Improving readiness towards shifts in regulatory context: Monitoring Quality indicators using a data-driven management approach

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Highlights:

· Readiness is essential for quality standards and universal coverage goals in regulatory challenging context (new legal framework and contract-based regulation)

· Preparation included dissemination for new regulatory practices and development of tools to undergo this shift proved essential to evaluate performance

· Systems and management adaptations, using daily updated panels, allows agile data-driven decision-making and reduce risks of tariff deficits

Keywords: Regulatory practices, Price-cap, Data-driven decision-making, Quality factor,

INTRODUCTION

The advent of a new framework for sanitation services in Brazil brought by Federal Law nº 14.026/2020 provided new insights on the regulatory aspects regarding universal coverage as well as other relevant changes on how concessions and Agencies must work on addressing quality standards. The norm determined that by 2033 service providers must achieve 99% water supply for domestic use and 90% of sewage collect and treatment, named as "the universalization of services". Acknowledging the challenge, in 2023 the State of Sao Paulo initiated a series of proposals towards the privatization of the water and sewage regional company SABESP, responsible for the services in 376 of 645 municipalities, including the state capital, with around 28 million users (around 44% in the municipality of Sao Paulo), considered as one of the major water and wastewater companies in the world (SABESP, 2024).

The new model consists in creating a regional governance body (URAE-1 Sudeste) and incorporating 371 of the 376 municipalities concessions under one main contract, reducing the states' shares of the company, from 50,5% to 18%, as well as calling for a key shareholder, Equatorial Energia, holding 15% of the shares, to maximize investments and achieving the Federal Law goal 2029, 4 years prior to the universalization deadline.

For that, the ongoing discretionary regulation undertaken by ARSESP must be modified to address a more private agent based contract, as well as all norms regarding reducing the discretionary mechanisms therein, such as the 4-year cycle of tariff review by ARSESP for a single year review evaluated by a third party, shift toward a backward-looking model to consider costs ex-post to investment realization, in opposition to a forward-looking model in place, and other mechanism to attract private agents looking for risk reduction. Particularly, the contract includes in the tariff equation the Universalization achievement (U Factor), corresponding to annual improvements for water supply and sewage collect and treatment, including rural and informal settlements (urban occupations and slums) (SEMIL, 2024).

As the company's regulatory culture stands from a 16 years discretionary model, challenges to implement the new model are expected from the workforce and operative/middle managers. In order to

disseminate the changes in regulatory context and prepare the company for the new context, the regulatory affairs office took actions to implement management practices focused on data-driven decision making, aiming to reduce risks and obtain better tariff results.

The current analysis focused on the adoption and dissemination of management practices focused on regulatory indicators, especially for quality incentive determined by ARSESP for the current tariffs cycle (3ª RTO). As the regulatory model consists in a price-cap model (PCR), efficiency evaluation (X factor) is balanced with service quality aspects determined by the Agency (Q Factor) in order to address relevant issues for the service, such as coverage of sewage collect and treatment (IACT), complaints on water shortage (IRFA), visible water leakages (IVV) and pavement replacement times (IPRP) (ARSESP, 2019, 2021 and 2022).

METHODOLOGY

The survey conducted tries to evaluate potential improvement in management practices focused on Q factor as well as the readiness to adopt new U factor indicators foreseen in the new regulatory model, therefore characterized as an exploratory study. The practices described were lined up between regulatory affairs and regional and district operation managers in order to tackle risks of goal underachievement and the need to a more agile monitoring of the quality indicators variables.

For this purpose, a case study (Yin, 2014) was proposed to evaluate whether the initiative of using agile methods to promote improvements in monitoring Factor Q has a positive impact on operational management practices in terms of achieving indicator targets. A participant observation was conducted, allowing for a deeper understanding of the context, observing behavior, interactions, and dynamics firsthand.

The sample units analyzed, based on the guiding question and the literature mentioned, were: 1) Facilitation of product delivery (results-oriented), 2) The flexibility of the method and tools used, 3) Strengthening team and partner collaboration, 4) The MVP (Minimum Viable Product)-oriented agile approach and incremental improvements, and 5) The potential for implementing these methods in new projects aimed at the new contract. The analysis framework consisted of describing the techniques and tools used for the initiative to take place. Thus, the evaluation criteria were: ensuring that the work teams involved in the initiative had a clear vision of requirements, goals, and expectations, as well as developing regulatory knowledge based on data.

The solution's implementation followed a similar approach applied in Italy and described in Bettin (2023), incorporating the following stages into the sprint model: 1) Data acquisition and analysis, 2) Gathering of technical specifications and user requirements (or user stories), 3) Implementation of data feeding and preparation flows (back-end), 4) Development of the user interface-GUI (front-end), and 5) Evaluation of user reception and acceptance.

For the development of the final product, the project team performed mind mapping to create usage, class, sequence, and database connection diagrams for web applications, aiming to gather improvement suggestions. Following this, interaction screens were created using Microsoft Power BI®, where the back-end and front-end development and programming were generated in their first version within this agile methodology framework. The final stage involved conducting alpha testing prototyping with users, whose feedback was presented and discussed in meetings with leadership. Initial user experience feedback was gathered, allowing for insights into the ease of use of the applications and areas for improvement to be implemented.

RESULTS AND CONCLUSIONS

The planning phase began with the formation of a multidisciplinary project team, including professionals from operational planning, engineering, technology, commercial, and regulatory areas. These team members undertook agile methodology training, aligning their understanding of the Scrum approach (Swarber and Suntherland, 2020). Key concepts, tools, roles, and responsibilities were discussed, with a focus on communication and iterative product development. The team explored different work approaches, deciding not to adopt a strict methodology but to leverage Scrum tools for efficiency. A Kanban board was built integrating Scrum practices, with the Regulation Department Manager as the Product Owner and an experienced commercial manager as the Scrum Master. Daily meetings and the backlog for the first sprint were established using Microsoft Planner® for project visualization. Each project indicator was assigned a user story, guiding team members in researching data sources, quality, and processes. This initial setup allowed each member to investigate relevant data dimensions and processes for the project's success.

During the sprints, the need for system access to the company's commercial database became apparent, as most indicators were developed within the new commercial system. Workshops with the operational department identified key data generation processes and relevant factors for management. This led to prioritizing the development of specific indicators, such as the pavement replacement times (IPRP), due to its regulatory importance, and initiating the design of dashboards for tracking key performance metrics like pavement restoration timelines.

The focus shifted toward simplifying data flows for indicators seen as with high readiness for automation and publishing (IVV and IPRP), for IRFA, data discrepancies were addressed, and improvements were made in order to integrate information from commercial to a more regulatory perspective, and IACT was seen as the most complex to automate. By the final sprint, the team had achieved a minimum viable product for key indicators IRFA, IPRP and IVV (as IACT was discontinued in the new Contract). They created prototypes with automated data feeds, which were tested and validated by users. Suggestions from users, such as receiving daily updates by email, were noted for future improvements. The project concluded with automated indicator tracking and the submission of data to regulatory agencies, marking a significant step in adopting agile methodologies for future projects.

This type of approach has great potential to assist in establishing data flows in the case of new regulatory indicators, whether in a new contract or in the assumption of a new concession. The importance of the solution developed is also highlighted, following an iterative process, divided into repetitive and incremental cycles, providing a flexible and adaptive approach to meet the company's needs in a changing context. Each iteration involves the design, implementation, testing, and review of a part of the product, allowing teams to quickly adapt to changing requirements in the backlog of each sprint.

Corroborating the results of Bettin (2023), in addition to the recommendation of working with a network of partners (regulatory experts and information management technicians), this project also faced its greatest challenges in the initial stages of development, whether due to the review of received data, the need for process adjustments and the incorporation of control fields (flags) in the corporate database, or the preparation of data when the intended automation is not feasible in the given context (such as in the case of IACT).

The experience of rapid value delivery, greater alignment with business needs, and increased responsiveness to changes in the business environment will allow this or another project team focused on developing a web solution for indicator management to proceed more smoothly.

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REFERENCES

ARSESP (Agência Reguladora de Serviços Públicos do Estado de São Paulo). (2024). *Quem somos.* https://www.arsesp.sp.gov.br/agencia/Paginas/default.aspx#quem_somos

_____ (2019). *Deliberação ARSESP 898 de 20 de agosto de 2019: Estabelece a metodologia para apuração e aplicação do Índice Geral de Qualidade (IGQ) para a Companhia de Saneamento Básico do Estado de São Paulo – SABESP, nos processos de reajustes e revisões tarifárias.* https://www.arsesp.sp.gov.br/LegislacaoArquivos/ldl8982019.pdf

_____ (2021). *Deliberação ARSESP 1.123 de 04 de fevereiro de 2021: Estabelece a metodologia para apuração e aplicação do Índice Geral de Qualidade (IGQ) para a Companhia de Saneamento Básico do Estado de São Paulo – SABESP, nos processos de reajustes e revisões tarifárias a partir da 3ª revisão tarifaria ordinária, definindo nova cesta de indicadores.* https://www.arsesp.sp.gov.br/LegislacaoArquivos/ldl11232021.pdf

_____ (2022). *Deliberação ARSESP Nº 1.324 de 11 de agosto de 2022: Dispõe sobre os prazos para reposição de pavimentos nos municípios regulados pela ARSESP.* https://www.arsesp.sp.gov.br/LegislacaoArquivos/ldl13242022.pdf

Bettin, A. (2023). Digital transformation for the water industry: How a data-driven business intelligence platform can improve operations. *Water Practice & Technology, 18*(7), 1599–1607.

Brasil. (2020). *Lei nº 14.026 de 15 de julho de 2020: Atualiza o marco legal do saneamento básico e altera a Lei nº 9.984 de 17 de julho de 2000, para atribuir à Agência Nacional de Águas e Saneamento Básico (ANA) competência para editar normas de referência sobre o serviço de saneamento.* https://www.planalto.gov.br/ccivil_03/_ato2019-2022/2020/lei/l14026.htm

SABESP (Companhia de Saneamento Básico do Estado de São Paulo). (n.d.). *Perfil institucional.* https://www.sabesp.com.br/site/interna/Default.aspx?secaoId=802

SEMIL (Secretaria de Meio Ambiente, Infraestrutura e Logística - Governo de São Paulo). (n.d.). *Portal Desestatização Sabesp.* https://semil.sp.gov.br/desestatizacaosabesp/

Schwaber, K., & Sutherland, J. (2020). *The 2020 Scrum Guide.* https://www.scrumguides.org/scrum-guide.html

Yin, R. K. (2014). *Case study research: Design and methods* (5th ed.). Sage. https://doi.org/10.3138/cjpe.30.1.108