



BRAZIL

PETROCHEMICALS AND CHEMICALS

2017



*Petrochemicals and Intermediaries - Specialty Chemicals
Distribution - Logistics and Services*

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Dear Reader,

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We cordially welcome you to the Brazil Petrochemicals and Chemicals Industry Exploration 2017, the second book in a series of Industry Explorations produced by GBR together with APLA for release at the 37° Latin American Petrochemical Annual Meeting.

Brazil's chemical sector is the eighth largest in the world and its petrochemical companies occupy leading positions in their product areas across Latin America. Moreover, Brazil is strong in research and development and this is reflected in the innovative nature of its specialty chemical producers that have been involved in bringing many new products to the market.

The aim of this cooperative work is to provide an investment guide, highlighting the opportunities for investment in Brazil's petrochemical and chemical industries, particularly in light of Brazil's recovery from recession, the prospects presented by Brazil's pre-salt reserves and its core strengths such as its agricultural sector and biodiversity. A series of interviews with the key players from across the petrochemical and chemical industries in Brazil, along with some of the companies providing key support services, such as distribution, third party and integrated logistics are contained in this edition.

As well as insights from major players such as Braskem, Unigel, Oxiteno, Elekeiroz, Rhodia Solvay and many more, the report delves into some of the key issues facing the industry such as the feedstock challenge, the impact of the pre-salt reserves and shale gas production and infrastructure. We also look at how the distribution market is changing, with increased consolidation, international competition and focus on specialty chemicals. As Brazil's economy rises again and prospects for the region as a whole look brighter, business leaders are optimistic about the future of the petrochemical and chemical industries in Brazil, the region's leading economy. With elections next year, they are also hoping for more political stability.

We hope that you enjoy the report and that it will assist in better understanding a sector of pivotal importance to the Brazilian economy.



Alice Pascoletti
General Manager
Global Business Reports



Manuel Díaz
Executive Director
APLA

Exclusive Interviews

Leaders from both the private and public sector delve into the nuances and nascent developments that are shaping the industry.

11, 14, 22, 28
and many more



Data and Maps

Quantitative data help readers better understand the position of Brazil, especially relative to its global competitors.

8, 10, 30,
41, 71



Editorial Content

Global Business Reports' journalists provide on-the-ground analysis of the trends that are shaping Brazil's petrochemical and chemical industry.

8, 18, 27, 34,
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BRAZIL PETROCHEMICALS AND CHEMICALS 2017
Industry Explorations
Global Business Reports

This research has been conducted by
Laura Brangwin,
Matthias Lomas and Lina Jafari

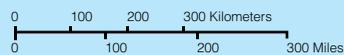
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Brazil

- International Boundary
- - - Province Boundary
- ★ National Capital
- Province Capital







AN INTRODUCTION TO **CHEMICALS** IN BRAZIL



“Until recently, Brazil’s central bank’s lent at 14%, whereas now it lends at 9% and we expect it to be at 7% by the end of the year. This will improve investment in Brazil’s economy and GDP will emerge from negative territory this year. In a market of over 200 million consumers, if GDP reaches 1% growth next year from a minus 3.6% decline in 2016, it will represent a huge increase in demand. There will be more demand for cars, refrigerators and paint for new apartments and offices – all areas in which our products are used.”

- Reinaldo Kröger,
President, Unigel

Light at the end of a long tunnel: Is the economy finally improving?

It was all going so well for Brazil in the years leading up to 2014. The economy was strong, with GDP growth reaching heady heights at 7.5% in 2010 and averaging 3% until 2014. Dilma Rousseff, now impeached, had been elected in October 2010 to become Brazil's first ever female president. As many developed countries were still reeling from the global financial crisis and the eurozone appeared on the brink of collapse, Brazil, a member of the BRICS nations of emerging economies, appeared ascendant. However, in 2014, Brazil's economy hit the rocks. What ensued was Brazil's worst recession on record. GDP dropped from 3% to 0.5% in 2014 and then plummeted to -3.8% in 2015 and -3.6% in 2016. By then, Brazil's GDP was 9% below its pre-crisis peak. Unemployment stood at 14 million in June 2017, the worst in 20 years. Furthermore, the crisis has been longer than previous ones. "What is different about the recent economic crisis is that, unlike other recessions, the recovery has not been short and Brazil will not come out of it better off even though we are now seeing some light at the end of the tunnel," commented Mauricio Adade, president, Latin America, at life sciences company and specialty chemical producer DSM.

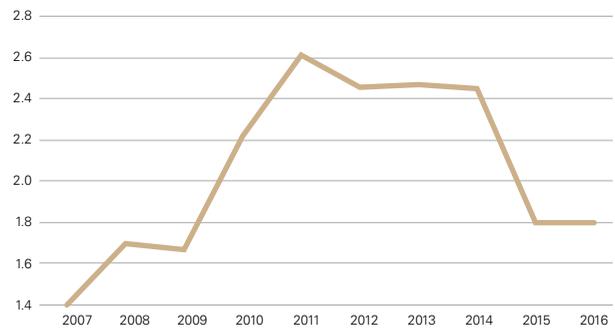
There is some debate around why Brazil's recession has been so severe, but the fall in commodity prices has had a substantial impact as prices of iron ore, soy beans and sugar, key exports for Brazil, all fell around 2014 as demand dropped off from China. The end of the commodity boom which buoyed Brazil in the first decade of the century exposed structural weaknesses in the economy such as its onerous tax system, poor infrastructure, high tariffs and lack of competition.

Political instability stalks Brazil

Just as the economy was in freefall, police agent Newton Ishii was waiting in Rio de Janeiro's Galeão airport for former Petrobras executive Nestor Cerveró's flight to arrive from London so that he could arrest him. What unfolded, based on investigations by Brazilian police since 2008, was the uncovering of Brazil's largest ever corruption scandal, codenamed Lava Jato, which still deepens by the day. To make matters worse, Brazil has experienced intense political instability of late after the impeachment of

GDP (\$ trillion)

Source: The World Bank



World's 9th biggest economy

(GDP approx. \$1.8 trillion, 2016)

GDP Growth Rate 2016

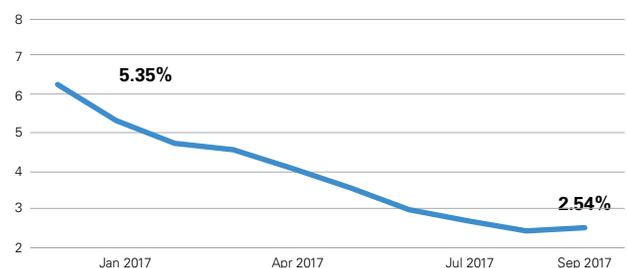
-3.6%

Brazil expected to have

0.73% growth in 2017 and **2.5%** in 2018

BRAZIL INFLATION RATE TREND (%)

Source: tradingeconomics.com



“

Brazil is known as the country of the future but now the future is finally coming.

- Roberto Kirschner,
Director, South America,
Huntsman Performance Products



”

Rousseff in 2016 who was accused of manipulating the government's budget. Some pin the reasons for economic turmoil and resulting woes in the chemical sector on politics. "Brazil has been suffering from political instability which has slowed investment into new projects for all the industry," commented Eric Schmitt, CEO, Arkema Quimica, the specialty chemical producer. Although, he continued: "Today the economy is improving independently from this situation."

Indeed, the economy does appear to be turning a corner despite the political situation, albeit slowly. Inflation has fallen to around 2% from a high of almost 11% in early 2016, GDP growth was at 0.2% in Q2 2017 and, in September 2017, the central bank cut its benchmark lending rate to 8.25%, which until January was at 14%. It also announced recently that it expects growth of 2.5% in 2018. There are signs Brazil's stubborn unemployment rate is gradually declining as well. Therefore, green shoots are emerging. As Reinaldo Kröger, president of petrochemical giant Unigel, noted: "This will improve investment in Brazil's economy and GDP will emerge from negative territory this year. In a market of over 200 million consumers, if GDP reaches 1% growth next year from a -3.6% decline in 2016, it will represent a huge increase in demand."

Looking to 2018

At the time of writing, President Michel Temer was defending himself against charges of obstruction of justice and racketeering, which have added to earlier corruption charges. With Brazil due to hold general elections next year, no one is sure who will be running for president. Business leaders will be hoping political instability will not steer Brazil's nascent recovery off-course and there are signs that the economy is now de-coupling from political developments, given that things are improving as scandals are continuing. In the long-run, most business leaders are positive about Brazil's prospects. "Brazil will come back; the one million dollar question is when and how? What is happening now is a very strong exercise in democracy that will have a strong positive impact on the country and the economy," commented Adade. —

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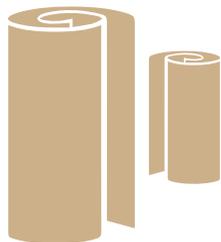


COSMETICS

COMPARATIVE ADVANTAGE BASED ON RAW MATERIAL

Competitive and available raw material

Value added in Brazil



CELLULOSE
DERIVATIVES



FOOD
ADDITIVES



AROMAS AND
FRAGRANCES

Potential competitive raw material

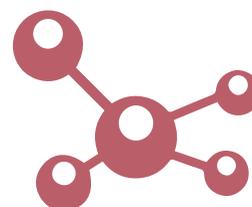
Increase availability and strengthen the commodity chain



PETROCHEMICALS



OLEOCHEMICALS



BIOMASS CHEMICALS

Competitive raw material Emerging technology

Establish a chemical base from renewable sources



Hon. Marcos Antônio Pereira

Minister of Industry Foreign
Trade and Services
**FEDERATIVE REPUBLIC
OF BRAZIL**

With key economic indicators improving after two years of crisis, how do you see prospects for the economy in the next year?

With a moderate and gradual recovery, the economy is preparing to grow after two years of recession. Economic activity is expected to resume a positive performance this year, with expected growth in 2018. According to projections by the Central Bank of Brazil, GDP growth is expected to be 0.7% in 2017 and 2.2% next year. Inflation is in the process of deceleration, within the limits defined by the Brazilian Central Bank. Indicators point to prices under control, and they should remain so in 2018. Interest rates are also falling, benefiting the consumption of families and the investments of companies, and should remain low in 2018, reducing the idle capacity of industry and helping the country to grow. Foreign trade will continue to expand

with increasing exports and imports due to consistent external demand and growing domestic demand. The government has been working to balance public accounts, conditioned, in this case, to the approval of the economic reforms. These elements are very important to maintain the process of falling inflation and interests rates, allowing for the sustainable growth of the Brazilian economy in the coming years.

What improvements in the business environment can investors expect after Brazil's recent political instability?

The improvement of the business environment is currently a state policy in Brazil. I would like to highlight a major initiative of MDIC and of the Federal Revenue Service of Brazil, the Foreign Trade Single Window Program, at the heart of Brazilian trade facilitation policies. It is a continuous initiative aimed at updating and rationalizing all import, export and transit routines. Once fully implemented, the computerized portal will support more efficient, harmonized and integrated procedures between public and private stakeholders in foreign trade.

The objective of the program is to reduce Brazil's export time to only eight days - to a period in accordance with the best international practices. For imports, the objective is to reduce the average period to 10 days, when fully implemented. This will reduce costs and considerably increase the competitiveness of companies operating in foreign trade in Brazil.

How much of a strategic priority is the chemical sector for MDIC and how does it support it?

MDIC recognizes the importance of the chemical industry in Brazil and continually works to stimulate its development in order to enable new investments, job creation and growth in the Brazilian economy. MDIC also works to increase its competitiveness both in domestic and international markets. We cooperate with other governmental institutions and agencies in order to foster investments, such as by providing competitive credit lines. We support logistics and infrastructure agendas in order to minimize costs for industries and their customers. We also work to improve the

regulatory and legal framework of the sector, such as the agendas on chemical safety and biodiversity access. Furthermore, we provide mechanisms to reduce import taxes on machinery and equipment, to encourage industrial parks renewal. And we foster agendas aimed towards lowering costs of raw materials to make local based industries more competitive.

In addition, MDIC plays an important role in the process of simplifying bureaucracy which will make it easier to open businesses, procedures in foreign trade and analysis and concession of industrial property rights. This way, Brazil creates a more attractive scenario for foreign investors and for the local-based companies in the global market. That agenda will impact both the chemical industry and other sectors of the economy, but the attractiveness is greater for the chemical industry, as there is a large opportunity represented by the gap between consumption and domestic production.

Abiquim recommends the government set up ministerial group in government making decisions on how to better help the industry. Do you support this approach?

MDIC supports government institutions to work together in order to lead policymakers and address industrial problems, their challenges and opportunities. However, as part of a bigger governmental system, we see there is no room for proposing the set-up of formal ministerial groups aimed to specific industrial sectors at this particular moment. The ones that are currently running were motivated by specific agendas, such as programs that were expiring or policies with external matters that must be addressed. And those particular cases had previous support of several governmental institutions that are trying to address their own issues regarding to the particular sectors inside their framework. Despite that, it is important to remark that the absence of a formal group does not prevent governmental institutions from working together as a network to address problems and challenges from different industrial sectors, including the ones from the chemical industry. We are regularly working on those strategic agendas. —

WACKER

AT HOME
IN BRAZIL
SINCE 1977

Introducing Brazil's chemical sector

Whilst Brazil is the ninth biggest economy in the world, its chemical industry is the eighth biggest and has grown substantially since the turn of the millennium as Brazil's economy has increased in global stature. "Brazil is a natural destination for the world's chemical industry because it is rich in oil, gas, minerals and rare earths and has much biodiversity," remarked Marcos de Marchi, chairman of the board of directors, Abiquim, the national trade association for the chemical industry.

Brazil's chemical industry has annual net sales from domestic production of US\$113.5 billion and is the third largest industrial sector in the economy, representing 10% of overall industrial GDP. It also supports 2 million jobs in terms of the whole chemical value chain and 400,000 direct jobs. The recession has unsurprisingly dented the industry's performance but it has been recovering since 2016, even as the economy was still in free-fall. Sales from local production fell from US\$156.7 billion in 2014 to US\$112.4 billion in 2015 but recovered slightly US\$113.5 billion in 2016, helped by the fall in the Real which has made local production more competitive. Consequently imports have seen a steady decline from US\$46.1 billion in 2014 to US\$34.2 billion in 2016, although a drop in domestic demand due to the recession has also played a powerful role.

Strength through nature

The chemical sector in Brazil is unique due to strengths in areas such as renewable chemicals, agrochemicals and cosmetics. Brazil is the second largest producer of ethanol fuels after the United States. As

any visitor to Brazil that paid attention will remember, drivers can easily fuel their cars with ethanol at the gas station. "Brazil has such huge potential in biomass and so many cars in Brazil already use bio-ethanol," commented Maurico Adade, president, Latin America, DSM, the life sciences company and specialty chemical producer.

Since 2010, Brazil's petrochemical stalwart, Braskem, has been operating a green ethylene plant in Triunfo Petrochemical Complex and it is a leader in this field.

Additionally, Brazil has substantial market power in vital chemical application markets. It has an almost 10% share of the global cosmetics market, over 20% share of the agrochemicals market and exploration of oil and gas growth has been expanding fast at a rate of almost 25% in the years 2007-2012. "When you look ahead, there is a great field of opportunities for the industry, in particular in sectors like pulp and paper, agrochemicals and cosmetics. This is why we have chosen to invest in new capacity and application labs," remarked Adriano Magalhães, managing director of chemical producer Wacker.

Growth estimates for the agricultural sector this year range from 9 to 11%, way ahead of the growth rate for the economy.

Indeed, pulp and paper is another area in which Brazil's industry is one of the world's largest, aided by the comparatively inexpensive wood costs and the availability of land and water in a sunny climate. Additionally, the food additives for animals market has been noted for its competitiveness, with the country representing 10% of the global market, reflecting its role as one of the world's top meat exporters.

Brazil's reputation for innovation and its link to the specialty chemical industry has



40 ANOS –
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also won plaudits. “Compared to other emerging countries, Brazil has a very advanced industry. For example, it is one of the few countries in the world that can produce large aircrafts and remains very receptive to new technologies, even compared to some developed countries,” remarked Eric Schmitt, CEO, Arkema Quimica, the Brazilian subsidiary of the global manufacturer in specialty chemicals and advanced materials headquartered in France.

Befitting its size, Brazil’s chemical companies occupy leading positions in South America, with only Mexico and Argentina coming close to their scale. On a net sales basis, industrial chemicals dominate local production, making up for almost 55% of the pie. Fertilizers, which are vital for Brazil’s booming agricultural sector, make up 12.6% of net sales, whilst more specialty chemicals divided across a diverse set of industry applications make up the rest.

Of course, the upstream side of the chemicals market in Brazil would be unfathomable without the presence of Petrobras, 64% owned by the state. Petrobras in turn owns 47% of Braskem, whilst Oderbrecht, the huge Brazilian conglomerate active in the fields of engineering, construction, infrastructure, industry, real estate and energy, owns 50.1%. Braskem is the largest thermoplastic resin producer in the Americas. Further down the supply chain, Brazilian companies also lead; Unigel is Latin America’s leading acrylics and styrenics producer, for example.

Going even further downstream are a plethora of specialty chemical producers catering to a wide variety of industries such as food, pharmaceuticals, agriculture and cosmetics. Notably, most specialty producers are subsidiaries of international giants, such as Eastman, Arkema, Croda, Huntsman, DSM, and Rhodia Solvay. Brazil’s chemical producers are supported by Abiquim which has 191 members representing about 90% of Brazil’s chemicals market. Marchi says of Abiquim’s mission: “Abiquim works to actively promote more competitiveness and sustainable development in the production of chemicals by the industry in Brazil.”

Aiding the growth of the industry is a large number of distributors and logistics providers. Major foreign distributors such as Univar, Brenntag and IMCD have a presence in Brazil, whilst the wider market of literally hundreds of distributors also includes many local players, including family-owned

and major companies such as MCassab, as well as quantiQ, Brazil’s largest chemical distributor. Associquim is the national trade body for Brazil’s chemical distributors and protects its 90 members’ interests.

Finally, logistic providers also include a mixture of large multinational players and local actors. BDP International, Den Hartogh, Leschaco and Stolthaven Nielsen are all present in Brazil and their services range from third-party logistics providers to trade line consolidation and storage solutions. Meanwhile, local players such as Ultracargo, a liquid storage company that is part of the Brazilian conglomerate Ultra which also owns chemical intermediaries player Oxiteno, are very much present.

Challenges, Brazil has a few

“The sky is not completely blue: the sector had a trade deficit of US\$1.5 billion in 1991 but this has reached US\$22 billion in 2016. Indeed, the deficit was US\$32 billion before the recession. We will import US\$43 billion a year, 35.6% of local demand, but still have 21% of idle capacity,” explained Marchi. The chemical industry’s trade deficit and idle capacity are caused by competitiveness issues. The relatively expensive costs of oil and gas feedstocks are a major impediment to the industry’s success, but this is not the whole story.

“The essential pre-conditions for a successful industry are competitive raw material and energy. Alongside these are good infrastructure and logistics, R&D investment and labor training. We are not competitive enough because we are not performing well on all these five elements,” continued Marchi.

Infrastructure in particular is a big headache for Brazil’s chemical industry. A lack of berthing capacity at Brazil’s ports means that companies are losing money due to delays. Unigel has lost US\$4 million over seven months due to this issue. However, Brazil’s infrastructure issues go beyond this singular issue.

Recognizing Brazil’s large trade deficit in chemicals and the impact this was having on the competitiveness of local industry, the Brazilian Development Bank, BNDES, commissioned a report by consultants Bain & Company in 2014 to identify the sources behind it and to find answers for what could be done to solve it. Beyond fertilizers, which

“

Brazil is not for amateurs – you need flexibility and to act fast. If a company enters Brazil they do not enter for 100m, they are here for a marathon and must be very persistent. Most companies that came to Brazil at the time when The Economist showed Christ the Redeemer as a rocket disappeared during the recession.

- Mauricio Adade,
President, Latin America,
DSM

”

represent a large chunk of Brazil’s chemical imports, Bain identified cosmetics and personal care, agrochemicals, food additives for animals and chemicals for exploration and production as segments that Brazil imported large quantities but where it had the most potential to improve its local production due to its competitiveness in these areas.

Bain recommended allocating part of Brazil’s pre-salt oil and gas reserves to these competitive areas of the chemical industry; improving the regulatory environment; investment in chemicals produced from biomass; funding for infrastructure that benefits the chemical industry; greater focus on R&D looking at technological challenges facing these segments; and simplifying the tax system.

Whilst some progress has been made on improving access to biodiversity through a law passed in 2015 to encourage its exploitation, advancement in other areas has stalled. “The major challenge now is to bring these proposals back into the agenda of the government as they were in 2014 as the focus of the industry, BNDES and the government has been diluted since the economic and political crisis,” commented Rodrigo Mas, partner, Bain & Company and lead author of the report.

If Brazil’s chemical industry is to be one of the world’s leading lights, this focus must return as the economy improves. —



Marcos De Marchi

Chairman of the Board of Directors
ABIQUIM

What is the state of Brazil's chemical industry today?

Brazil is a natural destination for the world's chemical industry because it is rich in oil, gas, minerals and rare earths and has much biodiversity. Since the discovery of new oil and gas reserves in the offshore pre-salt fields, our resource abundance is even more of a reality. This is why we believe we have all the conditions necessary to have a bigger chemical industry. Today, Brazil's chemical industry has an annual turnover of US\$113 billion per year, represents the third largest industrial sector in Brazil's GDP at 10% of overall industrial GDP and accounts for 2 million jobs in terms of the whole chemical value chain and 400,000 direct jobs. Worldwide, it is the eighth largest chemical industry in the world. More specifically, globally it represents about 20.5% of the agrochemicals market where we are the second biggest player behind the United States, 9.7% of the cosmetics market, 8.1% of chemicals for leather and 24.6% of the growth rate of chemicals used in oil production.

What role does Abiquim play in the chemicals industry?

Abiquim works to actively promote more competitiveness and sustainable development in the production of chemicals by the industry in Brazil. We were founded in 1964 and are a non-profit organization with 191 members including small, medium and larger companies. Abiquim's members represent about 90% of the Brazilian industrial chemicals production. We also represent the South American region at the International Council of Chemical Associations (ICCA). Anyone can become a member of Abiquim as long as they fulfil two conditions: they produce locally in Brazil and they commit to our Responsible Care program which aims to advance sustainable development in line with the ICCA's Responsible Care program. A big part of Abiquim's role is conducting studies and making recommendations to various government ministries on pressing issues in the industry such as logistics and what to do with the pre-salt discoveries. In particular, we work closely with the Ministry of Development, Industry and Foreign Trade; Ministry of Mines and Energy and others.

What challenges does the industry face?

The sky is not completely blue: the sector had a trade deficit of US\$1.5 billion in 1991 but this has reached US\$22 billion in 2016. Indeed, the deficit was US\$32 billion before

the recession. We import US\$43 billion a year, 35.6% of local demand, but still have 21% of idle capacity. This contradiction is due to some competitiveness problems, especially for fertilizers, which are not all caused by the relatively expensive cost of gas in Brazil. We import products which are 2.5 times higher in value than the products we are exporting, which shows that we are falling short of converting raw materials into high-value specialized products. Furthermore, the drop in the deficit from US\$32 billion to US\$22 billion is not because of increased competitiveness but because of a drop in demand during the recent economic crisis in Brazil.

What is needed for the industry to better succeed?

Brazil's National Bank for Economic and Social Development (BNDES) and Bain & Company recently conducted a report identifying opportunities for the chemical sector, which Abiquim advised on. In this we say that the essential pre-conditions for a successful industry are competitive raw material and energy. Alongside these are good infrastructure and logistics, R&D investment and labour training. We are not competitive enough because we are not performing well on all these five elements. We are progressing in discussions with the government on improving this situation but not at the pace we would need to recover the performance more quickly.

What specific proposals have you made to the government?

In terms of logistics, we highlighted the critical lack of railway capacity in Brazil and recommended greater usage of water transport, including cabotage. The government's privatization drive will have a positive effect on infrastructure as the private sector is much more dynamic and can complete projects more quickly. For innovation, we are not at the top of the leader board but we are progressing a lot. For example, the National Service of Industrial Training (SENAI) has opened fifty new laboratories and 26 new applied research centres with the help of Massachusetts Institute of Technology (MIT) and the Fraunhofer-Gesellschaft and is investing US\$1.3 billion in innovation and technical training.

Lastly, we want the government to create an executive group for the development of the chemical industry. This would involve a ministerial group in government making decisions on how to better help the industry. —

Felipe dos Santos Pereira & Martim Francisco de Oliveira e Silva

FSP: Manager
MFOS: Engineer,
Chemical Industry Department
**BRAZILIAN DEVELOPMENT
BANK (BNDES)**



FSP



MFOS

What is the role of BNDES in Brazil's chemical sector?

FSP: BNDES was involved from the time of the first petrochemical crackers built in Brazil in the 1970s and it financed the country's three main chemical poles of Capuava, Camaçari and Triunfo. Since 2000, BNDES has evolved to finance not just physical investments but also to promote innovation in companies, which requires less investment but delivers more value for Brazil. So now we support the traditional petrochemical chain, such as the crackers and the polymerization units in greenfield and brownfield projects, as well as innovation in both petrochemical and chemical companies.

What were the most important findings of the 2014 'Study of the Potential for Diversification of the Brazilian Chemical Industry' carried out by Bain & Company and funded by BNDES?

FSP: The study consisted of more than one year's worth of research carried out by Bain and interviews with more than 150 business leaders. It aimed at identifying opportunities for investments as well as providing more public information on the chemical sector, such as what products were behind Brazil's large trade deficit in chemical production, around US\$35 billion at the time, given that for one third of the deficit no one knew where it came from. As a result, it identified the 20 most competitive industry sectors which presented the best opportunities for investments in Brazil. Based on the report, chemicals from renewables and specialty chemicals are the key areas for BNDES.

How has BNDES supported the industries that the report recognized as most competitive?

FSP: In 2016 we launched the Chemical Industry Development and Innovation Plan (PADIQ) in partnership with the Brazilian Innovation Agency (FINEP) which made funding available from BNDES and FINEP for some of the competitive sectors. Out of 62 applications, 27 business plans were selected for support by the program, with a total investment of R\$2.4 billion over five years. MFOS: As examples, PADIQ promoted innovation in methionine used in

animal feed additives and is supporting a potential silicon derivatives plant as a result of the report's recommendations. This year we also updated our operational policy to provide better financing conditions to projects in sectors identified as competitive by the report.

How do you support renewable projects in particular?

FSP: Most of the PADIQ projects are in the renewables sector and we are now putting together contracts to support nineteen projects involving bio-sources. Projects involve forestry feedstock, native plants from the Amazon that will produce specialty cosmetics, sugar feedstock and rice residue.

To what extent will bio feedstocks come to replace petrochemical feedstocks and what impact will shale gas have on Brazil's chemical sector?

FSP: It is still a new movement but we see a lot of interest by companies to invest in bio feedstocks, even though we launched PADIQ during an economic crisis. It is hard to say how big and fast the transition will be but there is a big potential. Most projects start from agricultural residues, in which Brazil is a big player. For many of the projects we are funding, chemicals require oxygen, where bio sources are at an advantage as within them hydrogen comes with oxygen, which is not the case in petrochemicals. However, local specialists' forecasts predict that from 2016 to 2026 Brazil will increase its oil production from 2.6 million barrels a day to 5.2 million. If we convert this to gasoline and naphtha, it will provide more feedstock to the industry. MFOS: In fifteen years, biochemicals might represent about 10% of the global market, with a large proportion coming from Brazil. Shale gas will take too long to be converted into specialty chemicals; the impact will mostly be for commodity chemicals and plastics production, which represents only about 10% of Brazil's chemicals market. Also, we do not know how cheap shale gas from Argentina will be and it is possible that the United States will export more gas to Europe than South America due to lower import duties in Europe. —





PETROCHEMICALS AND INTERMEDIARIES



“Braskem is a global petrochemical company with a Brazilian heart.”

- Edison Terra Filho,
Executive Vice President, Braskem

The building blocks of the industry: An introduction to petrochemicals in Brazil

The 1950s ushered in the age of mass produced plastics, especially for the consumer goods industries, after the huge expansion of plastics usage in WWII across many different applications from military vehicles to radar installations. It is to this time period that the history of petrochemicals can be traced in Brazil, as the country started to industrialize and to demand more of this wonder material.

At first Brazil relied on imports but soon there were calls for a national industry. Until the 1990s Brazil's industry was protected by very high tariffs and found success in the so-called 'tripartite funding model' involving state-owned Petrobras and Petroquisa, its petrochemical subsidiary; a foreign technological licensor; and a Brazilian investor which acted as a third party. This led to the construction of three naphtha-based petrochemical complexes, which along with a new complex built in 2005, still form the backbone of Brazil's petrochemical industry today.

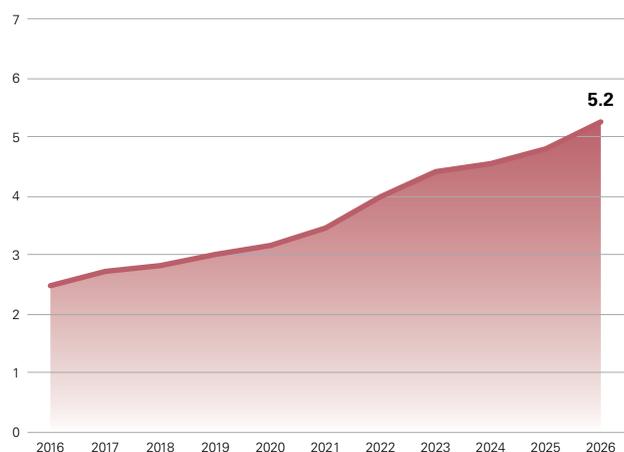
The first to be constructed was the Capuava Complex in São Paulo which produces thermoplastic resins, rubbers, paints and other products and has an ethylene capacity of around 700 kilotons per year. Next, the Camaçari Complex in Bahia was opened in 1978 and presently houses producers of petrochemical products used to make thermoplastic resins, fertilizers and copper metallurgy, as well as other applications and has an annual ethylene production capacity of 1,280 kilotons. Then in 1982, the Triunfo complex cracker – Copsul (today Braskem) started operating. It now has an annual ethylene capacity of 1,452 kilotons. Finally, in 2005 Brazil's first integrated gas-chemical complex was built in Duque de Caxias, Rio de Janeiro, and it has an annual ethylene capacity of 520 kilotons.

Regional Leaders

The national stalwarts of Brazil's petrochemical industry concentrate on these complexes and lead the region in their product areas. Braskem is the largest petrochemical company in the Americas. It was created in 2002 by the integration of six companies

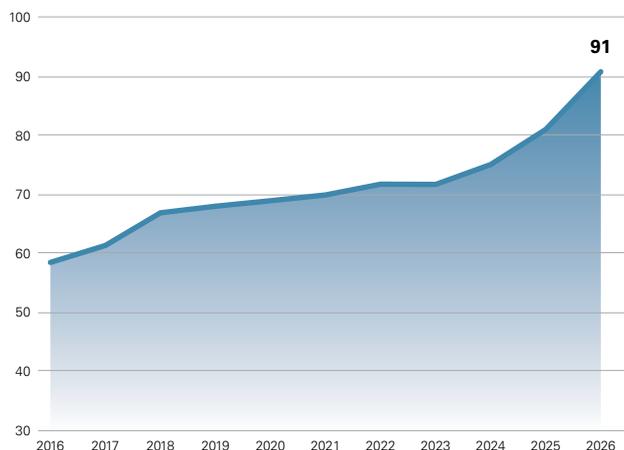
PROJECTION OF OIL PRODUCTION (million b/d)

Source: EPE



PROJECTION OF GAS PRODUCTION, NET (million m³/d)

Source: EPE



BRASKEM

Largest petrochemical company
in the Americas

Largest producer of thermoplastic resins
in the Americas

World's largest producer of biopolymers

from Oderbrecht Group and the Mariani Group and today focuses on polyethylene (PE), polypropene (PP) and polyvinylchloride (PVC), as well as basic chemicals such as ethylene, propylene, butadiene, benzene, toluene, chlorine, soda and solvents and more. Braskem is now moving on from being implicated in a corruption scandal connected with the Lava Jato investigation. "We want this situation to be an opportunity to become an industry reference on compliance issues. There have been substantial changes in our compliance team, which now reports to the board of directors for enhanced independence," commented Edison Terra Filho, executive vice president, Braskem.

Diverse intermediaries producer Oxiteno started as the first producer of ethylene oxide in Brazil and over time has diversified into oxide derivatives, such as ethanolamines, glycol ethers, surfactants and polyols. It has also diversified into oleochemicals production and, in 2008, opened the first fatty alcohols plant in Brazil and Latin America. Oxiteno are leaders in non-ionic surfactants in the region. Unigel is Latin America's leading producer of acrylics and styrenics, as well as of acrylonitrile (AN), methyl methacrylate (MMA) and sodium cyanide. It is currently investing US\$90 million to increase its styrene capacity by 35,000 tons per year (mt/y) in time for the first quarter of 2018 and 65,000 mt/y by 2020, meaning it will have 400,000 mt/y capacity for styrene monomer along with 320,000 mt/y for polystyrene by 2020. Lastly, Rhodia Solvay, whose history in Brazil stretches back to 1919, and Unipar Carbocloro are also important players in the Brazilian petrochemical industry, with Rhodia Solvay producing oxygenated solvents and phenol acetone derivatives and Unipar Carbocloro becoming the number one chlorocodide and PVC producer in the region after purchasing Solvay's assets in these areas in 2016.

Alongside these national players, BASF, the world's largest chemical company, has a large presence in Brazil. Its recent €500 million investment into the Camaçari complex, where it produces acrylic acid, butyl acrylate and superabsorbent polymers, is highly significant. "In the past 20 years, Brazilian chemical industry has not seen an investment as large as the one BASF made in

Camaçari, which was very meaningful for the chemical industry. The complex employs 230 people directly and 650 additional jobs are offered through external suppliers. It is an important operation for the state of Bahia. We started our operations in Brazil 106 years ago, and, since then, Camaçari has been BASF's most important investment in South America," commented Ralph Schweens, president for BASF South America.

Going global

Increasingly, Brazil's petrochemical giants have been diversifying their portfolio to include international assets. "Braskem is a global petrochemical company with a Brazilian heart," remarked Terra Filho.

Indeed, Braskem's reach extends far beyond Brazil's shores. In 2010 and 2011, Braskem acquired Sunoco and Dow's PP businesses with units in the United States and Germany. It also made a US\$5.2 billion investment in a new petrochemical plant in Mexico, which came on stream last year and will produce 1.05 million mt/y of ethylene and polyethylene in a JV with local player IDESA. Furthermore, it has just announced an investment of US\$675 million for a new PP plant in Houston, Texas, starting in 2020 and has made an investment in an ultra-high molecular weight PE plant in the United States. The culmination of all this is that Braskem is now the largest producer of thermoplastic resins in the Americas, the world's largest producer of biopolymers, and the largest PP producer in the United States.

Oxiteno has also diversified geographically, acquiring in 2012 a surfactant plant in Uruguay and a site in Pasadena (Texas) where they are building a US\$113 million ethoxylation facility that will be up and running in Q1 2018. "We want to continue growing abroad, hence our investment in Mexico two years ago and our current investment in the United States. We want to be a top player in the surfactants business in the Americas," stated João Parolin, CEO, Oxiteno.

Feedstock challenges and the shale gas revolution

At the same time as Brazil's major petrochemical companies have diversified geographically, the country's feedstock problem has stubbornly remained. Despite an abundance of natural resources (according to the National Agency of Petroleum, Natural Gas and Biofuels (ANP) Brazil has proven reserves of 12.67 billion barrels of oil and 372 billion cubic meters of gas) the price of petrochemical feedstocks like natural gas are much higher than in the United States.

"It is the same problem as in 2012: the high cost of natural gas, compared to the United States. Unigel and Abiquim have tried to persuade the government to lower the cost for natural gas. Only 2.5% of natural gas is used as a raw material, therefore the government needs to offer more incentives for its usage by the chemicals industry. They are open to our demands but currently there are budgetary restrictions. Nevertheless, with a reduced price, production will increase, which means increased tax revenues for the government," Reinaldo Kröger, president of Unigel, lamented.

Marcos di Marchi, chairman of Abiquim, stuck a similar tone:

Image: Elekeiroz



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We have a lot of capacity available, modern assets and a very strong R&D team. We want to continue growing abroad, hence our investment in Mexico two years ago and our current investment in the United States. We want to be a top player in the surfactants business in the Americas.

- João Parolin,
CEO,
Oxiten



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“Brazil may become the fifth largest oil producer in the world and we will be self-sufficient in gas in 2022 according the Ministry of Mines and Energy. Therefore, the challenge is competitive price, but not availability. In terms of the price, despite the fact that 70% of the country’s energy comes from hydro-electricity, the cost for the industries is too high. High taxes are among the causes of this overpricing.”

Whilst the Brazilian government is reluctant to reduce prices, some 8,000 kilometers north the United States is experiencing an energy revolution. It is hard to overstate the impact of shale gas production there. “The impact of shale gas is immense and the United States will be the number one exporter of LPG soon, when five years ago it was not even on the radar. By next year, we expect significant surplus polyethylene and other olefins derivatives to come on stream in the United States based on very competitive ethane, propane and butane,” predicted Rina Quijada, senior director, Latin America, IHS Markit. “At the same time, Brazil is becoming more flexible in its feedstock sources,” continued Quijada, with Braskem having just completed a new ethane terminal in Rio de Janeiro state and another due to be completed at the Port of Aratu this year, resulting in 15% additional ethane in Brazil’s feedstock mix.

Furthermore, there is some debate about the impact of pre-salt production on Brazil’s feedstock challenge. Marchi commented: “Going forward, due to the pre-salt discoveries we should have access to cheaper naphtha and natural gas, essential ingredients for the chemicals industry. We have already become the eighth largest chemical industry in the world without a cheap supply of these. Therefore, the outlook for the future is positive.” Although Quijada is less sanguine: “Pre-salt will provide additional feedstock for expansion of cracking facilities. Nevertheless, it is unlikely there will be a greenfield facility of over one million tons of

ethylene and derivatives in Brazil by 2020. There may be an increase in production capacity in Argentina but I do not see a similar plant to the Ethylene XXI in Mexico being built in Brazil.”

An uncertain future: risks and opportunities

There is no denying that some of Brazil’s petrochemical companies have risen up to be regional leaders in their fields. However, large shifts in oil and gas production mean the industry is undergoing profound changes and faces important risks as well as opportunities. The unresolved feedstock challenge and the sheer scale of the shale gas revolution means that Brazil may struggle to compete in petrochemicals compared to countries like the United States in the future.

Petrobras, which dominates Brazil’s oil and gas industry, has made it clear that they are pivoting away from petrochemicals by seeking to sell its 47% stake in Braskem. In large part, this is reflective of a trend among state-owned oil companies in Latin America driven by the drop in the oil price. “With the drop of oil prices, state-owned companies are under pressure to show better results to sustain their investment plans, which means that investments into refineries and chemical integration with them has stalled,” explained Marcos Gallo, regional feedstock manager, Cabot South America & Mexico, a specialty chemicals producer. In this context, the future competitiveness of the petrochemical industry in Brazil is uncertain.

However, another scenario is that production from Brazil’s pre-salt reserves, coupled with ethane imports from the United States, will bring the overall cost of feedstock down. Currently, the government is introducing legislation to open up the gas infrastructure market, including natural gas processing plants, re-gas stations for LNG and pipelines. There are hopes this will inject competition into a market Petrobras currently controls almost completely. “More gas is expected from pre-salt and Petrobras has opted for a pipeline to bring gas from these reserves to the Comperj petrochemical complex. A new processing plant has just been announced by Petrobras there with participation of Chinese

investors. The new legislation is expected to pass and will allow this to happen and in the long term, prices for gas in Brazil should come down,” predicted João Luis Ribeiro De Almeida, partner, mergers and acquisitions and oil and gas, at law firm Demarest Advogados.

Ultimately, the future remains uncertain. The perspective of Marcelo Cerqueira,

vice president, Chemicals & Vinyls, Braskem, is telling: “It is not clear if the price for feedstock will be lower but the business environment will be much better than today because there will be many more players in the market. We also expect there to be more raw material available but ultimately investment depends on the competitiveness of feedstock.” —




UNIGEL

Brazil is Back on Track, Unigel is Ready to Serve It



Unigel is the leading Latin American producer of acrylics and styrenics, with vertically integrated operations. We produce a diversified portfolio of chemical, petrochemical and plastic products, fertilizers and packaging materials.

With Brazil gradually recovering from the crisis phase, we will shortly see a return of focus on investments. Unigel has many development possibilities for its businesses that are being studied and already put on the project pipeline. We are interested in projects that generate improvements in our product and logistics processes increasing efficiency and competitiveness in the businesses we already work in, as well as increase our product portfolio to better serve our clients, principally looking at specialities that contain greater added value.

www.unigel.com.br



Edison Terra Filho

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Executive Vice President
BRASKEM

What has been the evolution of Braskem over the last years?

Braskem is a global petrochemical company with a Brazilian heart. It started in 2002 from the merger of six different companies and it has consolidated the Brazilian industry in 2010. In parallel to that movement, the company acquired Sunoco's and Dow's polypropylene (PP) businesses, with units in the U.S. and Germany. After that, Braskem also made a brand new investment of US\$5,2 billion in Mexico, which came on stream last year, a joint venture (75%-25%) with Idesa, a local chemical player. In the U.S., it leads the PP market and just announced an investment of US\$675 million for a new PP plant in Houston, Texas, starting in 2020. In addition, another investment was a new ultra-high molecular weight polyethylene plant in the U.S. We are also an innovative company: we started the first Green Polyethylene plant in Brazil, producing ethylene from sugar cane ethanol, becoming a global biopolymers player.

How do petrochemicals and renewable-sourced chemicals compare?

Green Polyethylene (PE) is definitely more competitive than any other renewable-sourced resin, not only in terms of the resin price. The Green PE is a drop in solution: the same assets that process Fossil PE can process Green PE. Braskem recommends Green PE to those customers that recognize that it adds value to their product within their particular market. In fossil PE production 2 metric tons (mt) of CO₂ are generated per mt of PE produced. With green PE, on the other hand, 2.8 mt CO₂ are captured for each mt of PE, because the CO₂ goes into the sugarcane. The difference is therefore 4.8 mt of emissions. If the carbon trading market becomes more liquid, this will become very relevant for customers using renewable sourced resins.

How is Braskem moving forward after the Lava Jato-related wrongdoings?

We want this situation to be an opportunity to become an industry reference on compliance issues. There have been substantial changes in our compliance team, which now reports to the board of directors for enhanced independence. After the initial reports about wrongdoings, we started an internal investigation and collaborated with the authorities, and this way we reached a settlement with the authorities of Brazil, the U.S. and Switzerland in late 2016.

What is the strategy of the company to keep its leadership position?

Besides looking for enhancing productivity and competitiveness, Braskem aims to diversify business on two fronts: feedstock and geography.

What trends do you see in the petrochemicals market?

On the one hand, companies want films and rigid packaging that use less material without losing their properties. On the other hand, sustainability and recycling are very relevant concerns. As an industry, we need to think about the whole product cycle. Plastics are one of the smartest materials available, which allows for weight reduction and therefore lower emissions. Plastics also contribute greatly to food safety and hygiene. However, taking care of the full product cycle is the final frontier for plastics. If we reach that goal, the material could be unbeatable.

At Braskem, in Brazil, we have launched a platform called "Wecycle", with the idea of supporting these circular initiatives to happen. In our office building, we collect around two metric tons of polypropylene every month, that we recycle to produce a post-consumption resin (PCR). We also have an agreement with supermarket chain Pão de Açúcar, who use PCR for their private label products.

What are going to be the main topics at the APLA gathering in Rio?

The major topic in the industry today is the consequences of shale gas investments. These have relevant implications for the resins market, mainly in ethylene, and also for other chemicals and derivatives from the naphtha value chain, such as propylene, butadiene and benzene, of which there may be a shortage if there is a movement from naphtha to ethane on the flexible crackers side.

Other important topics are Argentina's shale gas potential and the rapid changes brought by digital transformation: Industry 4.0, Big Data, the Internet of Things, artificial intelligence, etc, which are going to have a significant impact on our industry. Finally, we see the increasing uptake of electric cars as an opportunity for plastics, as the heat restrictions of having plastic near the combustion engine will not be there anymore. On the other hand, the demand for new cars may decrease with the rise of the collaborative economy, so there are many different dynamics that should be discussed. —



Marcelo Cerqueira

Vice President, Chemicals & Vinyls
BRASKEM

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The market is changing in Brazil and that will give us new opportunities. It is not clear if the price for feedstock will be lower but the business environment will be much better because there will be many more players in the market.

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Could you give an overview of your Brazil operations?

For the chemical business of Braskem, all of our production is in Brazil. Since the beginning, we have worked with master crackers, mostly using naphtha. We now have four crackers in the country and produce around 8.5 mt/y of ethylene, propylene, butadiene, butene and others. Half of what we produce we deliver to Braskem's downstream plants in Brazil to produce polyethylene (PE), polypropylene (PP) and polyvinyl chloride (PVC), 30% we deliver to other customers in Brazil and 20% we export. We also produce specialties and solvents which we supply domestically and export. In terms of the vinyls business unit, we have four plants in the north-east which supply PVC and caustic soda domestically. In 2012 we started a new PVC plant in Alagoas.

Although we export some of our products, we have been trying to sell to new customers in Brazil or encourage existing companies, including global ones, to expand here. Brazil is huge and the demand for the chemicals is high so we have an opportunity to produce products that today we import.

Do you expect foreign investment to pick up in the coming years as the economy improves?

We expect this to happen and already global clients are visiting us to discuss potential new investments. But as the current economic situation is difficult they are only starting discussions, not investing.

Can you provide examples of how Braskem is adapting to mega trends?

Electric cars combined with a rising middle class could lead to demand for new products from us and from our customers. Therefore, our strategy is to support our customers in coming up with solutions to develop these new products using our chemicals, as well as looking internally at how we can create new resins.

In terms of sustainability, we work with clients to produce additives which reduce the viscosity of liquids which therefore require less energy to be pumped and so leading to lower CO2 emissions. Regarding Industry 4.0, whilst we are not completely sure of its effects yet, we believe this will have a huge impact on business models and how we manage information and make decisions.

How do you see production from the pre-salt reserves and the US shale gas revolution impacting the feedstock situation in Brazil?

We see two opportunities. Firstly, shale gas production is growing fast and we see a potential to bring ethane and propane to supply our plants. Secondly, pre-salt will make more gas available. Our strategy is to make our plants in Brazil more flexible so they can use ethane and propane. At present, only our cracker in Rio can use these compounds whilst the other three cannot. So this year we will start bringing ethane to our cracker in north-east where we will be able to use up to 15% ethane. We are working on a logistics project to be able to supply our crackers with either raw material from shale or the pre-salt reserves.

How do you expect the potential legislation to liberalize the oil and gas market in Brazil affecting the competitiveness of feedstock for the petrochemicals industry?

The market will be impacted but not just because of the legislation as Petrobras is already selling some assets and foreign companies are coming to Brazil. The market is changing in Brazil and that will give us new opportunities. It is not clear if the price for feedstock will be lower but the business environment will be much better because there will be many more players in the market. We also expect there to be more raw material available but ultimately investment depends on the competitiveness of feedstock.

How has Hurricane Harvey affected feedstock supplies?

We are operating at full capacity at our plants in Brazil. However, because of plant shutdowns in Texas there will be some unmet needs in the global market which we will look to supply. It is to be expected that petrochemical prices will be volatile in the upcoming months.

What are the key objectives of the Chemicals & Vinyls division in the next year?

Our key objectives next year include improvements in feedstock flexibility in our crackers, strengthening competitiveness in the whole production chain together with current customers and suppliers and attracting new customers to invest in Brazil. We believe Brazil represents a huge opportunity to invest because of an increasing demand for petrochemicals in the domestic market. —

Ralph Schweens

President
BASF SOUTH AMERICA



As the world's population continues to grow, how can BASF play a role in increasing food production?

Agrochemicals are one of the segments we invest the most in R&D. We see three global challenges: resources, environment and climate; food and nutrition; and quality of life. Chemistry is an enabler to help farmers produce more using the same amount of land. BASF provides herbicides, fungicides or insecticides; also, it fosters technology and digitalization. In South America, BASF has a program called AgroDetecta, a solution that provides more accurate weather forecasts, assisting farmers in their decision-making in the short term.

What is the impact of your investment in the Camaçari site?

In the past 20 years, the Brazilian chemical industry has not seen an investment as large as the one BASF made in Camaçari, which was very meaningful for the chemical industry. The complex employs 230 people directly and 650 additional jobs are offered through external suppliers. It is an important operation for the state of Bahia. We started our operations in Brazil 106 years ago, and, since then, Camaçari has been BASF's most important investment in South America. It is a new, €500 million world-scale chemical site where we produce acrylic acid, butyl acrylate and super-absorbent polymers.

Moreover, we converted the butyl acrylate plant we had in Guaratinguetá into

a 2-ethylhexyl acrylate plant, covering a complete range of acrylics, and we also invested in two new formulation plants for agrochemicals in Brazil.

Will BASF continue to invest in Brazil over the long run?

There is room for more investments in Brazil. The trade balance has not improved over the last years, and Brazil continues to rely on imports in the chemical market. We foresee growth again in Brazil starting in 2018 and 2019. BASF sees opportunities to grow across the region – the two countries that have suffered the most, Brazil and Argentina, are the ones offering the highest potential, because the underlying opportunities have not disappeared. Brazil has more than 200 million consumers, a lot of natural resources and it is potentially the largest market for growing crops, offering great opportunities for investments in infrastructure. —

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In the past 20 years, the Brazilian chemical industry has not seen an investment as large as the one BASF made in Camaçari...

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João Parolin

CEO
OXITENO



What is Oxiteno's history and scope within the Ultrapar Group?

Oxiteno is part of Ultra, a multi-business company and a leader in the segments in which it operates and one of the largest corporate groups in Brazil. As its operation in the chemical industry, Oxiteno supplements Ultra's expertise and expands its operations to new geographic locations, operating in Latin America and in the United States.

Oxiteno started as the first and only producer of ethylene oxide in Brazil. Over time we diversified into most of the ethylene oxide derivatives, such as ethanolamines, glycol ethers, surfactants and polyols. We also diversified our chemistry to produce oleochemicals. In 2008, we inaugurated the first fatty alcohols plant in Brazil and Latin America. We are still the only producer of fatty alcohols from palm kernel oil in Latin America and this is an important component for our surfactants. Indeed, all the investments we have made since 2000 have to do with our surfactants business. Today, we are leading manufacturing of surfactants and specialty chemicals in Latin America.

What are your main target industries?

Our main market segment is home and personal care, which is a very resilient area. In a recession, people switch for cheaper products, but they still use them. Our second market is agrochemicals; Brazil is a huge market in this segment.

We have very good technology in surfactants and performance systems for agrochemicals. We supply most of the big ag-

Sinclair Fittipaldi

Director, South America Sales
LYONDELLBASELL BRASIL



rochemicals producers in the world. Our third market is paints and coatings in many different segments, such as construction, automotive, paints, printing inks, etc. Last but not least, we supply many products to the oil and gas industry, focused mainly on production activities and to a lesser extent on drilling.

Could you give us examples of innovation within Oxiteno's portfolio?

Recently, Oxiteno introduced the SURFOM® DRT 8575, a new adjuvant to optimize the process of spraying pesticides in farming. When added to the pesticides, SURFOM® DRT 8575, an emulsion-based technology, prevents the formation of very fine droplets during spraying, which can be carried out by the wind resulting in contamination of undesirable crop areas.

What is the role of renewably-sourced chemicals in this respect?

25% of raw materials we use are from renewable sources and 37% of our products use renewable raw material. There are many companies that are trying to use more vegetable oil formulations. Sustainability is one of Oxiteno's innovation process drivers in its main markets. The focus is to develop and deliver products and services that prioritize the efficient and responsible use of natural resources during our production processes, the lowest impact on the environment and the health and wellbeing of users.

How does Oxiteno see the future?

We made many investments in our industrial plants during the last decade, which allows us to serve our customers even in a context of economic recovery in Brazil. So we are ready to serve this market whenever it picks up again. We have a lot of capacity available, modern assets and a very strong R&D team. We want to continue growing abroad, hence our investment in Mexico two years ago and our current investment in the United States. We want to be a top player in the surfactants business in the Americas. —

know our offering can fully meet customer needs and leverage the strength of our supply chain to be a reliable partner.

Do you expect local production to significantly increase over the next five to ten years?

Our products are produced globally and expect those that are traded globally, like polyethylene, will be largely determined by feedstock costs and the cost to serve. We expect products that are more regionally based to see growth for local needs.

How do LyondellBasell's innovations help tackle some of the world's big environmental and societal challenges?

LyondellBasell's long-term business success is built on our commitment to advance sustainability principles. Our products contribute to the solutions of modern day sustainability challenges, such as plastics for the light-weighting of vehicles and materials for the evolution of renewable energy sources.

LyondellBasell has over 5,000 patents. We have just been awarded the European Innovation Award from Plastics Europe and the Society of Plastics Engineers (SPE) in the category 'Material Innovation.' The company was honored for the development of Koattro KT MR05, a new plastomer with 'self-healing' properties. We are also investing \$725 million into building a new polyethylene (PE) plant due to start in 2019 at La Porte, Texas which will use LyondellBasell's proprietary advanced material performance technology, a completely new technology. In addition, we are investing \$2.4 billion in a new propylene oxide and tertiary butyl alcohol plant in Texas, which will produce ethers among other products. Ethers are used in fuel blending to improve fuel efficiency and cleaner burning. This plant is the single largest capital project in our company's history.

Do you have any final messages for the APLA delegates?

LyondellBasell will continue to focus on our strengths: industry leading safety and environmental performance, excellent reliability, and efficient operations. It is the people of LyondellBasell that drive this commitment to our core competencies and our customers. Our long term demonstrated success in these areas has enabled LyondellBasell to reinvest in our business. These investments will fortify our ability to serve the Brazilian market. —

Could you give an overview of your presence in South America?

LyondellBasell has been in this region for over 30 years. We have the scope and scale to serve global markets and we deliver products and solutions in four key areas: chemicals, polymers, fuels and technology. In South America we have a strong sales presence for our chemicals business which is managed through our São Paulo office. In Brazil we also have a manufacturing plant in Pindamonhangaba which has 80 kilotons/year of capacity in polypropylene compounds mainly serving the automotive industry.

To what extent do you import products into Brazil and what was the impact of Hurricane Harvey?

Every chemical we sell in South America comes from the U.S. Gulf Coast. Prior to the hurricane we activated a very comprehensive storm plan designed to minimize potential impact to our facilities. We were able to restore operations shortly after the storm and there has not been a big impact to our customers in Brazil; we remain very reliable.

How competitive is the market for intermediaries and derivatives in Brazil and what are LyondellBasell's key differentiators?

There is quite a strong industrial base in Brazil. The region is very important for LyondellBasell as there is a very good fit for our products logistically given the relatively short transit time from Houston to South America. It also helps that Houston is on a similar time zone. We concentrate our efforts where we

Reinaldo Kröger & Edson de Paiva

RK: President

EdP: Operations Director

UNIGEL



RK



EdP

What are Unigel's main focus areas currently?

RK: We are currently investing US\$90 million to increase our styrene capacity by 35,000 mt/y in time for the first quarter of 2018 and 65,000 mt/y by 2020. This means we will have 400,000 mt/y capacity for styrene monomer along with 320,000 mt/y for polystyrene by 2020. Alongside increasing production, we also aim to reduce energy costs and modernise our facilities. Another key development is Unigel's purchase this year of the latex division of Trinseo, based near Guarujá. The goal behind this is vertical integration, given that styrene and acrylonitrile are used as a raw material to make latex. We are able to increase capacity as we have reduced our debt in recent years, which is particularly important given the high cost of borrowing in Brazil. In addition, five years ago, we increased our methyl methacrylate (MMA) capacity at our Bahia plant and this is enabling us to generate new products.

Unigel is Latin America's leading producer of acrylonitrile (AN), methyl methacrylate (MMA) and sodium cyanide. How have you reached this leading position?

EdP: We have grown by both purchasing and also by developing technologies in our Center for Innovation and Technology (CITU) based in Bahia. We also have very high plant efficiency and relatively low operating costs. Due to the pressures brought on by the economic crisis in Brazil, we have invested in technology to lower the cost of energy, such as two new reactors in our styrene producing facilities.

Also, because our chemicals are used across a very diverse set of applications - from mining, fertilizers, packaging and food to plastics - we are able to weather economic crises.

How do you see demand developing for your products in the next couple of years?

RK: In the last two years, our financial results have been quite good. Nevertheless, for two years GDP growth has been negative in Brazil and 14 million people are out of work, which has inevitably affected demand for chemicals. However, now macro indicators are changing: inflation, interest rates and unemployment are all coming down. Until recently, Brazil's central bank's

lent at 14%, whereas now it lends at 9% and we expect it to be at 7% by the end of the year. This will improve investment in Brazil's economy and GDP will emerge from negative territory this year. In a market of over 200 million consumers, if GDP reaches 1% growth next year from a minus 3.6% decline in 2016, it will represent a huge increase in demand. Furthermore, Brazil's current government under President Temer is generally managing things well. Therefore, we are optimistic about the future demand.

How does Unigel contribute to more environmental sustainability?

EdP: In the last five years, Unigel has invested a lot in sustainability. For example, we have invested in waste water treatment at two of our plants in Bahia and São Paulo for which we are partnering with Universal Environmental Technologies (UET) which is highly specialized in this area. This has been a very successful initiative as now 75% of water is re-used compared to in the past when 100% was disposed of in the sea. We plan to reuse 100% in the near future.

What challenges are there in developing the chemicals value chain in Brazil?

RK: It is the same problem as in 2012: the high cost of natural gas, compared to the United States.

The other big challenge is infrastructure and in particular the lack of capacity at ports. As the economy improves, there will not be enough capacity to meet the increase in demand.

EdP: Compared to before the crisis when the government had more resources, it is now more focused on opening up the market for infrastructure and encouraging private players to invest, such as from Chinese, US and European investors companies. This is a proven model that should lead to increased investment in Brazil's infrastructure.

What are your main goals for the next few years?

RK: Unigel is focused on increasing its production capacity. We also see many opportunities for methacrylate and we already supply 50% of higher methacrylates for the nail beauty products market globally. This reflects our plan to focus on specialty chemicals and develop new products in this area, leveraging our R&D efforts. —

Green feedstock and Bio Chemicals: How big is the potential?

Brazil benefits from being the most biodiverse country in the world as well as having a high level of production in sugarcane, corn, soybeans and wood – all potential feedstocks. It is also the second largest producer of ethanol fuel behind the United States and the largest producer of ethanol from sugarcane.'

In terms of green feedstock for the petrochemical industry, Braskem is leading the way. In September 2010, it commissioned a green ethylene plant at the Triunfo Petrochemical Complex. The plant has an annual production capacity of 200,000 mt/y of Braskem's I'm Green™ polyethylene, making the company a global leader in bioplastics. I'm Green™ is produced from ethanol sugarcane. Green polyethylene has some clear advantages as Edison Terra Filho, executive vice president, Braskem, explained: "Braskem recommends Green PE to those customers that recognize that it adds value to their product within their particular market. In fossil PE production 2 mt of CO₂ are generated per mt of PE produced. With green PE, on the other hand, 2.8 mt CO₂ are captured for each mt of PE, because the CO₂ goes into the sugarcane."

Brazil is also home to several producers of second-generation ethanol, which is distinguished by the fact that it is not produced from food crops. Abengoa, Raizen, and GranBio are the three companies producing second generation ethanol and have a total combined production capacity of 205 million liters per year.

Local company GranBio aims to be the largest producer of second-generation ethanol in the world and to prove the feasibility of ethanol for biochemicals. It achieved a 45% increase in productivity by using leftover materials, using no more land or

sugarcane. For this reason it was chosen by PAISS, a joint program between the Brazilian Development Bank (BNDES) and the Brazilian Innovation Agency (FINEP), for R\$300 million in funding for a cellulosic plant in Alagoas. GranBio is also partnering with Rhodia in a project to produce bio n-butanol which is used in making paints and solvents.

Government Support

BNDES has continued on its path of supporting biochemicals. In 2016 BNDES launched the R\$2.4 billion Chemical Industry Development and Innovation Plan (PADIQ) with FINEP. This was based on the findings of a study carried out by consultants Bain & Company and commissioned by BNDES on the potential for diversification of the Brazilian chemicals sector. "Most of the PADIQ projects are in the renewables sector and we are now putting together contracts to support nineteen projects involving bio-sources. Projects involve forestry feedstock, native plants from the Amazon that will produce specialty cosmetics, sugar feedstock and rice residue," revealed Felipe dos Santos Pereira, director, chemical industry department, BNDES.

Pereira sees a lot of potential for bio feedstocks in the chemical industry. "It is still a new movement but we see a lot of interest by companies to invest in bio feedstocks, even though we launched PADIQ during an economic crisis. It is hard to say how big and fast the transition will be but there is a big potential. Most projects start from agricultural residues, in which Brazil is a big player. For many of the projects we are funding, chemicals require oxygen, where

bio sources are at an advantage as within them hydrogen comes with oxygen, which is not the case in petrochemicals."

BNDES is also in talks with DSM in Brazil, the global science-based company active in health, nutrition and materials that has developed enzymes and yeasts that can treat corn to help with the production of second-generation ethanol. "We have been in talks with BNDES to further develop the technology's potential and we continue to invest in it. However, unfortunately the focus on developing this innovation has gone away due to the crisis," commented Mauricio Adade, president, Latin America, DSM.

More impact on specialties

In terms of the impact that green feedstocks will have on the chemical industry both in Brazil and globally, it is important to draw a distinction between the petrochemical and specialty chemical industry. As Rina Quijada, senior director, Latin America, IHS Markit explained: "Although green feedstocks are very welcome when they are competitive, the impact of shale gas is immense...By next year we expect significant surplus polyethylene and other olefins derivatives to come on stream in the United States based on very competitive ethane, propane and butane... Therefore, green polyethylene will have to compete under this new scenario."

As such, a significant impact from green feedstocks is only likely to be felt in specialty chemicals, but here it could slowly form the basis for a transformation in the market. "In fifteen years, biochemicals might represent about 10% of the global market, with a large proportion coming from Brazil. Shale gas will take too long to be converted into speciality chemicals; the impact will mostly be for commodity chemicals and plastics production," concluded Martim Francisco de Oliveira e Silva, engineer, chemical industry department, BNDES.

Whilst the transformative impact on petrochemicals is perhaps a long way off, green chemicals are rising in importance. With the launch of initiatives like the PADIQ program and as Brazil's economy improves bringing back investment, the world will be looking to Brazil in the years ahead to lead the way in biochemicals. —



Marcos De Marchi

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CEO
ELEKEIROZ

Could you provide an overview of Elekeiroz's main operations and history?

Elekeiroz has been in business for over 120 years, making it one of the oldest chemical companies in Brazil. We belong to the holding Itaúsa, which controls Itaú Unibanco, South America's biggest private bank, and Duratex. Elekeiroz is a regional leader in chemical production. We are the only producer in Latin America of oxo alcohols and have the largest plasticizers portfolio in the region. We produce and sell 2EH, NBA and IBA oxo alcohols. The end-uses include acrylates, painting and coatings, agrichemicals and many more. We

also produce plasticizers from oxo alcohols which are used in footwear, PVC films, wire and cables etc.

Furthermore, with aldehyde we produce organic acids such as 2EHA and butyric acid, the latter of which we launched last year, and which was not previously produced in Brazil. In addition, we produce formaldehyde from methanol which is also used in various applications such as adhesives, phenolic resin and many more. Last but not least we produce organic anhydrides, UPR and sulphuric acid. We have two production plants in Camaçari: one producing gases and the other producing oxo alcohols. We also have a plant in Várzea Paulista, São Paulo, which produces sulphuric acid, plasticizers, anhydrides, UPR and formaldehyde. Last year we formed a JV with Nexoleum, a company producing very efficient and competitive green plasticizers.

What is the relative importance of these different areas to Elekeiroz's business and what is your position within the Brazilian market?

41% of our sales are in flexible vinyl intermediates, 33% in oxo-derivatives, 10% in UPR and maleic, 12% in sulfuric acid and 5% in formaldehyde. We have the highest market share in Brazil for flexible vinyl intermediates, oxo-derivatives and maleic. We also have the fourth highest share for UPR, whilst we are niche players for sulfuric acid and formaldehyde.

What new developments have occurred since 2013?

In 2013, we purchased Air Products' Camaçari plant in order to produce our own gases and to integrate ourselves with the supply chain. We now also sell these gases directly to peroxide and hydrazine producing companies in Camaçari. Then, in 2016, we completed a joint-venture with Nexoleum that has allowed us to start creating a plasticizer from soy-bean oil which we will soon be exporting to the United States. The plasticizer is not only green but of high quality, so we have high hopes for its success. We also plan to expand Nexoleum's bio-plasticizers production capacity from 8 kta to 24 kta.

Other important developments include the launch of a phthalate-free DOCH plasti-

cizer, which has been accepted worldwide and is used, for example, in shoes exported from Brazil, and butyric acid, which is used in fragrances and animal feed and of which we are the only producer in Brazil. We have also introduced CO₂ recycling in our Syngas plant which has reduced our emissions.

How advanced is Brazil's chemicals industry compared with other countries?

We are not producing sophisticated enough chemicals. Although, in some areas we have progressed, such as in oil chemicals and polymers. Tellingly, of the 22 enterprises identified by the National Confederation of Industry (CNI) as innovative, only three were from the chemicals industry, one being Elekeiroz. There are many things the industry can do to become more sophisticated and Abiquim has made specific proposals about how to meet current challenges such as competitive raw materials, energy and infrastructure and logistics.

How challenging is it to obtain the right labor in Brazil?

The SENAI system in Brazil, owned by CNI, provides training and teaching for people who want to work in the industry and we work on many educational initiatives with them. This system has improved a lot in recent years and now labour training is not the bottleneck that constrains industry growth that it once was. Furthermore, research centers were previously too academic but now there are many positive initiatives, such as some training centers which design curriculums which meet specific industry needs and facilitate mentoring of students by people in the industry.

What are your main goals going forward?

As 2016 was a tough year, we want to recover the profitability that we lost, which we have already started to do in 2017. An important part of this will be working to fulfil our capacity in and the marketing of our new products such as butyric acid and phthalate-free plasticizers and developing our international market share for our core products. Among those products we now also have the green plasticizers from Nexoleum which completes our plasticizers offer. —



Adriano Magalhães

Managing Director
WACKER

Can you give a brief history of Wacker in Brazil up to its place in the market today?

We started in 1977 as a sales office but in just three years we began to develop our production site which has been operational since the 1980s. Ever since then we have been expanding our local footprint in the country and have grown our local production nine fold. We are mostly focused on silicone-based products, produced in Jandira, and in the last few years we have

been integrating ourselves further upstream in order to be able to provide more customized solutions and offer more flexibility.

How important is Brazil and Latin America to Wacker as a whole?

The São Paulo office is responsible for the southern cone, so Brazil, Argentina, Chile, Uruguay and Paraguay and our colleagues in Mexico are responsible for the rest of Latin America. In terms of Brazil specifically, the production plant is our only plant in the whole of Latin America and we export to the rest of the region. Due to Brazil's size, Wacker first came here and then expanded with sales offices in other Latin American countries.

Argentina and Chile present a huge potential for growth. Argentina has just recovered from its own crisis and is opening its markets to foreign investors. The Chilean economy is very competitive and they use sophisticated standards for silicon and polymer based products which we hope can be replicated in other countries.

How has Wacker adapted to the economic situation post 2014?

Two factors meant we were actually quite well prepared. Firstly, we went through a reorganization before the crisis so we entered into it with a better cost situation compared to our competitors and did not need to take any significant cost cutting actions in 2015/2016. Secondly, in May 2015 we decided to increase capacity and are now commissioning a new plant for silicone composites and fluids. Therefore, we invested counter-cyclically and now that the market is picking up again we will be able to offer higher capacity and more flexibility.

Could you provide more details on your product portfolio?

In terms of local production, we mostly produce silicone emulsions, anti-foamers and compounds, as well as silicone-based fluids which serve several markets such as pulp and paper, cosmetics, textiles, agriculture and oil and gas. On top of this, we merchandise silicone and polymers products for the construction industry produced by the Wacker group.

We also sell vinyl acetate-ethylene (VAE)

dispersions in Brazil which is mostly used by the adhesives industry. In addition, we are trying to develop its application in coatings, which would lower CO2 emissions compared with acrylics. However, the challenge we face is to guarantee a competitive offer for a higher value-added product.

What are the key drivers of innovation for Wacker?

Although Wacker is a global company, the innovations we bring depend very much on local needs. Generally, we have R&D at a global level but always have application labs at the local level. We use the Wacker Academy to work through problems with a client. We then work with them in product testing in one of our application labs. Some examples include work we have done on polymers for the construction industry.

How do you overcome some of the challenges of operating in Brazil?

On the economic side, our preemptive measures have been very successful at helping us maintain our success. On the other hand, there are structural changes occurring over time such as demographic change and rising incomes. When we introduce new products to meet these needs we need to adapt our offering to local circumstances and work through Wacker Academy to do this. As an example, we need to provide products which can withstand the hotter temperatures and high winds of the north of Brazil.

Recently there have been increases in raw material costs in the chemical industry and energy costs have not been getting cheaper either. However, year over year we have been improving our competitiveness and efficiency so that these factors will not have such a big impact.

Do you have any final messages?

We truly believe in the potential of the region. The reason behind this is that we see the openness and willingness to innovate in our customers. When you look ahead, there is a great field of opportunities for the industry, in particular in sectors like pulp and paper, agrochemicals and cosmetics. This is why we have chosen to invest in new capacity and application labs. —

Hikaru Kikkawa & Marco Figueira

HK: President and CEO

MF: Commercial Director – South America
YOKOGAWA SOUTH AMERICA



HK



MF

What key developments have occurred since 2012?

HK: Traditionally Yokogawa's strength has been in the robustness of its hardware. We were the world's first company to develop a distributed process control system (DCS) and we have had virtually 99.9% availability for our most important DCS over 40 years, offering an accomplishment of long-term stable operations. However, today we are in a VUCA world (volatile, uncertain, complex, and ambiguous) and customers' priorities are changing with these new global trends. Looking at this new background, Yokogawa wants to improve productivity, increase yield, lower maintenance costs and improve safety, whilst shifting to more value-add services and co-innovation with our customers, establishing ever greater levels of trust with customers. Since 2012 we have created global strategies to be the trusted partner for seamless sensor-to-enterprise integration, pursuing best in class operating performance for our customers in chemical industries.

In 2015 we launched a new business plan called "Transformation 2017" under which we are focusing on our customers, in terms of creating new values and maximizing efficiency globally, optimizing all functions and operations. Furthermore, we are accelerating Industrial Internet of Things technologies (IIoT) strategies to improve our solutions portfolio. We have acquired new technologies to do it and we are now entering into the growth phase of our plan. We also acquired KBC Advanced Technologies, which has best in class consulting and simulation technologies for refineries and petrochemicals; Industrial Evolution which provide DaaS services, that connects sensor data to the cloud and Soteica visual Mesa, an energy optimization company.

What differentiates Yokogawa from its competitors?

HK: Compared with our major global competitors, Yokogawa is the only company where the major part of its business is industrial automation and this differential creates a competitive strategy. In fact, we are the only company that derives more than 80% of its revenues from industrial automation. We also have 4,000 project engineers and 2,000 service engineers globally and are becoming very strong in operational excellence with simulation technology which will highlight Yokogawa in the future.

What major projects have you worked on in the region in recent years?

MF: The most remarkable project we have worked on recently is for an important Brazilian petrochemical company, which we completed last month, where we carried out a DCS migration at one of their polyethylene plants in only four days. In addition, in the last year we worked on an energy optimization project, taking advantage of our acquisition of Soteica Visual Mesa.

How will trends technology like AI and IOT affect your services going forward?

HK: Technology by itself cannot bring value-add but through providing operational excellence with simulation technologies, which will evolve into artificial intelligence, it is possible to identify where efficiency gains can be made. Through remote monitoring and a cloud database you can sustain these improvements and this is what we call transformation cloud-based real-time performance improvement. We are working with Microsoft Corporation, FogHorn Systems, Bayshore Networks and Telit IOT Platforms to integrate our technology into an IoT architecture which will transform our business model.

It will take some time for these new technologies to take effect and clients are still somewhat conservative as security is a major issue for them given that cyber threats like WannaCry are a big risk for industrial process automation. However, technology is changing fast so security of technology is becoming increasingly robust and the market will gradually shift to more cloud based solutions. The most advanced customer relationship we have in this area is in exploring the possibility of a cloud based DCS. There are other customers interested in the new solutions we are providing through our subsidiary KBC. Although, our first priority is to improve safety and efficiency and how we get there will depend on customer preference.

What areas do you see most opportunity in the region going forward?

MF: We are looking for opportunities in the ethanol industry and will be investing more into the chemicals sector. In addition, we see a lot of opportunity in the mining industry, in particular in Chile. —

MAJOR PETROCHEMICAL COMPLEXES



Camaçari Complex

Brasilia

**Duque de Caixas
Complex**

Capuava Complex

ATLANTIC OCEAN

Triunfo Complex

PACIFIC
OCEAN





SPECIALTY CHEMICALS



“Commodity chemicals have a 4% to 5% margin, which requires high volumes to make production worthwhile, whilst specialty chemicals have higher margins.”

- Reinaldo Kröger,
President, Unigel.



Specialty chemicals in Brazil: The future of Brazil's chemicals industry?

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An introduction to Brazil's highly innovative specialty chemicals sector

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Whilst Brazil's petrochemical companies have become regional leaders, further downstream, Brazil's specialty chemical producers are quietly notching up their own successes. In 2016, industrial chemicals made up almost US\$55 billion of the total US\$113.5 billion of Abiquim members' sales, whilst specialty chemicals made up almost US\$59 billion. At the same time, specialty chemicals offer higher rewards for producers than commodity chemicals.

Chemicals of course supply a plethora of segments across an economy. Sectors which stand out for their success include cosmetics, agrochemicals, food additives for animals, aromas, flavors and fragrances, chemicals for exploration and production and surfactants. In particular, the cosmetics, agrochemicals and food additives for animals sectors have been posting impressive growth in Brazil, in spite of the economic crisis. Demand for agrochemicals grew by 5% in 2016, compared to a 5% decrease for the chemicals market as a whole, whilst animal feed grew by 10% on average from 2007 to 2012 and has fared relatively well during the recession as well. Meanwhile, Brazil accounts for 10% of the global cosmetics industry which is expected to

Image:

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Brazil's chemical industry's core strengths have always been speciality chemicals and research and development.

**- Rina Quijada,
Senior Director, Latin America,
IHS Markit**



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post an average annual CAGR of 11% over the period 2015 to 2019, according to Infiniti Research.

In fact, these sectors have been identified by Bain & Company in 2014 as the most competitive sectors for Brazil's chemical industry that could help reduce its trade deficit in a report funded by BNDES on the opportunities for diversification of the Brazilian chemical industry. Brazil imported in 2012 a whopping US\$5,400 million in agrochemicals compared with US\$500 million exported and imported US\$830 million chemicals for cosmetics compared with US\$580 million exported. Therefore, Brazil's chemical industry is home to a flourishing specialty chemicals market, with companies offering a diverse set of products and serving numerous sectors across the Brazilian economy and beyond. However, trade deficits mean there is scope for improvement.

Local production: room for growth

In terms of local production, Arkema, which produces organic peroxide, coating (acrylic) resins and construction adhesives, has four plants in São Paulo state and one close to Rio de Janeiro. Croda, the diversified specialty chemical producer, has been committed to Brazilian manufacturing since the 1990s and produces about 15% of its products locally. Cabot has three manufacturing units in Mauá, São Paulo that produce carbon blacks for elastomer reinforcement and specialty carbon blacks, sold primarily in Brazil; whilst Eastman also has a facility there that has a capacity for diversified lines of polymeric and monomeric plasticizers of 20 to 25 KMT per year. Meanwhile, DSM, the life sciences company and specialty chemical producer, has operations consisting mostly of blending facilities where it prepares pre-mixes for the animal and human nutrition industries which include beverages, dietary supplements and personal care.

Finally, Rhodia Solvay, a mainstay of Brazil's chemical industry which is pivoting to become a multi-specialty producer, has eight production sites in São Paulo state and one in Paraná state. Nevertheless, there is certainly room for more local production in Brazil's specialty chemicals sector, as Rubens Medrano, president of Associquim, remarked: “There is a lack of local production in specialties and most of these are imported.”

The name of the game is innovation

Whilst efficiency is key for commodity producers, for specialty producers the priority is value-adding services and a continuous stream of innovation. Even during the crisis years and perhaps because of it, specialty companies have achieved a lot when it comes to innovation.

This fits a wider trend in specialty chemicals. As Richard Pino, vice president sales and marketing, Croda, remarked: “To innovate, you need to understand what your customers want and to help us do this throughout Latin America we have our own offices in Colombia, Argentina, Chile, Peru and Mexico.”

What customers want differs from country to country, sector to sector, making it crucial specialty producers understand their particular markets. Given that specialty chemicals are mostly used in consumer industries such as food, pharmaceuticals and cosmetics, this requires producers understand Brazilian tastes.

One example of companies recognizing this is Solvay's decision to pick Brazil to house its global research center for hair care products. It announced in 2015 that it was investing €20 million into expanding its plant in Itatiba and developing new molecules used in shampoos, conditioners and other hair care products at its research center in Paulínia. Whilst this will help to cater to local needs, Brazil is also an ideal market to conduct such research due to it having the largest variety of hair types in the world.

Eastman's product portfolio also exemplifies the benefits of being close to customers. It has just won an award for packaging from O Boticário, a giant of Brazil's formidable cosmetics industry. “We

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TACKLING TOMORROW'S CHALLENGES TODAY

Lighter vehicles, wind turbine blades, phone batteries, water management, sustainable housing and more — Arkema designs advanced materials and innovative solutions to meet tomorrow's challenges today.

ARKEMA, DESIGNER OF MATERIALS AND INNOVATIVE SOLUTIONS

ARKEMA
SPECIALTY CHEMICALS

arkema.com



Eric Schmitt

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CEO
ARKEMA QUIMICA (BRASIL)

Arkema was established in 2006 as a spin-off from Total. How do you position yourself in the Brazilian market today?

Arkema has a long history in Brazil since the WWII. Today, in Brazil we produce organic peroxides, coating resins and additives, leveraging an acquisition we made five years ago that generated Coatex Latin America. In addition, we produce construction adhesives following an acquisition by Bostik, part of Arkema since 2015, of a local company called Usina Fortaleza. We have four plants in São Paulo state and one close to Rio de Janeiro, plus a dozen

distribution centers and sales offices. We have also invested in international class innovation labs which reflect our focus on specialty chemicals, technical expertise and high quality products. We have been successful at increasing the quality of our products through our innovation approach despite the occurrence of a crisis which tends to slow the development of innovation. Furthermore, we offer more sophisticated solutions, which we believe is the direction the Brazilian market is heading.

Arkema aims to obtain 80% of its revenues from specialty chemicals by 2023. How does this align with your Brazil operations?

We are already over this level in Brazil, where we focus on products for niche and technical applications. We market products such as specialty polyamides, specialty fluorinated polymers under our Kynar® brand, gas odorizers and new generation fluorinated refrigerating gas to different clients across Brazil.

How do you see prospects for Brazil and the region in the longer term?

Historically, the reputation of Brazil within the Arkema group has not been always positive due to the instability here and some difficult partners we have had in the past. However, over the long run the prospects are still positive. Compared to other emerging countries, Brazil has a very advanced industry.

Overall, Brazil has a strong potential to be one of the strongest industrial powers with one of the most modern and productive agricultural sectors in the world and that invests in renewable energies. It also has a highly digitally interconnected population which presents opportunities for our industry to be part of in terms of new and connected technologies.

What are the main challenges Arkema faces to developing chemicals in Brazil?

Lack of raw materials is a big challenge and we even came to the conclusion that it was not worthwhile producing one type of specialty chemicals product because of this situation. Bureaucracy in Brazil hampers investment and projects are often only initiated with political connections. Some-

times we have met difficulties to open new ventures because of national laws often changing, and for the same reason it can also be difficult for international companies to get local licenses.

What are your key goals going forward?

We are often close to saturation point in Brazil so we are looking to increase capacity. Indeed, production has continued to increase during the crisis. The company wants to grow organically through investment in existing sites, such as through improving productivity and equipment, and also potentially through acquisitions in Brazil or the wider region. Arkema has given priority in recent decades to investing in Asia and in particular China. Therefore, South America is still underrepresented, which we would like to change. After the anti-corruption investigations and the election next year, prospects for Brazil will be brighter.

2023 represents a new strategic horizon for the company. Arkema is stepping up the development of its specialty activities, in particular adhesives, advanced materials and thiochemicals. Innovation addressing the major societal challenges, bolt-on acquisitions and strengthening our positions in higher growth countries will underpin this ambition.

Do you have any final messages?

Our objectives are also sustainable. In a fast-changing world characterized by global warming, a rising world population, the increasing difficulty in accessing energy and safe drinking water, and the growing scarcity of certain resources, manufacturing companies like Arkema must constantly innovate and adapt their product range to offer solutions addressing these challenges. To help meet these major changes, the group has structured its innovation strategy around six innovation platforms. These are delivering usable, innovative and environmentally friendly solutions in such areas as bio based products, new energies, water management, electronics solutions, lightweight materials and design, and home efficiency and insulation. We are also committed to contributing to the goals of COP21 and have a strong track record of lowering our emissions. —



José Borges Matias

President

**RHODIA - SOLVAY GROUP
LATIN AMERICA**

Rhodia Solvay's history in Brazil stretches back to 1919. Could you provide some background to the company and its main business areas today?

Rhodia has a history of developing textiles such as viscose, acrylic fibre, polyester and nylon. The fashion world is very connected to Rhodia and this is the strongest aspect of its brand. We used to have a Life Sciences division (including agro, pharmaceutical and vaccines, animal health and animal nutrition) that we sold and

which became part of Aventis in 1998. Over time, Rhodia re-focused on chemicals. Today, Solvay Group, which Rhodia belongs to, has twelve business units that produce chemicals such as oxygenated solvents and phenol acetone derivatives, innovative textiles such as ones that are biodegradable, lactic acid retardants used by sportspeople and alcohols, of which we are the leading producer in Latin America.

Our major chemical site is located in Paulínia, São Paulo, and is 15 million square meters in size. We have been there for 75 years. Here we manage an industrial complex which houses branches of Boehringer, Air Liquide, BASF and Bayer CropScience, as well as 20 production sites of Solvay. We also have a large sugar cane plant located there and one of our largest research centers.

Could you provide more insight into your strategy of becoming a multi-specialty company?

The company is reducing its exposure to commodities and moving more into specialties which is why Solvay acquired Rhodia and Cytec Industries. We will continue to focus on regional strengths like soda ash (sodium carbonate), the Solvay process established 153 years ago and hydrogen peroxide production where revenues are growing. We did not see the same level of growth for our PVC or cellulose acetate businesses that we have divested recently and are selling our polyamides division to BASF.

Due to our focus on long-term trends, we have the right portfolio to grow. For example, our acquisition of Cytec is driven by our belief that automobiles will increasingly use carbon fiber material. We also produce fluorinated polymers which were developed for the Solar Impulse aircraft's batteries to enable it to fly at night and are now used in smartphones and have many potential applications such as electric cars. At the same time, we stay very close to our customers to understand the evolution of their needs and have application labs for hair conditioners, an area Solvay is the leader in, coatings and other areas in Paulínia.

Can you give some example of how Solvay's products are used to enhance sustainability?

Solvay puts all its efforts into long-term trends like sustainability. We produce silica which is used to reinforce rubber and car tires, reducing gas consumption by 6% and so also reducing CO2 emissions. We have also developed a unique range of bio-based solvents, under the brand Augeo, which are used in most cleaning products in Brazil.

What are the main challenges facing your business?

Brazil faces a lot of economic volatility and feedstock prices are too high, impacting the production of commodities and intermediaries, which the industry must compensate for by improving competitiveness in other areas. There is enough demand in Brazil so this is not the problem. We have focused efforts on logistics, marketing and purchasing in order to gain market share. Also, economic downturns have a big impact on smaller companies and destroy part of the chemical value chain each time. Because of this, imported chemical products in 2016 represented almost 36% of chemicals used in Brazil, an all-time record. Nevertheless, conditions are good in Brazil to develop innovative products, such as from natural sources and for chemicals used in agriculture.

Do you have any final messages about your Latin American business?

Given the sales of our assets in acetate cellulose, polyamides, PVC and others, we are now looking to buy. Of course, this will differ in the region from country to country but in some we have sold more than we have bought and so will continue to invest. As an example of our investments, by the end of this year we will have a new hydrogen peroxide facility in the north of Brazil, which will be the first on-site peroxides plant in the world. Other areas in the region where we see much opportunity include for our Augeo brand, our silica portfolio, personal care products, chemicals for mining and oil and gas and more. —



Roberto Kirschner

Director, South America

HUNTSMAN PERFORMANCE PRODUCTS

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Huntsman now intends to merge with Clariant, which is expected to be completed by the end of the year.

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Could you introduce your operations in Brazil and the region more broadly?

Huntsman, which is headquartered in the United States, started in Brazil in 1994 after it bought Texaco Chemical which had a subsidiary here. After five years of having a small division in Brazil, Huntsman bought the polyurethanes and titanium dioxide divisions of ICI. Then, in 2003 Huntsman bought Vantico Group, the epoxy resin division of Ciba Specialty Chemicals, and its textile effects division a year later. Finally, last year we announced the spin-off of our titanium dioxide operations. Now we have four main divisions in Brazil encompassing Advanced Materials, our biggest unit, Polyurethanes, Textile Effects and Performance Products. We have two main offices in the region, Sao Paulo and Mexico City, with the former covering everything up to Aruba and the latter covering Mexico, Central America and the Caribbean. Brazil is very important to the wider company in terms of agrochemicals, where it has some of its biggest customers in this sector. Huntsman now intends to merge with Clariant, which is expected to be completed by the end of the year.

Do you see more consolidation in the chemicals market?

It will happen more all over the world as companies need more efficiency and to reduce cost. Companies like Dow and DuPont and now Huntsman and Clariant are examples of this trend. Also, not only producers but also our customers are merging, such as oilfield, agrochemicals and distributor companies.

How deep is your product expertise in Brazil and how are your products used here?

Most of our sales are technical sales and we are very well equipped in this regard; indeed, this is how we compete rather than on in price as with commodity chemicals. We also have a laboratory in Brazil with dedicated teams from all our main divisions. Currently there are only two full-time employees in the lab but there are close to 100 working in our labs in the United States that visit Brazil. We also have a huge technical support team in the US, Europe, China and Australia that travel here to offer their expertise. Sometimes it can be difficult to find the right talent but luckily we have a talent bank which means we can bring people from different Huntsman divisions. The main applications of our chemicals are in agriculture, oilfields, automotive and con-

struction. In automotive we market raw materials for car paints and fuels and lubricants. We also sell chemicals for concrete, asphalt and dry walls in the construction industry.

How do your products help the environment?

We have launched several new lines of green solvents that we are marketing in the agrochemicals market which have very high flashpoints, are biodegradable within fifteen days and can replace xylene which is bad for the environment. Unfortunately, greener products tend to be more expensive so either the government needs to introduce legislation which bans environmentally damaging chemicals or farmers need to be able to recoup more value by charging a higher price as their products move from red to yellow or green labels.

Are there any plans to open a production facility for performance products in Brazil?

We would love to have a plant in the country but the current situation deters investment as the raw material needed for production is much more expensive in Brazil compared with the United States.

How challenging is the business environment in Brazil?

It is difficult for the industry to compete on a global scale due to high import duties in Brazil. Our customers would like to have access to next-generation products but they have to pay a lot of money. Also, there are too many regulations and registrations for new agrochemicals, so by the time they are approved they are old technology.

A positive is that distributors have good coverage, even with smaller companies, and they offer good packages of products. Some of the larger players also have good technical knowledge.

What are your key goals in Brazil and the region going forward?

Huntsman has a good market share but we want to continue growing where it makes sense, for example introducing new products which fit better with the region. We also want to have a better presence in some countries such as Argentina and Colombia. Overall, we expect Brazil to keep growing and see benefit in continuing to invest in the country. Brazil is known as the country of the future but now the future is finally coming. —

Marcos Gallo

Regional Feedstock Manager

**CABOT
SOUTH AMERICA
& MEXICO**



Could you introduce the company and provide some insight into how you became Latin America's leading carbon black supplier?

Cabot Corporation is a leading global specialty chemicals and performance materials that has been an industry leader for more than 135 years. We entered Latin America in the 1960s. Overall, we have four operations in the region in Brazil, Argentina, Colombia, and Mexico. Initially, we entered the Brazilian market through the model that dominated the petrochemicals industry at time in which technology companies such as Cabot would partner with local investors on projects. In the 1970s, we then purchased our partners' stakes and assumed full ownership of the operation.

What steps has Cabot taken to advance environmental sustainability?

Cabot has very ambitious environmental goals to reduce energy intensity, GHG intensity, nitrogen oxides intensity, sulfur dioxide intensity and waste disposal. Regarding green feedstock, today that is an economic challenge, but the way technology is progressing this could change in the future.

In terms of our product line, our purification solutions business markets over 150 types of activated carbon which can remove contaminants and pollutants from water, air, natural gas, food and from many more substances.

What are some of the main challenges you face in Latin America to developing your products?

In Latin America the presence of the state and state-owned oil companies, responsible for more than 70% of the chemicals value chain, is very strong. With the drop of oil prices, state-owned companies are under pressure to show better results to sustain their investment plans, which means that investments into refineries and chemical integration with them has stalled. There is need for better communication between the chemical industry and the base industry (i.e. oil companies) which are owned by the state in this region, meaning we have to educate and communicate more with the government. There is some evidence that dialogue between the chemical industries, refineries and oil companies is improving. —

José Armando Piñón Aguirre

Vice-President
SOLENIS



What are Solenis' main business areas in Latin America?

Solenis is part of private equity company CD&R and is present in around 120 countries, with 3,700 employees. We are a specialty chemicals solution provider and focused on the pulp and paper, mining, bio-refining and water treatment markets. Our process chemicals improve efficiency and reduce production costs of our customers, while our On the water treatment side, our chemicals are used to treat boiler, cooling and effluent water systems. Solenis works with water-intensive industries such oil and gas, mining, petrochemicals, primary metals, sugar and alcohol, and pulp and paper.

This year Solenis opened a technology center in Paulínia. What advantages will this bring to your customers?

The intention is to serve our customers in three different areas: to analyze samples rather than sending them to the United States, leading to faster response times; application development through process simulation with our customers; and, most importantly, fast-track research looking at how to better customize our products for the Brazilian market.

Brazil has one of the world's largest pulp industries. What are the reasons for this aside from the abundance of biomass?

The wood cost makes Brazil very competitive. The country also has a solid technical tradition in this industry and a lot of knowledgeable people working in it.

How difficult is it to obtain talent in Brazil?

Solenis' headcount in Latin America almost doubled in the last three years so we have been hiring a lot of people. Whilst overall we have been able to attract the workforce we want and need, it is still challenging.

What are the top challenges to your business?

Brazil's economy is not for amateurs and the lack of macroeconomic predictability, such as on the future cost of money, GDP growth rate and a clear industrial policy, is the biggest challenge. Labor costs are also challenging and the tax system is difficult to manage; we have more people working on tax than in any other country. Getting licenses for new projects sometimes can take longer than we would like and this has led to delays in our client's projects and our expansion plans. —



Alexandre Bassaneze

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Managing Director
AIR LIQUIDE BRASIL

—

Air Liquide has been present in Brazil since 1945 and has a strong focus on healthcare. What new developments have occurred since 2013?

We have completed two new air separation units (ASUs), one at a pulp and paper mill in December 2016 and another in the Paulínia basin where we doubled our existing capacity. Air Liquide has continued to expand its footprint in the country and today it has 73 units and we can cover 80% of Brazil's territory.

The last few years have been difficult for the industrial gases industry. How has this affected Air Liquide?

In our industrial merchant business unit the construction, oil and gas and automotive sectors were hit hard by the economic crisis. On the other hand, other sectors like food and beverage and pulp and paper have continued to perform well. Also, generally we have some very solid accounts in our industrial merchant line, despite the drop in demand for new projects. In addition, our healthcare business unit, covering medical gas and home healthcare, has continued to do well. Also, now customers in our industrial merchant unit are indicating that new projects will be launched again soon, signaling a new cycle of expansion.

Part of our strategy has been to continue to grow our packaged gas sales, what we call 'pronto gas', where we sell to the direct market. We have adapted due to the crisis and it has actually made us and the Brazilian market more competitive. In fact, Brazil is now exporting more gases than it was during the growth years. A similar change has also occurred in the automotive industry, which has increased its productivity and exports.

Is healthcare still your major focus in Brazil?

Gases for healthcare are growing faster than the wider industrial gases industry. We expanded our footprint so we could penetrate more of the market and now we will launch more offers and increase our sales

in our customer portfolio. We will also continue to look for acquisitions to grow in this sector. There are a lot of opportunities and what we are focused on now is identifying where there is most value in the supply chain.

What do you expect the impact of consolidation in the industrial gases market to be on the industry?

The mergers will not affect the strategy the group has announced for the period to 2021. After our acquisition of Airgas in 2016, we aim to have a return on investment of over 20%, up from 6% currently. Everything we do is related to three main pillars: innovating, connectivity and improving. The acquisition of Airgas does not have an immediate impact on our Brazil operations but we are looking at what we can learn from them to improve our business processes and grow our business. However, the most significant benefits will be realized over the longer-run.

What challenges do you face in terms of infrastructure?

In our industry, products must be very local so that is why we have more than 70 units so we can serve all of our customers. If you need to transport your gases over long distances, you cannot be competitive, due to the infrastructure challenges and high costs to move them around. There are still some areas of the north and north-east which we want to expand into; we have just started in Pará and we still need to cover Acre. Nevertheless, we are in the areas where there is most industrial and healthcare demand.

Do you have any final messages?

The economy is improving and confidence is coming back. Air Liquide is well positioned to capture growth in the future and the group believes in the potential of Brazil so we will continue to develop our business here, following our strategic plan. Whilst we are market leaders in Argentina, Brazil has the most potential for growth in the region. —

COMPETITIVENESS OF SEGMENTS OF BRAZIL'S CHEMICAL INDUSTRY

Source: Bain & Company; Gas Energy

SEGMENT	BRAZIL MARKET (US\$B 2012)	BRAZIL SHARE (%)	GLOBAL GROWTH % (07-12)	BRAZILIAN GROWTH % (07-12)	IMPORTS (US\$M)	EXPORTS (US\$M)	UNIT PRICE (US\$/kg)
Cosmetics	41.80	9.7	4.1	12.4	830	580	5.4
Agrochemicals	9.70	20.5	7.6	16.1	5,400	500	11.3
Food additives for animals ¹	1.10	10.0	3.7	10.1	458	310	2.5
Butadiene and isoprene derivatives ²	1.95	5.7	1.1	3.2	860	740	2.5
Aromas, flavors and fragrances	1.20	5.1	3.3	6.5	295	317	5.2
Chemicals for E&P	0.71	3.6	11.2	24.6	85	9	1.7
Surfactants	1.54	5.7	3.0	6.9	315	185	3.0
Aromatic derivatives ³	2.52	1.6	3.8	5.2	1,154	0	1.2
PU	1.50	3.5	1.6	5.8	944	83	2.7
Cellulose derivatives	0.33	1.3	6.3	1.1	190	37	3.5
Lubricants	4.50	3.5	1.0	2.6	1,127	209	2.4
Food additives for humans ¹	0.65	3.0	3.8	4.1	367	625	2.8
Oleochemicals	0.66	2.8	8.1	23.2	230	179	1.7
CF	0.10	9.4	7.9	107.4	97	0	24.4
Chemicals for mineral processing	0.19	4.1	2.3	7.6	93	8	2.2
Chemicals for leather	0.38	8.1	2.8	3.7	111	83	1.7
Silicon derivatives	0.42	3.0	3.7	5.2	190	536	2.5
Chemicals for concrete	0.17	1.7	3.7	5.0	30	4	1.1
Specialty polyamides	1.28	1.7	1.9	-5.2	509	14	3.4
High-tenacity polyester	0.13	2.1	4.5	-3.0	70	10	2.0

1) The food additives segment was divided to facilitate analysis

2) excludes BTX

3) the segment, chemicals from renewable sources, which cuts across the other segments, was also analyzed to identify opportunities

◀ 35

help them introduce more sophisticated packaging by bringing together designers from around the world to help create new forms of packaging,” remarked Pedro Fortes, corporate development manager for Latin America, Eastman.

Related to staying close to their local customers, specialty chemicals companies are putting some financial muscle behind their innovation drives. Along with the Solvay example already mentioned, a common theme among producers is the establishment of research centers in the last few years. For example, Croda has established an innovation center in Campinas, where DSM this year established an innovation center focused on the beauty and personal care market. “It means we can provide a faster response and offer more quality products to our customers. The Latin American market requires more prototypes and formulation suggestions so this center will enable us to spend a higher proportion of time collaborating with our customers in their product development projects. In addition, we will be able to further develop our ingredients, building new molecules and blends that are specifically designed

for the local market,” commented Pino.

Specialty producer and water treatment company Solenis has an equally strong commitment to R&D in Brazil and this year opened a technology center in Paulínia. Solenis is looking at how its products can best serve Brazil’s pulp industry, one of the largest in the world, which uses a very specific type of wood from eucalyptus trees, as well as the sugar and alcohol industry.

As well as research centers, specialty chemical companies typically have application laboratories to experiment on the best product formulations for their clients. For example, Arkema has invested in three international class labs in Brazil.

It goes deep: structural competitiveness issues

Brazil arguably has real strength in high value-added chemicals but holding it back are some deep structural issues. The challenges are numerous but most pressing is the lack of competitive feedstock, which can be directly related to the deficit in local

production as both Huntsman and Arkema have put off plans for production in Brazil because of it. “We would love to have a plant in the country but the current situation deters investment as the raw material needed for production is much more expensive in Brazil compared with the United States,” commented Roberto Kirschner, director, South America, Huntsman Performance Products, the wider company of which has a presence in Brazil across its main divisions of advanced materials, polyurethanes, textile affects and performance products.

Similarly, Eric Schmitt, CEO of Arkema lamented: “Lack of raw materials is a big challenge and we even came to the conclusion that it was not worthwhile producing one type of specialty chemicals product because of this situation.”

The feedstock issue is on most leaders’ lips and it is a key priority of Abiquim which is lobbying the government on the issue. However, Abiquim is also working to tackle other competitiveness issues which blight the chemicals industry, such as infrastructure and logistics, R&D investment and labor training. “We import

products which are 2.5 times higher in value than the products we are exporting, which shows that we are falling short of converting raw materials into high-value specialized products,” remarked Marcos de Marchi, chairman of the board of directors, Abiquim.

Whilst Brazil has made some progress in labor training and R&D investment, for example with the National Service of Industrial Training (SENAI) opening 50 new laboratories and 26 new applied research centers and investing US\$1.3 billion in innovation and technical training, infrastructure quality remains poor.

Impediments to competitiveness that were cited by specialty producers were typically the economic situation, bureaucracy and the tax system. With a -3.6% fall in GDP in 2016, it is little wonder that the industry was badly hit. Most affected sectors have been those closely linked to headline economic confidence and consumer spending, such as construction, paints and coatings and automotive. Volatility is a concern to some. “Brazil’s economy is not for amateurs and the lack of macroeconomic predictability, such as on the future cost of money, GDP growth rate and a clear industrial policy, is the biggest challenge,” commented José Armando Piñón Aguirre, vice president, Solenis.

Nevertheless, there is broad consensus that the recession was deep but that the worst is now behind Brazil. As Marcos Gallo, feedstock manager, Cabot South America & Mexico stated: “We are optimistic about

Latin America and despite its volatility, we have continued to invest. We believe it is in a transition period and we anticipate that the economic situation will continue to improve.”

Also, although the recession was long it is still only temporary, whilst inhibitive bureaucracy appears enduring. According to Schmitt: “Bureaucracy in Brazil hampers investment and projects are often only initiated with political connections...it can also be difficult for international companies to get the right local licenses.”

Indeed, there is a direct relationship between bureaucracy and growth. According to Piñón Aguirre: “Getting licenses for new projects sometimes can take longer than we would like and this has led to delays in our client’s projects and our expansion plans.”

Furthermore, sometimes import duties can also hold the sector back. According to Kirschner: “It is difficult for the industry to compete on a global scale due to high import duties in Brazil.”

An emergent industry

Despite these challenges, Brazil’s specialty chemicals sector has some core strengths. Brazil has a reputation for industrial sophistication. This resonates with those that study the industry on a macro level, such as Rina Quijada, senior director, Latin America, at consultants IHS Markit: “Brazil’s chemical industry’s core strengths

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The company is reducing its exposure to commodities and moving more into specialties which is why Solvay acquired Rhodia and Cytec Industries.

- José Borges Mathias, CEO, Rhodia-Solvay Group, Solvay Latin America

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have always been specialty chemicals and research and development.”

Moreover, Brazil’s cosmetics, agrochemicals and animal feed markets are booming, which is creating much opportunity for those specialty producers able to supply these markets. Recognizing the opportunity, Brazil’s petrochemical companies are also diversifying ever more into specialty chemical production. Unigel is looking to increase its specialty portfolio, such as production of methacrylate for applications such as nail beauty products. The logic is simple. “Commodity chemicals have a 4 to 5% margin, which requires high volumes to make production worthwhile, whilst specialty chemicals have higher margins,” outlined Kröger, president, Unigel. —

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Pedro Fortes

Corporate Development Manager
for Latin America
**EASTMAN CHEMICAL
COMPANY**

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For a B2B company like Eastman, the key to better design is still winning with the customer, i.e. working closely with them to identify unmet needs and building a relationship based on trust

”

Can you provide an update on key developments since 2013?

After the acquisition of Solutia in 2012 we completed four more acquisitions globally: Taminco, Knowlton Technologies, Commonwealth Laminating & Coating and BP's turbine oil business. These acquisitions were intended to complement the product line we gained with the Solutia acquisition. Overall, we have made ten global acquisitions in the last eight years. With some of the brands and products we have decided to maintain their names in order to avoid having to re-apply for licenses from the regulators.

What benefits have these acquisitions brought for Eastman?

Ten years ago we conducted a preliminary study that at the time identified that animal nutrition would be an opportunity for Eastman in Brazil. With the Taminco acquisition, now we have the option to leverage Brazil's status as a powerhouse in animal nutrition. In addition, the acquisitions have given us access to high quality talent. Therefore, now we have the employees, product line and client connections to drive growth in the most profitable areas of the economy. We continue monitoring opportunities for new acquisitions and today the macroeconomics are more favorable for companies as the exchange rate is better than in 2012. Although, the majority of local family-owned companies have been acquired already.

How has the recession affected demand for the industries Eastman sells to and the importance of Brazil in the wider company?

The automotive sector is still suffering from macroeconomic challenges but some companies are performing better than others. On the other hand, two of the global leaders in the animal nutrition industry are based in Brazil and the industry here has continued to perform well. We should also mention that the building and construction, packaging and consumer industries are very linked to the overall performance of the economy so they have suffered a bit in recent years. Nevertheless, because Brazil is such an important market, there is always opportunity.

How do you provide solutions for the packaging of cosmetics?

As well as selling to big international brands like Dior and Lancôme, we have been suc-

cessful at helping Brazilian companies, such as Natura, with our innovation program where we collaborate with companies in order to provide solutions to their business. We help them introduce more sophisticated packaging by bringing together designers from around the world, universities and our customers to help create new forms of packaging. One recent breakthrough we had after many years of research is the creation of a very flexible type of plastic, TRÉVA™, which can be used in packaging across many different applications. It is a cellulose-based engineering bioplastic that offers both high performance and reduced environment impact.

Where else are your products used?

Our materials are used in many different applications such as tires, coatings, plasticizers and building and construction. Performance films are a very successful product line for us and have a lot of different applications. For example, we created a colored laminated polyvinyl butyral (PVB) film for Miami airport which won a World of Color Award. Indeed, our products are used in Paris' Louvre Museum and New York's Empire State Building. A recent application of our technology we are particularly proud of is the use of our copolyester, Tritan™ in Philips' new blender, the Walita ProBlend 6. Due to our technology the blender's jar is twenty times more resistant than the previous ones produced and it does not break or crack.

We also have an extensive portfolio in feed preservation, hygiene solutions, nutrition optimization and acidification solutions. Although we are still a small player in agrochemicals, we also sell crop protection chemicals, such as specialty amines that we gained through the Taminco acquisition.

How are trends such as 'big data' affecting the product development process?

If you can understand how consumers are using products through the collection of big data, then you can design better products, so definitely this is having an impact. However, for a B2B company like Eastman, the key to better design is still winning with the customer, i.e. working closely with them to identify unmet needs and building a relationship based on trust. For a specialty chemicals company, it is essential to do this in order to differentiate your offering from other players. —

A global trendsetter: Chemicals and Brazil's personal care and cosmetics industry

The numbers do not lie when it comes to the success of cosmetics in Brazil: it accounts for almost 10% of the global cosmetics market and is the second biggest market globally for fragrances, sunscreen protection, men's products, depilatories, and deodorants. It is also the third biggest in haircare and children's products. Brazil is home to major international cosmetics and personal care brands such as O Boticário and Natura which have found success in the Americas, Europe and Asia. The sector has also been resilient to the economic crisis, with growth of 4.8% in 2016.

Brazilian consumers power this phenomenon. The country represents 7.1% of the worldwide consumption in the toiletry and fragrance industry, which amounted to 1.8% of the entire Brazilian GDP in 2016. It is also the second largest export market

for US cosmetics, personal care and fragrance products. "Buying cosmetics is a form of indulgence that Brazilians can afford in times of economic recession," remarked Viviane Gandelman, supply chain director at Dinaco, a Brazilian distributor of chemical products which derives 55% of its sales from the cosmetics industry.

At the same time, Brazil also exports to the U.S. where Brazilian products represent 15% of the U.S.' cosmetics market.

"The two cosmetics segments that are growing fastest are products for older consumers as the population ages and cosmetics for men, a market which is experiencing incredible growth. The demand for fragrances is also strong in Brazil, perhaps due to it being a tropical environment and the need to be fresh," continued Gandelman.

This is a sentiment shared by distribu-

tors Brenntag who are heavily invested in the personal care market. "Personal care is another highly important market for Brenntag in Brazil. In this market we are seeing the development of new products, especially for men and older consumers," remarked Érica Takeda, managing director, Brenntag.

Do no harm

Research carried out by Brazilian NGO Instituto Akatu found that Brazilian consumers' purchasing habits are highly influenced by ethical considerations. The top five concerns are: "cruelty free", socially responsible", "environmentally friendly", "low energy consumption", and "certified for fair labor practices". "Although renewably-sourced chemicals are often more

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The Science Behind Sustainability



Sustainability is an integral part of everything we do!

From the raw materials we use and the way we make them, from the ingredients we create and from the people who produce them, we believe we are always a responsible company, helping our customers to achieve their goals and the demands of their consumers.

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CRODA

Richard Pino

Vice President Sales and Marketing,
Latin America
CRODA DO BRASIL



What are Croda's main focus areas in Brazil?

Croda is a specialty chemical company focused on innovation, sustainability and biotechnology that aims to be the main name in the market behind high value-added ingredients. We are always looking to identify unmet consumer and client needs in high growth markets evading commoditized markets as much as possible. In Latin America, although the majority of our portfolio comes from outside the region, we have three manufacturing sites in Brazil with the biggest one in Campinas, a new one in Holambra after the acquisition of Incotec, a seed enhancement company, and the latest in Porto Alegre after the acquisition of Inventiva, a company specializing in nanotech encapsulation of cosmetic actives.

Croda has been investing in Brazilian manufacturing since the 1990s. What is the extent of your local production?

Our current Brazilian sales ratio of locally produced to imported is about 25% to 75%. Brazilian markets demand some local production and customization and we have been investing into new chemistries for the Campinas site. Here we mainly make lanolin and esters, which comprise a wide range of products applied into cosmetic, agrochemicals, pharmaceutical and industrial applications, but we also have blending capabilities and a new reactor for polymers.

What are some of the benefits of the new innovation center Croda has established in Campinas?

The center will add more capacity for research into our personal care and life sciences businesses, as well as our performance technology segments, which includes smart materials, energy technologies, homecare and water treatment. It means we can provide a faster response and offer more quality products to our customers.

What benefits will the new distribution center in Campinas bring to your clients and how do you work with distributors?

It is a state-of-the-art automatized facility which is fully aligned with the toughest regulations for health and personal care, providing a very high quality service for our customers.

What are Croda's key goals in Latin America in the next few years?

We have a strong product development pipeline at our Campinas site and want to grow through local production and better serving our local customers. —

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Innovation for a Better Future

Croda believes that being close to our customers, understanding the regional needs is key to deliver a high level of service and products.

The recent investments in the plant in Brazil will reinforce **Croda's** presence in Latin America. The new Innovation Centre will offer to our customers new experiences through product development and application supported by the highest technical knowledge from **Croda**.

We will continue growing and investing in Latin America to give our customers the best and most responsive service.

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Innovation you can build on™

Maurico Adade

President,
Latin America
DSM



DSM is active in health, nutrition and materials. What are your main areas of focus in Latin America?

We have a presence in all the key markets of Latin America with about 2,000 employees and sales of around US\$1 billion. Our operations consist mostly of blending facilities where we prepare pre-mixes for the animal and human nutrition industries which include beverages, dietary supplements and personal care. Brazil is where the majority of our operations are and is the most important market in the region. Our focus in Latin America is much more on our nutritional cluster rather than our materials cluster. In our nutritional cluster we house our nutritional products and food specialties business units. Around 70% of our business in the region is related to animal nutrition so this is a huge business for us in Latin America.

What affect has the economic crisis had on your business and are there any key milestones since 2013?

What is different about the recent economic crisis is that, unlike other recessions, the recovery has not been short and Brazil will not come out of it better off, even though we are now seeing some light at the end of the tunnel. The whole economy collapsed and this

led to a very bad situation for our industry, although in recessions the food industry is usually the last sector to be affected as people need to eat. We have not seen a substantial decrease in food intake but there was a dramatic change of habits, such as less meat consumption, and demand from automotive and electronics completely collapsed.

Brazil is not for amateurs – you need flexibility and to act fast. If a company enters Brazil they do not enter for 100m, they are here for a marathon and must be very persistent. In 2013, we made a huge acquisition of Tortuga that provides specialized minerals for dairy and meat cattle which reflected our confidence in the country's future potential, especially in meat exports where Brazil is the global leader. The acquisition has doubled our turnover in the region despite a recent meat scandal in Brazil involving JBS which damaged exports. Luckily the Minister of Agriculture reacted quickly to this and we have now navigated the crisis.

DSM recently opened an innovation laboratory in Campinas. Can you give any examples of innovations you are working on in Brazil?

DSM provides global solutions tailored to local needs and has achieved its 2015 goal of having 20% of sales coming from innovation. Our innovation is tightly linked to sustainability which is not just a key value but a source of growth.

During economic downturns, people change their eating habits by finding cheaper substitutes, for example switching from butter to margarine. We are working with the biggest producer of margarine to make it healthier by fortifying it with micro-nutrients and combating hidden hunger. People that live in slums in Brazil eat cheaper sausages to obtain protein and we have a project with BRF to fortify these to improve their nutrition and thereby help tackle problems such as anaemia, growth stunting and other health problems.

How is DSM involved in developing second-generation bio-ethanol in Brazil?

It involves using the remnants of corn which then undergo two types of treatment by special enzymes and yeasts, technology which we have developed. We have been in talks with BNDES to further develop the technology's potential and we continue to invest in it. However, unfortunately the focus on developing this innovation has gone away due to the crisis.

How competitive is Brazil in innovation?

It depends on what type of innovation. Totally disruptive innovation, such as discovering a new molecule, is unlikely to occur in Brazil but innovations which are related to developing a new technology are happening here.

How do you see Brazil's long-term prospects?

Brazil will come back; the question is when and how? What is happening now is a very strong exercise in democracy that will have a strong positive impact on the country and the economy. The prospects for the nutritional industry are therefore bright. The country is bigger than the corruption scandals but it will probably take a bit longer to recover than other crises as the country has hit rock bottom. Companies that stick it out for the long-term in Brazil need to be resilient and very customer focused. If you are not close to your clients, you are always behind. —



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expensive, once leading companies like Natura and O Boticário approve them and can build a successful value proposition to consumers, they become more popular. Consumers are becoming much more concerned about the environmental impact of cosmetics,” explained Gandelman.

Dinaco markets many renewably sourced products, such as emollients for ingredients producer Aprinova made from sugarcane instead of naphtha and active ingredients from beet that use a natural mechanism to hydrate skin and keep water in cells. Producer of chemical intermediaries Oxiteno is also alive to this trend. “25% of raw materials we use are from renewable sources and 37% of our products use renewable raw material. There are many companies that are trying to use more vegetable oil formulations,” explained João Parolin, CEO, Oxiteno.

A home for innovation

Brazil is uniquely home to all eight major human hair types and of a variety of skin tones, making it a natural home for innovation in hair and skin care. “Beauty is very important in Brazil for both men and women, and research has found that many Brazilian women take showers twice a day, which shows the potential use of raw material for this industry,” remarked Alexandre Kaplan, owner, Dinaco.

Given these factors, international cosmetics and personal care giants like L'Oréal and Avon have established innovation centers in Brazil. Avon established a Global Development and Innovation Center in Brazil July 2017 which will house 40 scientists who will partner with local universities and research centers. The center will focus on developing fragrances and products for hair and daily care to Avon's 50 markets around the world, therefore directly contributing to exports.

In line with cosmetics giants basing their innovation centers in Brazil, multi-specialty chemical producer Solvay in 2015 chose Brazil to locate a research center for hair care products. The company is developing new molecules used in shampoos and conditioners at the research center in Paulínia, São Paulo. The project also includes the commitment by Solvay to invest €20 million to expand production capacity of specialty chemicals for hair and skin care at its Itatiba, São Paulo plant. Unigel is also taking advantage of Brazil's unique demographic profile. It recently launched Oxisense S 0440, a new conditioning agent whose main benefit is hair frizz reduction. “The product was inspired by the diversity of Brazilian hair types and hair care habits, especially for women with regard to hair care,” explained Parolin.

Another growing application area for Brazil's specialty producers in the cosmetics and personal care market is packaging. “One recent breakthrough we had after many years of research is the creation of a very flexible type of plastic, TRÉVA™, which can be used in packaging across many different applications. It is a cellulose-based engineering bioplastic that offers both high performance and reduced environment impact,” described Pedro Fortes, corporate development manager for Latin America, Eastman.

High hopes resting on its shoulders

The success of the cosmetic and personal care industry in Brazil and the opportunities for the chemical industry that supplies it has certainly not gone unnoticed. The study commissioned by BNDES and carried out by Bain & Company on opportunities for diversification in Brazil's chemical industry identified cosmetics as the most competitive area that was ripe for investment to help reduce the trade deficit.

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Buying cosmetics is a form of indulgence that Brazilians can afford in times of economic recession. The two cosmetics segments that are growing fastest are products for older consumers as the population ages and cosmetics for men, a market which is experiencing incredible growth.

- Viviane Gandelman,
Supply Chain Director,
Dinaco

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In particular the Bain study saw opportunities for investment in aerosol deodorants and various categories of cosmetics, especially products for makeup, hair and skin care if challenges such as greater access to Brazil's bio sources, the limited availability of propellant gas, some petrochemical derivatives such as plastic packaging and surfactants and the high tax burden on the sector are addressed. Indeed, for some products taxes can increase the price by around 60%.

There is at least one improvement to this scenario when a new biodiversity law came into force in 2015. The law, which “aims at facilitating scientific research and the economic exploitation of biological samples of Brazilian genetic heritage, has reduced uncertainty for investors and is particularly good news for the cosmetics industry,” according to Felipe dos Santos Pereira, director, chemical industry department, BNDES.

Given the demographic uniqueness of Brazil's population, consumer trends such as ethical concerns and the high demand for cosmetics and personal care among Brazilian consumers, specialty chemical companies will do well to continue to focus on developing new innovations for this fast growing market. Going forward, the industry will also be looking to the government to provide better incentives to help this industry flourish even more. —



A sector hungry for chemicals: Brazil's huge agricultural industry

For many years now, Brazil's agricultural sector has been the bright spot of its economy. Over the last 25 years, agribusiness in Brazil has grown consistently. Whilst other sectors have seen their trade balance tip deeper into deficit, Brazil's trade surplus in agribusiness reached US\$75 billion in 2015, and agricultural products made up 46.2% of total exports and 21.5% of GDP at the height of Brazil's recession according to the Ministry of Agriculture, Livestock and Food Supply. Growth estimates for the sector in 2017 range from 9 to 11%. Furthermore, the sector's competitiveness has risen dramatically over the last ten or so years. Compared with the 2005 to 2006 harvest, productivity up to the year 2017 has increased by 55%, whilst acreage has risen by 26%. Brazil has also doubled its grain output to 238 million tons (mt) over this period.

Brazil's is the largest producer of coffee and sugarcane, the second largest producer of soybean and the third largest producer of corn in the world. Meat exports are also huge for the economy. Brazil is the largest producer of chicken, second largest producer of beef and the fourth largest producer of pork. 2017 looks to be a bumper year for Brazil's agricultural sector. "Brazil is a huge market in this segment – indeed this year there was a record grain crop of 240 million mt, 50% of which is soybean," commented João Parolin, CEO, Oxitenio.

In fact, the United States Department of Agriculture estimates Brazil will export a record 61 million mt of soybeans in 2017. In addition, Brazil's corn production for 2016 to 2017 is set to reach a record 95 million mt, up 30% from the previous year, due to favorable weather conditions.

It is little wonder then that agrochemicals are a huge business for the wider chemicals industry in Brazil. In fact, Brazil represents over 20% of the global agrochemicals market, second only to the United States. The sector can be split into two main areas: pesticides and fertilizers. The tropical climate in the country means that it is a perfect environment for insects, weeds and fungi to flourish, so there is much demand for pesticides such as insecticides, fungicides, herbicides and biopesticides. So much so that Brazil overtook the United States as the world's largest buyer of pesticides recently.

Almost as voraciously, Brazil's agricultural sector is hungry for fertilizers, such as nitrogenous, phosphorous and potassium products, with demand expected to grow twice as fast as the rate of overall global growth until 2025. This presents a huge opportunity for Brazil's chemical sector. Overall, sales of agrochemicals grew by 5% in 2016 as sales of chemicals as a whole declined.

Surfing the wave

Companies up and down the supply chain are looking to profit from Brazil's agricultural boom, although there are already some very well established players. Leading companies include BASF, Bayer CropScience, TechnipFMC, Syngenta, DowDuPont, Adubos Sudoeste, Agrium, EuroChem, Koch Industries, Novozymes, PotashCorp and Valent BioSciences. "Agrochemicals are one of the segments we invest the most in R&D. There will be 10 billion people in the world by 2050, and the land we have for food production will not be enough, thus we need to increase crop yields meaning that the chemical industry has room to play a key role," remarked Ralf Schweens, president, South America, BASF.

Beyond these players, other producers that serve the agricultural market include Oxiteno and Huntsman. "Brazil is very important to the wider company in terms of agrochemicals, where it has some of its biggest customers in this sector," commented Roberto Kirschner, director, South America, Huntsman Performance Products.

More producers are also looking to ride this wave, such as Eastman. "Although we are still a small player in agrochemicals, we also sell crop protection chemicals, such as specialty amines that we gained through the Taminco acquisition," explained Pedro Fortes, corporate development manager for Latin America, Eastman.

Taminco's crop protection line produces alkylamine derivatives designed to protect crops from fungal diseases and to increase yields. Similarly, Croda acquired Incotec, a seed germination company. "Incotec is

a remarkable company as its technology increases seed germination from around 75% to 98%," remarked Richard Pino, vice president sales and marketing, Latin America, Croda.

Perhaps the area of most opportunity, however, is in the distribution and transportation of chemicals for Brazil's agricultural sector. This is particularly the case with fertilizers given the high degree of imports of these. Of the trade deficit in chemicals of US\$22 billion in 2016, fertilizers are the number one product imported, reaching US\$5.2 billion and 22.2 million mt, according to Abiquim. Some of Brazil's top chemical distributors have taken note. "We are increasing our presence in agrochemicals. We already produce liquid fertilizers with our own technology which we want to sell more of and we also want to distribute more chemicals used in agrochemicals formulations," said Érica Takeda, managing director, Brenntag, indicating the company's role in production as well as distribution of fertilizers.

Meanwhile, MCassab has placed agrochemicals as a core part of its strategy. "It is an increasing area of importance for the company and a few months ago we launched a new segment on fertilizers. Agrochemicals are a large and growing market in Brazil... We are very optimistic that in the short-term agrochemicals will become a very important business for our company," explained Victor Cutait, director, MCassab.

This of course means more business for logistics companies and agrochemicals form a large part of third-party logistics provider BDP International's Latin America business, as well as transportation and logistics company Grupo Toniato. Intriguingly, Grupo Toniato's business has actually profited from oversupply of agrochemicals. "The last few years have been marked by a larger stock than planned by the industry, compromising the entire agrochemical supply chain. Distributors currently have a backlog of agrochemicals which have a limited shelf life and need to be returned to the producer for re-processing which ironically has meant more demand for our services," explained André Façanha, CEO, Grupo Toniato.

Animal feed

Given Brazil's large market in meat products, chemicals for animal feed are also a booming market. Food additives for animals were identified in a major report by consultants Bain & Company, funded by BNDES, as the third most competitive chemicals market in their area of study which aimed to analyze key segments accounting for Brazil's trade deficit in chemicals. In an effort to capture this growth, food and feed is a key part of Brenntag's 2020 growth vision. There is also some overlap with the agrochemicals market and MCassab sees this as an opportunity for cross-selling: "(T)here are some synergies with our other business units. For example, we sell the same minerals for leaf fertilizers as we sell for animal feed," said Cutait. Animal nutrition is an even more strategic area for DSM, the global science-based company active in health, nutrition and materials. "Around 70% of our business in the region is related to animal nutrition so this is a huge business for us in Latin America," stated Maurico Adade, president, Latin America, DSM.

In 2013 DSM acquired Brazilian company Tortuga, which provides specialized minerals for dairy and meat cattle. "This reflected our confidence in the country's future potential, especially in meat exports where Brazil is the global leader," continued Adade.

The acquisition has doubled DSM's turnover in Latin America, even though Brazil's meat industry has recently suffered from a meat scandal, now resolved, involving Brazilian company JBS, the world's largest meat processing company. It must be noted the success of Brazil's agricultural industry is, to a large extent, dependent on global prices of agricultural products. Nevertheless, with Brazil's growing population of over 200 million and global growth, there will always be demand. Given Brazil's leading position in the production and export of so many agricultural products, which have weathered the recession whilst other sectors have floundered, it appears the prospects for both agrochemicals and animal nutrition are bright. —





DISTRIBUTION



“For specialty chemicals, simply competing on price is not the right strategy. We have a very well-equipped application laboratory for coatings which we have been told by industry analysts is the best one they have seen among distributors and even better than many producers’.”

- Érica Takeda,
Managing Director, Brenntag.

Chemical distribution: An industry in flux

The chemical distribution market in Brazil is a dynamic but crowded market. The 10 largest distributors currently have just 40% of the US\$5.6 billion market, whilst the remaining 60% is occupied by literally hundreds of players. There have been numerous acquisitions in recent years, typically in the form of international actors snapping up local companies. Just recently in April 2017, quantiQ, the biggest chemical distributor in Brazil, was acquired by GTM, one of the largest chemical distributors in Latin America and therefore creating the largest independent chemical distributor in the entire region. In 2013, Dutch chemical distribution firm IMCD acquired a majority stake in Makeni Chemicals, the Brazilian specialty chemicals distributor now named IMCD Brasil and in 2014 Univar, a global chemical distributor with more than 113,000 customers, purchased local specialty chemical distributor D'Altomare Quimica. Furthermore, Mexican distributor Pochteca is in the process of a staged acquisition over five years of local player Coremal.

Virtually all actors appear to support consolidation and it is the preferred outcome of Associquim, the national association for chemical distributors across the country. "This is very important, especially in a country as big as Brazil. The distribution business has been very resilient despite the economic crisis and, as our industry matures, we think it is good that international players are investing in Brazil," remarked Rubens Medrano, president, Associquim. There is certainly scope for more deals and international players will be eyeing further acquisitions. "There is plenty of room for more mergers and acquisitions. With regards to Brenntag, we are continuously evaluating potential acquisitions, continuing a long history of growth in this way," revealed Érica Takeda, managing director, Brenntag. Market participants expect consolidation to take the form of larger players buying small-

er ones in niche areas, in line with IMCD's acquisition of Makeni Chemicals. "As the market gets better, more companies will acquire smaller and more niche players, for example those focused on food and cosmetics. There are many companies that even focus on sub-segments of these sectors and often operate in only one part of the country, so there is much more room for acquisitions," predicted Romero Dantas, director, Coremal – Pochteca.

Why use a distributor?

Revenues for the sector have weathered Brazil's economic storm over the last few years. Whilst they did drop from roughly US\$6.8 billion in 2014 to US\$5.5 billion in 2015, they crept back up to US\$5.6 billion in 2016, despite the country experiencing a 3.6% drop in growth. The sector has a good reputation among many business leaders in the chemical industry, such as specialty chemical producers. "A positive is that distributors have good coverage, even with smaller companies, and they offer good packages of products. Some of the larger players also have good technical knowledge," remarked Roberto Kirschner, director, South America, Huntsman Performance Products, a specialty producer.

Curiously however, despite this reputation and the deep bank of companies involved in distribution, the participation rate of distributors in the chemicals and petrochemicals market has hovered around the 12% mark since 2013.

This begs the question as to what the role of a distributor should be in the chemicals market. Richard Pino, vice president sales and marketing, Latin America at Croda Do Brasil, another specialty producer, sees distributors providing value but only to a certain extent. "We have our own global sales force that is best placed to sell to our

customers, because they can discuss their precise requirements, understanding how we can work with them to help meet unmet consumer needs." Croda's decision to establish its own world-class distribution center in Campinas mirrors this sentiment.

According to Victor Cutait, director, MCassab, a Brazilian distributor with an international reach, there are a number of reasons producers should use a distributors such as his: "Firstly, to sell to small and medium companies that producers do not have the resources to handle. For example, MCassab has 6,000 active clients from the small to the very big companies. Secondly, a distributor handles logistics through distribution branches, which is especially important in a country as large as Brazil. Thirdly, we provide financing of the purchasing of products and cover credit risk."

Not just selling chemicals

"Brazilian distributors are generally good because they understand the need to provide

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The distribution business has been very resilient despite the economic crisis and as our industry matures we think it is good that international players are investing in Brazil.

- Rubens Medrano,
President,
Associquim



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clients with value-added services. Croda works with distributors that are very specialized and can add value,” continued Pino. Distributors are so much more than simply buying and selling and increasingly, as Brazil’s chemical industry matures, they are offering much value-added services. It is a natural extension of their services for distributors to be involved in logistics, as well as advising on onerous regulations, or offering financing as MCassab does. “We add value by offering cheaper transport, effective quality control, handling a large inventory and all labelling requirements, meeting all standards, providing financing and by being more flexible compared to what our customers could achieve on their own,” explained Jan Felix Krueder, CEO of Brazilian owned distributor Química Anastácio which has sustained double-digit growth every year in recent years.

Química Anastácio exemplifies how specialty distributors are increasingly offering packages of large quantities of chemicals, which has driven the expansion of its product portfolio from around 500 in 2013 to 800 today, with at least six new products added every month.

More indicative of an evolutionary shift in business model is that distributors are becoming partners in product innovation. It is highly unusual for specialty chemical distributors not to have application laboratories and arguably, it is essential they do given that specialty producers need to develop specific

products for highly particular functional needs across a variety of industries. “For specialty chemicals, simply competing on price is not the right strategy. We have a very well-equipped application laboratory for coatings which we have been told by industry analysts is the best one they have seen among distributors and even better than many producers’,” commented Takeda. Brenntag also has application labs for agrochemicals, polymers and is building one for home and personal care. quantiQ, on the other hand, provides customized solutions for clients through its formulated products line, reflecting its commitment to solving client’s specific problems.

Application labs help create new products. As Viviane Gandelman, supply chain director at Rio based distributors Dinaco explained, “We work with customers to develop formulations and solve their challenges rather than just sell chemicals... For example, as a result of consumer trends, we find natural sources for cosmetics clients and overall we have we have developed a lot of products in cosmetics.”

Future business models

As Brazil’s chemicals market matures, specialty chemicals are becoming more prominent. Exemplifying its pivot towards specialty chemicals, Univar acquired D’Altomare as it brought silicon into their

product line and Dow Corning as a customer. Quimisa, a local distributor, supplies a variety of industries and owns its own logistics, is looking to increase its specialty sales which have been growing at a rate of 5% in the last year.

Brazil has real strengths in areas such as cosmetics, agrochemicals and animal feed. It is therefore no surprise that distributors such as Dinaco, Brenntag and Química Anastácio and others have a strong focus on cosmetics.

Even though the distribution market has been somewhat resilient, it still faces challenges. The recession had a significant impact on revenues and was much longer than previous ones, whilst the need to diversify portfolios to specialties whilst providing more value-added services is no simple task. Furthermore, distributors reported Brazil’s complicated fiscal framework, with taxes differing from state to state, as a constant headache.

“The main players in the chemical distribution sector in Brazil should be able to coexist with increasingly international competition, more demanding legislation and regulations, and rigid financial health,” predicted Armando Bighetti, president, quantiQ.

More consolidation is likely to occur as the operating environment tightens. A key goal for the industry, meanwhile, should be increasing the participation rate of distributors in the chemical industry and promoting all the value they can bring to producers. —



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Rubens Medrano

President
ASSOCIQUIM

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Right now, the market is quite steady in terms of consolidation but it is still very fragmented and there is more opportunity for mergers.

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What is the role of Associquim in the chemical distribution market in Brazil?

Associquim is the national association for chemical distributors across the country. We were founded in 1960 and we have around 90 members. To become a member companies have to apply to the responsible distribution program called PRODIR, and must be a distributor (although we have some producers as members as well). PRODIR was launched in 2002 and follows the US National Association of Chemical Distributors' responsible distribution procedures very closely. In fact, we are supported by our US counterparts and have much contact with them.

Do you encourage the consolidation happening among distributors?

Yes, this is very important, especially in a country as big as Brazil. The distribution business has been very resilient despite the economic crisis and as our industry matures we think it is good that international players are investing in Brazil. Right now, the market is quite steady in terms of consolidation but it is still very fragmented and there is more opportunity for mergers.

What other trends are you noticing in the distribution industry?

Distributors are increasingly a one-stop-shop for many different products and so reduce the costs for everyone. Also, they now add a lot of value to the chemical industry that goes beyond just buying and selling to provide additional services. One aspect is technical support for both the producers and consumers. For example, many distributors have laboratories now for both application development and testing. Moreover, as the chemical industry has been reducing their headcount, distributors are becoming more important. They also remove the need for their customers to hold much inventory, especially useful where consumption is low for certain products.

For commodity chemicals there is a lot of local production but not always enough to meet demand. There is a lack of local production in specialties and most of these are imported so the role of distributors is very important for these, especially as they import in full containers which makes the cost for customers lower.

How do operating requirements differ

for commodity and specialty chemical distributors?

Most distributors nowadays have a combination of commodities and specialties in their portfolio, with a typical ratio of 60% commodities to 40% specialties. Distribution of commodities demand a high working capital, whilst specialties require less capital but more added value to the products provided, such as formulation, advice on maximizing usage and post-sale services. Specialty chemicals are mostly used in food, pharmaceuticals and cosmetics industries.

What are the main challenges holding back distributors in Brazil?

Firstly, fiscal legislation is very complicated, especially when distributors operate in several states as sales taxes differ from state to state. Secondly, the volatility of the economy is challenging for distributors, in particular when importing as it makes it difficult to plan the inventory they need. There are also many licenses and regulations distributors must adhere to in order to handle chemical products as there are many governmental entities impacting the chemical sector. We have to deal with federal, state and county legislation and entities such as Department of Federal Revenue of Brazil (Customs), the federal police, the Ministry of Defense, and others.

PRODIR has been helpful in this regard as it keeps the industry updated on new legislation and we interact with the government to help shape regulation affecting our industry so that it makes things easier for our members. We also provide advice to companies on how to meet all regulatory requirements.

Do you have any final messages?

We want to continue to protect the interests of distributors and provide market information. Every global distributor, if they want to be truly global, needs to be in Brazil as it is Latin America's largest market. Our market is similar to the US market, except it is smaller, making it attractive to international players. Furthermore, to expand in Latin America, it makes sense to be based in Brazil, given our similar culture and the fact that countries like Chile, Argentina and Peru are smaller markets compared to Brazil. We are confident that as soon as the political situation is back to normal, the market will grow again. —



Armando Bighetti

President
QUANTI Q

Could you provide a brief introduction to quantiQ and main developments since 2013, such as the acquisition by GTM?

quantiQ sets the benchmark for chemical distribution in Brazil and belongs to GTM Holdings SA. With diversified operations, we are present in several market segments. Our portfolio has more than 1,000 products, split between industrial, specialties and customer solutions (tailor-made products), offering value-added services to more than five thousand customers in Brazil. In addition, quantiQ has a service area for third parties (storage, bottling, industrialization and chemical analysis) and a lubricants production plant.

Over the past few years, we have prepared ourselves to be a solutions provider, looking to the future through the adequacy of the product portfolio, effective man-

agement of project pipeline and investments. As an example, we can mention the increase of specialties following global trends and regulatory demands in several segments, the start-up of a lubricant production plant and the development of customized solutions for clients through our formulated products line.

The acquisition of quantiQ by GTM represents a significant expansion of our business, strategic alliances and territorial coverage. The integration between the companies has increased the flow of international business, generating diverse synergies and numerous growth opportunities. With the integration, we have taken a leading position throughout Latin America with a broad portfolio of products and principals, 62 distribution centers and a highly qualified team capable of delivering solutions to our customers.

What are the main industries of interest for quantiQ and growth drivers at the moment?

We are present in more than 30 market segments, especially adhesives, agroindustry, flavors and fragrances, rubber, civil construction, cosmetics, pharmaceuticals, lubricants, human nutrition, oil and gas and paints. For the next few years, we are confident about the resumption of the Brazilian economy with a recovery of the confidence of the industry and the service sector.

Hence, structural segments such as automobile and civil construction tend to recover naturally, consequently boosting other segments such as paints, lubricants and rubber. The pharmaceutical, human nutrition and cosmetics segments are also considered promising due to their innovative nature and constant evolution, with participation of specialty chemicals.

As the economy improves after two years of crisis, what are the challenges remaining to develop the chemicals value chain?

Brazil is experiencing the worst economic crisis in its history. The last two years were extremely challenging, as several sectors of the economy registered a month-on-month decline, there was a crisis of confidence and consequently reduction of consumption and investments. This had a strong impact on the market and several production chains. As a result, the constant

search for operational efficiency, cost reduction and maintenance of competitiveness have become critical factors for survival. The economic recovery is already under way but at a slow pace. The main players in the chemical distribution sector in Brazil should be able to coexist with increasingly international competition, more demanding legislation and regulations, and rigid financial health.

How does quantiQ stay close to customers across such a diversified portfolio of industries?

Even in a diverse environment, quantiQ seeks incessantly to interpret the needs and tendencies of the market and clients, with a strategic alignment with its principals. As a result, we have found opportunities to offer our clients adequate solutions for their business, either through our portfolio of products and services or our experience in formulated products in the most diverse industries in which we operate.

What role can the chemical industry play in sustainability and environmental protection?

We believe that chemistry is in everything, providing security, quality, practicality and comfort to people's lives. With population growth, chemistry plays a major role in the progress and development of humanity, whether by the use of cleaner and more efficient technologies or products that promote waste reduction and are aligned with sustainable practices.

Do you have any final messages for the audience of Global Business Reports and APLA delegates?

We believe in the potential of the Brazilian market. Even amid the political and economic crisis of recent years, we have been able to make important changes and position ourselves adequately for stronger market growth. Based on this vision, quantiQ has been constantly working on improving its practices, focusing on the strategic segments, acting with rigor in inventory management, searching for new products and developing partnerships with global principals. With the acquisition by GTM, we have expanded our operations and reached a leading role in Latin America, thereby strengthening our commitment to growth and delivering solutions that add value to our customers and principals. —

Jan Felix Krueder

CEO

QUÍMICA ANASTÁCIO

Química Anastácio has quintupled its sales over the last ten years. How have you been so successful?

Many factors have led us to this point. We have been in existence for over 75 years and over this time we have always had strong values which we believed if we stuck to in the long term would sustain our growth. Also important is that we work across fourteen different segments and three master segments: Beauty and Health; Industrial; Agriculture; and finally Food which includes human food, sport nutrition and animal nutrition. For each segment we have separate marketing plans and technical support teams; we have to be competitive in each segment, which has to be seen as a single company inside our structure.

Furthermore, we launch new products very regularly – we increased our product portfolio from around 500 in 2013 to over 800 today and are targeting six new products every month, which we often surpass. Increasingly our import team is importing and consolidating products coming from over 50 different countries and delivering these to our customers. All of these factors working together mean we have been able to sustain double-digit growth every year.

Can you describe how you manage the process from sourcing new chemicals to delivery to the client?

Firstly, 95% of the time we source new products because a customer demands particular chemicals or suppliers want us to sell a more complete range of their portfolio. Our international purchasing team handles a lot of bureaucracy in order to get the right licenses and coordinates between our suppliers, quality control and pricing teams and the customer until the moment the product is approved. Then, our international department analyzes which transport method is best to ship particular packages and to which ports to ship each product.

We have warehouses in Santa Catarina, São Paulo, Rio de Janeiro, Pernambuco and one in Goiás, in the center of Brazil. In these locations we handle the importing, warehousing, invoicing and shipping of products all over Brazil. We also have a strategic unit in São Paulo which allows us to buy liquid products in trucks, ISO and flexi-tanks, warehousing them in a tank park and drumming into IBCs, steel and plastic drums or dispatching in trucks. This makes us competitive as we can buy the most economic package and meet the exact package requirements of our clients. We add value by of-



Henrique Bavoso

Business Director
UNIVAR BRAZIL



What key developments have happened since 2013 and what has been the impact of the acquisition of D'Altomare Quimica?

Univar has made a string of acquisitions since 2011 when it acquired Arinos. The rationale behind these has been to penetrate the market vertically and gain more authorisations in Brazil and across Latin America. In 2016 we integrated D'Altomare's business into ours at our headquarters in Osasco, having acquired them in 2014. We continue to look for new acquisitions in order to gain more authorizations. Although we provide some commodity chemicals, our strategy is to continue to move more into the speciality market. For this reason we have many different technical experts for each specific market, which we gained more of with the acquisition of D'Altomare – a move which was a key part of our strategy.

Univar also purchased Tagma in September 2017. Tagma shares Univar's safety, integrity and quality values. With this acquisition, we add tailored formulation and blending services to our capabilities, an important move into the Brazilian agro chemicals market, aligned with our global strategy for this segment.

What are the main business segments that you operate in?

In 2016 we consolidated our Latin American operations into four verticals: life sciences, which includes personal care, food and pharma; coating and construction; industrial chemicals which includes polyurethane applications, electronics, metalworking, lubricants, textiles and formulators; and agriculture, oil and gas, and mining. The goal behind this was to operate as one company across the region. Alongside distribution, we also carry out blending of polyurethane in Brazil and have application laboratories in specific markets.

How has your client base changed since 2013?

The acquisition of D'Altomare has added silicon to our product line and therefore Dow Corning as a customer, which was the main reason behind the acquisition. We have also gained authorization from ExxonMobil, Huntsman and others due to the expansion of our portfolio. We are con-

tinuously looking for new, niche markets where we can add value. Univar is also offering more packages of chemicals which reduce costs for its customers and helps broaden its client base.

What is the balance between imports and exports of speciality chemicals?

Generally, Brazil is a net importer of chemicals. It produces some specific basic chemicals but not so many speciality chemicals so mainly we need to import these. Overall, we import about 50% of the chemicals we distribute. Brazil, Mexico and Argentina are the biggest chemicals markets in Latin America but ultimately they are always going to need to import many of the chemicals they need in the future. The cost of raw materials in Brazil and Argentina is too high and infrastructure and logistics are a challenge, which holds their chemical industries back. Brazil will import more from the United States due to the shale gas revolution. Maybe with Argentina's shale gas reserves they can also supply more of their own feedstock but they also have significant challenges.

What is the perception of Brazil's chemical industry internationally?

Brazil is a challenging environment due to its tax system and other difficulties of doing business but things are improving compared to fifteen or twenty years ago. It is very difficult to establish a new company and therefore working through a distributor like Univar is a good option for foreign companies. Despite the economic crisis, we have strong local demand and more foreign companies are coming to Brazil. Also, now the economic fundamentals are picking up and we are moving out from the bottom of the economic cycle.

Do you have any final messages?

In the last six years, Univar has been investing in Brazil and Mexico, and in the coming years in other countries across the region such as Argentina, Colombia, Peru and Chile. We have been hearing from suppliers that there is a lack of distributors that work across the whole region. Therefore, we want to operate in the region as one company, working with suppliers to develop a strategy and offering the same high-quality service across different countries. —

Victor Cutait

Director
MCASSAB



Could you give an overview of MCassab's global presence and your product portfolio?

We have distribution sites in São Paulo, the northeast of Brazil, Santa Catarina, Rio Grande del Sul and the west of Brazil. We also have plants for pre-mixes close to Curitiba and in Mato Grande Del Sul. Internationally, we have a branch in Argentina, where we distribute to the same segments as in Brazil, and a branch in China. We have had our China office for a long time; it started as a procurement office to develop new products but three years ago we also started local distribution for producers there. In addition, we export some chemicals from Brazil to China.

Our portfolio includes commodities, specialties and formulations across three main divisions: industrial chemicals, where we sell

products for polyurethanes, paints, plastics, textiles and lubricants; life sciences which include cosmetics, food, pharmaceutical and household; and animal nutrition and health which include vitamins, minerals, antibiotics, enzymes and more.

Why should more producers use distributors such as MCassab?

Firstly, to sell to small and medium companies that producers do not have the resources to handle. MCassab has 6,000 active clients from the small to the very big companies. Secondly, a distributor handles logistics through distribution branches, which is especially important in a country as large as Brazil. Thirdly, we provide financing of the purchasing of products and cover credit risk.

What are the benefits of importing chemicals from China?

The quality of chemicals in China has increased a lot and many are at the same standard as those produced in the United States and Europe.

Do you have any plans for international expansion and where would you like to see MCassab in two years' time?

MCassab has doubled its size every five years, with the exception of during the current crisis which, along with a reduction of market prices for chemicals, reduced our turnover from US\$400 million to around US\$300 million. However, in the next five years we are looking to double in size again. We are optimistic about the economy and distribution market which is why we keep investing. —

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Érica Takeda

Managing Director
BRENTTAG



Could you introduce Brenttag's Brazil operations and the impact of the recent Gafor Distribuidora acquisition (2014)?

The acquisition of Gafor Distribuidora was aimed at bringing some of ExxonMobil Chemical's solvents and other specialty products into our portfolio and reflects our goal to continuously optimize our product portfolio in line with market needs. This means we need to be close to our clients to understand how their demands are changing and is the reason for our 'Connecting Chemistry' logo.

How much of its chemicals portfolio does Brenttag import?

Three years ago our suppliers were heavily skewed towards domestic producers. However, about two years ago we started to import more chemicals as we increased the amount of specialty chemicals in our portfolio. Nevertheless, we still have some key domestic suppliers in our portfolio such as Dow Chemical and Oxiteno.

What do you see as the main infrastructure challenges in Brazil?

Port congestion is the number one issue which means additional costs for the entire value chain for both imports and exports. Also, Brazil does not have enough rail cars compared with the United States or even Mexico. Unfortunately, we do not see the situation improving in the near future. This is a serious problem as, if the economy was doing better, infrastructure challenges would be an even bigger bottleneck.

Consolidation among distributors was a big trend in 2013. How has this trend evolved since then?

Despite the crisis years, Brazil's economy is still a powerhouse and will continue to attract foreign players. This, plus the fact that the chemicals distribution market in Brazil is very fragmented, will mean consolidation will increase in the future.

End-users of specialty chemicals require not just delivery of chemicals but technical know-how. How does Brenttag ensure it provides both?

For specialty chemicals, simply competing on price is not the right strategy. We have a very well-equipped application laboratory for coatings. This reflects our value proposition for specialties which is that we can recommend chemicals for different needs, compared to commodity chemicals where operational efficiency is our main value-add. We also have application laboratories for agro-chemicals, polymers and are building one for home and personal care. —

Rogério Gilberto Wehmuth & Andressa Wehmuth

RGW: Owner

AW: Regional Director, Latin America
QUIMISA



RG

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Quimisa has been on the market for over 50 years. What is the history of the company and its distribution presence today?

RGW: The company was launched in 1959 when we began working with the textile industry, from our headquarters in Brusque, Santa Catarina. Over time we expanded to have branches in Rio Grande del Sul, Paraná, Itu, São Paulo and São Paulo city. 85 of our business is in commodities and we supply to the agriculture, feed and food, pulp and paper, water treatment, detergents, paintings and coatings and metallurgy industries. For textiles we supply products for softeners and detergents. We also supply products for paints and dyes and have a contract with KISCO, a big South Korean company which produces many types of dyes for textiles, leather, paper and others.

AW: 15% of our business is in specialty chemicals. We supply enzymes for household care and medical cleaning. We also have a lab dedicated to product development. Quimisa is looking to grow its specialty chemicals business and this year we have been growing our specialty sales at a rate of 5% year-to-date. Customers need cheaper formulations so we develop special mixes for them, such as for stain removal. For medical cleaning we have approval from Brazilian Health Regulatory Agency (Anvisa).

Quimisa distributes the largest volume of tanked caustic soda in Brazil. What trends are you noticing in the market?

RGW: Caustic soda is like milk and bread as everybody needs it. The most important end market is aluminum, followed by pulp and paper detergents, textiles and leather. Demand decreased a little during the economic crisis but from July 2017 until now demand has been growing every month. As we have been facing some external factors as hurricanes, tight volumes and politics instability, we are even more focus on high quality of service and solutions, in terms of packages and product mix for customers.

How have trends in demand for your products changed due to the economic crisis?

AW: We found during the crisis that customers stopped buying stocks of products but instead bought them on short-notice when they really needed it. Also from July till now, they are buying more packages of

products and demanding more flexible payment terms.

The distribution market is quite crowded. How does Quimisa stand out?

AW: We are different because we also own the logistics. We have almost 80 trucks and hold inventories of one to two months so we can deliver products very quickly and flexibly – we are always available. We also provide flexible payment terms. We have lots of different packages and always have the volume that a client needs.

How much are certifications like PRO-DIR, SASSMAQ and ISO 9001 requirements to be a distributor in Brazil and how do your products contribute to sustainability?

AW: You need these certificates, which we have, in order to gain business with the big companies. It is the first step to build a partnership. Although, for the informal market they are not as important.

RGW: Our products treat water and most of our products are bio-degradable. Our enzymes are an example of bio-technology and their use leads to a 20% reduction in water usage in washing machines. We also have a system to capture the rainwater, in order to reduce and reuse water.

Are taxes an important challenge for your business and are there any other significant challenges?

RGW: Taxes are a challenge and differ from state to state. Some states like Santa Catarina have a more beneficial tax system for importing, which São Paulo does not have. Therefore, some companies just have a representative office in Santa Catarina so they can benefit from this. Sometimes customers based in São Paulo will ask us to invoice them from Santa Catarina, which we can do because of our branch in that state.

Do you have any final messages?

RGW: We are innovating in animal feed and have actually hired a vet so that we can measure the effect of feed on animals. Also, six months ago we started the production of resins for MDF wood for furniture.

AW: Quimisa will be focusing more on the specialties segments, as such detergents and medical cleaning because we believe these sectors will grow as everyone needs to wash their clothes and needs healthcare. —

Romero Dantas

Director

COREMAL – POCHTECA



Could you provide an introduction to Coremal and insight into its acquisition by Pochteca?

Our most important distribution segments are plastics and rubber, household and personal care and paint and coatings, with the last two representing 15% each of our revenues and plastics and rubber above 20%. Coremal agreed to sell 50% of the company to the Mexican company Pochteca in 2013 and then 50% over five years, with 10% sold each year.

What differentiates Coremal-Pochteca from other players in the market?

Two-thirds of what we distribute is from local production and one-third from imports, so we import less than most other players. As a result, we have a 42-day inventory which is better than the industry average. Furthermore, we have a very good organization with branches in strategic locations in Brazil. —

Carlos Fernando de Abreu & Alexandre Castro Monteiro

CFA



CFA: CEO

ACM: Sales Manager

**COLORMIX
ESPECIALIDADES**

ACM



Could you provide some background to the company?

CFA: We founded the company due to a few important reasons. Firstly, Brazil does not have any major pigment producers, so around 95% are imported. Further, Brazil is a very big country and customers use small or medium quantities of many different types of pigments. Therefore, pigments require a very specialized form of distribution. Colormix has a unique portfolio to meet companies' diverse needs as we represent the most important organic, inorganic, metallic and effect pigment producers globally, as well as producers of additives for the coatings, inks, plastics and cosmetics industries.

How do you help your customers with dispersion of pigments?

ACM: To disperse pigments you need to use specialist milling machinery which is expensive, so therefore we provide this to our customers, which is particularly helpful for small and medium companies that would not be able to afford the machinery. —

Alexandre Kaplan & Viviane Gandelman

AK: Owner

VG: Supply Chain Director

DINACO



AK

Could you give an overview of the role you play in the Brazilian chemicals market?

VG: This year we are celebrating our 80 year history in Brazil. We started by supplying machinery and PVC to the plastic industry, which back then was considered a specialty chemical. What makes us different is our capacity to adapt and, over time, our portfolio has become focused on specialty chemicals. In 1967 we became a fully-fledged distributor and since the beginning have represented large companies like Lubrizol and Honeywell. We work with customers to develop formulations and solve their challenges rather than just sell chemicals, leveraging our application laboratory.

Are you still planning to expand internationally?

AK: A few years ago, three of our principals were pushing us to expand into other Latin American countries because they wanted to deal with the same distributor so they could benefit from using the same business model across the region. We were very proud that they wanted to work with us in this way and we were ready to expand but as we were doubling our sales in Brazil we decided we could capture more growth here.

Having said that, Mexico's chemical market is growing and it is a country we would consider entering. We will also keep considering other countries, especially as our principals still want us to, but our main focus is on becoming the number one, two or three specialty distributor in Brazil. —

Harry Heise

CEO

FORSCHER



Where does Forscher fit into the chemical supply chain and does it now produce preparation pigments?

Forscher is an importer and distributor of pigments. Since 2012, through a third-party, we have achieved our goal of producing preparation intermediaries for pigments at an industrial scale and we are now testing its quality. If things go well, we will set up our own production plant. The intermediaries will have special functions that go beyond providing coloring, such as increasing the stretch of plastic.

What are the key challenges you face?

Brazil is very complicated. The level of import taxes is still a big challenge and gets worse every day as the government is continuously introducing new rules. —





LOGISTICS AND SERVICES



“Compared to before the crisis when the government had more resources, it is now more focused on opening up the market for infrastructure and encouraging private players to invest, such as from Chinese, US and European investors companies. This is a proven model that should lead to increased investment in Brazil’s infrastructure.”

- Edson de Paiva,
Operations Director, Unigel

Brazil's infrastructure: A major roadblock

It is widely acknowledged that for a country's chemical industry to succeed it needs good infrastructure. Compared to its major rivals, Brazil's infrastructure is sorely lacking, a major problem in a continent sized country. In this context, logistics, transport and storage companies do their best to keep the wheels turning for the chemical industry. A noticeable characteristic of the logistics set up is that the petrochemical industry transports 98% of its products via trucks, reflecting the lack of alternatives.

The logistics landscape covers three main types of companies handling both dry and liquid chemicals: those that deal with storage, transporters and third-party-logistics, or 3PL, providers, with a mixture of major international participants and local companies. It all starts with storage, often at Brazil's ports given the amount of chemicals it imports. A major storage provider is Ultracargo, which owns two thirds of the liquid bulk storage capacity at the Port of Aratu, the gateway for feedstock for the petrochemical industry. Another major player is Stolthaven Nielsen, a global integrated transportation, storage and distribution solutions provider for chemicals and other bulk-liquid products. Both companies have announced expansion plans in response to increasing demand. At the time of writing, Ultracargo had just received approval from the Ministry of Transport to double its static capacity at the Terminal of Itaquí to 100,000 m³ and also plans to double its capacity at Suape, Breve, Aratu and Santos terminals. Stolthaven Santos, which functions both as a break-bulk facility for domestic distribution and as a regional distribution hub, is expanding its capacity by 16,000 cubic meters and also has land available to expand by a further 53,000 in the near future. The key service Stolthaven provides for its domestic clients is the consolidation of trade lines for bulk liquids. Notably, however, both companies are seeing most demand increases for clean petroleum products rather than petrochemicals as the recession has meant less demand for chemicals. Although, two chemicals which are experiencing an increasing demand are methanol and caustic soda.

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Logistics in Brazil are terrible. Due to the high volume of fuels that Brazil imports currently, of which Tricon has the highest market share, the price of logistics has increased by three times in the last two to three years.



- Roberto Fratta,
Director,
Tricon Energy

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Cesari, based in Santos, is an example of a company which goes beyond storage to provide further logistics services. It has 200,000 m² of storage, 800 of its own ISO tanks and delivers to production plants across the country. Alongside such companies are providers Den Hartogh, one of the world's leading logistics service providers of bulk liquids and gases for the chemical industry. After its merger with Interbulk, it now has 19,000 ISO tanks, 26,000 dry bulk containers and almost 600 trucks globally. Such companies compete with international third-party logistics (3PL) providers that do not typically own assets such as BDP International which offers freight forwarding, customs brokerage, documentation, transportation, warehousing and many value-added services, and Leschaco which has partners for trucking, warehousing, ocean lining and airlines. Brazilian company IC Transportes transports bulk liquid and solid chemicals, air gases and liquefied gases and is present in the south, São Paulo state, Minas Gerais, Rio de Janeiro and northeast, including Camaçari;

and Grupo Toniato provides trucking services in the south-east, south and mid-east of Brazil.

Life in the Slow Lane

Brazil’s infrastructure problems are multi-faceted and companies up and down the supply chain are broadly in agreement that it is one of the major obstacles holding the chemical industry back. In fact, the country’s logistics woes have led to the ire of many. Roberto Fratta, director at Tricon Energy, a trading company of chemicals and petrochemicals, summed up the general frustration: “Logistics in Brazil are terrible.”

The picture is nuanced but there is no hiding from the country’s weaknesses in this regard. To start off with, there are significant delays at Brazil’s ports. According to Reinaldo Kröger, president of Unigel: “The Port of Aratu operates at 92% capacity, well above the 50 to 60% capacity that is optimal. This causes delays which mean companies must pay large fines for late deliveries. Unigel lost US\$4 million in seven months because of this problem.”

A cursory assessment would suggest that the problem is a simple lack of capacity but the problem is more complicated. “The issue is not storage capacity. The private sector has invested in infrastructure in areas in which it operates, but berthing capacity, which demands public investments, did not grow in the same proportion. So, handling volume have increased 10% per year, but there has not been an increase in berthing capacity, so there is queueing, which represents a major cost for producers,” explained Ricardo Catran, director at Ultracargo.

Jean Felipe Albuquerque, Latin America business development director and general manager, Den Hartogh, concurs: “Liquid bulk terminals have been at over capacity for a long time and more investments are needed. However, for containerized cargo, the quality of the port infrastructure from Santos to Rio Grande has improved a lot since 2012, when it was on the brink of col-

lapse. There has been much investment into capacity to handle ISO tanks and containers, and this is helping us convert products from vessels into ISO tanks.”

AP Moller-Maersk, which operates the Maersk Line, has invested US\$400 million into the Santos container terminal since 2010 but to make full use of this berthing capacity must improve.

Moving inland, given virtually all transport of chemicals is done by trucks, road quality is critical but Brazil falls short in this area as well. “Brazil has awful roads, although it is getting a little bit better after investments from the states,” complained Romero Dantas, director, Coremal – Pochteca, alluding to the lack of federal funds, especially in the recent years of economic crisis.

One area that has seen improvement is the organization of trucks at ports. “Although road infrastructure is still a big bottleneck, at least at Santos the arrival and departure of trucks is now much better organised,” reflected Albuquerque, continuing “and rail transport of dry goods in Santos, Paranaguá and Rio Grande is increasing.”

Indeed, the lack of alternatives, such as rail, to transport by roads is a big issue. Brazil has far fewer rail cars than the United States or Mexico and the transportation of chemicals is not given priority. “70% of our production is supported by trucks and very little via rail as Brazil has very little availability compared to Mexico or the United States,” commented Romero Dantas, Director, Coremal – Pochteca.

Finally, the infrastructure for ISO tanks, such as cleaning centers – a key requirement, merits analysis given a large number of chemical products are now transported in them. Generally the south of Brazil has a good standard of cleaning facilities for ISO tanks, with facilities in Santos, Paranaguá and Porto Alegre and one being developed in Santa Caterina. But north of Santos only in Rio and Salvador can tanks be cleaned. “This is a big problem as many chemicals go to places like Fortaleza, Suape, Belém, Manaus and others but, for example, its costs over US\$2,000 and takes 30 days to move ISO tanks from Manaus to somewhere where they can be cleaned,” lamented Albuquerque. 67▶



SEGMENTOS DE ATUAÇÃO | BUSINESS SEGMENT

Sólidos Fertilizantes Açúcar Soja Milho	Líquidos Combustíveis Químicos Arla 32	Gases Hidrogênio Oxigênio Nitrogênio Argônio Amônia	Solids Fertilizers Sugar Soy Corn	Liquids Fuel Chemicals Arla 32	Gases Hydrogen Oxygen Nitrogen Argon Ammonia
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 www.ictransportes.com.br



Ivan Camargo

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Director and Owner
IC TRANSPORTES

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Client profiles in the transportation market are changing here in Brazil, as clients understand that the cheapest option does not mean the most efficient.

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IC Transportes is celebrating 35 years, could you provide an update since our previous interview in 2012 on the company's capacity and performance?

Since 2012 we have had the biggest growth historically for the company. We are a dynamic company and are constantly adapting the fleet and workforce in accordance with demand. We now have over 1,000 trucks, 1,000 semi-trailers and 1,500 employees. Into the middle of 2014 we were benefiting from Brazil's growth period, then we fell victim to the crisis until the end of 2016. Despite the downturn, agribusiness experienced growth as it benefitted from a good harvest and the rising dollar, favorable for exports; whilst industrial clients were transporting smaller volumes. This year, we are seeing a strong reaction from our biggest sectors, the chemical and agribusiness sectors.

We also increased the number of affiliates and expanded in other locations. Today we are present in the south of the country, Sao Paulo state, including our headquarters in Sumaré, Minas Gerais, Rio de Janeiro and in the northeast, including Camaçari. Other players left the market during the crisis years, which accelerated IC Transportes plans to expand geographically, especially in the northeast. Another motive of expansion was to further support our clients. For example, for both Linde Gases and Air Liquide we are now responsible for 100% of their liquid transport in Brazil.

Could you explain the importance of technology in IC Transportes operations?

In the past five years, we have evolved significantly in cutting-edge technology, including the implementation of a sharing center system to improve the client's access to information. We invested in new monitoring systems, one with the ability to warn the driver about risk areas or nearby accidents and another system for the client to watch their load's transportation in real time. We look to invest as much in modernizing the fleet as in technology to provide more security in service for the client.

How does IC Transportes balance quality of service with staying competitive in the market?

Today, we have clients that share our values in high quality and the use of technology to improve safety and efficiencies. The market regulates the price, and it is important to stay competitive, so we keep working closely

with the client so that we can understand their changing needs and provide personalized operations. Client profiles in the transportation market are changing here in Brazil, as clients understand that the cheapest option does not mean the most efficient. We are always questioning how we can add value for a client, and although price is important, we look first to quality, expertise and safety. Moreover, we are reliable and flexible, with capacity to deal with different loads, meet client's deadlines, adapt schedules or make alterations the client may request during operations.

How does IC Transportes prepare drivers for transporting chemicals?

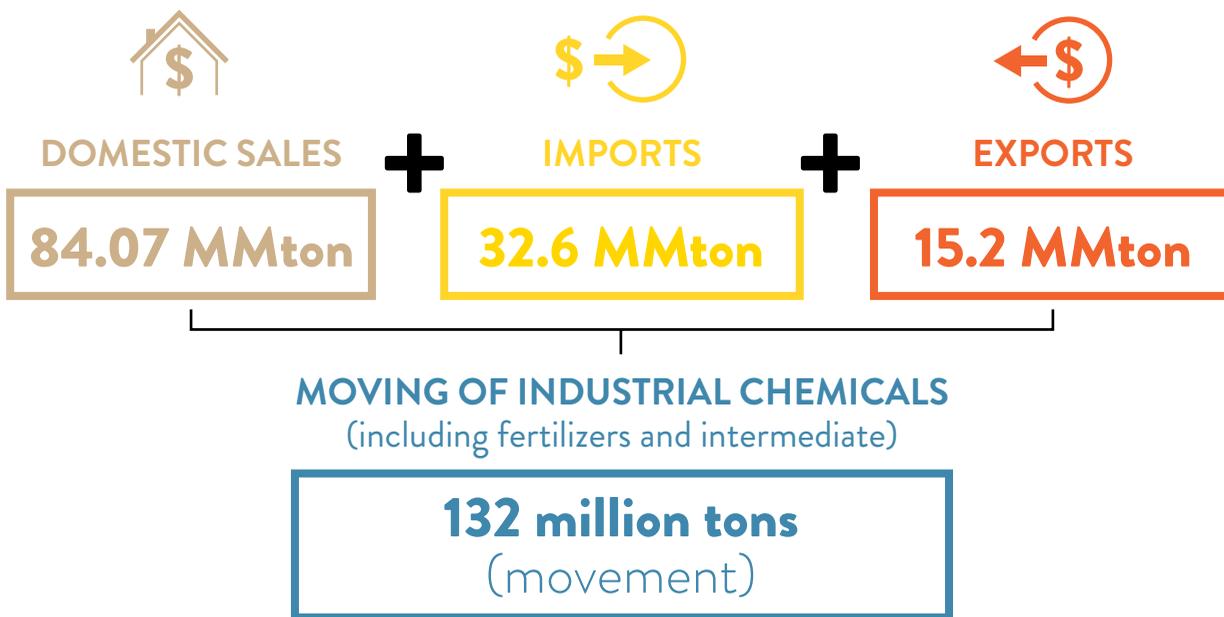
Brazil may have a large availability of drivers, but not with the specific expertise we need. We train drivers within the company here on site due to the complexity of some of the products we transport. The training covers the specific legislations and certifications of products, as well as approvals from organizations. For example, with the air gases, it takes 90 days to prepare a driver and then they often become specialists for that certain product type.

Wait time at ports is a growing concern for producers losing them time and therefore money. However, we hear that the queue for truck loads at Santos has improved, do you agree?

Port infrastructure in Brazil continues to be a serious problem and the crisis certainly has not helped to encourage port investments, yet there are opportunities, especially in the northeast. At Santos, the big difference made has been in the scheduling for the trucks. Before, all the trucks would arrive and wait in a queue, whereas today you can book your space. However, sometimes they do not have an available window for unloading, so instead of waiting there at the port, the truck will wait at our garages or at a point along the journey. The scheduling has not resolved the flow of traffic, in fact, the issue has just gone further away from the port!

Do you have a final message for our readers and APLA delegates?

We are optimistic and believe that after such a negative experience we can improve and come out benefiting, this is my hope. Within this context, I hope that we learn from this crisis, grow, solidify our operations and continue to provide clients with a top quality service. —



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Today we see new opportunities in cabotage of waterways and we are investing accordingly, especially in the north of Brazil, where we are using the Amazon River. We have become a market leader in this area in the last six years.



- Antonio Rosa,
Commercial Director,
Grupo Cesari

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Creative Solutions

How to make the most of Brazil’s infrastructure is an essential goal for logistics companies operating in the country. Price is not always the most important factor for customers. “Client profiles in the transportation market are changing here in Brazil, as clients understand that the cheapest option does not mean the most efficient,” remarked Ivan Camargo, director and owner, IC Transportes. Each provider has its differentiating factors. BDP, for example, has the best-in-class BDP Smart Suite, which provides information, reports, metrics, alerts, documentation and more across a region or the world. Grupo Toniato has set up two new companies, which use technology to provide next-generation ‘4PL’ and reduce costs through the pooling of resources, and IC Transportes has invested in a monitoring system which allows clients to watch in real time the transportation of their goods. Other actors, liked Cesari, are looking to bypass road in favor of cabotage. “Today we see new opportunities in cabotage of water-

ways and we are investing accordingly, especially in the north of Brazil, where we are using the Amazon River. We have become a market leader in this area in the last six years,” remarked Antonio Rosa, commercial director, Grupo Cesari.

This is in line with the recommendations of Abiquim, which has recommended to the government that it encourage the greater use of cabotage. Den Hartogh has also begun to offer vessel transport of goods from Brazil to Argentina, bypassing road connections.

Privatization drive

With a primary budget deficit of almost US\$6.4 billion in July 2017, the government has not been in a position to make significant investments into infrastructure. To help plug the gap, Brazil’s government is embarking on a massive R\$44bn privatization drive, which will include infrastructure assets. Significant parts of the plan include the sale of concessions for 900 km of highways and tenders for port projects with the goal of attracting R\$20 billion of investment. Analysts predict that large greenfield investments are unlikely but the government has committed R\$10 billion to new highways. There is optimism across the supply chain that the privatization drive will improve Brail’s infrastructure. “The government’s privatization drive will have a positive effect on infrastructure as the private sector is much more dynamic and can complete projects more quickly,” argued Marcos De Marchi, chairman of the board of directors, Abiquim.

Chinese and European companies have already shown a keen interest in investing in Brazil’s infrastructure. “Compared to before the crisis when the government had more resources, it is now more focused on opening up the market for infrastructure and encouraging private players to invest. This is a proven model that should lead to increased investment in Brazil’s infrastructure,” predicted Edson de Paiva, operations director, Unigel. Brazil deserves better infrastructure and until it gets it, its chemical sector will continue to perform below its potential. —

André Façanha

CEO
GRUPO TONIATO



What new developments have there been since 2012?

Grupo Toniato has 43 years of experience in Brazil and transports agrochemicals and specialty chemicals. In the last five years, we expanded a lot, from around 1000 employees to more than 2000. We have also moved more into agrochemicals and have expanded our geographical reach out of the south-east of Brazil to include the south and mid-east of the country. In addition, we have invested in facilities in Minas Gerais, Paraná, Rio Grande do Sul and São Paulo states, including R\$100 million in new warehouses and a fleet of trucks and forklifts.

We have also invested a lot into technology and have opened two

new companies. Due to the crisis, chemical companies have been looking for logistics providers with a better, more efficient service offering, which we have been able to provide due to these investments. Furthermore, as demand has increased, our extra capacity has paid off. Therefore, for us crisis has been an opportunity to strengthen our business.

What sectors have done well in the years of economic crisis?

Depending on categorization, demand from the chemical segment decreased by 5 to 20% last year and the year before, but agrochemicals increased by around 5%. Overall, we are working at about the same level as in 2014. Paints have performed particularly badly as the automotive and construction industries have really suffered as consumers have had less disposable income. Furthermore, specialty chemicals which are raw materials for these sectors, have also suffered. Agrochemicals operate to different fundamentals because they are like medicine for plants so you need to protect them against the elements whatever happens.

Has your client base changed since 2012?

Most of the important players are our clients. Since 2012 we have expanding our operations with most of our clients. For example, some customers have used us more as they have been looking to reduce logistics costs and use less providers. Another advantage we offer them is our geographic presence and productivity. —

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Rodrigo Seabra

Director – Latin America,
Global Strategic Sales
BDP INTERNATIONAL



How diversified is your client base in the chemicals sector?

In Latin America, a large part of our business is focused on the agro-chemicals sector. We also have many accounts in the polymers market and our Uruguay office was established to service polymer customers. We also offer our services for a range of products in the health and personal care, civil construction, consumer, and oil and gas sectors.

BDP manages a wide range of chemical shipments, such as hazardous and non-hazardous, short and long shelf life, variable volatility and so on, spanning all classes with diverse end uses and regulatory limitations.

What trends are you noticing in the distribution market for chemicals in Brazil and the wider region?

In 2017, ocean freight rates are forecast to increase due to factors such as supplier consolidation, increased bunker prices and slower capacity growth. However, rates will remain moderate due to the uncertain global economic environment. In terms of the economy, the trend is becoming more positive. Yet, for at least the next one to two years, we see a lack of carrier capacity, particularly after mergers between carriers like Maersk Line and Hamburg Süd. We expect this merger to have a significant impact on the region and recommend clients have direct contract with carriers to guarantee space. In this scenario, BDP plays the role of 3PL and forwarder managing direct contracts and outsourcing some functions inside the companies, with value-added services such as compliance, technology, reports and KPI-driven operations.

Distribution in the region is often more complicated compared to other parts of the world. As a result, although BDP provides quotes that provide global coverage, Latin America must always be dealt with separately.

What are your key goals for the next few years?

With 15 owned offices and growing in the region, our goal is to be present in every important market where our clients in the chemicals sector have operations. Recent expansion plans include opening new offices in Peru and Uruguay, which add to the BDP LA-TAM existing offices in Argentina, Brazil, Chile and Colombia. —

Antonio Rosa



Commercial Director
GRUPO CESARI

Could you provide a brief overview of Cesari's history?

Cesari has been in the market for 65 years and has always focused on the transporting of chemicals. Around the year 2000, it was a boom period for Brazil and Cesari became a market leader in transporting petrochemicals and derived chemicals. At this time we decided to diversify to other areas such as storage for solids and liquids, logistics and maintenance, cleaning and modal transport for ISO tanks.

Today we have 200,000m² of storage and we deliver to production plants across the country. We have increased our volume capacity so that we now have more than 800 of our own ISO tanks, ready to meet the requirements for our clients.

How are plans to connect Cesari's operations to Brazil's ports via a duct and tunnel system and bringing railroad to Cesari's sites progressing?

The duct and tunnel projects are still in development and waiting to obtain environmental permits. We will not make any investments unless we have these licenses in place. The railway investments however went ahead after we received concessions and licenses from the government. We have a train with 102 carriages that handles 250 containers a day.

Could you tell us more about Cesari's customised solutions department?

Our employees are embedded within a company, overseeing operations, which differentiates us in the market. We aim to reduce a company's total transport and logistics spend by 10%, as well as improving productivity and safety management.

What are your key goals going forward and do you have any final messages?

Now is the time for us to be planning for investment to be ready with the solutions our clients will need once the economy picks up. We have lots of projects in the pipeline of five to fifteen years in the petrochemical and chemical sector that we are ready to launch once things improve. —

Ricardo Catran



Director
ULTRACARGO

Ultracargo has more than 50 years of history and is the largest independent liquid bulk storage company in Brazil. Could you provide a brief introduction about the company and describe your position in the chemicals supply chain?

Ultracargo began its operations in 1966, initially with road transportation operations, driven by the chemical industry. After a few years, the company started its liquid bulk storage operations. We experienced great growth in the 80s and 90s. In 2008, we doubled our size with an important acquisition in Santos, Paranaguá, and Rio de Janeiro. In 2010, the company took the strategic decision to sell its transport business and focus on port liquid bulk storage.

Could you tell us about any recent capacity expansions and are there any planned for the future?

We have plans to grow our terminals. We just had approval from the Ministry of Transport to double our static capacity at the Terminal of Itaquí.

What are the main challenges at Brazil's ports?

The issue is not storage capacity. The private sector has invested in infrastructure in areas in which it operates, but berthing capacity, which demands public investments, did not grow in the same proportion.

Can you tell us about efficient service and safety at Ultracargo?

Through Integra, our storage management system, our clients can gain access to information such as: times, schedule, inventory, and movements. It also facilitates decision-making and the understanding of the terminal's operations. We are designing an improvement for this system.

We are at the forefront of the best safety practices, with a new fire protection system that has been developed in a superior standard that exceeds legal and regulatory requirements. We also launched a program with the aim of promoting a behavioral change across the company.

Do you have any final messages?

The port issue demands the involvement of the government and of private companies, together. As an industry, it is important to share knowledge with the government to assist in decisions to be made that will affect all parties involved. In terms of Brazil, my perspective is positive for the coming years. Reforms are being made, and we will be in a more favourable position for growth. —

Jean Felipe Albuquerque



Latin America Business

Development Director and General Manager

DEN HARTOGH

Could you provide an introduction to Den Hartogh and insight into the impact of the acquisition of Interbulk?

In 2016, we acquired Interbulk, bringing together our 7,000 tanks with their 12,000 and expanding our dry bulk containers to 26,000 and trucks to almost 600. This expanded our international reach and we are now a top player globally. We have offices in 23 countries and operations in almost 300 ports. We provide customised solutions and operate in the retail as well as wholesale market. In Latin America, our headquarters are in Rio de Janeiro where we started as part of Interbulk in 1996. Some of our clients include Dow Chemical, Solvay and BASF, as well as many others.

What other added value services do you provide in Brazil?

Health, safety and the environment is always a priority and we support our customers in the proper handling of ISO Tanks. We are not only involved in door-to-door transport. We support our clients navigate import taxes which differ by state; for example, we operate imports through Santa Catarina where the taxes are only 4% as compared to 18% in Rio de Janeiro and São Paulo. Furthermore, our market knowledge means we know the best transport routes and ports for a particular distribution need.

How much of a challenge is Brazil's infrastructure bottlenecks for Den Hartogh?

Liquid bulk terminals have been at over capacity for a long time and more investments are needed. However, for containerized cargo, the quality of the port infrastructure from Santos to Rio Grande has improved a lot since 2012, when it was on the brink of collapse. There has been much investment into capacity to handle ISO tanks and containers, and this is helping us convert products from vessels into ISO tanks.

Do you have any final messages?

Our key goal is to be ever more in line with our customers' supply chain and sales departments. Our logistics solutions help leverage our clients' global sales, given that companies operating in Brazil compete not just with local companies or even just Latin American ones but competitors from all over the world. —

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Akira Koga



Commercial Director

MAMMOET LATIN AMERICA

What is the importance of Mammoet's Brazil office in the wider company and what are your main strengths as a business?

Mammoet's São Paulo office is the headquarters for all of its Latin American operations below Mexico. Whilst the economic situation in the region is challenging, SHV Holdings, the owner of Mammoet, still sees it as a very important area for the business. Brazil is by far the biggest market in the Latin American region for Mammoet so most opportunities are here. Our strength is that we are at the vanguard of planning, engineering and logistics and can provide varied solutions with the ability to scale up for large, more complex projects, and scale down for those that are smaller and less complex.

Are you seeing an uptick in new projects in the chemical industry as the economy improves in Brazil?

The mindset of investors is different than five years ago when there were more greenfield projects. Now they are more focused on brownfield investments such as re-vamps and projects to improve efficiency. They want to do more with less to increase production which means we are experiencing less demand for our services compared to previous years. We do expect new large greenfield projects in five years time because of the cyclical nature of such projects, but they are unlikely to return in the next one to two years.

Have there been any recent new innovations or product launches at Mammoet?

The launch of the PTC 140-200 ring cranes has been a game-changer in Brazil. Also, the MTC-15 terminal crane possesses new technology. It is a very powerful crane designed specifically for remote areas where there is no port structure.

Do the delays at Brazil's ports effect your operations?

Mammoet has a global fleet of equipment so we import and export a lot of cargo. Due to the delays at the port, it is sometimes a challenge to meet schedules. We do our best to mitigate the port delays through careful planning and communicating with the client upfront, explaining the possibilities. —

Roberto Fratta

Director
TRICON ENERGY



What has been the history of the Tricon Energy in Brazil and what are your current main service areas?

Tricon Energy is a trading company that has one of the biggest incident sales of chemicals and petrochemicals in the world. Our operations in the country are split into our fuel business and our chemicals business, which is further split into chemicals, petrochemicals and plastics. Our petrochemicals and chemicals business includes distribution of caustic soda and methanol.

Tricon Energy has operations all around the world. What advantages does this bring?

Our positions in the Middle East, Europe, Asia, United States means we can source from different places for the same product, which is very important. Logistics makes the difference in commodity chemi-

cals and we are very competitive in this so we can provide a good price and service to the client.

What trends are you noticing in the distribution of chemicals in Brazil?

Logistics in Brazil are terrible. Due to the high volume of fuels that Brazil imports currently, of which Tricon has the highest market share, the price of logistics has increased by three times in the last two to three years. It is very difficult to find space to import new products and we have to sometimes import via ISO tanks rather than bulk vessels. The demurrage costs at ports are also terrible as it takes a week to berth a vessel at Aratu or Santos, although Paranaguá is a little better.

Given Tricon Energy's headquarters in Houston, what has been the impact of Hurricane Harvey on imports of raw materials to Brazil?

There has been no major supply interruption to our clients but the prices in Brazil have increased very rapidly. Caustic soda increased by 35% in one week because of the hurricane and compounded by the longer term inability to bring more bulk vessels to the country due to the infrastructure challenges. On the other hand, local producers have raised their prices so now petrochemical companies in Brazil are making money and they are exporting more so the hurricane has actually been a good thing for the industry. —

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Fabriciano Pinheiro & Michel Polity

FP: Managing Partner
MP: Director Latin American Expansion
INTERTOX



FP
MP



How did Intertox begin and what is your position in the market today?

FP: Intertox has been in the market for eighteen years. It began because we realised there was a market need for advisory services on risk management of environmental and occupational toxicology. We started by offering specialized training programs and reports. For example, we assisted our first client Petrobras in this way by helping them understand potential hazards and how to prevent oil spill accidents. Generally, we have had to do a lot of education of the market about the importance of toxicology across the entire lifecycle of chemicals from production, to handling, storage and disposal. Now that we have helped educate the market, we focus on providing services in chemical risk, toxicological risk and environmental risk. Our main value-add is helping companies under-

stand which chemicals are potentially harmful and managing the risks accordingly.

What trends are you noticing in the risk management of chemicals in Brazil?

MP: Compared with more developed markets in Europe and North America, Brazilian companies do not have as advanced an approach to safety and environmental issues and often focus more on the quality of chemicals. However, ABIQUIM, through the National Commission on Chemical Safety (Conasq), has played a very important role in implementing UN Globally Harmonized System (GHS) for classification and labelling of chemicals. This represented a change of mindset in Brazil as previously the country was behind many other countries in terms of chemical safety.

How are you looking to expand internationally?

MP: We see Latin America as a huge potential market for Intertox, in particular Argentina, Chile, Mexico and Colombia. We are focusing on marketing our software capabilities to larger companies in these countries; whilst for smaller companies, we are aiming to assist them with obtaining security documents for handling chemicals. We also plan to provide training services to companies in the region. In addition, the GHS has failed to unify regulation in the region, which presents an opportunity for Intertox to advise on regulatory compliance. We have the expertise and software to really help companies throughout the region. This is all part of our goal to be the key consultancy in Latin America for chemical, toxicological and environmental risk management services. —



Miguel (Mike) Sealy

General Manager
STOLTHAVEN SANTOS

Could you provide an overview of your presence in Santos?

Santos is a crucial strategic facility for Stolthaven's international network as it enables the company to consolidate our import and export services for Latin America. Our key service for our domestic clients is to consolidate trade lines. Santos plays an important role as one of the main storage facilities for the petrochemical industry and as a distribution center for clean petroleum products. 60% of our tankage is used for clean petroleum products, whilst 40% is used for the petrochemical industry. Our facilities have access to three berths and immediate access to highways.

Since 2002, we have expanded our capacity and currently we handle 133,750 cubic meters, which we are expanding by 16,000 cubic meters. This is in line with Brazil's expected continued increase of clean petroleum imports until 2030. We also have land available to expand by a further 53,000 cubic meters so in the near future we project we will have close to 200,000 cubic meters of capacity. In terms of chemicals, we store several families of polyols, chemical alcohols, vegoils and caustic soda. In addition, we handle a lot of imports and exports of ethanol. Brazil is a very big exporter and leader of second generation, green ethanol which we ship all over the world.

How competitive is the market for importing and storing these products?

It is a very competitive market. Stolthaven Santos does not focus on renting tanks but on consolidating trade lines and ensuring the quality of products that are being handled for our clients. We provide extra value in services such as logistics, market intelligence and operational excellence.

Is the lack of capacity for handling of liquid bulk products at ports negatively affecting Stolthaven's business?

On the contrary, it is providing a business opportunity for us to invest in capacity. Brazil transports 98% of its products via trucks, compared to the past when rail was more common, across a continent sized country. This means there is a lot of demand for fuel which Brazil's ports are not able to supply at present. Although, due to the economic crisis, the demand for certain types of products from many industries decreased, which meant we had more space for diesel and gasoline derivatives imports. However, we foresee that the economic recovery is just around the corner.

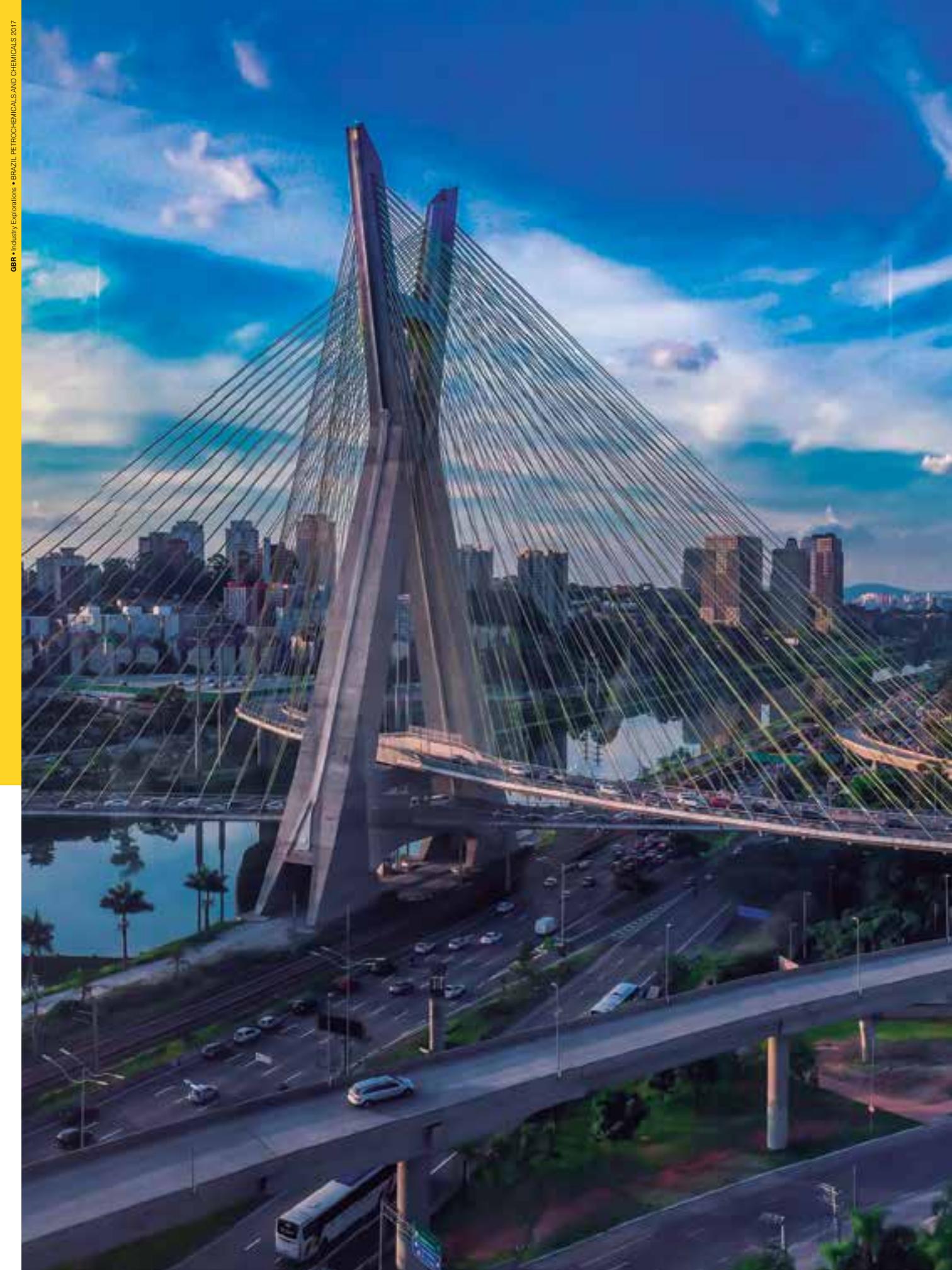
Even with the pre-salt petroleum exploitation discoveries, Brazil will continue to import fuels as it has insufficient refining capacity. Generally, we can react very quickly to market fluctuations and this allows us to maintain our leading position.

How is Stolthaven adapting to technological change?

We are preparing ourselves for a leap into the future in terms of automation. Technology today sustains our operational intelligence. All of our contact with clients, agencies and transporters are now all done online, which means technology is playing an increasingly important role. We will invest a lot into this into the future, especially to ensure the safety and automation of our operations.

What are your key priorities going forward?

We want to consolidate the level that we have in the market today in the Port of Santos where we have about 14% of the local market. Also, we want to maintain our operational excellence and increase our capacity. We do not produce products but we provide a crucial part of the value chain for manufacturers to make products to be put on the shelf and will continue to be focused on that. —





FINAL THOUGHTS



“The essential pre-conditions for a successful industry are competitive raw material and energy. Alongside these are good infrastructure and logistics, R&D investment and labor training. We are not competitive enough because we are not performing well on all these five elements.”

- Marcos De Marchi,
Chairman of the Board of Directors, Abiquim

Rina Quijada

Senior Director, Latin America
IHS MARKIT



What sets IHS Markit apart from other consultants advising the petrochemical industry?

We are a completely integrated source of information: from 'Wellhead to Walmart'. Under one umbrella we can provide solutions from oil exploration, midstream,

downstream to chemicals. IHS merged with Markit and now offers what we call: 'The New Intelligence'. We partner with leaders in business, finance and government to help our customers be more efficient and make more informed decisions to secure their future.

What is the outlook for the business environments in Latin America?

The entire region has gone through difficult times in the last ten years but from Mexico down to Patagonia, the next few years will present a better business environment for investors. However, the risk continues and political stability will need to improve in order to attract significant foreign direct investment.

Regarding Brazil, despite the crisis and chaos, it has shown the world that its democracy is strong and institutions are firm. Brazil is going through a painful exercise and has successfully tackled corruption. We believe the Brazilian economy has reached an inflection point where the economy should start to turn around. Brazil will come out of this crisis stronger and opportunities for the petrochemical industry will return.

To what extent is access to feedstock a

barrier for Brazil's petrochemical industry?

In this business, access to abundant and competitively priced feedstock is key to success and competitiveness. Brazil is working hard to improve its feedstock position. It has therefore recently invested in terminals to source from international markets. Its pre-salt reserves are off-shore and costly, so getting access to feedstock requires innovation. Pre-salt will provide additional feedstock for expansion of cracking facilities. Nevertheless, it is unlikely there will be a greenfield facility of over 1 million mt of ethylene and derivatives in Brazil by 2020. There may be an increase in production capacity in Argentina but it is unlikely there will be a similar plant to the Ethylene XXI in Mexico being built in Brazil.

At the same time, Brazil is becoming more flexible in its feedstock sources. Braskem just completed construction of an ethane terminal in Rio de Janeiro state where it receives ethane from the US Gulf Coast. A second terminal is expected to be completed in Aratu by end of the year. Soon, 15% of additional ethane will come into Brazil's feedstock mix, making it more competitive. Most state-owned companies in Latin America are trying to divest their petrochemical

Rodrigo Mas

Partner
BAIN & COMPANY



Bain produced the 2014 report 'Study of the Potential for Diversification of the Brazilian Chemical Industry', funded by BNDES. Are there any updates on the findings of the report?

One of the key areas of opportunity in 2014 was for renewably sourced feedstock but now economic incentives are less favorable compared to when there was a higher oil price; although, this does not mean that bio-sources are no longer a strategic priority for Brazil. Secondly, due to the economic crisis, large government investments to support the chemical industry are not possible. This makes the proposals of the report, such as tax reforms, less feasible and there needs to be some readjustment because of this situation. Thirdly, consumption patterns have changed due to the exchange rate which has made some sectors more or less competitive. But in terms of the general direction, there are no significant changes to the proposals we recommended. The major challenge now is to bring these proposals back onto the agenda of the government as they were in 2014 as the

focus of the industry; BNDES and the government has been diluted since the economic and political crisis. The most important thing is that we regain this lost momentum and come together again around an agenda for the industry.

Abiquim recommends that the government has a proper industrial policy and a ministerial group for the chemical industry. Do you agree with this proposal?

It is correct that the management of these issues by the government is very diffused. The Ministry for Industry, Foreign Trade and Services needs to better coordinate with ministries responsible for infrastructure, energy and resources, technology, health and environment that look after regulations and licenses of new products. The problem is that there is no single point of accountability for moving the proposals of the report forward. Having a group such as this would help streamline initiatives a lot.

How has the trade balance in chemicals

assets and focus on exploration and production. In Brazil, Petrobras is looking to divest its petrochemical assets and has already sold its PET (polyethylene terephthalate) resin unit to Mexico's private company, Alpek. On the other hand, important market participants like Braskem, Unigel and Oxitenos are no longer just Brazilian companies; they are investing abroad and are now much more engaged in global markets. We expect changes in the petrochemical industry in Latin America to bring business opportunities for investors in the region.

How transformative is the potential for green feedstock?

Although green feedstocks are very welcome when they are competitive, the impact of shale gas is immense and the United States will be the number one exporter of LPG when five years ago it was not even on the radar. By next year we expect significant surplus polyethylene and other olefins derivatives to come on stream in the United States based on very competitive ethane, propane and butane. For example, Exxon-Mobil just completed a new facility to export over 1 million mt of polyethylene.

Therefore, green polyethylene will have to compete under this new scenario. —

changed since you conducted the report?

When we conducted the report, the trade deficit in chemicals was about US\$28 billion, but this figure has gone down due to the fall in consumption caused by the economic crisis. In 2014, the Brazilian real was valued higher than it is today which affected the competitiveness of Brazilian producers. Nevertheless, Brazil still has a competitive disadvantage compared to other markets due to the cost of raw materials and other inputs. In 2014, we found that sometimes the cost of producing a chemical in Brazil was 20% or more than it cost in the United States.

Are the sectors identified in 2014 still the most competitive today?

Directionally things have not changed very much. The three industries which we picked out as competitive that are still doing well even despite the crisis are agrochemicals, animal feed and cosmetics. Whilst they did experience a drop in demand, they rebounded, especially agrochemicals which recovered very quickly. —

João Luis Ribeiro De Almeida



Partner, Mergers and Acquisitions
and Oil and Gas

DEMAREST ADVOGADOS

Could you introduce the company and the oil and gas practice?

We are a full-service law firm focused on helping foreign investors in Brazil. Our oil and gas practice is focused on the market in Rio, where most companies in the sector are located. We provide full-service legal support for the whole supply chain. The main area we work in is transactions and we also often help clients in administrative proceedings with regulators. Demarest also works with petrochemical and chemical companies, as well as agrochemical-related companies like Monsanto who are very strong in Brazil.

Do you expect consolidation to continue in the oil and gas and chemicals industries going forward?

Because of the crisis in Brazil and high prices of gas and electricity, we are seeing a lot of assets changing hands and many for sale but not so many interested investors.

What trends are you noticing in foreign investment?

Brazil's economic growth has been built on three pillars, which are foreign investment, huge investment from BNDES and the participation of state-owned companies. Because of the crisis, the government is trying to reduce the role of state-owned companies in the economy and has embarked on a huge privatization program. BNDES is also tightening its lines of credit. These developments mean there are more opportunities for foreign investors and foreign financing. In the near future, there will be a larger presence of foreign investors, in particular from China. This year China has just passed the United States as the largest source of foreign investment. There are no real legal restrictions on foreign investment in Brazil but challenges include the tax and labor system, the political situation and poor infrastructure.

What impact do you expect shale gas to have?

Globally, there is a huge pressure from cheaper LNG, especially as the United States has become a net exporter of gas. There are a couple of projects to build re-gas facilities in Brazil, one in the north-east and another in Rio, to add to the three that already exist. It is unclear what the role of Petrobras will be in the importing of gas, so there are many different things going on in the market. Ultimately, the country will need the infrastructure, so it will have to be built.

Do you have any final messages?

There is a big commitment in the country to open up its oil and gas market, with many bid rounds for oil and gas exploration and production, whilst the government is looking to liberalize the gas market and Petrobras has a huge divestment program. If all of this is implemented successfully, there will be a better environment in two or three years for the petrochemical industry. —

“Brazil will come back; the \$1 million question is when and how. What is happening now is a very strong exercise in democracy that will have a strong positive impact on the country and the economy. The prospects for the nutritional industry are therefore bright. The country is bigger than the corruption scandals but it will probably take a bit longer to recover than other crises as the country has hit rock bottom.”

-Maurico Adade,
President, Latin America,
DSM

“Brazil, despite the crisis and chaos, it has shown the world that its democracy is strong and institutions are firm. Brazil is going through a painful exercise and has successfully tackled corruption. We believe the Brazilian economy has reached an inflection point where the economy should start to turn around. Brazil will come out of this crisis stronger and opportunities for the petrochemical industry will return.”

- Rina Quijada,
Senior Director, Latin America,
IHS Markit

“We truly believe in the potential of the region. The reason behind this is that we see the openness and willingness to innovate in our customers. When you look ahead, there is a great field of opportunities for the industry, in particular in sectors like pulp and paper, agrochemicals and cosmetics.”

- Adriano Magalhães,
Managing Director,
Wacker

“We believe Brazil represents a huge opportunity with much demand for petrochemicals and overall it is a good place to invest.”

- Marcelo Cerqueira,
Vice President, Chemicals & Vinyls,
Braskem

“Brazil is a hard place to do business due to the corruption, tax and labor system but still there are opportunities.”

- Newton de Oliveira,
President,
IBG





There will be 10 billion people in the world by 2050, and the land we have for food production will not be enough, thus we need to increase crop yields meaning that the chemical industry has room to play a key role.

- Ralph Schweens,
President,
BASF South America

We have adapted due to the crisis and it has actually made us and the Brazilian market more competitive. In fact, Brazil is now exporting more gases than it was during the growth years. A similar change has also occurred in the automotive industry, which has increased its productivity and exports.

- Alexandre Bassaneze,
Managing Director,
Air Liquide Brasil

The last two years were extremely challenging, as several sectors of the economy registered a month-on-month decline, there was a crisis of confidence and consequently reduction of consumption and investments. This had a strong impact on the market and several production chains. As a result, the constant search for operational efficiency, cost reduction and maintenance of competitiveness have become critical factors for survival.

- Armando Bighetti,
President,
quantiQ

If you can understand how consumers are using products through the collection of big data, then you can design better products, so definitely this is having an impact. However, for a B2B company like Eastman, the key to better design is still winning with the customer, i.e. working closely with them to identify unmet needs and building a relationship based on trust.

- Pedro Fortes,
Corporate Development Manager for Latin America,
Eastman Chemical Company



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YOKOGAWA www.yokogawa.com



EDITORIAL AND MANAGEMENT TEAM

Project Director: Laura Brangwin (lbrangwin@gbreports.com)

Project Journalist: Matthias Lomas (mlomas@gbreports.com)

Project Coordinator: Lina Jafari

Editor: Mungo Smith (mungo@gbreports.com)

Operations Director: Miguel Pérez-Solero (mperezsolero@gbreports.com)

Graphic Design: Gonzalo Da Cunha (gonidc@gmail.com)

Graphic Design (adverts): Özgür & Deniz (ozgur@gbreports.com)

General Manager: Alice Pascoletti (apascoletti@gbreports.com)

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(MDIC)**

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