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RESPONSE TO OIL PRICE CHANGE: A CASE STUDY OF NATIONAL OIL COMPANIES IN SOUTHEAST ASIA

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Summary

In the most recent crude oil price fluctuation in the 2015 - 2017 period, when the average price was around USD 47 per barrel, the oil and gas industry witnessed many players imperatively conducting various synthetic and systematic measures in an effort to withstand the effects. Looking into the practices of the three largest NOCs in Southeast Asia (Petronas of Malaysia, PTT Public Company Limited of Thailand, PT Pertamina - Persero of Indonesia) through the period, this paper aims to bring about some measures learnt from them, of which the most notable ones are i) guaranteeing a risk management system appropriate to different scenario, ii) being flexible and ready to adapt to any changes and iii) maintaining a full business value chain to maximise opportunities for business and values for shareholders.

Key words: Oil price decline, capability, portfolio, operation, technology, risk management.

1. Introduction

Like any other energy companies in the world, national oil companies (NOCs) in Southeast Asia always have to cope with the high volatility and uncertainties of the industry. Petroliam Nasional Berhad (Petronas), PTT Public Company Limited and PT Pertamina are the case. By revenue, these three NOCs are ranked among the top 10 largest oil and gas companies in Asia Pacific according to the Forbes Global 2000[1] [1] list in 2017.

Among the oil and gas companies in the region, they were considered the ones to have timely and appropriate responses, which helped them to efficiently limit the crisis consequences of the oil price drop-off and accommodate future changes.

By synthesising the business performance of each of the three NOCs and analysing their responsive actions during the oil price slump of 2015 - 2017, the authors consequently draw some implications to PVN.

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2. Theoretical framework

2.1. Global oil price overview

A critical characteristic of the oil market is its volatility in price as illustrated over the last 10 years since 2010 (Figure 1). Unlike other products, oil price is not only influenced by supply and demand principle but also strongly governed by decisions about production output made by OPEC [2]. From 2015, a combination of stable demand and oversupply had put pressure on oil price, resulting in its drop-off to approximately USD 47.56 per barrel in the period 2015 - 2017.

2.2. Concept of the Boston Consulting Group

Boston Consulting Group (BCG) is a global management consulting firm, having extensive experiences in alliances and joint ventures in both emerging, developed markets across the world, in a broad range of industries. Among those, the oil and gas industry is grappling with complex challenges such as energy transition, unstable oil prices, and intensified global competition. These elements increase risks for even the best-run firms. In an adaptive strategy helping energy companies to thrive in the years ahead [8], BCG addressed the concept that an

[1] *The Forbes Global 2000 is determined by a composite score of equally weighted measures of revenue, profits, assets and market value [3].*

Table 1. *Brief description of Petronas, PTT and Pertamina*

NOCs[2]	Revenue (billion USD)	Description
PETRONAS	100.74	Petronas is wholly owned by the government through the Ministry of Finance. Four of its majority-owned subsidiaries having some private ownership, including foreign equity participation, are listed on Bursa Malaysia stock exchange. Traded subsidiaries are Petronas' E&P company, its natural gas transmission company, refining company and petrochemical company [4]
ptt Group	93.55	PTT is an operating and holding company, of which the Thailand Ministry of Finance is the largest shareholder. Main business is conducted by itself and other PTT Group companies [5].
PERTAMINA	70.65	Pertamina is a state-owned enterprise of the Republic of Indonesia with the mission of carrying out integrated business in oil, gas, new and renewable energy based on marketing principles [6].

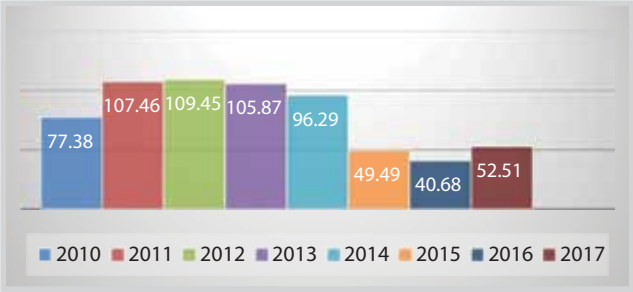
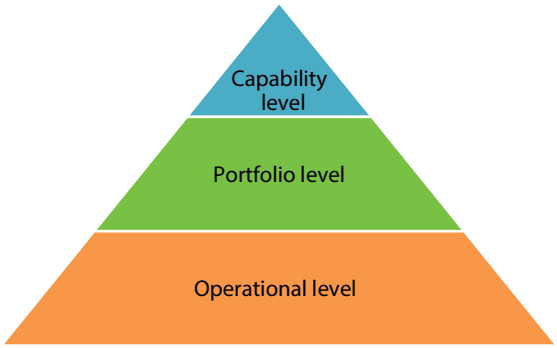


Figure 1. *Average annual crude oil price from 2010 to 2017 (in USD per barrel) [7].*



Capability level: *systematically build-up adaptive capability, increase resilience.*
Portfolio level: *develop, execute strategic portfolio decisions, take into account risks and competitive advantages.*
Operation level: *achieve cost competitiveness, productivity improvement.*

Figure 2. *Three levels to cope with uncertainties.*

NOC needs to formulate its responses to risks at 3 levels: capability, portfolio and operational level [9]. This BCG concept is employed as the theoretical framework of this paper, as described in Figure 2.

3. Analysis of the cases

If the period of 2011 - 2013 was maximising resources for growth as oil price reached the peak of more than 100 USD per barrel, 3 years later (2015 - 2017) was thriving through tough time for the NOCs.

3.1. Petronas

Since 2015, Petronas has undertaken numerous transformative initiatives.

The focus areas were (i) cash generation, cost efficiency, process simplification and project execution to ensure the immediate survival; (ii) technology, talent management, and culture change towards long-term sustainability. These are integrated in upstream and downstream as in Table 2.

At portfolio management level, Petronas conducted the followings:

- Maximise cash generator through international assets: monetising Canadian gas resources; continuing focus on Southeast Asia to pursue monetisation resources and further exploration opportunities.

- Expand core business: delivering material oil in Atlantic basin: building materiality and improving the balanced portfolio of oil and gas; expanding unconventional resource in North America with a focus on short-cycle investments; balancing portfolio through major reserve holder proven oil: obtaining steady cash flows that were less susceptible to oil price; successfully delivering RAPID (Refinery and Petrochemical Integrated Development) by 2019 and expanding value chain by extending into adjacent products; developing the Integrated Business Model: replicating the integrated

[2]*According to PFC Energy, an international energy consulting company based in Washington DC, Petronas and PTT are public entrepreneurs which support the industrialisation and growth in the respective countries as they are granted more autonomy in the pursuit of commercial goals both domestically and globally while Pertamina is development bureaucracy, ensuring revenues to the government, providing domestic subsidies for fuel, facilitating broader socio-economic development [5].*

Table 2. *Petronas focuses in the upstream and downstream*

Upstream	Downstream
- Prioritise safety and asset integrity; - Prioritise margins over production volume via cost reduction; - Maximise value of integrated domestic production across the value chain; - Secure new LNG customers; - Maintain consistent investment in exploration.	- Strive for operational and commercial excellence; - Deliver project excellence; - Optimise value chain; - Ensure the right talent and cultural beliefs to deliver on strategies; - Leverage on digital and technology.

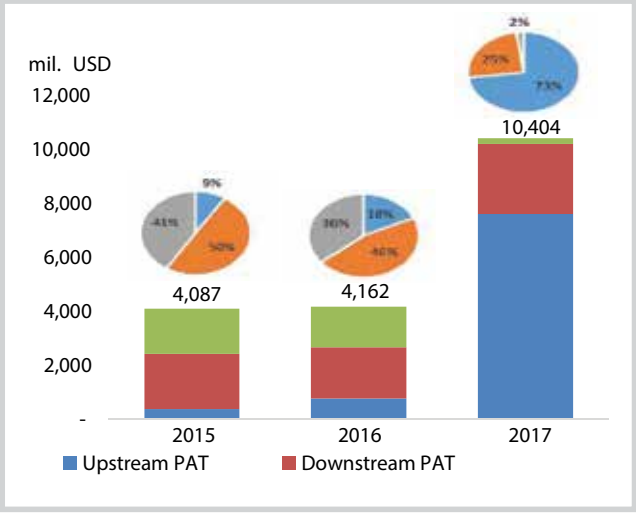


Figure 3*. Petronas financial performance in 2015, 2016, 2017 [3].*

model in Malaysia to selected regions, aligned with the growth of resource base.

- Step out: Specialty Chemicals[3], New Energy.

Specially, Cost reduction alliance 2.0 (CORAL 2.0), a long-term industry-wide program, was launched in March 2015 across the domestic upstream sector through close collaboration among the petroleum arrangement contractors and service providers. A total of 24 petroleum arrangement contractors and more than 100 service providers were involved in 11 initiatives. The primary results recorded were USD 550.65 million in cost savings in 2015, USD 596.54 million in 2016 and USD 1,491.34 million in 2017.

Figure 3 illustrates Petronas' financial performance in the 2015 - 2017 period.

In 2015, upstream reported a PAT (profit after tax) of USD 367.39 million, lower by 95% compared to 2014, contributing only 9% to the Group's gross PAT. The impact of lower prices was slightly offset by the improvement in the operational performance with the delivery of first hydrocarbon from 11 greenfield projects, most of which were from international operations. Upstream production rose by 3% in 2015 to 2,290 kboe/d compared to 2,226 kboe/d in 2014. The downstream posted a higher PAT of USD 2,043.81 million, an increase of 56% in comparison with 2014. This was basically owing to higher refining, marketing margins benefiting from lower feedstock prices as well as higher petrochemical products sales volume. The downstream was responsible for 50% of the Group's gross PAT.

In 2017, the upstream improved substantially in comparison with 2016, accounting for 73% of the Group's gross PAT, thanks to higher prices, rigorous operational excellence, and cost management. Upstream efforts saw 13 projects achieving first production and the delivery of 443 LNG cargoes in total from Bintulu - the highest in Petronas' history. Downstream also showed a higher PAT of USD 2,595 million, 36% increase compared to 2016, due to improved petrochemical product spreads, international refining margin plus higher trading and marketing margins. The downstream business shared 25% of the Group's gross PAT.

3.2. PTT

During this time, PTT defined its business strategies in 3D:

- **Do now:** productivity improvement to be implemented immediately.

- **Decide now:** sustainable growth to be achieved through 3 - 5 years investment decisions for organic growth with a focus on enhancing competitiveness and business advantages.

- **Design now:** priming for leapfrogging growth by leveraging innovation and new technologies.

In upstream business, strategic redirections were:

[3]*Specialty Chemicals are amongst the broad range of petrochemical products developed in the Pengerang Integrated Complex which has a petrochemical production capacity of 3.3 million mtpa.*

- Maintain production levels for projects in production phase but lower the costs.

- Review capital investment or final investment decision for projects in the development phase, particularly those with high costs.

- Focus only on low-risk projects for those in the exploration phase.

- Choose to invest in projects with existing or imminent production for merger and acquisition (M&A) projects aimed to increase petroleum reserves, generate revenue in a short timeframe.

- Reduce costs of general and administration category.

The major portfolio management activities were in Myanmar, Indonesia, Mozambique, Kenya, and Thailand. PTT Exploration & Production PLC (PTTEP) engaged in 20% equity transfer of 2 projects in Myanmar, PSC-G and EP-2, to a subsidiary of Mitsui Oil Exploration Co., Ltd. (MOECO) and Palang Sophon Offshore Pte., Ltd. Another 10% equity of Myanmar MOGE-3 was transferred to a subsidiary of MOECO. PTTEP made a total relinquishment of 3 blocks: Malunda, South Mandar of Indonesia and an onshore block, Rovuma, of Mozambique.

Besides, following the launch of the "SAVE to be SAFE" programme, PTTEP modified its investment plans and took actions to reduce costs, avoid expenses and defer investment, consisting of:

- Reduce operating and capital costs while seeking solutions to increase efficiency by the way of working or technologies;

- Avoid all activities deemed unnecessary or just "nice to have or nice to do" and focus only on projects and activities classified as "need to have or need to do";

- Defer investments marked as risky; reprioritise projects based on the capital amount; invest only on projects with positive returns.

"SPEND SMART" programme helped the descending unit cost to USD 30.46 per BOE (2016), a drop of 22% from USD 38.88 per BOE in 2015. Total expenditure before impairment was brought down to USD 3.664 billion in 2016 compared to USD 4.601 billion in 2015. PTTEP's financial status remained strong with a positive cash flow of USD 2.308 billion from operations, production levels being as planned, and cost management performance exceeding targets. EBITDA (Earnings before finance costs, income taxes depreciation, and amortisation including other non-operating income and expenses) margin in 2016 was well maintained at 71%, with net profit turning positive at USD 372 million, compared to a USD 854 million loss in 2015 after an impairment recognition of USD 1.385 billion during the year.

The scope of petrochemical and refining business ranges from fuel processing, production and sale of upstream, intermediate, and downstream petrochemicals together with various polymers, worldwide marketing business and integrated logistics services, in addition to jetty terminal and tank services. In 2017, PTT restructured its shareholding in the Group's companies associated with propane and bioplastics business. In 2015, a net profit was USD 716 million. In 2016, it was USD 1,894.28 million, excluding the net profit from PTT's shares in Bangchak Petroleum Public Limited and Star Petroleum Refining Public Limited, which were sold out. In 2017, the net profit amounted to USD 2,454.54 million. The downstream business stayed superior thanks to efficiency improvement, cost reduction, application of best practices, logistics management, value chain optimisation, higher output and sales volumes along with the overall improved spreads between refined products and crude oil.

3.3. Pertamina

To maintain stability in this challenging time, Pertamina embarked upon 5 strategic priorities as in Table 3.

These strategies were supported by the followings:

- Implement integrated supply chain strategy to ensure the procurement of national stocks.

- Formulate risk appetite and risk tolerance in the corporate top risk profile.

- Improve the performances of corporates, business units and subsidiaries performances through performance management system.

- Develop a corporate portfolio optimisation.

- Optimise ERP based human resources information system for the whole cycle of human resource management.

- Apply the business planning and consolidation - MySAP module.

- Set up SAP Business Object - CFO Dashboard system to support the speed and availability of standardised information for mobile decision makers.

Table 3. *Pertamina's five strategic priorities and the gains [6]*

Strategic priorities	Gains
Expansion in upstream: acquisition, development of Indonesia's main blocks; international development: Algeria, other international M&A; geothermal/new & renewable energy development; operations excellence (drilling, EOR, efficiency); exploration.	- As of December 2016, Pertamina was the holder of 24.53% shares in Maurel & Prom SA. - Extension of ONWJ block management contract. - Discovery of 2C reserve in 2016, 10% higher than in 2015.
Efficiencies at all lines of activity: - Reformation of crude and oil product procurement. - Reduce volume losses in all lines of operation. - Streamlining corporate functions; procurement centralisation. - Marketing concentration.	- Cost efficiency of upstream operations: USD 1.2 billion. - Refinery cost decreased to 97.1% of MOPS (Mean of Platts Singapore) compared to 98.2% of MOPS in 2015. - Yield valuable product increased from 75.52% to 77.67%. - The efficiency of crude and oil products procurement by an integrated supply chain worth up to USD 315.4 million. - Reduced total losses to 0.13% with the efficiency value worth up to USD 143 million. - The efficiency of the centralised non-hydrocarbon procurement was worth up to USD 280 million.
Increasing refinery capacity: refinery upgrade (refinery development master plan); grass root refinery (GRR) project; revitalisation and integration of private refinery.	- Development of existing refineries: + Blue sky project Cilacap in Cilacap refinery unit. + Refinery development master plan in Balikpapan, Cilacap, Dumai and Balongan refinery units. - Construction of new refineries: GRR East in Bontang, GRR West 1 and 2 in Tuban.
Development of infrastructure & marketing: Leverage of storage and terminal capacities; development of public fuel filling station and world-class marketing network; development of LNG receiving and regasification facilities as well as fuel gas filling stations; marketing; operation excellence; go international.	Plans for infrastructure development: - LPG refrigerated development in West Java - Construction of gas pipeline in Java. + Marketing goes international programme with a market entry strategy to Thailand. + Locally constructed of 8 units of crude oil tankers Type GP 17,500 DWT.
Improvement of financial structure: settlement of receivables to the government, alignment of short-term/long-term funding strategies, management of investment planning and evaluation.	- The increase of free cash used to accelerate the loan repayment. - The decrease in short-term and long-term liabilities resulted in the decrease of interest expense. - Better long-term liabilities to total assets ratio.

- Encourage changes through information communication - technology and shared services.

Employ internal control over financial reporting programme to encourage the internal control in Pertamina in accordance with international financial reporting standards. It is clear that upstream performance dynamically depends upon the world oil price, petroleum exploration, field development success, efficient cost management of E&P projects, investment opportunities, and corporate competency development while the downstream sector is primarily subjected to feedstock and product prices in the world market, which are a function of world supply and demand, year-end inventory (stocks), and world economy. As crude oil price declines, the NOCs need to quickly adjust other elements (cost, investment and competence, etc.) to mitigate negative impacts on the upstream.

On the other hand, the three NOCs still demonstrated a sound business performance in this period because each company has a fully integrated value chain. The downturn in oil price caused a severe decrease in upstream revenue and immediately influenced input values of refining and petrochemical business. In other words, a marginal loss of the financial indicators in the upstream sector can be partially offset by the downstream or other business segments' returns. Consequently, the company's profit which had been dominated by the upstream before, then was led by the downstream surplus.

Typical initiatives conducted by the NOCs and critical factors are discussed in more details in the following section.

4. Discussion

4.1. The NOCs' responses were implemented systematically as shown in Table 4

The commonality across the companies was technology at capability level, while it was M&A, relinquishment of blocks, equity transfer, and enhanced diversification at the portfolio level. However, it is important for a NOC to

Table 4. *Initiatives at 3 levels of risk management*

Capability level	Portfolio level	Operational level
Petronas		
- Technology and innovation - Intensify capability and talent development - Culture change	- Maximise cash generation through international assets. - Expand core business: specialty chemicals, new energy.	- Cash generation, cost efficiency (for example: CORAL 2.0), process simplification, project execution program.
PTT		
- Innovation, technology	- In the upstream: review the capital investment/final investment decision, M&A of projects, relinquishment of blocks, equity transfer. - In the downstream: sold out some public limited companies.	- In the upstream: "Spend Smart", "Save to be Safe" programs. - In the downstream: efficiency improvement, cost reduction, application of best practices, logistics management, value chain optimisation.
Pertamina		
- Human capital development - Technology	- Acquisition, development of Indonesia's main blocks; international M&A. - New/renewable energy. - Develop downstream business of CNG, LNG, gas trading, transmission, distribution.	- Develop infrastructure and marketing. - Improve financial structure. - Enhance efficiencies. - Tools: integrated supply chain, performance management system, business planning and consolidation - MySAP module, SAP business object-CFO dashboard system, information communication, technology and shared services, internal control over financial reporting program, ERP based human resources information system.

define its future competitive advantages [9] for portfolio management driven by efficiency principles to optimise expected returns at a given level of market risk [10]. At operation level, cost cutting-off needs to go beyond plan as much as possible and broadens into strategic productivity improvements.

4.2. Among those initiatives, technology and risk management are recognised as vital factors to boost the company capability

4.2.1. Successful application of technology will bring out differentiation and shape up the competitive edge

Petronas has been enlarging the technology funnel via multiple avenues comprising in-house R&D, innovation gateway, technology challenge, collaboration and corporate venture capitals. At the same time, the group is seeking ways to deploy technology in terms of digital, data analysis, automation and robotic solution in the assets, which will address brownfield assets with a 50% operational expenditure reduction target by 2026, specifically in surface operations, maintenance and logistics.

An example: In downstream, in line with Petronas aspiration of creating the plants of future, the conceptual design of Petronas Refinery & Petrochemical Complex-PRPC - a digital plant - started since 2011, aimed to enable PRPC to become a connected and agile organisation that can make informed decisions, rapidly adapt to different situations.

In PTT, since 2014, the integrated technology and innovation management operating system (TIMOS) has been implemented to provide a synchronised management system in transforming technology and innovation strategic direction into value realisation. In 2015, PTT managed technology and innovation by diversified practices across the company which USD 68.32 million (5.73% of total income) was invested in research and development.

Pertamina strived to facilitate demands in information and technology through its Corporate Shared Service functions.

- Upstream business management transfer: providing infrastructure (WAN), radio telecommunication support, telephone systems and VoIP; computing for end-user assistance involving the implementation of managed print services, replacement for proprietary application, which was suitable with standard Pertamina applications; software license transfer, procurement of the vessel traffic information system as a navigation system, non-directional beacons and radio beacons; as well as the rearrangement and adjustment of IT compliance and & governance.

Figure 4. *Digital PRPC vision [11].*

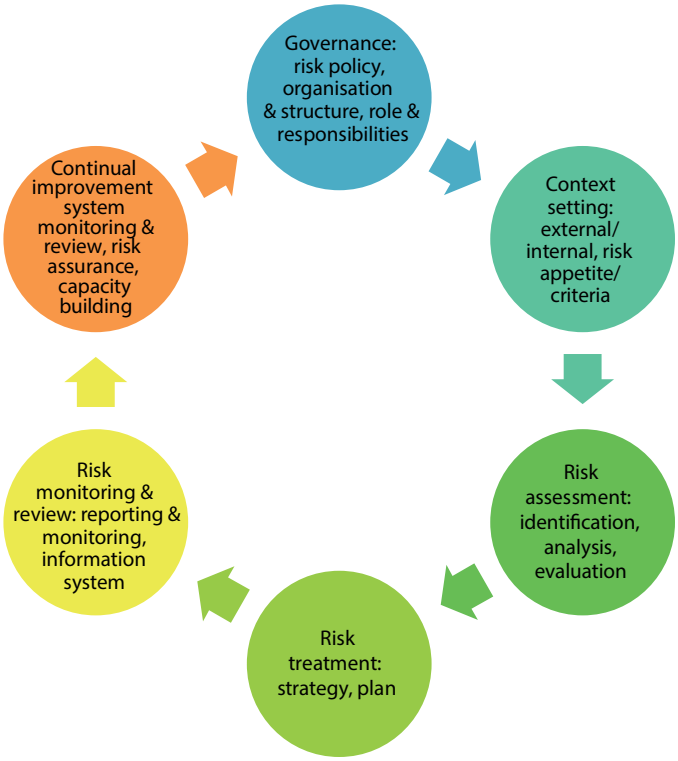


Figure 5. *Enterprise risk management framework.*

- Digital marketing: implementation of B2B and B2C technology/application; acceleration of culture change in relation to creativity and promoting an agile work scheme.

- PTKAM ICT improvement was conducted through the ERP and non-ERP (web E-LC) enhancement system, supporting loss calculations that occurred as a result of oil flow activities.

- Logistic excellence was an ongoing improvement of Pertamina's material number, through material code standardisation from Pertamina nomenclature into global Shell code nomenclature.

- Corporate administration system re-engineering encompassed the development of E-Correspondence 2.0 using an alternative platform to the previous version, from the web 1.0 to the web 3.0.

- Concurrent employment and corporation management was an expansion of the SAP HCM Module, used for multiple employment scenario management between the company and its subsidiaries.

- Investment improvement programme aimed to monitor the success of Investment Projects. In 2017, Pertamina implemented Direct Link SIIP at 2 of its subsidiaries: PT. Pertamina EP Cepu and PT. PDSI and the non-business development marketing directorate (527 projects).

In this challenging time, technology has proved its crucial role in cost reduction, efficient operation and driving higher competence for oil and gas companies.

4.2.2. Risk management is essential in strengthening abilities to withstand forthcoming uncertainties

Throughout years of development, the Board Governance & Risk Committee has been established in Petronas to provide oversight and in-depth discus-

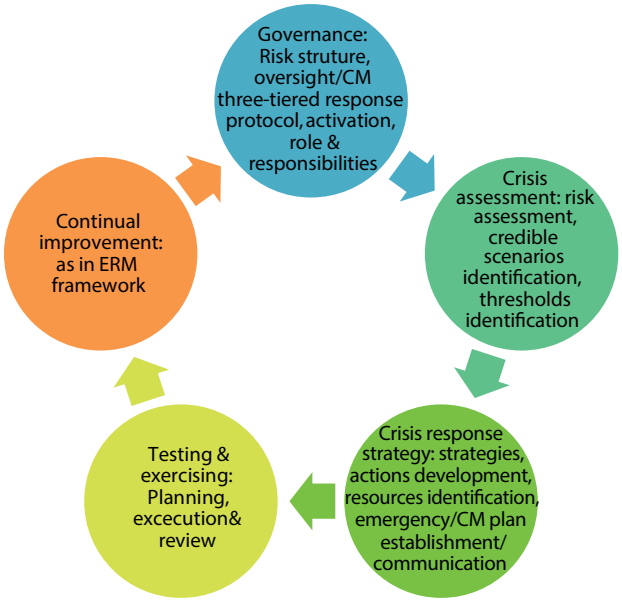


Figure 6. *Crisis management framework.*

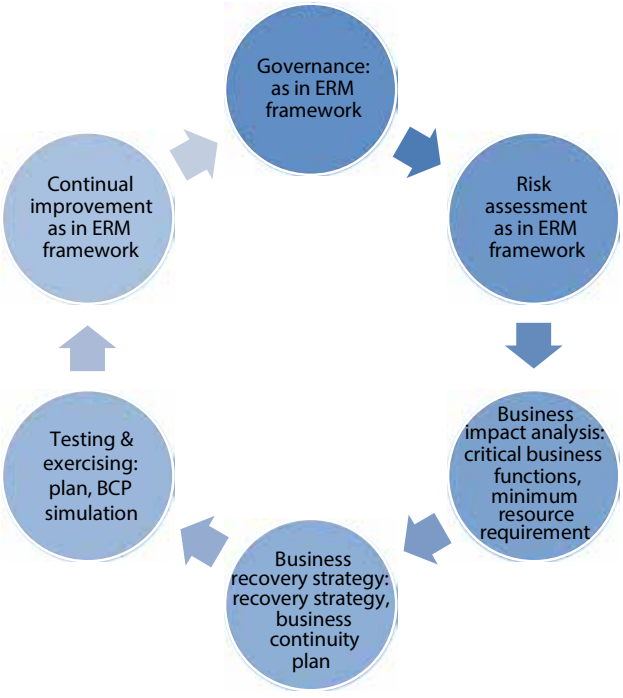


Figure 7. *Business continuity management framework.*

sion on risk management at the Board level. Since 2015, the Resiliency Model has focused on 3 areas, namely Enterprise Risk Management (ERM) - Figure 5, Crisis Management (CM) - Figure 6 and Business Continuity Management (BCM) - Figure 7 [3].

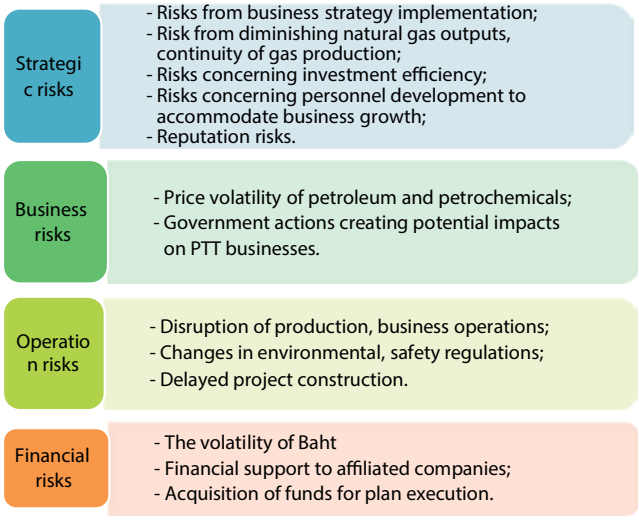


Figure 8. *PTT key risk factors [5].*

Figure 9. *Pertamina ERM roadmap [6].*

A Risk Management Committee was appointed to steer all risk management activities in PTT: monitoring risk management every quarter, deliberating and commenting on long-term obligations, business complication, significant impacts toward the corporate, screening the list of corporate risks and seeking endorsement of the Board. Emerging risk factors had been identified and managed annually under risk management plans. PTT continues to refine the risk factors to better reflect risks affecting investors (Figure 8).

ISO 31000: 2009, a global risk management standard, has been put into implementation in Pertamina since 2011.

The roadmap implementation was done in stages, starting from risk awareness, framework, discipline to habit and culture (Figure 9). Throughout 2017, 1,908 risks with 1,071 qualitative risks and 837 quantitative risks were found. From the identification result, the risk profile (financial risk[4], operational and infrastructure risk[5], risk of governance[6], compliance risk[7], reporting risk[8]) was obtained by the Board of Directors and the mitigation plans were undertaken.

[4]*Financial risk is associated with accounting, credit, liquidity & financial intelligence, financial market, planning & budgeting, and operational, which has resulted in financial loss, including the risk of movement or fluctuation of market variables: commodity prices, interest rates, oil prices and the risk of delays or failures of customers.*

[5]*Operational & infrastructure risk contains corporate assets, human resources, information technology, external events, legal, process management, product development, sales, marketing and communications.*

[6]*Risk of Governance is caused by the lack of or non-compliance with the rules of Corporate Governance and Business Ethics.*

[7]*Compliance risk is derived by the deficiency of or non-compliance with prevailing regulations. There are two major risks: the Risk of a Decreasing Good Corporate Governance Assessment and Fraud Risk.*

[8]*Reporting risk is related to the obligation to submit reports to interested parties/shareholders.*

In short, the oil price shock, a frequent issue in short/middle-terms which happened in many years, is regarded as one of the most crucial components in the overall risk profile. Thanks to effective risk management frameworks connecting at all levels in each NOC, the decision makers have been efficiently assisted to achieve the company's strategic objectives in a fair, informed, and transparent manner.

5. Conclusion

Although the upstream recorded low profit in the first year of the period 2015 - 2017 because of oil price downturn, in the following years it recovered steadily thanks to significant efforts to improve operational efficiency and cost management. In the downstream, revenue was exceptional due to lower oil price, higher production and sales, less impairment from a lower inventory as well as increasing refinery capacity. In general, the NOCs' performance was sustained thanks to their complete business value chains with a consolidated interrelation among sectors, which helped to offset the loss of one business segment by the earnings of others.

These best practices in Petronas, PTT and Pertamina give some reflections to PVN. The overall success of remaining highly resilient firstly comes from considering low oil price as the most-likely scenario in order to regularly develop and revise short-term and middle-term business plans and long-term strategies to accommodate future changes. Secondly, it is the company's preparedness and readiness to adapt that enable necessary actions to be implemented in time. Each NOC might pursue different paths to respond to particular contexts; however, the fundamental issues are (i) (at the capability level) the establishment of consistent policies and guidelines that guarantees the risk management system enforcement; (ii) (at the portfolio level) portfolio refining toward competitive advantages; and (iii) (at the operational level) extending cost reduction into strategic productivity improvements and utilising technology in all lines of businesses.

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