

## CHAPTER 3

## **CHAPTER 3**

### **TECHNOLOGICAL CAPABILITY - A CASE STUDY**

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#### **3.1 INTRODUCTION**

This chapter provides the outcome of a study on three selected defence related companies. They are the Malaysian Mining Corporation Defence (MMC Defence), which specialises in armoured vehicles modification works, DRB Deftech, which assembles and supplies soft-skinned vehicles, and Pesaka Astana, which supplies specialised vehicles. The source of information is obtained from interviews with the top management team of the companies. These include the Chief Executive Officers (CEO), General Managers (GM), and some of the project engineers. The writer was given permission to witness the assembly and refurbishment activities and was shown the facilities available in the premises.

Beside the study on the selected companies, feedback from the users is obtained to judge the companies' performance. The sources are from the following agencies:

- Logistic Branch, Army Headquarters, Ministry of Defence.

- REME Group, Army Logistic Command, Ministry of Defence.
- Equipment Cell, Army Headquarters, Ministry of Defence.

The information gathered from the interviews will then be used as the input for the analysis on the capabilities of the companies concerned.

## **3.2 MALAYSIAN MINING CORPORATION –DEFENCE**

### **3.2.1 Company's Profile**

MMC Defence is under the conglomerate of Malaysian Mining Corporation Berhad, a public listed group of companies, which was incorporated in 1928. It is one of the leading companies in the field of power generation, infrastructure and utility development, as well as manufacturing and investment. In their efforts to diversify into other engineering related businesses, in particular the defence industry, a subsidiary company named MMC Engineering Sdn. Bhd was established in 1986. It is one of the pioneer companies in the local defence industry. It took advantage from the government's incentive in encouraging the development of local defence industry by focusing in a specialised field of defence engineering, particularly in the refurbishment of armoured vehicles. The company secured its first government contract in 1986 with the task to develop a prototype of a

modernised Cadillac Gage Commando armoured personnel carrier. It involved the coupling of the Cummins V6 – 155 diesel engine to an Allison AT –545 fully automatic transmission. Later, in 1989, it successfully modernised a petrol driven Ferret Scout car and subsequently was awarded a contract for the modernisation of 100 units of Ferret (4X4) . Since then it has established itself as an active player in the local defence industry. Its reputation as a reliable agency in the modernisation programme for the army grew in strength from here

In 1993, the company secured another big deal; general overhaul of 96 units of German-made RPZ Condor armoured vehicles. It involved total refurbishment of the vehicle including overhauling of the engine, axle, transmission, hull and turret. The three- year contract was completed in 1996. The contract was further extended to include a further 150 units, to be spread over the next three years. The company changed to its current name as MMC Defence in March 2001 as a result of strategic move to provide more focus and quality services to current and potential customers.

### **3.2.2 Vision**

The company's vision is to be the preferred company in the field of armoured vehicle technology in the country and to be a reliable partner to the Malaysian Armed Forces.

**3.2.3 Mission**

The company's missions are as follows.

- MMC Defence Sdn. Bhd. is in the business of providing expertise in the armoured vehicle technology to the Armed Forces with emphasis on quality, application of current technology, optimisation of local content cost effective and timely completion of projects.
- Active participation in the development of local defence industry in accordance to Vision 2020.
- Conduct business based on principles of good corporate citizenship.

The corporate structure of MMC Berhad is shown in figure 4.

**3.2.4 Engineering Support**

MMC Defence is backed by another sister company, MMC Engineering Group Berhad (MMCEG). The company is staffed by experienced management team, professional engineers and skilled personnel with hands-on experience in the related field. All repair, refurbishment and upgrading of armoured vehicles are carried out at the company's workshop in Nilai

Industrial Estate. The workshop has the facilities to repair all variants of armoured vehicles including the main battle tanks.. The facilities include overhead cranes, general tools, special tools and test equipment. It also has ample capacity for future expansion to cater for additional load. The company is planning to add armoured vehicle test track and amphibious test pit in their next development project. It utilises 100% local engineering workforce capability as evident by its recruitment of local engineers and skilled tradesmen. Another interesting aspect about the company is that it employs more than 70% of its staff from the ex-servicemen. This noble move provides a second career opportunity for the servicemen with the required technical skill to continue utilising their trade once they leave the service. Many of them had served the army for more than 15 years and were attached to the regimental workshops while they were in uniform. According to the General Manager, the company will continue to employ the ex-servicemen as they prove to be technically competent and are very dedicated.

### **3.2.5 Research and Development (R&D) Activities**

The company does not have its own R&D Department. It gets the assistance from MMCEG to conduct R&D activities. Its first activity was on the upgrading of the Commando V 150 and the Ferret Scout car. In 1996 MMC Defence took the initiative to undertake R&D programme for life extension and upgrading of the Scorpion light tank and Stormer Armoured Personnel Carrier for the army. This involved general overhaul of the vehicle

and upgrading of suspension system as well as the turret system. Upon the completion of the R&D works, it was given to the army trial team to conduct performance and other operational tests. The army took about one and a half years before it successfully completed the stringent trial and evaluation. The company is now waiting for the contract for the upgrading of the vehicles to be awarded to them.

Another programme, the conversion of Stormer armoured personnel carrier into a command vehicle was successfully completed in 2000.

### **3.2.6 Technical Collaboration**

The company has established technical collaboration with OEM of armoured vehicles. The following companies have already established the link:

- Alvis of United Kingdom – maker of Scorpion light tank used by the Armoured Corps.
- Henschel of Germany - maker of Condor armoured personnel carrier used by the Mechanised Infantry Battalion.
- Bumar Labedy of Poland – maker of PT 91 main battle tank to be

purchased by the Malaysian Army.

- Daewoo of South Korea – maker of KIFV used by the Mechanised Infantry Battalion.
- Cadillac Gage of USA – maker of Commando V150 armoured personnel carriers used by the Mechanised Infantry Battalion .

Beside the OEM, MMC Defence has also collaborated with many sub-system manufacturers such as Helio Mirror, Delf Sensors, Racal, CMI, Thales Avimo and Sagem.

### **3.2.7 Transfer of Technology (ToT)**

In line with the government's intention to develop local defence industry, MMC Defence has already started collaborative arrangements with the OEM to transfer the technology from them. It was appointed by the Malaysian government to receive technology transfer from the OEM of the Korean Infantry Fighting Vehicle (KIFV). It involves on the job training (OJT) which was successfully conducted in Malaysia, Korea and Bosnia, while the Malaysian troops were serving there. The OJT covers fourth level repair and maintenance works for the vehicles. The vehicles are scheduled to undergo



overhauling in 2005. To prepare the necessary manpower to undertake the job, a number of technicians have been sent to the OEM plants in South Korea for OJT.

Strategic alliances with foreign manufacturers have enabled MMC Defence to successfully refurbish and modify the Condor armoured personnel carriers and the Scorpion light tank respectively. According to the GM, he was very satisfied with the conduct of ToT by the OEM. Their field engineers were in attendance throughout most of the stages of development and were ever ready to impart their knowledge to local participants. He added that the local technicians involved in the two projects have learnt a great deal about the engineering processes, engineering designs, test protocols and many other engineering aspects of the projects.

### **3.2.8 Current Activities**

Works are now in progress for the refurbishment of 25 units of RPZ Condor armoured personnel carriers. The contract was signed in 1999, which stipulated that 150 units were to undergo refurbishment that will be spread over the next three years. The project is now behind schedule due to some technical problems on the status of spare parts. To protect the army's interest, a team known as the Government Inspection and Acceptance Team (GIAT), is permanently stationed in the plant to monitor the work and carry out progressive inspection and assist in the final acceptance test. The team

consists of one officer of a rank of major and four army technicians. The three-year contract is worth RM 45 million.

The recent government's announced decision to purchase MBTs from Poland had provided a shot in the arm for the company. MMC Defence is appointed the local agent to bring the tanks into the country. The contract for the purchase of PT 91 Polish MBTs is expected to cost over RM 1 billion. Representatives from the government, MMC Defence and Bumar Labedy of Poland are now engaged in technical discussion before contract negotiation is expected to commence in early June 2002. The project is scheduled to take about five years, with an agreed number of units to be assembled in country under the ToT arrangement.

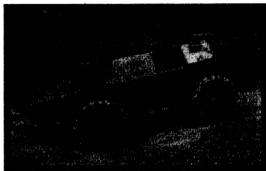
A range of armoured vehicles and tank under the arms of MMC Defence is illustrated in Picture 1.

### **3.2.9 Expansion Plan**

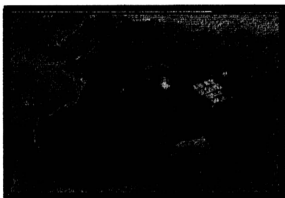
In line with the company's strategic planning and commitments towards developing local defence industry, MMC Defence has embarked on expansion programme that will occupy two premises. One is at its present locality (MMC defence Service Center) and the other is at MMC Defence Complex, formerly owned by MMC Engineering Group Berhad. Distance



Scorpion & Stormer



Upgraded Commando V150



Ferret Scout Car



RP2 Condor



Upgraded Scorpion Tank



Upgraded Stormer ACV

Picture 1: MMC Product

between both premises is less than one kilometre. With the newly acquired premise, MMC Defence has a combined area of 5.5 hectares and a total built up area of about 9,800 square meters.

Finally, the GM concluded by emphasising that, with the technical know-how, track record and investment in infrastructure, MMC Defence is ready to play a more prominent and leading role in the development of local defence industry in Malaysia in the field of armoured vehicles in the country and incorporating many local contents to further enhance the development of local industry as a whole. This, he said, is a small contribution by MMC Defence to the nation towards achieving the status of industrialised country by the year 2020.

**3.3 DIVERSIFIED RESOURCE BERHAD- DEFENCE TECHNOLOGY (DRB-DEFTECH)**

**3.3.1 Company's Profile**

DEFTECH is a wholly owned subsidiary of DRB-HICOM Berhad. It was established in 1996 with an authorised capital of RM 100 million. The company is one of the pioneers in local defence automotive industry, having secured a contract to supply 4X4 ¾ tons vehicles in early 1990s through another subsidiary, Automotive Corporation Malaysia (ACM). It is presently

operating from two locations. The corporate office is located at 57<sup>th</sup> floor, Empire Tower, in Kuala Lumpur. The defence production activities are conducted at a 25.62-acre site in Peramu Jaya industrial estate in Pekan , Pahang.

### **3.3.2 Company's Mission**

The mission of DEFTECH is to build a sustainable business enterprise in defence industry through achieving excellence in the following core areas:

- The marketing and sale of military vehicles, associated equipment and spare parts in the Malaysian and potential export market.
- The development and production (assembly, manufacture and system integration) of military vehicles, meeting the requirement of potential customers.
- The provision of effective and efficient logistics support services in repair, refurbishment and upgrading of military vehicles.

### **3.3.3 Vision**

DEFTECH aspires to become the leading defence equipment supplier, manufacturer and repairer in Malaysia. In striving for this mission, the

company is constantly guided by the following philosophy of the DRB-HICOM Berhad.

- To strive for total customer satisfaction by providing zero-defect products and excellent services at a competitive price.
- To shareholders, the company is committed to optimise the generation of profits for consistent high return on investment through the efficient and effective management of resources.
- To provide a competitive compensation package to the employees and opportunities for self-development and career advancement.
- To business associates, the company is committed to establish and develop a long and mutually beneficial relationship.
- To be a responsible corporate citizen, contributing towards achieving the national self-reliance policy in defence production, care of the environment and the general well being of the community in which the company operates.

### 3.3.4 Facilities

The development of Peramu Jaya Plant estimated at RM70 million is in progress and is carried out in 3 phases to provide the following facilities.

- A flexible manufacturing plant for the assembly of armoured vehicles (wheeled and tracked) of up to 50 ton tanks as well as for system integration of specialist vehicles such as CAESAR 155mm truck mounted artillery system, weapon carriers, communication shelters, recovery vehicles, tank transporter, ambulances etc.
- A workshop for the repair (including base overhaul), maintenance and refurbishment of soft-skin and armoured vehicles.
- A warehouse with the requisite facilities for the stocking and distribution of spare parts nation-wide.

Apart from the above-mentioned development programme, a computerised materials resource planning (MRP) system costing RM8 million will also be introduced for production planning and control and spare parts inventory management in DEFTECH. Where required and cost effective, provision will also be made to provide computers.

Also in the development plan will be a computerised materials resources planning system (MRP) for production planning and control (PP&C) and inventory management in DEFTECH. In the event of implementing the proposed stockist project for the supply of spares and refurbishment of vehicles, DEFTECH will also invest to provide computer terminals in selected military units for stock enquiry and spare orders processing where necessary and cost effective to do so.

As an indispensable part of the vehicle assembly, system integration and refurbishment infrastructure, a NATO standard vehicle test track will also be built on a 100 acres site close to Peramu Jaya by the middle of 2002.

### **3.3.5 Organisation and Manning**

DEFTECH has an establishment for 101 staffs (16 engineers, 37 technicians mechanics and 57 management and supporting staffs. To meet additional manpower requirement, the company have initiated recruitment action to fill the existing 51 vacancies.

In consequence of its policy of favouring ex-service personnel, the majority (more than 85%) of the existing management and technical staffs are recruited from retired officers and NCOs of the Malaysian Armed Forces



with the relevant management or technical qualification and experience. This recruitment will continue to prevail in all their recruitment exercise.

### 3.3.6 Products Range

In line with the business strategy, DEFTECH has entered into several MOUs/agreements on commercial and industrial collaboration for the promotion and sale of various equipment systems with the following international manufacturers:

<u>Companies</u>	<u>Products</u>
FNSS (Turkey)	Tracked APC/IFV (ACV300)
MGWAG (Switzerland)	Wheeled APC/IFV (Mowag Piranha)
State Enterprises' Progress' ( Ukr)	Main Battle Tank T84
Isuzu Motors ( Japan )	Isuzu trucks
IVECO (Italy)	Heavy Duty Military Trucks
Bucher-Guyer (Switzerland)	Duro 4x4 and 6x6 HMLC
DaimlerChrysler (Germany)	G Wagon family of vehicle
Alvis (UK)	ATMP SUPACAT
Raba' (Hungary)	Special vehicle components
GIAT Industries (France)	CAESAR 155mm Artillery System
Euromissile (France)	Milan ATGM System
Flyer Group Inc. (USA)	Flyer High Mobility Vehicle

To embark on the production of purely military vehicles, DEFTECH has been granted pioneer status and obtained a manufacturing licence. The company hopes to manufacture tracked and wheeled vehicles from 1-ton truck category to 50-ton MBT. The range of vehicles manufactured and supplied by DEFTECH is shown in Picture 2.

### **3.3.7 Major Contracts**

Since its inception in 1996, DEFTECH has been awarded several contracts for the supply and refurbishment of military vehicles. The major contracts are:

- The assembly, fabrication and supply of 1511 units of 3 tons truck 4X4 GS Cargo HICOM Handalan vehicle.
- The assembly, fabrication and supply of 168 units of 2- ton, 4X4 Pinzgauer Gun Tower and 164 units of 2-ton 6X6 Pinzgauer Mortar Transporter complete with 4 units of ammunition trailers.
- The assembly, fabrication and supply of 13 units of 6-ton 4X4 light recovery vehicle.
- The assembly, fabrication and supply of 29 units of 5-ton 4X4 communication shelter vehicle.



HICOM Handalan



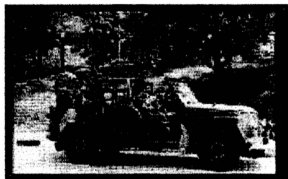
Duro 6 x 6



Gomba Stonefield



Communication Shelter



Milan ATGM



Supacat ATMP

Picture 2: DEFTECH Product

- The assembly of 65 CKD units of ACV 300 armoured personnel carrier.
- The fabrication of 19 units of 2-ton 4X4 field ambulance and 4 units of 2-ton 4X4 Satellite Communication vehicles.
- The supply of 8 units of Supacat 6X6 all terrain vehicle.
- The upgrading and refurbishment of 33 units of Gomba Stonefield Field Ambulance.

### **3.3.8 Research and Development**

DEFTECH spends around RM3 to RM4 million yearly on R&D activities. It receives technical assistance from the foreign strategic partners and works closely with the military in all projects. In 1998 it entered into a Memorandum of Understanding (MoU) with the Ministry of Defence on R&D as well as skill enhancement in the field of automotive and automotive related technology. The projects that have been successfully conducted with the cooperation of the ministry are:

- Refurbishment of Sibmas AFSV 90 and Sibmas AVR.

- Upgrading and refurbishment of Gomba Stonefield Field Ambulance
- Refurbishment of 16-ton Volvo F88 Gun Tower.
- Configuration of HMG/106 RCL carriers based on G Wagon chassis.
- Configuration High Mobility Troop Carrier based on Duro 6X6 chassis.

### **3.4 PESAKA ASTANA (M) SDN. BHD**

#### **3.4.1 Company's Profile.**

Pasaka Astana (PA) was incorporated in 1992 and is a wholly-owned Bumiputera company. It manufactures and supplies heavy duty and special purpose vehicles, mostly to Malaysian market. The vehicles are manufactured from its own chassis under a brand name of AMDAC or in full, Astana Multi-sourcing Diesel Automotive Component. The company is the only Malaysian company involved in the customised, specialised vehicle sector.

Over a decade, PA has grown from just a trading company to an automotive manufacturer in the niche market, locally and internationally. The growth is quite phenomenal as it is a private company, venturing into highly technical but small market and without the required manufacturing experience. It celebrates ten years of operation this year after having garnered invaluable experience and vital knowledge in the automotive industry all these years. Currently, the company's clients include the Ministry of Defence, port authorities, Malaysian Police and Fire Service Department. The company also intends to extend its reach to other sectors that require customised vehicles in an effort to further expand its clientele list. In order to gain exposure in the international market, the company is a regular participant at the local defence exposition, Defence Service Asia (DSA), which is held biannually. The growth can be traced as described below:

- 1992. The company is incorporated
- 1993. Awarded contract from Ministry of Defence for the supply of specialised vehicle to Malaysian Peace keeping Force in Bosnia.
- . Signed technical co-operation with ROMAN S.A. of Romania to develop specialised vehicle chassis.
- 1997. The 100<sup>th</sup> heavy special purpose vehicle rolls out.

- 1999.      Awarded contract to supply port terminal trucks to Singapore Port Authority.  
Started in-house fabrication of vehicle body and superstructure.
- 2000.      Certified by MTLi as licensed manufacturer of special purpose vehicle.  
Awarded contract by Fire and Rescue Department to supply Rapid Fire Rescue Tender.
- 2001.      Launches a project with the Malaysian Police to manufacture specialised vehicle.  
Penetrated into Brunei market and awarded contract to supply Water Tender Ladder vehicle and Turntable Ladder vehicle to Brunei Fire Department.  
Joint venture with CNIM from France to manufacture and market bridging system for the Asian region.  
Collaboration with Fili Ferrari from Italy to manufacture and market crane system for the Asian region.

### **3.4.2 Company's Vision.**

To be a renowned name in the manufacture of customised and specialised heavy duty vehicles.

### **3.4.3 Corporate Mission.**

- To consistently offer high quality customised vehicles.
- To play a role in the development of the heavy duty automotive industry in Malaysia.
- To innovate and create vehicles of various types that can compliment the physical and local environment as well as needs.
- To develop a highly skilled workforce that can contribute to the growth of the industry.
- To further enhance the company's position in the Malaysian heavy vehicles sector.



#### **3.4.4 Facilities.**

PA occupies an area of about 8 acres at Bukit Jelutong in Shah Alam. It has an administration block and factory complex with a total floor area of 150,000 square feet. The administration block comprises the main office, a training centre, and a comprehensive R&D Department. The factory complex has an assembly, production and services blocks plus a body fabrication, washing and painting block. It is a one-stop centre for the manufacture of specialised vehicle, with state-of-the-art machinery, tooling and test benches. When fully utilised the facilities are expected to increase capacity two-fold. A visit to the area shows that the company is able to expand further in terms of adding another production line and increasing administrative office floor area. It also has adequate warehouse to stock vehicle spares and components for production and maintenance services to the customers.

#### **3.4.5 Core Business Activities.**

Presently, Company is very much involved in the following activities.

- Designing, customising, and manufacturing specialised vehicle chassis ranging from 4x4, 6x6, 10x10 and 12x12 wheel drive vehicles.

- Design and manufacture of heavy duty cranes and recovery equipment.
- Design and manufacture of superstructures and equipment for special operation.
- Re-engineering and re-manufacturing.
- Servicing and repair network.
- Conducting vehicle familiarisation training.
- Servicing and repair.

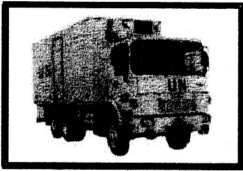
Combining resourcefulness and technical know-how, the company incorporates the "integrated Manufacturing System (IMS)" technology to their manufacturing process. IMS technology is widely used abroad in the manufacturing of vehicles. This process allows PA the option to source the necessary components from any OEM world-wide to manufacture its products. Not only does allow flexibility in design, it also enables the company to offer competitive pricing. To-date the company has already established technical collaborations with truck manufacturers in Europe and the USA. It has also acquired capabilities and knowledge to become an

independent integrated OEM manufacturer in truck design and manufacturing in Malaysia. The range of products manufactured by the company is shown in Picture 3.

#### **3.4.6 Research and Development Activities.**

Although PA's organisational structure caters for R&D Department, the present set-up is still understaffed. All major R&D projects are usually sent to overseas alliances to make use of the much better facilities there. However, the local researchers and engineers are very much involved in the design of vehicles according to customer's specifications. PA insists on producing a very detailed drawing of vehicles. Local engineers working with PA produce all the drawings.

By investing in R&D activities including technology development in automotive engineering, components and designing prototypes, PA envisage that it can further improve the existing range of its products. It has developed the Auto.eNet, a fully comprehensive IT system that provides cataloguing and product design as well as diagnostics and servicing. The entire servicing process can be done by engineers who operate and communicate with customers via computers.



AMDAC DROP Vehicle



AMDAC Medium Recovery



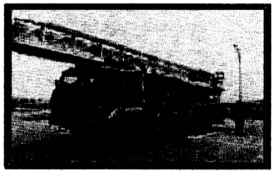
AMDAC All Terrain Crane



AMDAC Low Loader



Recovery Vehicle



AMDAC Fire Tender

**Picture 3: PESAKA ASTANA Product**

In an effort to jointly conduct R&D activities with the army, in 2001 the company successfully produced a model of Medium Recovery Vehicle (MRV) which was based on the technical specification prepared by the REME. The good performance of the product has prompted REME to purchase the vehicles in the same year for recovery tasks.

Overall, the company spends about 5% of the revenue on R&D activities, mainly in collaboration with its alliances overseas. However, with the setting up of R&D department at the new complex, the company hopes to hire more local researchers to generate innovation within the company.

#### **3.4.7 Human Resource Development**

According to the GM, the development of technological competency within the company is uppermost in their human resource development plan. The company has already established a training department to cater for the training requirement within the organisation and the customers. A field engineer from Romania is presently attached to the company to provide training in automotive engineering as well as assisting in the after sales services to customers.

As with other defence-related companies, PA provides opportunities for ex-servicemen to join the private sector. Currently about 55% of the total

work force are former technicians from the army. The company also provides facilities for the soldiers to attend resettlement courses prior to them leaving the service. This, according to the GM, is a small contribution in recognition of the soldier's sacrifice to the nation.

#### **3.4.8 The Future Plan**

PA is going all out for global reach in order for the company to receive further recognition. The move to new complex in Shah Alam will boost its manufacturing capacity as well as improving its facilities. PA plans to increase its workforce from less than 100 to 200 personnel. Another area that the company is concentrating is automotive engineering training facilities that will be extended to other automotive firms. With successful penetration into the regional market, PA is looking at global market as its next target market. It also plans to widen its strategic alliances to further strengthen its technological capabilities.

### **3.5 SUMMARY**

The case study conducted on the three selected automotive companies provided an insight of the extent of technological capabilities they have developed over the years in providing the vehicles for the army. The different types and configuration of military vehicles require diverse technological

know-how that manufacturers are expected to possess in order to meet the stringent military specification. MMC-Defence's specialisation in armoured vehicles refurbishment and modification works is considered a new venture in local automotive industry as no other companies have undertaken that job before, and it eventually managed to develop a reputable level of capability in armour technology. DRE-DEFTECH on the other hand, concentrates on assembling soft-skinned vehicle through the assistance of its other sister companies with the required facilities. PA, a privately owned company seems to find a niche market in customised and special purpose vehicle and is successful in its venture.

Overall, the three companies have adequate facilities to provide the services needed by the army and also in the manufacture of soft-skinned and specialised vehicles. However, it is felt that they have not attained the required capabilities to assemble and manufacture armoured vehicles and tanks yet. As the technology involved in tank production, it will take much effort and require foreign company's assistance before the capabilities can be achieved.