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Delta Tecnica: becoming a smarter business*

Delta Técnica: tornando-se um negócio mais inteligente

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ABSTRACT

This case presents the implementation of a new way of analyzing historical data at Delta Tecnica, a Brazilian company based in São Paulo State specialized in contracting infrastructure work and reports the actual application of a solution to help data-driven decision making through the use of analytical tools. Over the years, Delta Tecnica had carried out major national infrastructure projects, achieving notable diversification in its portfolio. However, the company was facing difficulties in improving the analysis of its data and information. Most of Delta's leadership decisions were made *ad-hoc* and intuitively, they were rarely data driven. The company was making little use of the ability to decide based on objective evidence. This sometimes led to negative consequences such as wasteful practices and lack of reliable data for planning. This case can be utilized in undergraduate and graduate-level courses in general management, information management, and business strategy. The case can also be used in executive-level courses with more in-depth discussions on decision-making processes.

KEYWORDS: Data analysis. Information Administration. Technologies. Business Intelligence.

RESUMO

Este caso apresenta a implementação de uma nova forma de análise de dados históricos na Delta Técnica, empresa brasileira sediada no estado de São Paulo especializada em contratação de obras de infraestrutura, e relata a aplicação prática de uma solução para auxiliar a tomada de decisões baseada em dados por meio do uso de ferramentas analíticas. Ao longo dos anos, a Delta Técnica realizou grandes projetos nacionais de infraestrutura, alcançando notável diversificação em seu portfólio. No entanto, a empresa enfrentava dificuldades para aprimorar a análise de seus dados e informações. A maioria das decisões de liderança da Delta era tomada ad hoc e intuitivamente, raramente sendo baseadas em dados. A empresa utilizava pouco a capacidade de decidir com base em evidências objetivas. Isso, por vezes, levava a consequências negativas, como práticas desnecessárias e falta de dados confiáveis para o planejamento. Este caso pode ser utilizado em cursos de graduação e pós-graduação em administração geral, gestão da informação e estratégia de negócios.

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O caso também pode ser utilizado em cursos de nível executivo com discussões mais aprofundadas sobre processos de tomada de decisão.

PALAVRAS-CHAVE: Análise de dados. Administração da Informação. Tecnologias. Inteligência de Negócios.

1. Introdução

On another typically hot Brazilian summer day in January of 2021, Richard Stanis, a senior consultant was wrapping up his recommendation for Delta Tecnica (Delta), a Sao Paulo-based mid-sized company specializing in road infrastructure contracting, which had grown exponentially in the last three years. He knew this would be a long meeting with the partners of Delta, and in preparation had carefully analyzed several contexts and data points, including employees' perceptions and past company records. The mission was to make Delta an agile organization by creating more effective information management systems and reports which could speed up decision-making processes.

Delta Tecnica was a growing company; its portfolio included toll plazas, bridges, viaducts, and concrete paving on roads and highways. The company was facing difficulties in improving the analysis of its data and information. Most of Delta's leadership decisions were made ad-hoc and intuitively, they were rarely data driven. The company was making little use of the ability to decide based on objective evidence. This sometimes led to negative consequences such as wasteful practices and lack of reliable data for planning.

After analyzing the data and pondering Delta's current structure, capabilities, and strategic plans, Richard narrowed down his recommendations to three courses of action to be presented during his 2pm meeting. Which one was best suited to the organization? What would his clients say about the solutions? *It's the moment of truth*, Richard reflected as he prepared himself for the virtual meeting with all partners.

1. Delta Tecnica

Founded in September of 2000, Delta Tecnica was a Brazilian company based in São Paulo State specialized in contracting infrastructure road work as listed in Table 1.

Table 1

Services offered by Delta Tecnica

Project	Definition
New Jersey style protection barriers	New Jersey-type concrete safety barriers were reinforced concrete elements used to contain vehicles in curves, uncontrolled vehicles, also for the separation between traffic flows and for provisionally delimiting areas under construction.
Shotcrete	Shotcrete was is pneumatically transported and shot at high speed onto a surface. It was self-compacted and highly resistant. The Brazilian Association of Technical Standards (ABNT) defines shotcrete as "a concrete with a maximum aggregate dimension greater than 4.8mm,

	transported through a pipe and projected, under pressure, at high speed, on a surface, being compacted simultaneously".
Retaining walls	A retaining wall was a specific type of wall that serves to support the land in addition to isolating the terrain. It was a safe solution for sloping terrain that could be cut to become flat. After the cut, the accommodation areas could appear, the space between the original profile of the lot and the area that had become flat.

Over the years, Delta had carried out major national infrastructure projects, achieving notable diversification in its client portfolio. Those projects had a significant positive impact on the company's revenue, considering they were highly complex engineering projects.

For example, in 2010, Delta built a return viaduct located on the SP-300 Road (Marechal Rondon) an it was the first viaduct executed by the company as seen in Figure 1.

Figure 1. Viaduct built on the SP300 Road.

Another important project was the recovery and extension of five bridges on Régis Bittencourt road (BR-116 / SP), as seen in Figure 2. This work was carried out for Autopista Régis Bittencourt - Arteris. Arteris was one of the largest companies in the Brazilian highway concession sector in managed kilometers, with more than 3,250 km in operation, of which 1,100 km were in concessions in São Paulo and another 2,100 km in Federal concessions.

Figure 2. Reinforcement of beam joists under construction on BR-116 / SP.

2. The Brazilian Infrastructure – Context

Brazil had three clusters of construction companies operating nationwide: large, medium-sized, and international companies operating within Brazilian borders. As shown in Table 2, Delta was continually battling funding for larger projects and the technical capabilities to expand market share.

Table 2
Segments of construction companies operating in the Brazilian market

	Financial Capabilities	Technical Capabilities	Challenges	Strategies
Large Companies	• Revenue reduction • Loan restrictions • Currently in debt renegotiation	• Extensive experience in major works • Some facility to re-mobilize people, despite the reduction in staff in recent years	• Participate in more projects to resume growth • Obtain resources from new sources of financing • Remobilize staff • Restrictions on tenders that use public resources	• Expand internationally • Increase performance within the private sector • Partnerships with international agents
Medium-sized Companies	• Relatively good financial health	• Experience with medium-sized projects / operations	• Obtain funding sources for larger projects	• Operate in less complex assets (e.g. parks, lighting,

	• Low equity	(municipal / state) • Limitation for large projects	• Structuring high complexity and technical quality projects	hospitals) at the municipal / State level • Participate as a builder in larger projects
International Companies in Brazil	• Highly capitalized • Restrictions on working in the Country's conditions (ex: foreign exchange, project limitation)	• Experience in large-scale projects • Need for local credentials	• Operate in a highly complex market, often depending on local partners • Have local credentials to operate	• Establish partnerships or acquisitions of national companies • Operation of assets (ex: energy, sanitation)

According to the President of the Brazilian Chamber of the Construction Industry (Relatório..., 2019), José Carlos Martins, the civil construction sector had been going through a transition, moving away from a market-concentrated model, in which only a few companies carried out large projects, and moving towards a decentralized model in which small and medium-sized companies could operate.

The context of civil construction had changed dramatically, and one of the reasons was the impact of the anti-corruption carwash operation (Operação Lava-Jato) on large construction companies. This paved the way for medium and small companies to assume a relevant role in the infrastructure projects market.

In light of this new scenario, in March of 2019, CBIC conducted an extensive study (Relatório..., 2019) in partnership with the Confederation of International Contractors Associations (CICA), highlighting ways of improving midsized companies' participation in the infrastructure sector. Among the suggested changes, the Confederation affirmed the revision of projects' modeling to generate new Request for Proposals (RFPs) with new criteria for contracting. As a result of these new RFPs, major projects may be auctioned in lots, which minimizes the risks of transactions, making them more attractive to small and medium-sized companies, which previously would not have had the capital to apply.

The dynamics of competition in the Brazilian construction sector usually involved analyzing a basic executive project provided by the client, with all technical specifications required. The client provided the final project so that the construction companies that still wished to participate in the concession could prepare a budget, as change could decrease in the event of the cost of the overall project. At the end of the bidding process, the client compared all prices budgeted by the candidates and then chose the one with the best cost-benefit.

According to Delta's partners, highway concessionaires had almost always opted for the lowest-priced bid in recent years, even if the project congregates potential flaws due to cost reduction. They also claimed that the number of projects was seasonal; that is, some months were

hectic, but that there was a scarcity of revenue influx in some other months. This dynamic then forced construction companies to partake less work during the busy months due to the lack of trained staff. The same team could be idle during low demand periods, generating high fixed costs with labor and low revenue.

When asked about the relationship between the number of competitors versus the number of projects offered, Delta's partners believed that there were enough projects for small and medium-sized construction companies to prosper. However, because of the seasonal demand cycle, the "price war" was fierce, and the company had problems managing its cash flow during the low contract period. This was one of the brakes for its growth.

3. The diagnostic: assessing information management capabilities

Richard was categorical in his analysis: "This company does not have the proper tools for managing information. They need something easy-to-use, and that compiles historical data from past projects to assist the leadership decision-making process." This conclusion came after many hours of data gathering within Delta Tecnica.

First, Richard conducted a focus group with all four Partners and four key employees from the administration team. He wanted to list and understand the company's significant blockages and challenges in terms of information management. After the first focus group, Richard launched a company-wide survey using the Technology Acceptance Model (TAM) from Davis (1989) and the SI Success from (DeLone & McLean, 2003).

The TAM model aims to verify the user perception of both the easiness-of-use and the technologies' usefulness. The DeLone and McLean model aim to measure user satisfaction and quality of information. The *perceived utility* – the extent to which each person believes that the use of a particular system could increase their work performance.

A second stage of the diagnosis quantified the Partners' perceptions about four support activities that had the most significant impact on the business, and consequently the ones with the greatest potential for intervention through information management: (1) infrastructure, (2) human resources management, (3) technological development, and (4) purchasing.

Listening to The Employees

Richard asked them to list all possible areas for improvement regarding information management systems in a series of focus groups with employees. The first suggestion was the cost spreadsheet. It helped the execution team monitor project expenditures with information on food, transportation, maintenance, fuel, bank charges, taxes, labor costs, office supplies, communication, construction raw materials, security, insurance, training, and travel expenses. All of this information was exported from the custom-made ERP.

Delta’s ERP consisted of interconnected information subsystems that coordinated all of the company's internal activities. However, it was old-fashioned and had not been updated in the past six years; therefore, it did not generate reports monthly, making it difficult to monitor, especially when comparing the cost of similar projects in different periods.

The system exported a consolidated report in CSV format, "Comma Separated Values", with all the financial results included in the system's monthly register and information registered by the operational team in pre-established fields. This report was tabulated with the metrics that the company needed at the time of the system's implementation six years ago. Several new metrics became necessary as the company grew. They were currently left out of the ERP.

Every month, the administrative team exported a fifteen-page report with the consolidated information from the previous month and prints the report to summarize the projects. One issue with this report was when there was a need to compare a project evolution monthly. To do this, the workaround was to print out the files and manually compare the months. There was a waste of time, resources, and energy compiling all the data manually.

The employees also mentioned that the registration was done manually by the administrative team, and because operational errors could occur during the registration of the information, consequently, indices were generated with misinformation.

Among the KPIs generated by this ERP, there was the labor cost of the execution team. With the increase in clients and projects, this expense had become significant, which created a demand on the human resources area for specific monitoring of this aspect in each work.

Another group of administrative employees mentioned a different issue: the need to monitor, very closely, what was sold versus what was billed, as well as sales that had not yet been billed or that were made in the long term and that did not generate cash for the company.

Among the technical team, a suggestion of a Project Diary came up. This diary consisted of a daily report on the project's progress, which presented variables such as the number of active employees, expected versus delivered footage, time worked, and the assigned foreman for that project. The technical team had tried to implement this suggestion in the past, but the initiative did not move forward due to technical limitations to create the tool. When asked how they made decisions regarding budgeting, purchasing, and staffing, Delta's partners responded that, in addition to the use of information from a specific project, many decisions were based on their perception "after many years of experience in the sector."After many hours of focus groups and surveys, Richard finally had some quantitative data to present to the partners. One report showed score averages attributed by all four partners as seen in Table 3.

Table 3

Results from Delta's partners regarding satisfaction with current information system.

Variable	Administrative Team	Technical Team	Average
Perceived Ease of use	1.8	2.5	2.1
Quality of information	1.6	2.4	2.0
Perceived utility	3.0	3.5	3.3
User satisfaction	1.0	2.0	1.5
Average	**1.8**	**2.6**	**2.2**

He found that the lowest score given by Delta's partners was user satisfaction, with an average score of 1.5 out of five possible points. Its leadership did not evaluate the current system very well since all variables' general average was 2.2 out of five possible points. The results also indicated that the satisfaction of the current information system users concerning the value chain's activities was low. Another critical data compiled by Richard was about the overall satisfaction, using a five-point Likert scale, being 5 "very satisfied" and 1 "very dissatisfied" with the level of information received concerning the four support activities listed for data collection. The results in Table 4 show that the support activity with the lowest score was technological development.

Table 4

Level of perceived Satisfaction by Support Activity in the Value Chain.

Activity	Administrative Team	Technical Team	Average
Infrastructure: Support systems that the company needs to maintain daily operations. It includes general, administrative, legal, financial, accounting, public affairs, quality management, etc.	3	2	2.5
Human Resource Management: Activities associated with the recruitment, development, retention and compensation of employees and managers.	2	4	3
Technological Development: Includes technological development to support value chain activities, such as Research and Development (R&D), process automation, design, etc.	2	2	2
Purchasing: All the processes carried out to acquire necessary resources to work: acquisition of raw materials, services, facilities, machines, etc. This also includes finding suppliers and negotiating the best prices.	3	4	3.5
Average	**2.5**	**3**	**2.75**

With those results in hand, Richard now had the mission to compile, present, and recommend some courses of action to Delta Tecnica. He aimed to make this business more agile and smarter by using better information management processes and systems. He came up with three alternatives:

Alternative #1: Remodel project monitoring reports exported by the ERP.

This alternative aimed to develop new construction monitoring reports. Construction monitoring reports were currently exported monthly from the company's ERP and made available via a printed report; they contained the information of the month's projects that preceded the date of export of the data. As an alternative to current hard copy reports, the consolidation of the monthly records that the ERP exported could be elaborated and published via power BI, through dashboards with analysis of the project performance. By analyzing the company's strengths with the new report's preparation, it would be possible to diagnose the information on construction costs more clearly, which could help Delta manage and use the data.

Another benefit of this system would be leveraging Delta's bargaining power with suppliers. Currently, the material purchasing information was scattered across several spreadsheets, making it difficult for managers to monitor costs accurately. A total of five months was estimated to implement alternative one.

Alternative #2: Project Diary Implementation.

This alternative resonated with the members of the technical team. They had tried to create a project control spreadsheet weekly but have not followed through with the plan due to technical limitations and lack of time. The absence of a project diary made it challenging to monitor, daily, how many employees were allocated per day in each project and the progress of 'projected versus executed' by the technical team. This gap could result in a loss of opportunities to acquire new projects. A total of five months was estimated to implement alternative two.

Alternative #3: Design and implementation of a custom-based ERP.

This alternative was based on the relevant number of complaints regarding the quality of the current ERP. During the diagnostic phase, it was clear that the system did not meet the current demands of Delta Tecnica. Implementing a new ERP would meet the company's unique needs, which would generate a competitive advantage in the face of competition and possible new entrants. Naturally, this alternative was the most expensive of all three considering the financial implications of creating and implementing a brand-new ERP for the company. It was estimated that alternative three would take more than a year to be implemented.

All three alternatives were considered process innovations, as they aimed to develop a new way of doing the same job, improving the level of information made available to Delta's leadership. Complementing these alternatives, Richard affirmed that it could be necessary to implement continuous training processes for the administrative team on new technologies. The changes resulting from technological evolution were ongoing, and it was useless to create new processes if, in the future, the administrative team was not able to improve and operationalize the latest tools.

One of Richard's slides mentioned: "When analyzing the applicability of the three alternatives, it should be considered that currently the administrative team does not have the necessary technical capabilities for the execution and maintenance of modern data analysis and treatment tools, so it could be necessary to implement the process of continuous training of the administrative team on emerging technologies. Given this current technical limitation, Delta could start implementing all three alternatives today, so they all have high applicability."

Minutes before the presentation, Richard thought about which would be the alternative that the client would pick and why. He knew that the company needed new solutions desperately and fast. He also knew that some options would be quick-wins, whereas others would take more time, capital, and patience.

What would be the best course of action, what would the partners decide?

TEACHING NOTES

Learning Objectives

This case provides several possibilities. After working through the case and assignment questions, students will be able to do the following:

- Discuss the external business context surrounding the organization and understand the most significant impacts on the company.
- Understand and discuss the role of information management systems for business agility and competitiveness.

- Critically reflect on the elements of an organizational diagnosis and extract information to support arguments.
- Analyze different business alternatives based on reliable and verifiable information.
- Recommend courses of action for the Partners based on evidence.

Position in Course

This case can be utilized in undergraduate and graduate-level courses in general management, information management, and business strategy. The case can also be used in executive-level courses with more in-depth discussions on decision-making processes.

Assignment Questions

1. Identify and analyze the business context surrounding Delta Tecnica highlighting the most significant impacts on the company.
2. What are the most salient challenges faced by Delta Tecnica regarding their information management systems?
3. Analyze the pros and cons of each of the three alternatives drafted by Richard to the Partners of Delta Tecnica.
4. What additional recommendations would you make to the partners moving forward?

Teaching Plan

Below, two alternatives of teaching plans, for Online and In-person learning approaches. The in-person is designed for a 90-minute class, whereas the Online is designed for a 60-minute class (considering screen fatigue issues).

Teaching Plan #1 – In Person Learning (90-minute class)

<u>The First 15 Minutes:</u>

The instructor could start by introducing major themes of information management and the elements of successful business strategies linked to effective information management. The instructor can use the supplementary videos to contextualize both the Brazilian context, the State of Sao Paulo, and the impacts that the carwash operation had in businesses.

<u>The 60 Minutes in Between:</u>

There are four questions for this case, all of them with suggested model answers. The instructor should present the assignment questions to students, and then divide the class into smaller discussion groups. The students can choose someone to note their answers on flip chart paper or type them on a slide to give feedback to the larger group. The instructor can also refer to Figure 3 to facilitate the discussion on Question #1.

<u>The Last 15 Minutes:</u>

Groups must report back with their answers to each assignment question. The instructor should provoke students by role-playing, putting him/herself in the position of both Richard or the Partners. This discussion should be focused on the choosing of an alternative and the "whys" and "hows" surrounding the feasibility of each alternative.

Teaching Plan #2 – Online Learning (60-minute class)

Asynchronous components (preparation before synchronous class)

The instructor should refer students to the supplemental materials, instructing the class to watch all videos and include their notes with the reading of the case. Preferably, students should watch the videos before reading the case. This activity should take approximately 15 minutes.

Synchronous – Block #1 (10 minutes)

The instructor could start by introducing major themes of information management and the elements of successful business strategies linked to effective information management. Additionally, a quick retrieval practice using the videos creates a more conducive online learning environment to start the discussion. Another possibility for instructors, is to prepare a quick poll to assess students' perceptions on the level of difficulty of the case using a five-point Likert scale.

Synchronous – Block #2 (30 minutes)

Students are divided in breakout rooms in groups of around 4-5 participants. The groups are instructed to analyze and discuss all four questions with one student being responsible for taking notes on a Presentation software (PowerPoint, Keynote, Google Present) document which should not take more than 4 slides (one slide per answer). To facilitate the discussion, the instructor could share Figure 3 with students as a Segway to question #1. Instructors should rotate between breakout rooms to check for questions and foment positive discussions.

Synchronous – Block #3 (20 minutes)

Groups must report back with their answers by sharing their screen with the presentation. The instructor should provoke students by role-playing, putting him/herself in the position of both Richard or the Partners. This discussion should be focused on the choosing of an alternative and the "whys" and "hows" surrounding the feasibility of each alternative.

Analysis

1. **Identify and analyze the business context surrounding Delta Tecnica highlighting the most significant impacts on the company.**

The instructor could use Figure 3 and Table 2 to start the discussion on Delta Tecnica current challenges. Delta is located at the wealthiest State of Brazil, Sao Paulo. As shown in Table 2, the company is continually battling funding for larger projects and the technical capabilities to expand

market share. But it competes with large construction companies which usually secure the bigger projects.

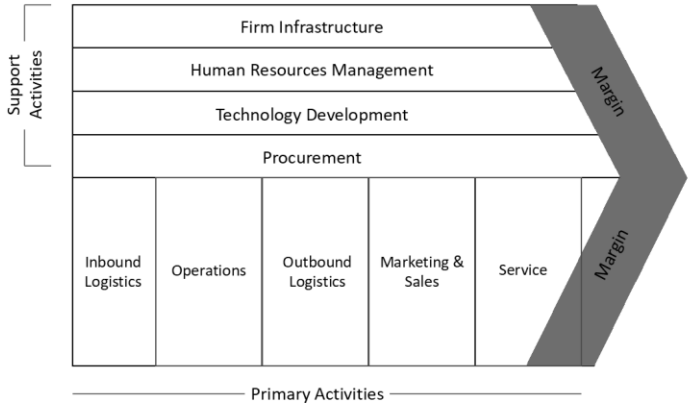

Figure 3. Porter's Value Chain Model.
Source: Porter (1989).

Currently, large construction companies are facing financial problems and, as a result, had to cut a large part of their employees. Therefore, many experienced unemployed engineers, who have the technical requirements, know the market in which they operate and gain access to capital at low cost. Another effect of large construction companies' crisis is that the entry barriers for small and medium-sized works are currently low, which creates a favorable situation for new competitors' entry.

The current competition in this segment has been reduced, and the number of infrastructure projects on offer to small and medium-sized companies is greater than the number of companies capable of executing them. In other words, some construction companies choose not to take the projects to avoid inflating their contingent of employees and due to administrative limitations. When it comes to the bargaining power of customers, one must weigh in a couple of factors. First, these are regulated tenders, so the exercise of this power by the stakeholders is weakened since the construction companies' amount is fixed in advance. Secondly, there is a visible lack of companies willing and equipped to participate in these tenders.

Another force with a low impact on the construction market is that of substitute products or services. Construction companies differentiate themselves through cost reduction, both in purchasing materials and human resources management (the largest source of fixed costs). Finally, the force with the most significant impact on business is that of suppliers: the budget management of a project is one of the most critical factors for success since the customer's amount is fixed. Only companies that can carry out the project by spending less than the amount paid for it survive. For this reason, suppliers have a high bargaining power since project success is intimately dependent on the amount paid for raw material. A schematic of this analysis is represented on Table 5.

Table 5

External Environment Analysis

Threats	Details
Suppliers	• High bargaining power • Construction companies rely heavily on suppliers
New entrants	• Macro-environment ripe for accommodating new entrants due to changes in tender legislation and the aftermath of Operation Carwash
Competition	• High demand for projects • Few regional competitors for AB Colinas (not nationally though)
Clients' bargaining power	• Tenders with fixed rates and agreed upon prices • Fewer companies willing, or capable to participate in new tenders
Replacements (products and services)	• Low operational differentiation • High potential for differentiation through production costs and HR Management

2. What are the most salient challenges faced by Delta Tecnica regarding their information management systems?

Students should refer to Table 3 and Table 4 to answer this question.

The most well-known issues are:

- A dated ERP which does not support the demands by both technical and administrative employees. This ERP creates several extra manual processes which increases cost and time. Additionally, the ERP was built around the company a long time ago, one could even argue that the business demands have changed, but not the system.
- The system exports a consolidated report in CSV format, "Comma Separated Values", with all the financial results included in the system's monthly register and information registered by the operational team in pre-established fields. This report is tabulated with the metrics that the company needed at the time of the system's implementation six years ago. Several new metrics became necessary as the company grew. They are currently left out of the ERP.
- As mentioned by the technical team, there is a constant need to monitor, very closely, what is sold versus what was billed, as well as sales that have not yet been billed or that were made in the long term and that did not generate cash for the company.
- When assessing the current information system, the lowest score given by Delta's partners was user satisfaction, with an average score of 1.5 out of five possible points. Its leadership does not evaluate the current system very well since all variables' general average is 2.2 out of five

possible points. The results also indicate that the satisfaction of the current information system users concerning the value chain's activities is low.

- In terms of overall satisfaction with the level of information received, the results are shown in Table 4 and it shows that the support activity with the lowest score was technological development.
- Without a reliable and smart information system, Delta Tecnica partners cannot make timely decisions regarding budget, human resources, and purchasing. This is potentially damaging to a company exponentially growing, not to mention liability issues when participating in tenders which used to be targeted at large-scale companies only.

3. Analyze the pros and cons of each of the three alternatives drafted by Richard to the Partners of Delta Tecnica.

Instructors can use the Table 6 to help students navigating several parameters. Four criteria should be analyzed for all three alternatives, namely: Innovation, restrictions, applicability, and attainment of the prescribed objective. All three alternatives can be considered process innovations, so there is no distinction between the three options and the innovation criterion. However, when analyzing internal and external restrictions, one can note a significant financial constraint regarding a new ERP's elaboration (alternative 3).

Table 6
Assessing Different Strategies

Alternative	Innovation Criteria	Internal & External Restrictions	Applicability	Goal Attainment
1	Process innovation	None	High	Total
2	Process innovation	None	High	Partial
3	Process innovation	Financial	High	Total

When analyzing the three alternatives' applicability, students should consider that currently, the administrative team lacks the essential technical capabilities for the execution and maintenance of modern data analysis tools. That means it would be necessary to invest in the administrative team's continuous training on emerging technologies. Given this technical limitation, Delta could already start implementing all three alternatives right away. Lastly, students should remember that the objective is to solve the issues that the current construction monitoring tool presents low end-user satisfaction and is directly impacted by the praising technological development activities.

The alternatives that best solve this problem are #1 and #3. The project diary initiative is geared to the technical team, thus directly impacting the technical development activity; however, it will not directly affect the technological development activity, which would only partially solve the issues. In conclusion, the solution with the highest feasibility potential is alternative #1 - Replace the current project monitoring tool with a Power BI report that is easy to use and aggregates the history of information on a single basis, thus impacting the partners' level of decision-making through the technological development and logistical activities from Delta.

4. What additional recommendations would you make to the partners moving forward?

Students should note that even though the current feasibility of alternative 1, given contextual constraints, should not prevent the Partners to pursue a more sustainable and long-term solution, which would be alternative 3. Naturally, this should only be pursued when the company has the proper clarity of its strategy and goals. As Davenport (1998) puts it, a good ERP can deliver great rewards, but it comes at a certain risk, since an enterprise system imposes its own logic on a company's strategy and culture.

Additionally, the Partners of Delta Tecnica should be aware of the remaining alternative – implementing the project diary as a potential quick-win with the technical team. Should they choose to implement the full ERP in the future, this alternative would be dissolved into the new system, but could function as a potential bridge while the system is designed. On the business side, the Partners could probably benefit from a strategic re-design since now they are looking to compete with larger corporations for bigger projects. This competition will demand a high-level of organizational capabilities, both on the technical and human resources sides. This may include not only upskilling the current workforce, but also adding new skills to the administrative team.

What Happened

All four partners voted in favour of adopting solution #1. The partners saw with good eyes the possibility of consolidation of monthly records elaborated and published via power BI, through dashboards with analysis of the project performance. After completing the report's migration to Power BI, Richard presented the tool to the administrative team employees, the same ones who participated in the focus group at the diagnosis phase. The team made positive comments regarding how much the report could bring financial prosperity to the company.

The partners responsible for the administrative team highlighted that the report is an efficient way to monitor projects' costs. The Administrative team was initially concerned with who would update the reports and how much time would be necessary to adapt to new technologies; however, they considered the solution to be of great value for monitoring costs. After the implementation, Richard, once again, decided to measure users' satisfaction level with the new system. The results are displayed in the Table 7.

Table 7
Results From Delta´s Partners Regarding Satisfaction with Current Information System

Variable	Administrative Team	Technical Team	Average
Perceived Ease of Use	4.8	4.3	4.6
Quality of information	5.0	4.8	4.9
Perceived utility	4.5	4.3	4.4
User satisfaction	5.0	4.4	4.7
Average	**4.8**	**4.5**	**4.6**

Recommended Readings

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