Innovation and Efficiency Guided by Data: Business Intelligence at the Grupo Pellas SER Company

Track: Management Education and Teaching Cases

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Abstract

SER was a company belonging to the Grupo Pellas Corporation. The Corporation operated in 5 countries, had 6 subsidiaries, employed more than 25,000 people, had more than 43,700 *manzanas* of sugarcane crops just in Nicaragua alone and had global annual sales of more than US $700 million. In 2008, due to the negative effects of the crisis on the company's business model, the company decided to implement a BI system to optimize its processes in order to reduce costs and increase productivity. The purpose of this case is to provide students and managers with a chance to learn about and discuss the implementation of one of the most important information systems: business intelligence (BI).

While Graham Tercero prepared for the first senior management meeting to elaborate Sugar, Energy & Rum's (SER) business strategy for the next five years as the company's Chief Information Technology Officer (CIO) he reflected on how he had been selected to lead the meeting. Graham's success in implementing a business intelligence (BI) system had led to the company thinking about information technology (IT) as a way to facilitate its new strategy. This situation had created high expectations from the management team and had put pressure on Graham. His preparation for the meeting included asking questions, such as: How were we successful with BI? What did we do well? And, what can we apply to future projects?

The BI system that Graham had led revolutionized how SER visualized IT since having real time data had allowed the company to make better decisions and make corrections in their most critical processes. As a result SER had increased its productivity and reduced costs. Graham's success with BI had resulted in him winning first place in the Grupo Pellas' 2010 innovation fair, being covered in the local press and being named as the company's CIO.

Sugar, Energy and Rum: SER

SER was a company belonging to the Nicaraguan corporation, Grupo Pellas, which owned businesses around the world. The headquarters were located in Nicaragua. The company produced renewable energy and quality sugar and alcohol. The Corporation had facilities in five countries: Nicaragua, Panama, Honduras, El Salvador and Guatemala and operated six subsidiaries: four sugar mills and two alcohol companies. They employed more than 25,000 in Nicaragua alone, had more than 43,700 *manzanas* of sugarcane fields in Nicaragua and had global annual sales of over US $700 million.

The San Antonio mill in Nicaragua, where the company headquarters were located, had a processing capacity of 20,000 tons of sugarcane a day, while the other 3 mills in Central America processed approximately 6,000 tons a day each. Nicaragua's production was done on 1,733 lots, of which 58.1% were owned by the company and the remaining 41.9% were owned by other suppliers. These suppliers were responsible for growing and tending the sugarcane with supervision provided by the San Antonio mill; they later sold to the mill once the sugarcane was ready to be harvested.

At the beginning of the 20th century, SER operated under the name of Nicaragua Sugar, the company that owned the San Antonio mill and operated with two subsidiaries: Marcas (that marketed and sold liquor, including Flor de Caña) and Industrias (that produced alcohol, sugar and energy). They operated with that structure until 2007, when the two subsidiaries merged and formed SER, a company that continued to grow.

BI was understood as a group of strategies and tools to manage and create knowledge using existing data. SER's Deputy Director of Finance and head of the IT department, Noel Sacasa, had assigned Graham Tercero the job of implementing a project to analyze SER's existing data in 2008. The company had great historical data, meaning it had information on the weather, agricultural practices, harvests, yields, production and finance since the beginning of the 20th century.

Graham Tercero's specialization in integrating databases, which he had done in his previous job, led Noel Sacasa to select him as the lead for the BI project. Before working with SER, Graham had worked for TELCOR[1] in the company's BI area, where he had developed the skills to integrate databases and systems. From there, he moved to the San Antonio mill where he worked as an IT project manager. There, he implemented an integrated user control platform and a first rendition of a BI platform for the Marcas subsidiary in Nicaragua Sugar.

The challenges and benefits of BI

The results of a study[2] done with more than 100 Latin American managers about IT adoption had shown that BI was the number one priority on the IT agendas at companies in Latin America in 2014. This fact was not surprising since it was consistent with global business priorities; for example, the 2013 Gartner manager program survey[3] had also listed BI as the number one priority for CIOs, and a report done by IBM on technology trends had listed BI as one of the four most important trends since 2012.[4]

BI was a concept introduced by Howard Dressner at the beginning of the 90s when he was an analyst at the Gartner Group. BI referred to the consolidation and analysis of internal data (for example, transaction data from points of sale) and/or external data (for example, demographic client data) to make effective decisions. However, combining and integrating data from different sources was a complex task that required highly sophisticated abilities.

Some of the challenges faced by companies implementing BI were having a dedicated senior manager leading the process, limited resources, understanding the rules of the game, the quality and integrity of existing data, understanding and managing internal expectations, a culture resistant and unwilling to change, complex data integration, training, justification of the investment and departmental silos.

[1] The Instituto Nicaragüense de Telecomunicaciones y Correos (TELCOR) is the "Supervisory body" for telecommunications and postal services.

[2] Research including the INCAE survey: "100 Preguntas para Medir su Negocio en TI" (100 questions to measure your IT business) applied in 2014 to 108 managers from Latin America.

[3] Gartner. (2013). Hunting and Harvesting in a Digital World: Insights From the 2013 Gartner CIO Agenda Report.

[4] IBM. (2012). Fast track to the future: The 2012 IBM Tech Trends Report. Armonk, NY: IBM Corporation.

Despite these challenges, the possible benefits counterbalanced and maintained manager motivation to implement BI to the maximum, since companies that were able to take advantage of the system improved their business processes and cost structures, used innovation to position themselves strategically, detected patterns in their target markets and managed risk proactively to create a positive impact on the business.

In addition, implementing BI offered other benefits, such as promoting and encouraging an evidence-based culture for decision-making, controlling the business's performance to reach defined objectives, establishing a proactive framework within which to make decisions, facilitating the articulation and alignment of strategies throughout the company and anticipating and managing change. In addition, BI users accessed data instantly or almost instantly and invested time in data analysis and understanding it, rather than spending their time collecting and formatting data. Managers who used BI did not have to discuss who had the right numbers (because there was only "one version of the truth"), guaranteeing that data was managed throughout the lifecycle and was shared routinely and automatically in the company.

In global companies the use of information systems had made it technologically feasible to capture and store large amounts of data. The numbers were hard to comprehend, but technicians understood the passage of time through megabytes (a million bytes[5]) transforming into gigabytes (one billion bytes), and from gigabytes to terabytes (equal to 10^{12} bytes) and from terabytes to petabytes (equal to 10^{15} bytes). For better or for worse, of the information available in the world in 2013, 90% had been created in the last two years.

Somewhat paradoxically, while organizations had more data than ever available, only a small percentage could actually use the data to its fullest potential. Even though people at all levels needed better information and managers had to make precise decisions quickly, there were gaps in the data throughout companies that led many people to make decisions based on instinct, subjective data or even erroneous information.

The absence of useable information or the inability to analyze it quickly and effectively led companies to depend on their past experiences. Large amounts of data were badly managed, ignored or underutilized. In fact, one out of three business managers reported having made decisions with incomplete or imprecise data.[6]

[5] A byte is a unit of information, the smallest amount of data that a computer can process at once, used as a multiple of a bit; it is generally equal to 8 bits. One or two words equal approximately 10 bytes.
[6] Report: IBM Global Business Services, Business Analytics and Optimization: Smarter decisions for optimized performance.

BI project at SER

SER's BI project was quite important for two reasons. First, the company had more than 120 years of data that could be used to make better decisions, evaluate productivity and conditions that influenced it, determine what trends and variables were important and project harvests and yields.

Second, the company had suffered from the effects of the global crisis in 2008, which had increased the cost of fuel and decreased income due to low international sugar prices. Finding ways to increase their productivity and/or reduce their costs was high on the managers' list of priorities.

Because SER's products (sugar, energy and alcohol) were evaluated as "commodities,"[7] dependent on international prices, their business model was structured around reducing costs and increasing sales volumes. With commodities it was not possible for them to differentiate their products in the market, since the products in competition were basically identical. Therefore, the only way to increase income was to do one of two things: either produce more with less, or reduce costs to increase the earnings margin.

BI offered SER an opportunity to monitor its processes to identify how to optimize tasks that would allow the company to reduce its costs and/or increase its productivity, all in real time and not as part of a usual management review process. For SER, BI should monitor and optimize several processes that were important to their cost structure and productivity. These processes included planting, nutrition, harvest, transportation to the factory and production of the alcohol, fuel, sugar and electricity.

SER before BI

Business model

SER's value proposition was to produce the best quality renewable energy, sugar and alcohols through basic processes that included planting sugarcane, harvesting it and processing it. This processing required that the company have direct relationships with sugarcane suppliers and indirect relationships with sugar, alcohol and energy buyers; access key resources needed for operations (sugarcane, fuel, lubricants and agricultural inputs); and negotiate prices with distributors and international brokers.

[7] Products for which there is demand but that are supplied without qualitative differentiation in the market.

SER's business model established market segments locally and internationally. Local segments were industrial sugar, sugar for consumption with vitamin A, potable alcohols and industrial alcohols and energy distribution. International segments were industrial sugar, alcohols and fuels.

The company formed alliances with local sugar distributors, international brokers, raw material suppliers (sugarcane), agricultural equipment suppliers, agricultural service providers and communications and software providers.

At the time of the BI project, the company's cost structure was made up of harvest (40%), field activities (25%), manufacturing activities (20%) and factory activities (15%). Income came from sugar exports (45%), local sugar sales (25%), ethanol sales (20%) and electricity sales (10%). The BI project focused on processes that allowed the company to reduce costs in the harvest and in the field and increase sugar productivity.

Company structure

The company's organizational structure was divided into six departments: Agroindustry, Logistics, Brands, Finance, Administration and Communication. These areas formed part of SER's senior management team, which was responsible for managing the company, under the control of the Board of Directors presided by Carlos Pellas, owner of Grupo Pellas.

As the company's managers, the senior management team met periodically to evaluate the company's performance and coordinate collaboration among departments. At that level agreements facilitated company-wide improvements and made management easier because of how the managers understood the business. Departments had pressure to implement agreed-upon changes successfully because of the strong leadership shown by the company's management.

SER promoted a balance between innovation and decision-making, offering space for ideas that could come from lower management levels. Graham indicated that one of the things he most liked about the company was its "support for innovation and ideas that could come from anyone."

However, having information to carry out those changes implied certain challenges for all levels of the company. For example, reports did not distinguish between important and unimportant information, calculation sheets were full of rows and columns, field engineers received emails with reports that could only be seen at night when they had internet connections and department heads came to meetings with data that did not match.

The Agro-industrial Manager, responsible for processes selected as priority by BI, was known for being completely entrenched in the company's operations and knowing its processes very well. This understanding led him to view the BI project as an opportunity to facilitate access to information and process optimization.

Technological infrastructure

The processes selected for BI began with the preparation of land for planting and fertilizing the sugarcane for about a year. Once the sugarcane had grown, they carried out an "optimal programming" process through laboratory tests and mathematical models to understand the best way to harvest to maximize productivity and distribute costs considering distances to the properties, age, variety, soil, season, etc. Through the programming they did a pre-harvest analysis for each lot to know how much sugar could be extracted through the cane. This information was needed to calculate optimal scheduling and create a detailed harvest plan. Then, they harvested with the help of handhelds[8] that allowed them to record each worker's harvest, collecting information about equipment, processes and locations where each harvest was taking place. Upon leaving the field, the handheld printed a ticket with a code for each wagon driven, so it could be scanned at the mill and the harvest information could be collected. Upon arrival at the mill, the driver drove over a scale to verify the weight of each wagon and scan the tickets so that the information could be collected. Finally, the sugarcane entered the factory to be processed.

To support these processes the company had different information systems: in 1994 it implemented the handheld system with tickets, in 2002 it implemented an ERP[9] (BPICS[10]) that kept cost controls, a maintenance system to manage assets (EAM[11]) and a total of 160 supporting applications, which included systems for human resources, lots, quality, industrial laboratory, agricultural information laboratory and others (which were mostly replaced in 2011 by an agricultural ERP, BIOSALC,[12] to control yields and efficiencies more precisely).

[8] A handheld is a small portable computing device that typically has a touchscreen and/or mini keyboard that functions with an operating system that can run several types of software applications.

[9] ERP, Enterprise Resource Planning, is business management software that usually includes applications that are used to collect, store and interpret data from the company's activities, such as planning, manufacturing and delivery, sales and marketing, inventory and payments.

[10] BPICS, Business Planning and Control System, is an ERP developed by System Software Associates (SSA) that was later acquired by Infor Global Solutions and is used to control manufacturing and assembling operations.

[11] EAM is software to manage company assets created by Infor that allows companies to administer asset management plans, decisions and share management.

[12] BIOSALC is a company with more than 20 years of experience in agro-industry systems.

Despite the use of these systems, decision-makers could not use the information optimally because the information systems created duplicity among data and led to imprecise reports with data that did not coincide. In addition, the reports that were available were shown on green screens or on calculation sheets that were updated by hand.

For example, the "final cost" report was an Excel sheet with approximately 48 columns and 1,500 rows that could grow, depending on the number of lots. Since users did not have useful and correct data, they generated reports with all possible data even though that made the report's application challenging.

The green screen reports were shown using AS/400[13] systems, which were hard to read and provided information that was not useful. For example, the "manufacturing order history" required the F24 function (non-existent) to see more details. No one looked at the green screen reports. See Exhibit 1.

BI performance indicators at SER

The BI project had the challenge of measuring the company's business model impact and had to answer the following questions: How should they measure changes in a process? How much savings will these changes represent? And, how much will income increase? Graham was clear that BI had to be more than an information-sharing system; the system had to lead to quantifiable changes.

The fact that many BI applications had failed or not lived up to their full potential by focusing more on technology than on providing critical information to decision-making processes led Graham to define, along with the Agro-industrial Manager, the key performance indicators (KPI[14]) that they needed to improve. The company was not willing to implement BI as a test without tangible results, since they recognized that it might frustrate employees and damage trust in the management team.

During this phase of implementation, Graham used Albert Einstein's quote that says: "Not everything that can be counted counts and not everything that counts can be counted," allowing him to make an initial selection of four indicators,

[13] IBM multiuser system launched in 1988 with an interface controlled through menus and commands with terminals and an operating system based on objects and libraries.

[14] KPI, Key Performance Indicator, is a measure of process performance. The value of the indicator is directly linked to the target set and level of progress achieved.

which were then narrowed to two. These two indicators, "equipment use" and "time spent," [15] were the most important for the change process.

Equipment use was part of the harvest process, in which close to 500 machines were sent to the field. They had traditionally been controlled using two white boards: one for drivers (that allowed them to organize workers, support teams, equipment status, etc.) and one for supplies (that identified lots, harvest plan, tons to cut, etc.). Using this control system, the white boards were updated manually every three hours. See Exhibit 2.

The implementation of the BI system created a "control tower" that allowed the company to see if the equipment was working in real time, the amount the equipment was being used and the tons of sugarcane that were left to cut on each lot based on the harvest plan. The control tower collected a series of data that allowed them to provide real time support to the field using valuable information about the equipment, tons of cut sugarcane, tons of sugarcane on the way to the factory, estimated time of arrival of the trucks, truck weight, etc. This information allowed for 100% visibility of the harvest and field processes, which allowed managers to make more immediate and precise decisions. See Exhibit 3.

With the availability of this information, SER optimized its processes, reducing manual time from 39.89 hours to 34.38 hours (representing a decrease of 14%), automated time from 7.12 hours to 6.44 hours (representing a decrease of 10%), and the equipment's dead time from 6,345 hours to 4,789 hours (representing a decrease of 1,556 hours). The KPI that had been selected showed great improvements, both in terms of time spent, as well as equipment use. These improvements increased productivity by US $1 million just in sugar processing.

These changes also led SER to have higher productivity than the average in the region. For example, suppliers' average productivity in the field was 70 tons of sugarcane per *manzana*, while SER's average was 90 tons. Suppliers' average productivity in the factory was 198 quintals of sugar per ton of sugarcane, while SER's average was 213.

In addition, the BI implementation improved several other processes that also generated savings and benefits for the company's image. These processes were selected as priority. Each selected process had performance indicators that could be used to measure the impact of BI.

[15] Time spent is the time used to go from cutting the sugarcane to processing it at the mill. The more time that passes after the sugarcane is cut, the less amount of sugar that can be extracted.

For example, monitoring the weight of the wagons that entered the mill in real time allowed them to know if they had excess weight or were underweight, leading to immediate corrections in loading sugarcane in the fields. The availability of this information allowed the company to move from 19 tons of sugarcane per wagon to 24 tons, which represented approximately 20,000 fewer trips. In monetary terms that represented savings of US $1 million per year. See Exhibit 4.

Improved product traceability reports led to FSSC 22000[16] certification and helped improve the company's image among clients. The BI system allowed the company to trace sugar using any data point from its production process, for example, the number on the bag of sugar, the production lot, the date it was processed, the date the sugar was harvested, the truck that transported it, the lot it came from, the treatment it received, etc. This improvement meant that response time for questions related to traceability decreased from five hours to immediately.

This improved response time made clients happy: "…we are going to recommend the online traceability system as a best practice for the FSSC 22000 standard," said Lloyd's Register Quality Assurance (international auditors for the standard). "… They should patent the system; we haven't seen anything like it at any other mill …" said the Big Cola Regional Manager.

BI extract, transform and load at SER

The main problem implementing BI was integrating data from different systems. SER had to deal with the fact that even though systems had the same data, the values may not correspond, leading to discussions among users and different versions of the truth.

To resolve this problem SER had to integrate its data into a single data warehouse.[17] Graham used the ETL (extract, transform and load) database process to accomplish this task. In information technology, "extract," "transform" and "load" referred to the process of extracting data from external sources, transforming them to comply with operating requirements and loading them into a final application for use. ETL systems were used often to convert and integrate data from multiple applications that were normally developed and operated by different users.

[16] The FSSC 22000 standard defines requirements for processes that control and minimize food safety risks. If an organization implements processes that comply with all requirements, it can become FSSC 22000 certified. The certification program is managed by the Food Safety System Certification foundation: www.fssc22000.com

[17] System used for data reports and analysis that combined data from one or more other sources, creating a central data warehouse.

The cleaning and consolidation of SER's data could not replace or transform any of the internal data systems since each one carried out a specific business function. Instead, the process created a data warehouse placed on top of the existing systems to integrate them via ETL.

They extracted data from the existing systems (ERP, ERP agriculture, asset management system (EAM) and other business applications). The data transformation was done by standardizing identifications, terminologies, data types, masters, codes and names and making them similar. To operate the BI system they loaded data online and in information cubes to conduct historical analysis and projections. See Exhibit 5.

BI graphic design at SER

Another issue related to the success of BI at SER was its graphic design. Graham recognized from the beginning that applications, especially those directed toward senior managers, needed to be designed well. Graham believed that "from a user's perspective, a badly designed report was a sign of bad quality information."

Quite accidently, Graham and his team found out that even if data was not correct in the system, the presence of a good design was enough to motivate coworkers to use the application because of the mere fact that it was nice to use. Due to a quality control problem at the beginning of implementation, the system had bad data for several days, although this fact did not diminish users' trust in the system.

Graham also learned, however, that satisfaction with the BI design was particularly critical at the beginning. The constant use of the tool led users to have high expectations about the design quality, but they also became more demanding in terms of the quality of the data displayed. As a result the IT department at SER created a Quality Control Manager position to guarantee that the incident of erroneous data did not occur again. In the final version of the BI application, the data problem no longer existed.

The experience with the BI design showed the team that less was more. Having a dynamic, intuitive and graphically-organized report with four columns, rather than an Excel sheet with 49 columns and more than 1,500 rows of data for the "final cost" report, for example, was greatly satisfying to users. Therefore, Graham's team concentrated on creating reports and screens using the most important 20% of data to generate 80% of the impact.[18]

[18] Pareto's Principle is also known as the 20/80 rule. It was named after Vilfredo Pareto. The Principle suggests that for many things close to 80% of the impact results from 20% of the cause.

The selection of that 20%, of the most critical information, was done by expert users from each area together. However, before receiving the senior management's approval to engage those expert users Graham and his team designed two draft reports with the highest quality design to convince everyone of their value. The availability of critical information in a single place and the enthusiasm for the well-designed tool led the managers and users to accept the new BI reports without a problem.

Graham learned that it was important to understand the user point of view and needs before beginning design, that any company report should offer data corresponding to the business's core questions, that style and image were more important than many technical features, that a design standard must exist among interfaces and that instead of yelling loudly and flashing data he should reduce the noise so that the most important message could be received.

Important decisions about colors, designs, thematic styles, design standards, etc. were made after having selected the few critical data that would be included in each report.

The quality of the BI system interface had left favorable impressions, such as that of Diego Diaz, CEO of BIOSALC Sistemas, who said: *"…it's incredible to see how advanced their information management systems are, the quality of the interface design is quite impressive…"*

Going forward: Lessons learned from the BI project

Graham ended his reflection on the implementation of the BI system by noting its success and how it could be replicated in their new projects. His notes said:

- *Do not start without senior management support*. Senior managers must have a vision of what they want to accomplish with the application, and the initiative must be promoted and involve the entire organization.

- *Make sure the application is aligned with the business model*. When the two are aligned, the applications can be a powerful tool to create strategy and can provide opportunities for new business models.

- *Do not try to cover all business areas*. The project should select where to focus most effort considering functions or initiatives that, together, will most impact the business model.

- *Establish the right performance indicators*. Defining performance indicators for the selected processes allows results to be quantified. Indicators can show how much costs have decreased and/or sales have increased.

- *Do not look at data as an end goal*. Extracting value from the information is a journey that means making changes in decision-making and resource allocation. Data leads to findings, findings require decisions and decisions must be implemented in order to create value.

- *Make people the heart of the project:* The logic that better quality information allows people to respond to complex problems does not negate the fact that people dismiss information without valuing it, introduce biases and lack the skills necessary to use it effectively. Emphasize the way people use data to reach conclusions.

- *Provide incentives for the organizational culture*. For BI the company must have a culture that respects measuring and evaluating quantitative data, and employees must be taught to make decisions based on facts.

- *Train users and guarantee use*. Users require access to information that is appropriate to their needs. They must be trained in how to use these tools and their data.

- *Do not implement the application with only the technical team*. Applications require collaborative and constant efforts made by different business areas. People with skills to understand how others are perceiving problems are key.

- *Ensure that the company has the type of people required for the project*. People should facilitate horizontal collaboration and have the technical skills needed for the project.

- *Do not provoke change as a revolution*. Change should be seen as an evolution to avoid conflict. Create an environment of curiosity, rather than authority. This means evaluating the organizational culture and what is valued at the company.

- *Make sure the appropriate technology is selected*. Selecting the right applications that respond to company requirements is critical for the project's success. This selection includes strategy, hardware and software.

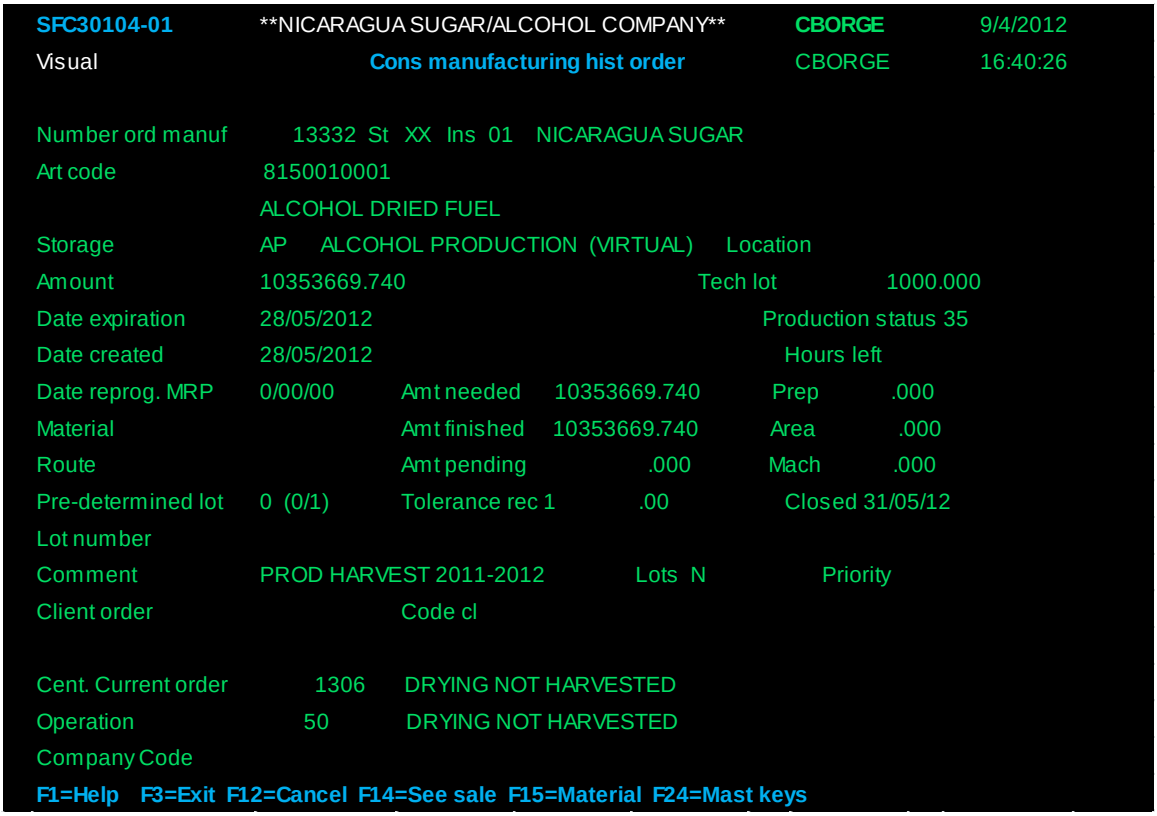
- *Make design a priority*. An application with a bad design suggests to the user that it contains bad content. The presentation of too much data is like having too much noise. Important decisions about colors, designs, thematic styles, design standards, etc. should be made once the critical information that will appear in the reports has been selected.

After finishing his notes, Graham left his office headed toward the business strategy meeting with much more confidence, knowing that he understood SER's business well and that he had been able to identify what had made the BI

system so successful. He walked with confidence, knowing that he would use his experience and knowledge to identify ways in which IT could support the business with its new business strategy.

Exhibit 1

Report from "Manufacturing order history"



Source: Elaborated by the author´s.

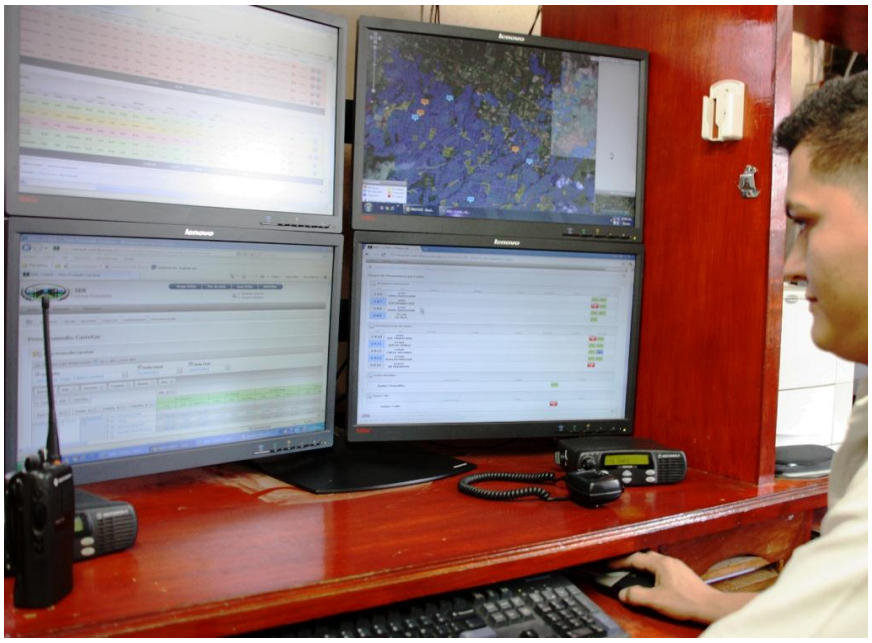
Exhibit 2

Old transportation and supply boards

Source: Elaborated by the author´s.

Exhibit 3

Business intelligence control tower



Source: Elaborated by the author´s.

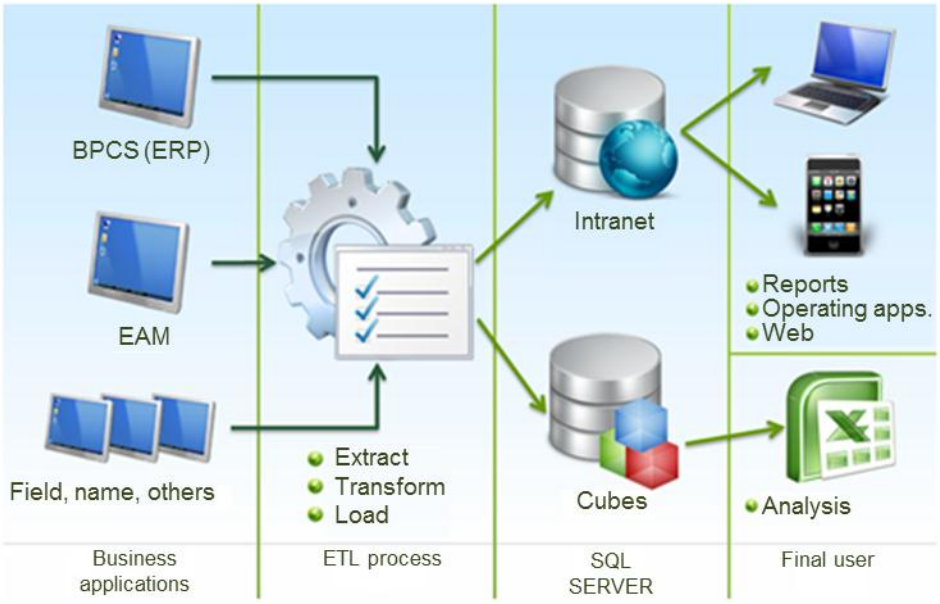
Exhibit 4

Road scales at the mill

Source: Elaborated by the author´s.

Exhibit 5

Extraction, transformation, and load at SER



Source: Elaborated by the author´s.

Innovation and Efficiency Guided by Data: Business Intelligence at the Grupo Pellas SER Company

Teaching Note[19]

Case synopsis

SER (Sugar, Energy & Rum) was a company belonging to the Grupo Pellas Corporation. The Corporation operated in 5 countries, had 6 subsidiaries, employed more than 25,000 people, had more than 43,700 *manzanas* of sugarcane crops just in Nicaragua alone and had global annual sales of more than US $700 million. In 2008, due to the negative effects of the crisis on the company's business model (increasing costs due to higher prices for fuel and decreasing income because of low international sugar prices), the company decided to implement a BI system to optimize its processes in order to reduce costs and increase productivity.

At that time the company had more than 100 years of data, information systems that fed into their main business processes and a culture that appreciated data as the basis for decision-making. However, there were inconsistencies among data systems, users received highly complex reports in Excel or green screens and process monitoring happened long after the tasks had been completed.

As a response, SER used extraction, transformation and load (ETL) to collect and clean data that would be used in the BI system. Based on their business model, they selected the most critical processes and defined key performance indicators (KPI) to measure the impact of changes in those processes. They considered graphic design as a tool to make the system more accepted by users and worked together with users so that reports only offered the most important information.

The result was improved costs and productivity. They decreased manual labor times by 14%, automated labor by 10% and eliminated 1,556 hours of dead time for equipment in the field, which allowed them to increase productivity by US $1 million just in sugar. They saved 20,000 trips from the fields to the factories, which represented more than US $1 million in

[19] This teaching note was prepared by researcher David Zamora and Professor Juan Carlos Barahona to support class instruction while using the case entitled "Innovation and Efficiency Guided by Data: Business Intelligence at the Grupo Pellas SER Company". The teaching note offers analysis and questions that present alternative approaches to improve classroom discussion and student understanding of business and technical topics that influence the implementation of business intelligence. It was translated from Spanish to English by Connie Gonzalez in November 2014.

savings by monitoring the weight of wagons loaded with sugarcane in real time. They improved client perceptions about the company both locally and internationally by implementing a sugar traceability system.

Background

The purpose of this case is to provide students and managers with a chance to learn about and discuss the implementation of one of the most important information systems in the past few years: business intelligence, or BI. Several studies that analyze CIO priorities, such as those done by Gartner and INCAE, have identified BI as the most important IT priority in Latin America and the world.

With the use of different information systems, such as ERP, CRM and other business applications, companies have increased the amount of data they have available significantly. However, they rarely can use the data to its fullest potential. Large amounts of data are poorly managed, ignored or underutilized, meaning that critical decisions are not made based on real or recent information.

Faced with the challenge of implementing a BI system at SER, managers named Graham Tercero as the lead; Graham had a degree in Engineering and an MBA. He was considered an expert in information system integration with the skills needed to understand the business and join the management team. His skills led him to make a successful proposal about the BI implementation, leading the company to generate huge savings and increase its productivity. The case describes his challenges, actions and recommendations.

Case objectives

The case “Innovation and Efficiency Guided by Data: Business Intelligence at the Grupo Pellas SER Company” has as its objective to respond to the question: How does a company make its BI system implementation successful? As such, the case:

- Describes what a BI system is and what it provides to a business.
- Describes the challenges and benefits of implementing a BI system.
- Describes success factors in the BI system implementation process.
- Describes the process of implementing a BI system successfully.

Suggested questions

1. Why did SER decide to implement a BI system?

2. What are the benefits and challenges of implementing a BI system?

3. What were SER's characteristics before implementing BI?

4. How do you measure success with a BI system?

5. Was Graham a good candidate to implement BI at SER?

6. What things should you do/not do when implementing BI?

Suggested reading

- BusinessWeek Research Services. (2009). Driven by Data: The importance of building culture of fact-based decision making. SAS.

- Davenport, T.H. (2006). Competing on Analytics. Harvard Business Review.

- Marchand D.A. & Peppard, J. (2013). Why IT Fumbles Analytics. Harvard Business Review.

- Sharma, R., Mithas, S., & Kankanhalli, A. (2014). Transforming decision-making processes: a research agenda for understanding the impact of business analytics on organisations. European Journal of Information Systems, 23(4), 433-441.

- Watson, H.J. & Wixom, B.H. (2007). The Current State of Business Intelligence. Computer, 40(9), 96-99.

Related websites

- http://businessintelligence.ittoolbox.com/

- http://www.grupopellas.com/empresas.htm

Suggested analysis

1. Why did SER decide to implement a BI system?

Although not limited to this list, some motivations were:

Tradition of collecting data. The company had collected data on weather, agricultural practices, harvests, yields, production and finance to support decision-making over the past 100 years. This demonstrated a culture that favored the use of data for decision-making.

Availability of data. The use of handhelds, ERP and other business applications allowed the company to have digital data available in real time. This data provided an opportunity for immediate information and process analysis.

Need to reduce costs and/or increase productivity. Since SER sold commodities (sugar, alcohol and energy) its business model was designed to reduce costs and increase production.

2008 economic crisis. During the 2008 economic crisis, the business model's cost structure went through the roof (mainly because of high fuel prices, one of the company's greatest costs) and the price of sugar dropped significantly. This situation was the trigger to implement the BI system.

2. What are the benefits and challenges of implementing a BI system?

Benefits include: promoting and fostering a culture based on evidence for decision-making, controlling business performance to reach defined objectives, establishing a proactive framework for decision-making, facilitating the articulation and alignment of strategies throughout the company and anticipating and managing change. In addition, BI users have access to data in real time or almost immediately, invest their time analyzing data and studying its implications rather than collecting and formatting it, managers who use BI do not have to discuss whether the numbers are right, it guarantees that data is managed throughout the lifecycle and data is shared routinely and automatically within the company.

Challenges include: senior level support, limited resources, understanding the rules of the game, quality and integrity of existing data, understanding and managing internal expectations, a culture resistant and unwilling to change, complex data integration, training, justifying the investments and departmental silos.

3. What were SER's characteristics before implementing BI?

Strategy and business model. The case includes a description of the business model canvas to understand SER's business and the most influential variables (see Exhibit 1, in summary). The Exhibit shows that 65% of the cost structure included field and harvest activities, and 70% of income came from sugar sales. Prioritization for the BI project defined processes that would reduce costs for "harvest" and "field" activities and increase productivity in "sugar" production.

Social infrastructure. Three organizational characteristics came together to implement the BI system. Even though the company was not used to making brusque changes in its processes (since they were so common and normal), when senior managers dictated a change, it was guaranteed to occur. The organizational structure and the talent of people serving as senior managers facilitated horizontal collaboration. And the organizational culture also appreciated the use of data in decision-making since employees had used other reports before BI (even though they were confusing and not user-friendly).

Technology infrastructure. The company had information systems that provided information about the business and collected data in real time: ERP (BPICS), an agricultural ERP (BIOSALC), an asset management system (EAM) and a large number of business applications. However, data was duplicated in the systems and did not coincide. This meant that people spent many hours just figuring out which data was correct.

4. How do you measure success with a BI system?

The BI system should make a significant impact on the company's main business model areas; therefore, BI requires support from the highest levels to make sure it is aligned with business needs.

After selecting BI priorities (in the case of SER they were to reduce costs in "harvest" and "field" activities and increase productivity in "sugar"), KPI should be defined to measure the impact of BI quantitatively (in the case of SER the KPI were "equipment use" and "time spent"). SER obtained the following results:

- Time spent: Manual labor went from 39.89 hours to 34.38 hours (a decrease of 14%) and automated labor went from 7.12 hours to 6.44 hours (a decrease of 10%), generating savings of US$ 1 million during sugar harvest (since the more time that passed after harvest, the amount of sugar that could be extracted decreased).

- Equipment use: Dead time of equipment in the field went from 6,345 hours to 4,789 hours (a decrease of 1,556 hours) and monitoring of wagon weight led to an increase from an average of 19 tons per wagon to 24 tons per wagon, representing 20,000 fewer trips and more than US $1 million in savings per year.

5. Was Graham a good candidate to implement BI at SER?

Graham had three critical skills to lead this project:

Understanding the business. His academic preparation in engineering and an MBA led him to associate and align technological aspects with the business and its processes. Graham could serve as both a system engineer, as well as a business analyst, depending on the project. He could lead a technical team and make technical decisions about implementing the ETL system in one meeting, and then go to another meeting and convince managers and users that the availability of real time data could help them make better decisions about processes being implemented.

Expert in system integration. With understanding of the technical complexity that the BI system implementation would require, Noel Sacasa (Deputy Director of Finance) named Graham as the project lead since he was an expert in system integration. At the beginning of BI, SER had systems with duplicated data that did not coincide. Graham's talents allowed him to lead the ETL process successfully.

Design skills. Graham's professional experience also included valuing design. His ability to design the tool well led to manager and user acceptance even without tangible results in costs and productivity. One of the most important things he did was to emphasize graphic design, select the most important 20% of data to include in reports, focus on user needs and standardize colors, designs, thematic styles, etc.

6. What things should you do/not do when implementing BI?

Strategy and Business

- *Don't* Do not start without senior management support.
- *Do* Make sure to align the BI with the business model.
- *Don't* Do not try to cover all business areas.
- *Do* Define the right performance indicators.

- *Don't* Do not look at data as the end goal.

- *Do* Make people the heart of the project.

Social Infrastructure

- *Do* Provide incentives to create a culture that favors analysis and metrics.

- *Do* Train users and make sure they use the system.

- *Don't* Do not implement the BI system with just a technical team.

- *Do* Ensure that the company has the right people.

- *Don't* Do not make change a revolution.

Technology Infrastructure

- *Do* Ensure that the proper technology is selected.

- *Do* Make sure design is a priority.

- *Don't* Do not use BI as a temporary solution to connect data.

- *Do* Visualize BI with self-service and automatic functions.

- *Don't* Do not forget to evaluate BI in the cloud, mobile functions and social media.

Teaching plan and board

Assuming an 80-minute class (see Exhibit 2):

Geek board. The geek board (see Exhibit 2) is a technique to write down words and phrases students do not understand on one side of the board. Students are motivated to identify a word for the geek board using terms identified in the case and in class. This allows the class the chance to discuss technical terms in a dynamic and interesting way.

Open and close. Begin the class by describing what a BI is, what it does and why it is important today. Close the class with the "do's and don'ts" when implementing BI, concluding with the idea that successful implementation depends on the company itself.

First 15 minutes. Description of the company and characteristics of its "business model," "social infrastructure," and "technological infrastructure" before implementing BI. Discussion questions include:

- Can the company's characteristics have a positive or negative impact?
- What characteristics are favorable to BI?
- Are these characteristics a given, or can they be created?

15 to 25 minutes. Description of conditions and triggers that led the company to decide to implement the BI system. Discussion questions include:

- What was BI to SER?
- What could it give to the business given the company's situation at the time?
- What was the purpose of the BI project at SER?
- Could BI have another purpose, other than those listed in the SER case?

25 to 40 minutes. Description of BI, challenges and benefits. Discussion questions include:

- What are the main benefits of BI?
- What are the main challenges of BI?
- Why is BI the #1 priority on the IT agenda for Latin American companies?

40 to 50 minutes. Description of KPIs at SER and their relationship with the business model. Discussion questions include:

- How are KPIs defined?

- How many KPIs should be used in a BI project?

- What do the KPIs mean to managers, users and the project leader?

50 to 60 minutes. Description of Graham, his decisions and the impact of those decisions on the BI project. Discussion questions include:

- Why is it recommended that someone have a technical and business background for BI?

- What importance did Graham give to design?

60 to 80 minutes. Discussion of the "do's and don'ts" identified in the SER case. Discussion questions include:

- What should be done during BI implementation?

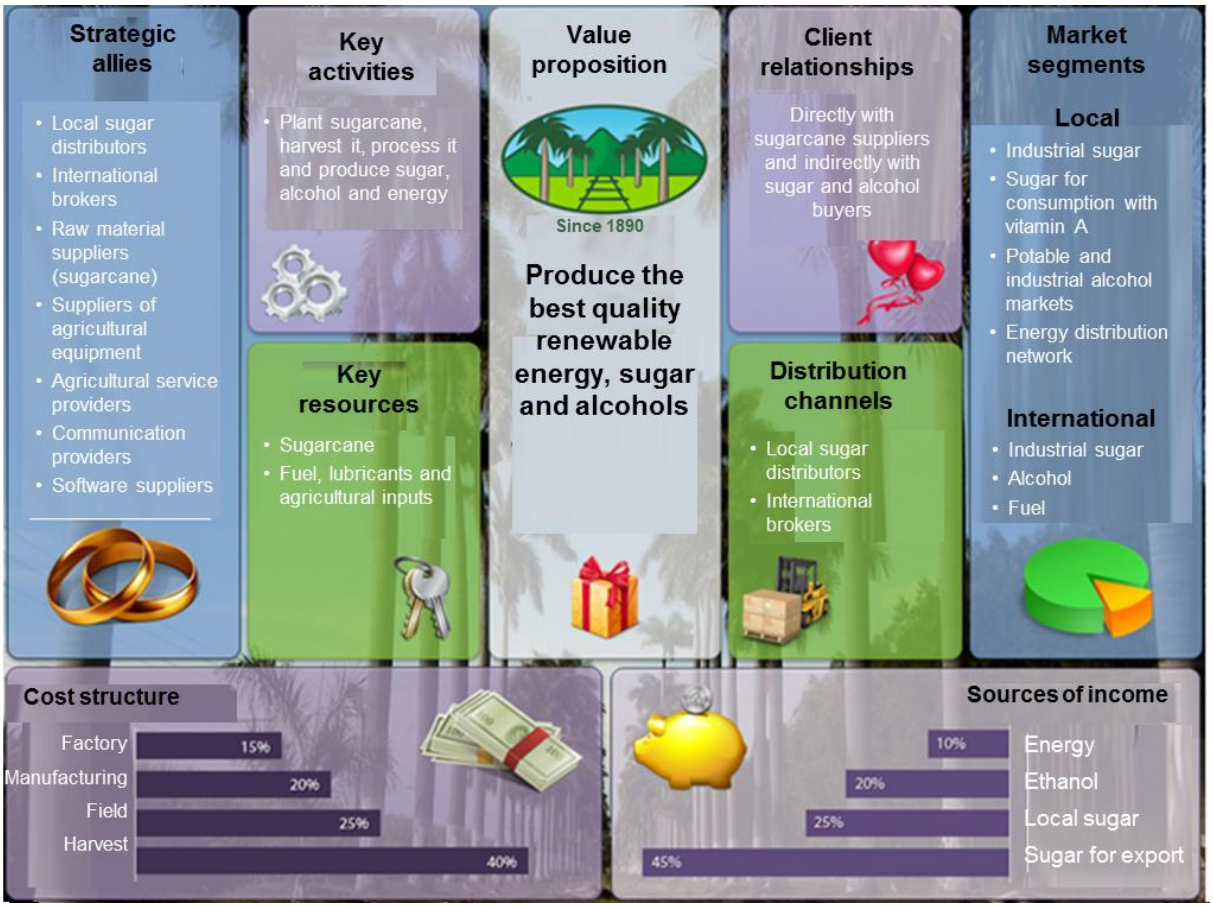
- What should not be done during BI implementation?

- Can you think of other "do's and don'ts"?

Exhibit 1

Teaching note

Business Model Canvas for SER



Source: Elaborated by the author´s.

Exhibit 2

Teaching note

Board Plan

<table>
<tr>
<td>Geek board

- Byte
- Handheld
- ERP: BPICS, Biosalc
- EAM
- Business applications
- AS/400
- KPI
- Time spent
- FSSC 22000 standard
- Data warehouse
- ETL</td>
<td>Business and characteristics

- Business model
- Social infrastructure
- Technological infrastructure
- Can the company’s characteristics have a positive or negative impact?
- What characteristics are favorable for BI implementation?
- Are these characteristics a given, or can they be created?</td>
<td>Reasons to implement BI

- Influential conditions: culture, cost/productivity and availability of data
- Main trigger: 2008 economic crisis
- What was BI to SER?
- What could it provide to the business given the situation at the time?
- What was the purpose of the BI project at SER?
- Could BI have other objectives?</td>
</tr>
<tr>
<td>BI, challenges and benefits

- Benefits: culture based on evidence for decisions, control between performance and objectives, anticipate and manage change, access to real time data, time used to analyze data, one truth, data management during lifecycle, routine and automatic data sharing, etc.
- Challenges: senior level support, limited resources, understanding business, quality and integrity of data, expectations, resistant culture, complex integration, training, justifying ROI, silos, etc.
- What are the main benefits and challenges of BI?
- Why was BI a #1 priority?</td>
<td>BI, business model and KPIs

- Relationship among 3 variables
- KPIs at SER: equipment use and time spent and relation to business model
- How do you define KPIs?
- How many KPIs should be used in a BI project?
- What do KPIs mean to managers, users and the project lead?</td>
<td>Graham’s profile

- Understanding of the business
- Expert in system integration
- Design skills
- What is it necessary to have a technical and business background for BI?
- What importance did Graham give to design?</td>
</tr>
<tr>
<td colspan="2">Do

- Align BI and business
- Define the right KPIs
- Make people the heart of the project
- Provide incentives for a culture that favors analysis and metrics
- Train users and guarantee use
- Ensure the right people are hired
- Select the right technology
- Make design a priority
- Visualize self-service and automatic functions</td>
<td>Don’t

- Start without senior level support
- Cover all business areas
- Think of data as the end goal
- Implement BI with just a technical team
- Make change a revolution
- Use BI as a temporary solution to connect data
- Forget the cloud, mobile functions and social media</td>
</tr>
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