

DEVELOPING TECHNOLOGICAL CAPABILITIES ON THE UPSTREAM  
PETROLEUM SECTOR: A CASE STUDY OF PETRONAS

BY

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## DECLARATION

I hereby declare that this thesis, submitted to University Malaya as a partial fulfillment of the requirements for Master of Science in Science and Technology Policy Studies has not been submitted as an exercise for a degree at any other universities. I also certify that the work described here is entirely my own except for excerpts and summaries whose sources are appropriately cited in the references.

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## ABSTRACT

PETRONAS is a fully integrated oil and gas company, wholly owned by the Malaysian government. It is the largest corporation in Malaysia, with total assets of RM139 billion at March 31, 2001. It was incorporated in August 1974 and derives its powers from the Petroleum Development Act, which vests in it the ownership and powers of exploring and obtaining petroleum onshore and offshore Malaysia.

Over the years, PETRONAS has grown from strength to strength to become a fully integrated petroleum corporation, involved in a wide spectrum of petroleum activities. Currently its business activities range from upstream exploration and production of oil and gas to downstream oil refining; marketing and distribution of petroleum products; trading; gas processing and liquefaction; gas transmission pipeline operation; marketing of liquefied natural gas and other operations, both locally and internationally.

This study is aimed to find out how PETRONAS has managed to acquire and develop its technological capabilities in the upstream sector of the petroleum industry. In its 28 years of operation, PETRONAS has grown into a successful oil corporation with business interest in more than 20 countries and is also listed in the Fortune Global 500 as one of the largest corporations in the world. Its transition from being a technological novice to a well-respected global player did not happen by chance. This study is aimed to find out how this transition took place, especially in PETRONAS' core business, which is the upstream sector where oil production is concerned.

This study employed the case study method to find out how capabilities was acquired and developed in the upstream sector. Many literatures are discussed regarding technological capabilities and also mechanisms to develop and acquire capabilities. The case studies cover the two most important aspect of the upstream petroleum sector, which is the exploration and production division. The case studies revealed the learning efforts and technology accumulation efforts which was undertaken by PETRONAS to enhance its technological capabilities.

The findings of this study show that PETRONAS has adopted deliberate and sustained efforts to gather and develop technological capabilities. Many methods of technology capability development mechanisms were used, such as smart partnerships, acquisition of companies, the use of expatriates and other mechanisms to acquire capabilities, which led to its success.

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## ABBREVIATIONS

|       |  |
|-------|--|
| ASEAN | Association of Southeast Asian Nations |
| BEE   | Black Economic Empowerment             |
| BP    | British Petroleum                      |
| bpd   | barrels per day                        |
| CEO   | Chief Executive Officer                |
| CUF   | Centralised Utility Facilities         |
| EPMI  | Esso Production Malaysia Incorporation |
| E&P   | Exploration and Production             |
| GDP   | Gross Domestic Product                 |
| IPC   | Integrated Petrochemical Complexes     |
| ISO   | International Standards Organization   |
| IT    | Information and Technology             |
| LNG   | Liquefied Natural Gas                  |
| Ltd.  | Limited                                |
| LPG   | Liquefied Petroleum Gas                |
| MNC   | Multinational Corporation              |
| MLNG  | Malaysia liquefied natural gas         |
| MNOC  | Multinational Oil Companies            |
| MTBE  | Methyl Tertiary Butyl Ether            |

|          |   |
|----------|---|
| mmbtu    | million British Thermal Unit                            |
| mmscfd   | million standard cubic feet per day                     |
| mtpa     | million tonnes per annum                                |
| NEP      | New Economic Policy                                     |
| NGV      | Natural Gas for Vehicles                                |
| NIC      | Newly Industrialize Countries                           |
| NIE      | Newly Industrializing Economics                         |
| NOC      | National Oil Corporation                                |
| OECD     | Organization for Economic Cooperation and Development   |
| OPEC     | Organization of Petroleum Exporting Countries           |
| PETRONAS | Petroleum Nasional (The National Petroleum Corporation) |
| PGU      | Peninsular Gas Utilisation                              |
| PRSS     | Petronas Research and Scientific Services Sdn Bhd       |
| PSC      | Production Sharing Contracts.                           |
| R & D    | Research and Development                                |
| S & T    | Science and Technology                                  |
| UNCTAD   | United Nations Conference on Trade and Development      |
| www      | World-wide web  |