

## Teaching Case

# SAPCO: From Good to Great

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## Abstract

Saudi Arabian Petrochemical Company (SAPCO), a petrochemicals manufacturer, has decided to make some major internal changes to gain increased market share and continue its success. It has been easy going for some time now, and business has been very good, but in order to take that next step, SAPCO needs to attain the Responsible Care certification. Responsible Care is an environmental focus safety and health initiative focused on reducing negative impacts of all facets of hazardous material manufacturing. Environmental awareness has taken a front seat in the petrochemicals industry, and many of SAPCO's clients are looking to only do business with certified manufacturers. To get certified, SAPCO will need to convince some of its vendors to meet the certification requirements as well. Saudi National Transportation (SNT), a hazardous material transportation company who has a long standing business relationship with SAPCO, is apprehensive to meet the requirements for certification. Let's see what can be done.

**Keywords:** Responsible Care certification (RC), Enterprise Resource Planning (ERP), Vendor Partnering, Project Management, Petrochemical Industry

### 1. SAPCO BACKGROUND

Launched in December of 1999, within the fast growing and highly competitive petrochemicals industry, a new company was born to compete with the giants. Saudi Arabian Petrochemical Company (SAPCO) focused mainly on methanol, vinyl, and various other acetic acids as its primary

product offering. These products are considered important mediation products, heavily used in the manufacturing industry, especially high in demand in Germany and China. The company's top selling product, methanol, is one of the main components used in the production of plastics. Methanol's hazard level and reaction with other chemicals can vary in strength and texture

depending on the amount used. Almost everything we see around us is the result of a reaction involving methanol or vinyl.

“SAPCO continues to grow as a petrochemical manufacturer, advancing its reputation in turning out high quality products and innovation in both products and processes.” - Mr. Al-Mansour (Chairman of SAPCO)

SAPCO began its journey with an equally ambitious and optimistic goal of capturing the largest portion of the methanol production market within 10 years, and to become one of the world's leading methanol producers. The top managers all were in agreement that one of the keys to success was to implement an ERP system, heavily involved at the technical production level, which would nearly automate the daily production and significantly reduce inventory costs. The second, and equally important key, is a strong contracting and purchasing department. This would be integral in maintaining profit margins as one of SAPCO's largest expenses is raw materials. The first new hire of this initiative was an elite contracting specialist. Industry chatter led them to Mr. Sharif, an expert in contracting management, who had built great vendor relations over time. Nationally and internationally, Mr. Sharif was known as a matchmaker that led small companies down the path to become industry giants. His rule of thumb is clear communication; to which he credits a great deal of his success.

The company also began to diversify their clients and differentiate their products in an effort to reach their market share goal. Business was good. The production numbers kept growing and the company's sales kept inflating with the majority of growth centered in China and Turkey. The number of current and future projects started to increase and they began to capture a higher and higher percentage of the industry's market share. SAPCO's competitors began to take this success as a challenge.

Mr. Sharif felt he needed to enhance SAPCO's project and contract bidding process. In an effort to do so, he split the contract evaluation process into two classifications. Technical evaluation, which is handled by engineers and technicians in the related departments and business evaluation, to follow the completion of the technical evaluation process. The business evaluation focuses on pricing, timing, and contract scope. The contracting process of SAPCO became dynamic, weighing multiple factors such as risk

assessment, technicality, commerciality, quality and safety.

## 2. THE RESPONSIBLE CARE CERTIFICATION PROJECT

In an effort to maintain their industry leading position, SAPCO began to research ways in which they could differentiate themselves from other organizations in the market. They were approached by the Responsible Care Association (RC), a United States based safety organization overseen by the American Chemistry Council (ACC). The goals of the Responsible Care Association can be seen in Figure 1.



Figure 1: Goals of Responsible Care Association (<https://slideshare.net/kaushalsutaria/rcms-rc-14001>)

Some of Responsible Care's main focuses are integration of management systems, community awareness, higher emergency response rates, improved safety and emergency handling, pollution prevention, safety staff, and more efficient and safe processes in general. The Responsible Care philosophy is "Plan, Do, Check, & Act". Around 220 companies in the U.S undergo tests and audits every three years to meet and maintain these qualifications. Being certified as a Responsible Care Organization, can also lead to an ISO 14001 certification, officially labeling the company as a cost effective performer. The Responsible Care implementation process is detailed in Figure 2.



Figure 2: Responsible Care Implementation Process(<https://responsiblecare.americanchemistry.com/Responsible-Care-Program-Elements/Management-System-and-Certification>)

The Responsible Care Organization audits and trains petrochemical companies on how to handle their products in a way that reduces the number of safety incidences, while simultaneously increasing efficiency. Prior to training, all segments of the company go through a vigorous safety and quality audit and all issues uncovered during the audit must be remedied. RC requirements were extended to cover contracts handled by third party vendors, and now require comprehensive audits of their facilities. The method for handling contracts under RC differs greatly from SAPCO's current practices.

The RC requirements are much stricter than normal practice in the region, and complying with these requirements means higher costs and delayed projects. Mr. Sharif's main concern is not

that SAPCO will be able to comply, but that projects that are held by third parties will cause issues. Very few of the third party vendors used by SAPCO have heard of RC nor are they willing to change their current practices for this certification, which will result in higher costs and lower profit margins in the short-term. One of the main issues faced by Mr. Sharif is convincing the main vendors to act more as business partners, and not simply vendors. SAPCO is expecting them to share in the concerns when it comes to risks, and work together to resolve any strategic or tactical problem related to the projects. They are expected to engage in RC examinations of their safety regulations, lead time tests and to be a bit more transparent when it comes to employee's emergency response rates.

### 3. THE ROLE OF IT SOLUTIONS

Mr. Sharif was concerned that the RC auditing procedures would require reliable, accurate and easily accessible data sources. At the time, SAPCO was lacking software to align and integrate their data where it could be readily retrieved. He believed this could be an opportunity, though, for a new IT solution to enhance their business value rather than just an upgrade of the technology to satisfy certifiers. Fundamentally, IT solutions could allow SAPCO's information to become an open source to encourage transparency "To Whom It May Concern" from employers to employees and from investors to RC auditors. Unfortunately, SAPCO, like many other industrial companies, was lacking many IT elements like storage, network administration, and data analysis; which are key factors proving the accuracy of SAPCO's practices and an important milestone in RC's auditing process. Overall, a new implementation of these IT solutions could result not only in satisfying RC, but also increase employee involvement and improve prospects for problem solving.

Another aspect that needed to be evaluated for change was SAPCO's implementation process. SAPCO mainly used the traditional waterfall model. The company worked linearly with its tasks and stages delivering goals sequentially. However, the problem in this type of approach as described by Mr. Sharif: "once objectives are delivered and tasks are made it is very hard to retackle issues or return to the accomplished tasks, it's exactly like a flowing waterfall." This is especially problematic when dealing with unclear expectations and constant changes of scope, which does not work well with this type of model.

Mr. Sharif discussed these issues with the CEO of SAPCO Mr. Ahmad Al-Ali and they both realized they will need to find an alternative to achieve their deliverables using an iterative basis that supports the ever-changing environment that exists in most of their projects. They reviewed their problems through a set of questions to determine what defines a successful project, the level of commitment to this transformation, the degree of tolerance toward new changes in their working environment, and whether they will need an outside expert to help them overcome their problems and transform. The common belief was to have a model that would allow them to engage more with their teams through regular cooperative work with RC certifiers. Furthermore, they both agreed that the goal was not only to become certified but also to increase their client satisfaction, improve cost predictability, and reduce the expense of future developments. The only obstacle that they were facing was getting everyone on board and identifying the possible challenges that might appear during the transitioning stage, moving away from the current waterfall model to an appropriate iterative effective model.

The true challenges come from misconceptions and the lack of understanding about what an alternative model, an Agile approach for instance, would do if implemented at SAPCO. For that, SAPCO will have to take the differences between models in consideration and train employees and members of the boards to educate them on the importance of replacing a rigid, ineffective model to an agile approach. This is going to require a teamwork effort to accomplish an extreme cultural makeover after years of implementing with a waterfall model. This will be difficult for Mr. Sharif to get all of his leaders and employees fully on board.

Another need was for business analysts to use an integration of finance, logistics, sales, and marketing data for analysis. Unfortunately, SAPCO's database was 90 percent unstructured, which also resulted in a tremendous amount of noise in their processes; this was yet another area that will likely be flagged as an issue by RC certifiers.

There was a need within the company for an expert who could deliver the value of understanding how their partners and customers think. The desired improvements would also require high technical security specialists who could interpret any data into a business risk. With the importance of data and the range of data

types that SAPCO is pursuing to take advantage of, there is an increased need for developers who could extract data from multiple sources within departments, and transfer it to fit SAPCO's needs. Loading the data into a warehouse and making it presentable is another important aspect that was heavily needed, permitting easy access to information for internal users within SAPCO and external RC auditors. This would also require an open source framework that could support the processing of big datasets. Thus, SAPCO needed a massive data landscaping with a visualization tool development that would guarantee good intuitive data analysis. Although this transformation process tends to be challenging, IT leaders at SAPCO were viewing it as an opportunity to innovate and become involved in the art of transitioning their IT function.

Mr. Sharif knew the IT issues were not only a factor in providing RC the information they needed for the certification inspection, but were also a key element in the overall efficiency and strategic positioning of the company. They were already aware of the need for their development model to become more flexible and their systems to be more integrated and secure while being more accessible to those who needed to know the data. The timing of this RC audit may work well as the catalyst needed to really get the ball rolling on addressing the technology changes that have been needed for some time. Mr. Sharif recognized that the changes would be extensive, impacting every functional unit of their business, so he braced for the internal management of the upgrades. Internally, it would be a challenge, but should he consider a potential impact on relationships with external partners? How would the RC inspection and technology changes affect their business partners, especially in the key area of logistics and transportation? Would there be resistance? Mr. Sharif speculated there may be issues to address with suppliers as well.

#### **4. THE CASE OF LOGISTICS AND TRANSPORTATION**

The shipping and handling function of SAPCO is outsourced to Saudi National Transportation (SNT), their primary transportation vendor. SNT's job is the delivery of products directly to customers or to port stations, depending on whether the destination is national or international. In order to acquire RC certification, Mr. Sharif needs to convince SNT to get on board and adjust their practices to meet the RC requirements. After meeting the board and consulting his industry contacts, he decides his

best course of action would be to speak to SNT about the benefits of implementing an RC certified management system. The board seems to think that this will be a no-brainer, but he expects a great deal of push back.

He puts in a call to Mr. Pico, CEO of SNT, and informs him that a representative from the RC association would be stopping by to perform a general audit. Mr. Pico was upset that he was not first consulted and is not all that interested in becoming an RC certified organization, let alone what he calls "an invasive audit". Mr. Pico was worried that the audit might lead to schedule interruptions and disrupt their already very tight schedule. However, SAPCO is a very valuable client, so he eventually agrees to the audit.

The day of the audit Mr. Sharif arrives at SNT headquarters with a group of U.S experts and engineers. SNT flat out fails the audit. The report recommends that SAPCO either educate their current transportation services provider about enhancements to safety, or to terminate the contract and move to another transport company. If one of these two recommendations are not met, SAPCO themselves would fail the audit. Mr. Sharif again meets with Mr. Pico to further explain the benefits of the RC certification and how important it is to SAPCO. His suggestion is that they improve their qualifications gradually, and emphasis that participation in the certification would cause them to have a better management system in the long run. For instance, SNT needed to better streamline their contract handling process in order to better control costs in relation to fixed price or cost plus contracts. In addition, they were struggling with the reduction procurement risk, and their contract evaluation style was a waterfall approach in most scenarios. Mr. Sharif suggests that they test their market and consider building a system of RFI, RFQ and RFP. His efforts prove a failure when despite the benefits, Mr. Pico is still not interested in participating. He said: "the changes needed to meet the requirements for certification were simply too large and too costly." He believed that participation would not affect his bottom line because there were too few competitors in the transportation market to necessitate the change. Things were going fine the way they are, so if it isn't broken, don't fix it.

Mr. Sharif knew that Mr. Pico had the upper hand in this situation. He found himself in a difficult situation knowing that no other transporter would have his back on multiple occasions like SNT had. He decided to consult his contact at the RC for advice. "SNT makes their tanks available to us,

even during peak times. No one else but SNT is able to meet our current demand", Mr. Sharif said to the RC expert. "They have largest fleet in the region with over 150 tanks". The RC expert stated that they understand his predicament, and that their main concern, and largest reason for failing SNT during the audit, was that they require hazardous materials transporters to change the tires of all eighteen wheelers every 6 to 9 months, depending on usage and number of trips, but Mr. Pico was unwilling to meet this requirement. Other important issues are adding tracking devices to the trucks, intensive driver training, adding safety data for each product on each tank, installing pressure gages for each tank, and the most expensive of the requirements; installing an ERP system that can help them monitor vehicles and environmental impacts. Mr. Sharif told the RC representative that Mr. Pico refused to accommodate these alterations due to the associated costs.

With approval from SAPCO's board of directors, Mr. Sharif reluctantly offers to share some of the implementation cost. SNT's main argument is that none of the other petrochemical manufacturers in the region are requiring such extremely detailed and intense regulation requirements, and that the return on complying with such regulations is simply not beneficial on a large scale, since other companies only care about the availability of tanks. Mr. Pico offers his own solution of adding a new fleet that meets the RC requirements devoted only to SAPCO. He would do this only if they would be willing to sign a long-term contract. Mr. Sharif knew that the cost of having a devoted fleet would be extremely expensive and that upper management would never approve. Not putting all his eggs in the SNT basket, Mr. Sharif began searching for another transporter, and the best he is able to find is 90% compliant with RC requirements. Unfortunately, they have a much smaller fleet of only 30 tanks. This means that each tank will have to be reloaded multiple times to cover daily shipments, and this will lead to delays and various other inefficiencies. This is not an optimal solution and Mr. Sharif feels that the small number of available tanks will interrupt workflow increase transportation costs.

## 5. IBM SOLUTION TO THE RESCUE

SAPCO, at that time was using SAP ERP system but they were facing a lack of professional users able to build and upgrade their modules based on departmental needs. This was problematic to Mr.

Sharif and his staff at the contracting department. Moreover, the company's main implementation of ERP is only seen in direct operations and technical departments. SAP was used in the business departments solely to process orders for the purchasing department and to aid in the technical needs of the processing engineers at the factory. The head of the IT department, Mr. Smith, saw a need for increased connectivity and integration, especially when it comes to data managing and resource planning. Ahmad Al-Ali the CEO of SAPCO stated:

"Working with IBM international business specialists can equip us to successfully complete our optimization initiative and see positive results across multiple units of our organization including the plant, logistics, and marketing. Our sales team will be able to tap into growing markets while continuing to improve brand image and value."

He believed in virtualization and in the capabilities of ERP management. He shared this vision with the CEO and Mr. Sharif alike. Mr. Sharif saw the ERP management as an opportunity, and the funding was made available for this approach to solving the transportation issues.

IBM decided to educate SNT first, and then revise the policy and the procedures that are outside the RC requirements in order for SAPCO to be accredited the certificate. Consultants hired by Mr. Pico suggest that if SAPCO is dedicated enough, it should engage in a long term contract in the name of community awareness. Mr. Sharif gave Mr. Pico a call and explained that this is only the beginning, and an industry-wide shift towards environmental awareness has begun; he is better off reaching compliance early in the movement rather than being left behind. However, the agreement is contingent on SNT's willingness to participate in operations planning and optimization.

IBM solution experts arrive from Dubai and the audit of the contracting department was postponed due to various issues. IBM experts conduct an estimation of timeline, consisting of roughly 18 weeks to review the affiliates, 13 weeks to review the headquarters and 6 weeks to review the transporter. A meeting was held between SNT and SAPCO to lay out a plan for enhancing operational efficiency by imposing some ERP related planning strategies in real time. They focus on cargo management and human capital investments. They also identify the importance of quality management within the

new distribution standards involving safety management systems, as recommended by the RC auditor. Also discussed handling and management of distribution service providers with the clear distinction that SAPCO provided delivery management and SNT provided transportation. IBM looks inside the fence line and revises the standards of distribution, public relations/communication, and marketing functions. They implemented a predictive transport network and mobile enablement of operations. SNT hires staff dedicated to this project, and begin to realize how they could grow even more with the use of IT solutions. The consultants improved the quality of policy statement by developing new management system documents within SAPCO and SNT. In addition, they implemented a gap analysis. IBM involves 100 employees at SAPCO to address these gaps and assist in the redesigning process.

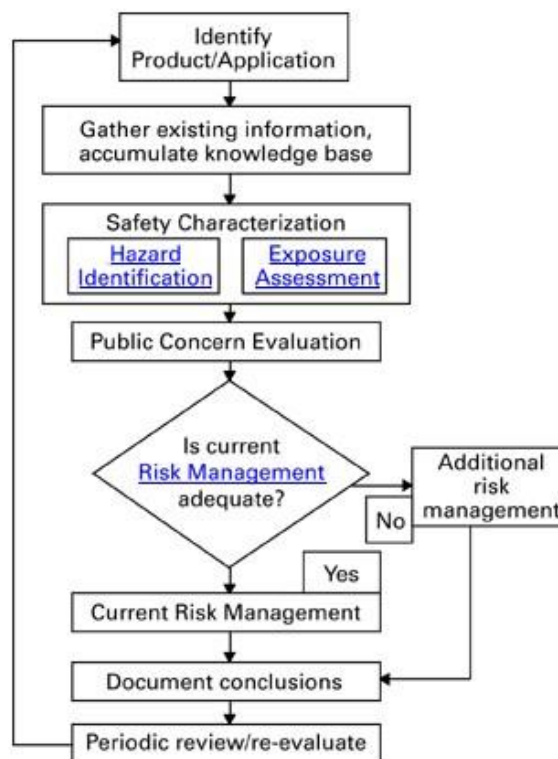


Figure 3: Product Safety Assessment and Management Framework (<http://www.dow.com/en-us/markets-and-solutions/product-safety/product-safety-assessment>)

Every petrochemical company goes through what they call the shutdown period, which is a scheduled plant shutdown. These shutdowns occur for maintenance, and each one can cost up



to \$4.8 million and last up to 30 days, depending on the maintenance needs. The experts at IBM take these shutdowns as an opportunity to perform multiple tests to distinguish between the technical and commercial gaps within the gap analysis. Prior to plant recovery, they conduct multiple tasks and select subject matter experts as consultants from within to assist in closing the commercial gaps. Figure 3 illustrates the recommended procedure that SNT needed to follow. It is simply an iteration through a loop of identified steps to understand the need of applying risk management during the process of every level of hazardous material that leaves the plant and is handled by SNT.

Mr. Al-Ali was very committed to becoming a responsible care company and the suggested approach is to have a full time manager appointed at the company and an RC coordinator appointed at SNT. They can then coordinate the movement of each individual tank and also improve the utilization of physical and human resources. SAPCO gained an advantage through increased operational capacity of SNT, and by the reduction of the number of accidents and empty tank trips. SNT implemented a data warehouse and analytics engine to make it easier to track financial performance. They redesigned the new values and beliefs of SAPCO.

IBM conducted a thirty-minute refresher overview for the executive leading teams, with new reading material for every milestone accomplished and to be accomplished. They also had a general orientation which was handled by an RC manager trained by the RC expert to cover safety meeting objectives which are mandatory for all employees at SAPCO. An identical process was handled by the coordinator at SNT. The involvement of IBM helped to enhance the monitoring process and educate third parties on how to update their reporting processes.

At SNT, the transformation was underway. The implementation of the ERP system and full training was given to selected employees. These employees started to produce clear reports and have clear communication with stakeholders, represented by the head of the IT department. The selection of the lead team at SNT was based on an employee's potential to become a professional ERP user. The logistics department began using target action planning and categorizing tasks by functional areas which they called "cascading of objectives". IBM recommended the use of the process of iteration through corrective action planning. The technical

side of the improvement included following the monitor and measure procedure, which requires inspection at the critical phases, and testing of compliance by the RC manager during the transitioning period. IBM focused on the importance of executive management involvement equal to the involvement of everyone else at the company. IBM's help was leading both companies to fast track their shipments and shorten their scheduled delivery times, which in return led to a major reduction in costs for both firms. One of the major improvements resulting from the SAPCO/SNT partnership was reduction of overlapping tasks. Most delays that occurred after enhancements were due to change risk that occurred during the work so to minimize this risk, they began with the project that had the least amount of risks. With the approaches that were offered by IBM and the implementation of ERP in both companies, they were able to determine their courses and the duration of each course.

It had been quite a journey, but benefits were now being realized by both SAPCO and SNT. Mr. Sharif felt it was time to reflect on what had been accomplished and document lessons learned. He considered the things that could have been done differently and what was done well. Mr. Sharif hoped SAPCO would now be granted the RC certification and wondered what should be carried forward from the lessons learned as they aspired to continue this mutually beneficial relationship with SNT and with future business partners.

## 6. DISCUSSION QUESTIONS

1. Do you think SAPCO made a wise choice deciding to stay in business with SNT despite their resistance to change?
2. What other routes could they have taken to meet the requirements for Responsible Care Certification?
3. Should SAPCO have offered to share the costs of the ERP implementation?
4. Could SAPCO have handled the ERP implementation without the added costs of IBM Solutions?

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## Appendix

### Key Characters and Acronyms in the Case

SAPCO	Saudi Arabian Petrochemical Company
Mr. Al-Mansour	Chairman of SAPCO
Ahmad Al-Ali	CEO of SAPCO
Mr. Smith	Head of IT department at SAPCO
Mr. Sharif	Manger of contracting and purchasing department
Mr. Pico	CEO of SNT transportation company
RC	Responsible Care certifying association
SNT	Saudi National Transportation company
ERP	Enterprise Resource Planning

### Responsible Care Code of Management Practices

(<https://responsiblecare.americanchemistry.com/Responsible-Care-Program-Elements/Management-System-and-Certification>)

Code of management practices	Purpose
Distribution code	To reduce the potential for harm posed by the distribution of chemicals to the general public, employees and the environment.
Community awareness and emergency response code	To work with nearby communities to understand their concerns and to plan and practice for emergencies.
Pollution prevention code	To achieve ongoing reductions in the amount of all pollutants released into the environment
Process safety code	To prevent fires, explosions and accidental chemical releases.
Employee health and safety code	To protect and promote the health and safety of people working at or visiting company sites.
Product stewardship code	To make health, safety and environmental protection a priority in all stages of a product's life, from design to disposal.