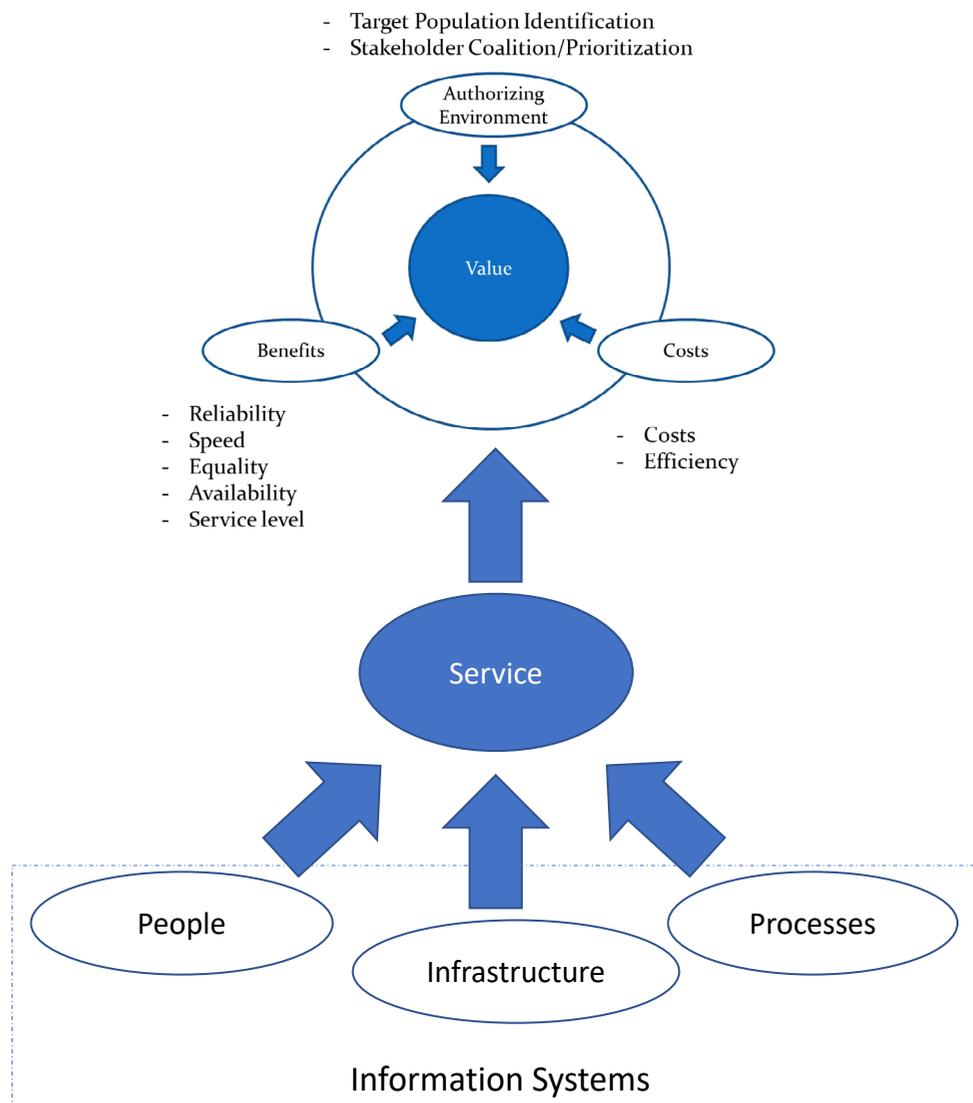


Figure 1. Alignment between market demands and operational resources in the context of public services.

Source: The authors.

PREPARATION FOR CASE DISCUSSION

The aim of these questions is to promote non-structured reflections on possible operational measures for the Maceió concession.

1) Draft the production process of BRK Ambiental

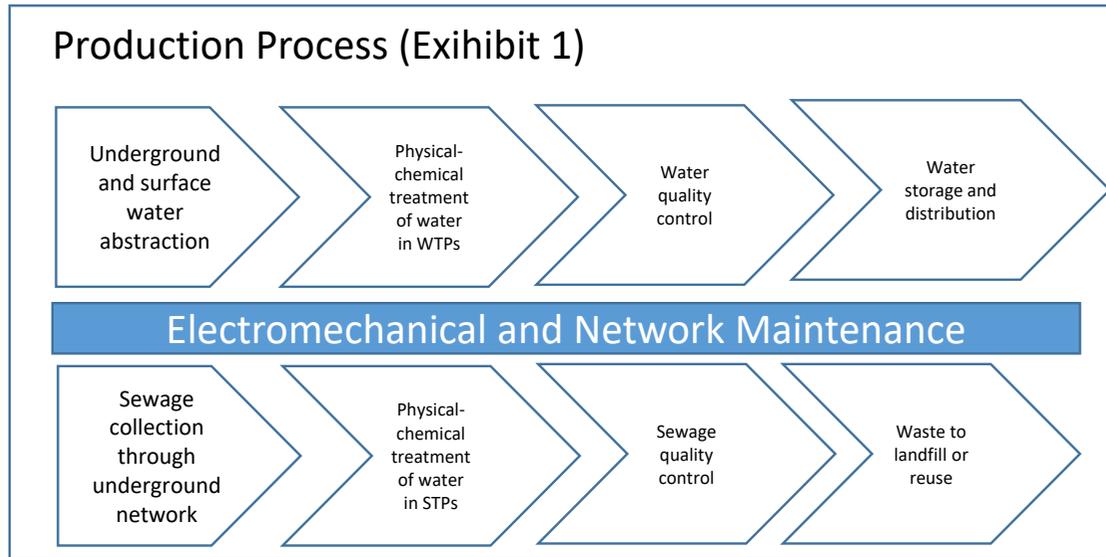


Figure 2. The BRK Ambiental productive process.
Source: The authors.

2) Put yourself in Rafaella's position and think of some measures that might help address the topics raised about the Maceió concession

There are no right answers. Each student will bring ideas on what they found most relevant in the case.

QUESTIONS FOR DISCUSSION IN CLASS

The first two questions for discussion are meant to stimulate the discussion about market demands, operational resources, and the alignment between them in each phase of the BRK Sumaré operation. It is expected that, through these questions, students will be acquainted with the concept of operational alignment as part of operations strategy. The third and fourth questions look further into the alignment issue by exploring demand changes over time, the alignment of measures and demands, and the evolution of the operations over time. Questions five and six aim to lead students to use the concepts discussed in the previous questions to solve Rafaella's problem.

1) In each phase, what did citizens and the municipality expect from BRK that they were not getting?

In the Sumaré concession, it is clear from the outset that the population of the city is facing a major problem of water supply and sewage collection. The problem is clearly one of availability of the service provided. In the second phase, there is still an availability problem, though not as critical as before, due to the infrastructure investments made in the first phase. What gains prominence are problems of water quality, supply reliability (water is on and off, sometimes on with no pressure), and equity in the service provided for different neighborhoods. In the third phase, the operation is already capable of providing a quality, homogeneous service to the population. However, there is pressure to keep tariffs constant due to the population's past dissatisfaction and the fact that it is an election year. The focus on costs then emerges as critical.

2) What was done in each phase to minimize those problems and deliver the desired service to citizens?

Here it is worth highlighting what was done over time to solve those problems.

In the first phase, three aspects stand out:

- a. Infrastructure: A massive investment was made in heavy and light infrastructure, with multiple works in abstraction wells, water mains, interconnections of existing systems, and modernization of WTPs and STPs (see Appendix 3). This investment can be considered the main factor for improving the availability of services.
- b. People: The transition of personnel from the old DAE to the concessionaire was troubled. There was change in personnel. Former DAE employees who joined the BRK Ambiental Sumaré team were resistant to adopting new procedures. It was necessary to dismiss them or integrate them into the team.
- c. Information: The lack of information about the operation (e.g., a technical register) limited planning, as with cleaning and maintenance schedules and network diagnoses. It was necessary to seek DAE employees' tacit knowledge to start building the information.

In the second phase, the following aspects stand out:

- a. Infrastructure: Investments in infrastructure continued, which once again contributed in terms of availability.
- b. Processes: It is clear in this case that availability is higher in this phase, but problems of supply reliability and unequal supply of services across neighborhoods arise. Water quality is also an issue. New processes are adopted to solve these problems. The following stand out:
 - daily monitoring of water quality and a redistribution of sample collection points;
 - implementation of preventive collection through a mobile laboratory to rapidly assess changes in water samples;
 - daily monitoring of pipe discharges and the implementation of new weekly laboratory tests to monitor algae in raw water sources;
 - control and reduction of losses in water distribution;

- water pressure management and 'know your DCM' methodology to monitor the volume of water available.
- c. People: The company invests in motivational training to maintain employee satisfaction.
 - d. Information: Investment in register expansion and computerized processes, such as:
 - the creation of a technical register that is periodically updated and maps the entire water and sewage network, structure, and accessories;
 - statistical analyses and modeling to improve water flow and pressure across the network;
 - implementation of information systems, such as online access to work orders (MOBTeam) and to the technical register of water supply and sewage collection systems (ArcGIS).

In the third phase, the following aspects stand out:

- a. Processes: Since the focus shifts to cost, investments are made in continuous improvement methodologies with support from the corporate productivity team. Here the goal is no longer to create processes, but to improve existing ones, with a focus on cost reduction. All measures implemented in this phase had this characteristic. Even the organizational structure change sought to simplify processes and reduce duplicate processes.
- b. Information: To support the continuous improvement process, performance indicator management comes into use. After all, "you cannot improve what you cannot measure." The unit starts to generate performance indicators, produce bulletins and reports, and use TV screens and management panels in visible positions so that the entire team can monitor the performance of the operation.

3) How have the demands and needs of citizens and the municipality changed over the course of the phases? Why did this happen?

Changes in the needs of citizens and the municipality emerge progressively, since as the company solves a problem, something else becomes a bottleneck in the operation and upsets users. When there is no availability of water, the need to serve the population in a homogeneous way is not thought of. Once water/sewage treatment is available, the matter becomes whether it is always available (reliability) to everyone equally, and in the expected quality. Once that was solved, cost became critical, since it was necessary to

improve the profitability of the operation. It is the operation's development process.

4) Is there any alignment between the demands in each phase and the main measures that the company took?

The measures taken in each phase can be seen to prioritize delivery on demands. Infrastructure is strongly related to availability in the first phase. Implementation of new processes was required to improve reliability and quality in phase two, and continuous process improvement was essential to cost reduction in phase three.

5) What are the main differences and similarities in the demands and needs of the municipality and citizens of Maceió in relation to Sumaré?

In Maceió, the problems are clearly distinct. One of the biggest problems is customer service, which is insufficient and very unequally provided. There are only two branches, working during business hours, located far from the disadvantaged population, which tends to suffer more from availability problems. Besides, there are problems concerning the reliability of water availability due to leaks and pressure drops. User behavior also generates waste and worsens the availability of water.

6) If you were Rafaella, what measures would you include in the proposal to address the main aspects listed in item 5?

Here students can give different suggestions to solve the problems listed in question 5. Some students can give answers mostly based on what was done at the Sumaré unit. However, it is necessary to steer the discussion toward measures that can help with the customer service problem, such as opening new branches in different places, creating new customer service channels, and expanding service hours. Regarding availability and supply reliability, measures adopted in phase two at Sumaré can help. However, in the people management category, it is necessary to add processes and measures to manage the behavior of the population (users) and encourage waste reduction. Here some ideas may involve actions to inform users on waste reduction or incentives through discounts by water savings level.

SUGGESTION FOR TEACHING PLAN

The recommended teaching plan for this case is indicated below. The time lengths indicated are suggestions and should be tested and adjusted to the preferences of each instructor.

Have students read the case in advance of the class and reflect individually on the questions provided on the 'Preparation for case discussion' session presented earlier.

Icebreaker — An open discussion on students' perceptions of the case (5 minutes): Ask students what they thought about the case and what aspects were most interesting in their view.

Drawing the BRK Ambiental process (5-10 minutes): To provide a view of the BRK operation, have students help you draw the BRK process on the board (not yet directing students to the four decision areas, i.e., processes, people, infrastructure, information). The representation of the process helps to understand how BRK works, and makes it easier to view the four decision areas in relation to operations' process, people, infrastructure, and information. See Figure 2, plan for board, exhibit 1.

Preparing discussion questions 1 and 2 (10 minutes): Divide students into groups (four to five students per group) and have them answer the questions for discussion 1 and 2 suggested in the previous section. This step is optional and depends on each instructor's preference and available time.

Market demands (about value in public services) (10-15 minutes): As an opening question, you can propose, "At the beginning of the Sumaré concession, what did citizens and the municipality expect from the services provided by BRK, but were not getting?" Then, you can encourage students to advance this reflection to the other two phases of the Sumaré operation. Suggestion: organize the discussion around the main operational goals of performance (availability, reliability, quality, costs) in each phase. See Figure 2, plan for board, exhibit 2.

- If you are focusing on the issue of public services, this is the time to also address the issue of equity and emphasize how public managers influence it. In the third phase, there is availability, reliability, quality, but this puts pressure on costs. On the other hand, both the population and public managers are concerned with maintaining tariff rates. In this case, there is pressure on the company to reduce costs. However, in another context, public managers may be more open to discussing tariffs.

Discussion about what was done in each phase to promote delivery of the desired service (10 minutes): Here the focus is on collecting students' answers to discussion

question 2 about what BRK Sumaré did in each phase to increase availability, reliability, quality, and to keep costs from rising. It is important that you group the answers by category (infrastructure, process, people, and information) without naming each category yet. Once all measures have been listed on the board, the column names can be presented at the end of this discussion (process, people, infrastructure, information). See Figure 2, plan for board, exhibit 3.

Discussion on strategic alignment (5-10 minutes): Here you can use discussion question 3 to open up a broader discussion with the class. After asking, “How have the demands and needs of citizens and the municipality changed over the course of the phases? Why did this happen?” you can collect the answers of two or three students. Then, you can discuss the evolution of demands as presented in the answer to this question. Subsequently, you can ask, “Is there any alignment between the demands in each phase and the main measures that the company took?” You can collect the answers of two or three other students, encouraging them to elaborate on the reasons for their answers, and close the topic by talking about the alignment between market demands and operational decisions. At the end of this discussion, you can return to the board and circle the measures that contributed most to solving the situation in each phase. See Figure 2, plan for board, exhibit 3, items in bold.

Preparing discussion questions 5 and 6 (10 minutes): Divide students into groups (four to five students per group) and have them answer the questions for discussion 5 and 6 suggested in the previous section. This step is optional and depends on each instructor’s preference and available time.

Discussion about the demands of the Maceió operation and possible measures (10 minutes): You can start the discussion by having students point out the central demands in the Maceió operation that appear in the case, until the answer presented for question 5 is complete on the board. Then, ask for students’ suggestions for the operational plan, and list them next to each of the main demands (customer service and reliability of availability). If the waste issue has not been linked to availability, you can establish that link, emphasizing the need to manage users in service operations. See Figure 2, plan for board, exhibit 4.

Closure (5 minutes): You can conclude the case by reviewing the key lessons learned from the case:

- the demands of service users and their change over time;
- the issue of value in public service (if this was covered during the discussion);
- the categories of operational decisions;
- the need for strategic alignment.

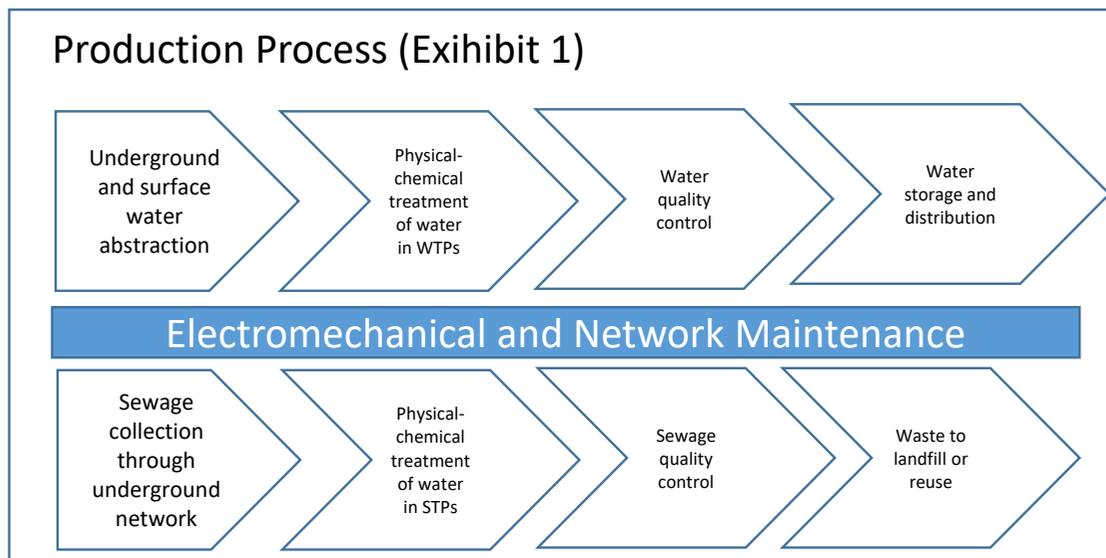


Figure 3. Plan for board – part 1.

Unmet expectations and needs (Exhibit 2)	
Phase 1 - Concession and start of operation (2015 to 2016)	<ul style="list-style-type: none"> • Access to water supply and sewage treatment • Limited availability
Phase 2 - Recovery and learning (2017 to 2019)	<ul style="list-style-type: none"> • Water quality • Lack of dependability on water supply (shortages and pressure problems) • Unequal water supply in the municipality
Phase 3 – Consolidation and pursuit of operational excellence (2020 onwards)	<ul style="list-style-type: none"> • Maintenance of tariff rates • Need for ROI • Focus on costs

Figure 4. Plan for board – part 2.

Actions to minimize problems (Exhibit 3)			
Infrastructure*	People*	Information*	Process*
Massive investment in infrastructure (wells, pipelines, interconnections, WTPs and STPs)	Former DAE employees resistant – layoff or integration into the team	Lack of information about operation and pursuit of tacit knowledge of DAE employees	
Continuous investment	Motivational training to maintain employee satisfaction	Investment in expanding the technical register Informatization of processes, (e.g., MOBTeam, ArcGIS)	New processes to improve water quality and reduce problems of pressure loss and shortages (list students' examples)
Investments in infrastructure more focused on sewage network		Performance management systems Genation of reports and bulletins Visible Management System	Process improvement with help from the productivity project team Organizational change to eliminate duplication

Figure 5. Plan for board – part 3.

*Collect answers and categorize them in these columns, and name the categories at the end of this discussion; bold indicates operational decisions with greater relevance to solve the identified problem

A Proposal for Maceió (Exhibit 4)	
Main concerns*	Suggestions for Rafaella
<ul style="list-style-type: none"> • Lack of customer service • Inequality in customer service • Lack of reliability in water distribution <ul style="list-style-type: none"> • Pressure • Water waste (population) 	<ul style="list-style-type: none"> • List students' ideas for solving these problems • Place the measures next to the problems they solve to emphasize the alignment issue, and use arrows to link them • Measures similar to the second phase at Sumaré make sense for pressure and reliability problems • Emphasize user control measures to reduce waste within the people dimension, given that in services it is also necessary to manage users

Figure 6. Plan for board – part 4.

Source: The authors.

CASE DISCUSSION/ANALYSIS

Operations strategy involves creating alignment between market demands and operational practices. In public services, market demands can be represented as the delivery of value to citizens. This involves balancing three aspects: the quality of the service provided; the demands of public bodies, users, and regulatory authorities; and operating costs. The delivery of quality according to the expectations of citizens and public entities depends on how the operation is structured and generates costs, which derive from people management (i.e., customers and employees), infrastructure, processes, and information.

However, market demands change over time, and the operation must keep up with those changes. Those changes derive from two main sources: (1) changes in the competitive and institutional environment; and (2) improvements in some areas, causing other aspects to become critical (for example, once water availability is no longer a problem, the price that is paid for it may prove critical). The latter concerns the development of operations. The case portrays the need for both alignment and operational development.

By looking at each phase of the Sumaré operation separately, we can see the need for alignment, as well as the most important operational decisions. When comparing the three phases we can see the maturation process. The initial phase shows the need to improve service availability. Strong investments in service provision infrastructure are required. Also noticeable are the difficulties of raising an

operation without data and with unengaged people. In the second phase, availability is still a problem, but water quality emerges as a new demand. New investments in infrastructure are necessary, but availability also depends on process creation. New processes are also needed to improve water quality. In addition to consolidating data and training people, investments are made in information technology.

In the last phase, the concern with cost becomes central and the operation needs to focus on cost reduction and productivity. To this end, it is important to think about the logic of people management, to control indicators, and to seek continuous cost reduction measures. By presenting the evolution of the BRK operation over time, including the improvements and changes experienced by the company, the case provides all the elements for the instructor to offer students an in-depth view and discussion of the described items.

CENTRAL CONCEPTS

This case covers three central concepts in the field of operations: market demands translated as requirements for the operation, the categories of operational decisions (people, processes, infrastructure, and information) to be made in order to design the operation, and the strategic alignment between operation and market demands. The logic of strategic alignment is derived from the discussion in chapter 1 of the book *Operations strategy*, by Slack and Lewis (2020) and chapters 2 and 3 of the traditional book

Operations management, by Slack and Brandon-Jones (2019). These chapters also address operational decision categories and market demands, which translate into performance requirements such as cost, quality, reliability, speed, and availability.

The idea of market demands traditionally used in the field of operations was elaborated to better reflect the reality of public services. The notion of value used in the marketing

literature (Ravald & Grönroos, 1996), in which value is the result of the benefits generated through service in a given context, discounting the sacrifices involved in receiving that service, was combined with characteristics of the public sector discussed Moore (2002). The latter reference highlights the importance of balancing the demands of various stakeholders involved in the management, funding, and use of public services to define what needs to be done as a priority.

REFERENCES

Moore, M. H. (2002). *Criando valor público: Gestão estratégica no governo*. Uniletras.

Ravald, A., & Grönroos, C. (1996). The value concept and relationship marketing. *European Journal of Marketing*, 30(2), 19-30.

Slack, N., & Brandon-Jones, A. (2019). *Operations management* (9 ed.). Pearson Education.

Slack, N., & Lewis, M. (2020). *Operations strategy* (6 ed.). Pearson Education.

Authorship

Juliana Bonomi Santos*

Fundação Getulio Vargas, Escola de Administração de Empresas de São Paulo

Av. 9 de julho, n. 2029, Bela Vista, CEP 01313-902, São Paulo, SP, Brazil

E-mail: juliana.bonomi@fgv.br

 <https://orcid.org/0000-0002-9582-7152>

Rafaella Scorsatto Lange

BRK Ambiental

Av. das Nações Unidas, n. 14261, Vila Gertrudes, 04794-000, São Paulo, SP, Brazil

E-mail: rlange@brkambiental.com.br

 <https://orcid.org/0000-0002-3547-2759>

Carlos Eduardo Lourenço

Fundação Getulio Vargas, Escola de Administração de Empresas de São Paulo

Av. 9 de julho, n. 2029, Bela Vista, CEP 01313-902, São Paulo, SP, Brazil

E-mail: carlos.lourenco@fgv.br

 <https://orcid.org/0000-0002-9278-8282>

* Autora Correspondente

Financiamento

The authors thank the FGV In Company for the financial support for the research in this article.

Plagiarism Check

RAC maintains the practice of submitting all documents approved for publication to the plagiarism check, using specific tools, e.g.: iThenticate.

Authors' Contributions

1st author: conceptualization (lead); formal analysis (lead); investigation (lead); methodology (lead); project administration (lead); validation (lead); writing – original draft (lead); writing – review & editing (lead).

2nd author: conceptualization (supporting); investigation (supporting); validation (supporting); writing – review & editing (supporting).

3rd author: conceptualization (supporting); funding acquisition (lead); investigation (supporting); writing – review & editing (supporting).

Copyrights

RAC owns the copyright to this content.

Conflict of Interests

The authors have stated that there is no conflict of interest.

Peer Review Method

This content was evaluated using the double-blind peer review process. The disclosure of the reviewers' information on the first page, as well as the Peer Review Report, is made only after concluding the evaluation process, and with the voluntary consent of the respective reviewers and authors.

Data Availability

RAC encourages data sharing but, in compliance with ethical principles, it does not demand the disclosure of any means of identifying research subjects, preserving the privacy of research subjects. The practice of open data is to enable the reproducibility of results, and to ensure the unrestricted transparency of the results of the published research, without requiring the identity of research subjects.

RAC is a member of, and subscribes to the principles of the Committee on Publication Ethics (COPE) for scholarly publication

