

Top 10 investment priorities for refining and petrochemical companies to achieve operational excellence

April 2015



Operational excellence is the key differentiator that sets apart industry leaders from the rest. Today's refining and petrochemical industry is in urgent need of operational excellence to elevate performance due to cost cutting pressures. The focus goes beyond the traditional event based models of improvements, and looks at improvement based on a long term change in organisational culture.

We recently sat down with a group of senior managers within Asian based refining and petrochemical companies and were promptly told that it was not merely the latest buzzword but by following this across an organisational approach, it was helping their organisations improving productivity, efficiency and output. We then found out what some of the investment priorities were.

"Operational excellence is a core competency within the global chemical company and it is no surprise that the companies at the forefront of the industry are those who truly excel in this area. The challenge for Asian producers is to embed a more rigorous cost culture throughout their organisations and to focus on driving excellence through all areas of the organisation from supply chain to operations, to channel management to sales and marketing, R&D and finance."

Paul Harnick, KPMG, COO, Chemicals and Performance technologies in a report titled Asia Pacific Petrochemical Industry, A tale of contrasting regions.

1. Asset management

Once considered an important part of the “game” asset management is now considered the end game. Extending the life cycle of the plant, maximising the efficiency and ensuring maximum return of the investment is the key goal for managing the plant and asset management is the key. Linking data analytics with computerised asset management systems is proving to be the most effective way of using real time information for maximum effect. This will be a big focus in 2015.

Did you know?

Most of the industry heavyweights have an asset management system using data analytics including – GE, Siemens, ABB, Emerson, Honeywell, IBM, Oracle.

2. Reliability & Maintenance

Improving equipment availability is key to improve productivity and margin, especially at times of market volatility. Uncovering evidence, finding root causes and repairing equipment utilizing world-class precision maintenance techniques requires a reliability centred system and culture to be established throughout the organisation.

Did you know?

At PETRONAS East Coast Refinery (PPTSB), A Five-Year Road-Map was drawn out to provide a clear planning, scheduling and prioritization of initiatives to improve plant instrumentation. This initiative has contributed more than 50% reduction in instrument related plant trip comparing FY2012 against 4 years average nos of instrument related plant trip as incurred by PP(T)SB refinery and Aromatics Plant. *(from Downstream 2014 paper presented from PETRONAS)*

3. Energy efficiency

Improving energy efficiency is one of the key strategies for regional refineries to improve profitability and competitiveness. By identifying energy saving opportunities and exploring innovative energy analysing systems, millions of dollars can be saved.

Did you know?

ExxonMobil has started the construction of a new 84-megawatt cogeneration plant at its Singapore Refinery's Jurong Site. The site will increase the energy efficiency of the refinery upon completion. *(From Straits Times, 2 April 2015)*

4. Process safety

As refining and petrochemical plants become increasingly more complex, as have the risks to the employees, the environment and the assets of the company. The development of new techniques and technologies designed to improve operational safety has evolved to meet these challenges. Safety remains a key investment focus.

Did you know?

“Several incidents and fires occurred at Formosa Plastics Group (FPG) petrochemical plants in Taiwan. At the request of government authorities, FPG successively shut down more than 50 plants in the No. 6 Naphtha Cracking Project, Mailiao Industrial Park from August 2011, for a year-long safety inspection under the supervision of third party organisations. TÜV Rheinland Taiwan was commissioned by FPG to inspect 13 of these units between December 2011 and September 2012.

In total, more than 3,000 findings and recommendations were provided on FPG's 13 plants. However, through active rectification and improvements by FPG, the efficacy of pressure vessel, piping, safety control systems, and explosive-proof electrical equipment inspections were considered to have been improved to an acceptable level and the associated risks had been effectively mitigated. A strong commitment on safety improvement from FPG top management has revealed a new safety culture within group corporate operations. (from <http://www.hazardexonthenet.net/>)

5. Shutdown & Turnaround

Shutdowns are expensive and labour intensive. Clock is ticking and it is imperative that shutdowns are carried out effectively to minimize negative business impacts.

Did you know?

Neste Oil's Porvoo refinery will be stopped for the planned maintenance turnaround in April 2015. The major turnaround of nearly EUR 100 million involving 4,500 employees is the largest in the refinery's history. The turnaround is estimated to involve close to a million man-hours of work and will employ some 3,500 people from outside contractors on site.

6. Supply chain and procurement

Optimising supply chains for petrochemical companies is neither cheap nor easy, however this is where one of the greatest opportunities exists to reduce costs and improve performance. Data is however the key.

Did you know?

According to DAMCO, the automation of transaction processing and data capture is one way of optimising logistics, however they noted that it is often hard to achieve as data is often manually sourced from various sources.

For a logistics optimisation effort to be successful, it is key that data is accurate, timely and complete, taking variability levels into consideration. For example, optimising container utilisation requires order data, goods descriptions, handling notes, packaging and availability details. With the right data, higher load utilisation can be realized, which on its turn drives up efficiency and reduces costs – and carbon emissions.

Manually entering more than basic data is too time consuming, and too error prone, to support supply chain optimisation. Outsourcing data entry to a 3PL with chemical supply chain development expertise can help save costs by increasing optimisation, through the availability of systems, connections and processes capable of handling it. The result is full end-to-end supply chain management, plus local expertise for customs, regulatory and customer interface requirements in key chemical origin and destination markets.

A number of their customers, including copolyester, titanium dioxide, and polyethylene producers, have already chosen to outsource their supply chain management for Inbound, basic handling, storage, on-forwarding by ocean and truck and local distribution. They have successfully achieved reduced costs and carbon through CFS Consolidation, helping them to move quicker and optimise

routes. (from 'Why Data drives logistics optimization in the petrochemical industry' Damco blog, 6/5/14, www.Damco.com)

7. Production planning

In the complex market environment of the chemicals industry, companies must excel at forecasting product demand and adjusting supplies up or down quickly in response to changing market conditions. In many Asian refinery and petrochemical organisations, silos exist in the process of procurement, production and supply chain. One of the key investment areas is breaking down these barriers and developing a seamlessly integrated production planning system.

Did you know?

BASF is strongly committed to operational excellence on a global scale. By the end of 2015, STEP is expected to contribute around €1 billion in savings each year. This program includes measures in the areas of production, engineering, maintenance, logistics, procurement and administration. STEP comprises more than 100 projects that are expected to lower fixed costs and raise profit margins. In 2013 savings of more than €600 million annually has been recorded compared to the base year 2011. (From BASF factbook)

8. Training and OE culture development

To achieve a real cultural shift within any organisation, training and the commitment to talent is the key. While some organisations within the region will respond to the recent volatility with a slowing down in training activities, the need for greater productivity will require greater commitment to training and talent.

Did you know?

The Dow Chemical Company and the Gulf Petrochemicals and Chemicals Association announced the launch of the first "Young Scientists Program," in the GCC, an initiative that aims to identify and reward students aspiring to pursue a career in chemical and petroleum engineering. This unique program will provide selected students with access to information, events and intelligence to help further their studies in STEM (Science, Technology, Engineering and Math) related fields, and support their passion for scientific discovery.

Rolling out across educational institutes in the UAE, Saudi Arabia and Kuwait, the program will involve selecting talented students to participate in a range of activities, including a visit to Dow's Jebel Ali Coatings Plant. In addition to having many "hands-on" experiences with the downstream petrochemical industry, the students will also receive suitable accreditation for their achievements. (from www.gpca.org.ae)

9. Working with contractors

As processes become more complicated, it is critical that operators work with their contractors to achieve productivity and efficiency gains. It also makes sense that the process construction and maintenance sector works closely with operators to bring in new technologies and assist in the development of best practice. Perhaps there even may be government grants available!

Did you know?

"The Singapore Refining Company and its contractors set up a Contractor Productivity Committee to look into improving productivity in its labour-intensive plant maintenance activities. One initiative

by this Committee was to encourage contractors to adopt powered tools such as the self-propelled bundle puller and the automated hydro-jet cleaning machine. SRC thus took the lead, and invested in Singapore's first refinery-wide compressed air system to power these PCM tools. This effort has enabled contractors to achieve productivity improvements of up to 40%, reduced worker fatigue, and contributed towards a safer working environment for workers.

While SRC and its PCM contractors establish their close partnership, the same collaborative spirit is now being realised across the industry, through the formation of a Productivity Council comprising plant owners, PCM contractors and the Association for Process Industry (ASPRI) to drive the adoption of global best practices.

Amongst many things, the Council will lead the development and implementation of management practices and certification systems for productivity and safety. It will also encourage benchmarking to demonstrate the benefits of productivity improvement, and is aiming to establish a Centre of Excellence to provide training and consultation to PCM contractors to sustain longer-term productivity growth.

Sustaining change and overcoming inertia are never easy, but with the constraint of worker supply the industry now faces, there is greater urgency for plant owners and the PCM sector to introduce changes quickly. The Government will assist by offering a Capability Development Grant to support companies' efforts to adopt mechanisation and automation technologies, and upgrade their workers' capabilities. *(from a speech by Mr Lee Yi Shyan, Senior Minister Of State For Trade And Industry And National Development, At The Singapore Refining Company And Contractors' Productivity Roadshow At 1 Merlimau Road, Jurong Island, On Wednesday 11 February 2015.)*

10. **M**easuring operational excellence

If you can't measure it, you can't implement it. Measurement is the key to sustain the improvement and make it the way of life from leadership to operational level.

Did you know?

"Overall, performance management systems are judged to be effective by just 1/3 of respondents. Top performers are better at gathering and analysing operational performance data at all levels of the organization." *From the EIU survey of Strategy execution: Achieving operational efficiency, November 2014*

*This research is conducted to help prepare for the [8th Asian Downstream Week](#) on 28 – 29 October 2015 at Sands Expo & Convention Centre, the anchor oil & gas event during the Singapore International Energy Week. If you are interested in getting more information about our research and opportunities associated with **Asian Downstream Week**, contact Shantal via shantal@clarionevents.asia*

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