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THE ROLE OF OFFSETS IN MALAYSIAN DEFENCE INDUSTRIALISATION

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Defence offsets rank as one of the most important and controversial topics within the broad field of defence economics. Arms vendors are likely to view offsetting investment as a distraction, fearful of its potential to hurt the bottom line. By contrast, policymakers in the arms purchasing countries see offsets as an opportunity to extract technology transfer, as well as employment, investment and export sales opportunities. Establishing the actual impact of offsets, however, is not easy. The subject is shrouded in secrecy and myth, with anecdote and generalisation pervading even the intellectual press. This paper seeks to break the mould by offering an empirical case study of the role of offsets in Malaysian defence industrialisation.

Keywords: Defence offsets; Technology transfer; Defence industry; Malaysia

INTRODUCTION: SEARCH FOR SECURITY

Since the early 1990s, the principal mechanism for promoting Malaysian defence industrialisation has been defence offsets. Big ticket purchases of BAE Systems Hawk trainer/fighter aircraft, Russian MIG-29/SU-30 MKM fighters, US F/A-18s, French/Spanish Scorpene submarines and Polish MBTs have all been tied to technology transfer requirements through offsets. More major weapon systems purchases are planned during the Ninth Malaysia Plan (2006–2010), including A400M Heavy Lift Aircraft, Frigate Batch 2 warships, Pilatus PC7MKII aircraft, Very Short Range Air Defence Systems and Multiple Launcher Rocket Systems (MLRS). These high value defence acquisitions have been financed by Malaysia's growth in national income. The country's GDP growth, measured in constant US\$ prices, increased by 65% from 1994 to 2004; this exactly matches the rise in Singapore's GDP over the same period (Australian DoD, 2007). Table I shows the trend in Malaysia's defence expenditure across 1997–2005, registering a 61% increase over this period.

Although no formal Malaysian offsets policy existed until 2005, the country's high value defence acquisitions have long been tied to *ad hoc* and uncoordinated demands for offsetting investment. This raises the question as to the contribution that offsets have made to the development of an 'indigenous' defence industrial base. The sensitivity of offsets means that there

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TABLE I Malaysian Military Expenditure, 1997–2005 (US\$ million)

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
Milex (US\$m)	1,858	1,365	1,847	2,087	2,370	3,020	2,917	3,120	2,996
Milex/GDP (%)	2.1	1.6	2.1	1.7	2.2	2.3	2.8	2.4	2.4

Source: SIPRI (2007, Table 8A3).

Note: Constant 2005 prices.

has been minimal academic investigation of country experiences, and none at all in the context of Malaysia. This paucity of empirical study is surprising, not least because of the vaunted, but invariably unsubstantiated, claims by protagonists that offsets offer a ‘win-win’ trading arrangement for both the overseas vendor and the purchasing country. Indeed, for the latter countries, there is the additional perception that offsets represent a ‘third-way’ to industrial and technological development, more effective than either import-substitution or export-promotion. The purpose of this paper is thus to address this gap in the literature, exploring whether offsets can make a net contribution to the development of local defence-industrial capability. The study will be undertaken by reference to the case of Malaysia.

DEFENCE-INDUSTRIAL ORIGINS

Malaysia possessed minimal defence production capacity prior to Independence. Its economy at that time was mainly agrarian, with only pockets of small Chinese-owned enterprises, and larger enterprises dominated by foreigners, mainly British (Lawrence and Wheelwright, 1965). Post-Independence, the authorities began to recognise the need for local defence industrialisation. This was primarily on the grounds of sovereignty, but also to bolster efforts to pursue strategic and foreign policy goals. Progress was uncoordinated and *ad hoc* though, with the Armed Forces’ basic equipment requirements satisfied through ‘in-house’ military facilities geared towards the needs of the separate service branches. For instance, the Aircraft Repair and Overhaul Depot (AIROD) was established in 1976 as a public sector enterprise to service Royal Malaysian Air Force (RMAF) aircraft. Additionally, the government-owned Syarikat Malaysia Explosives (SME) enterprise was established in 1972 to produce small arms, ammunition, hand grenades and pyrotechnics. Thus, the first two decades of Malaysian defence industrialisation, by and large, reflected a process of public investment in key but basic sectors, with progress both gradual and non-ambitious. The principal objective at that time was the creation of a modest but credible defence industrial capability able to provide first-line logistical support to Malaysia’s Armed Forces (MAF) in the form of through-life maintenance, repair and overhaul.

The 1982 publication of the National Defence Production Policy (NDPP) provided greater direction to Malaysia’s defence industrial planning. Importantly, the government-owned defence undertakings would henceforth take sole responsibility for the production of strategic defence items, whilst semi-government and private-sector enterprises would be encouraged to produce essential and non-strategic defence goods. Although important policy structures were finally under construction, the late-1980s recession led to declining defence expenditure, and, as a consequence, implementation of the NDPP was stalled. Parallel defence modernisation initiatives were also delayed, with reduced defence funding instead channelled towards extending the shelf-life of existing weapons platforms, through upgrades and overhauls.

‘Take-off’ for Malaysian defence industrialisation finally occurred in the early 1990s. Several events combined to catalyse developments. To begin, Dr Mahathir Mohamad came to

TABLE II Structure and Expansion of Malaysia's Defence Industry, 1969–2005

<i>Aerospace</i>	<i>Shipbuilding</i>	<i>Land Systems</i>	<i>Other Industries</i>
Ikramatik Flight Simulation Systems, 1998	Boustead Maritime Naval Dockyard, 2005	DRB Hicom/DEFTECH, 1996	Sapura Defence, Defence Simulator and Electronic, 1995
Astronautic Technology (ATSB), 1996	MSET Shipbuilding, 2001	Malaysia Mining Corporation (MMC) Defence, 1976	Caidmark, IT and Consultancy, 1980
Aerospace Technology Systems Corp (ATSC), 1994	Penang Naval Dockyard (PSCNDSB), 1995		Tenaga Kimia, Explosives, 1976
UPECA Engineering and Aerospace, 1992	ME & O Fleet Support, 1985		System Consultancy Service, 1975
Composite Technology Research Malaysia (CTRM), 1991	Labuan Shipyard Maritime (LSE), 1972		Syarikat Malaysia Explosives Sdn Bhd (SME), 1972
SME Aerospace, 1990	Nautica Nova Shipyard and Engineering, 1969		
SME Aviation, 1990			
Zetro Aerospace, Repair and Overhaul of Avionics, Radar and Communications Equipment and Systems, 1981			
Aircraft Repair and Overhaul Depot (AIROD), 1976			

Source: Malaysian Defence Industry Council (MDIC), 15 May 2006; www.mod.gov.my.

power and energised the defence-industrial push, not least by substantially increasing defence budgets. The expanded defence budgets led to the acquisition of a broad array of foreign weapons systems, linked significantly to increasingly robust demands for defence offsets. Finally, there was a push for defence privatisation, in line with wider commercialisation initiatives. These events accelerated the development of a Malaysian industrial base, beyond the rudimentary activities begun in the 1970s and 1980s. Table II details the principal companies that have contributed to the development of Malaysia's defence industry over the extended period 1969–2005.

A sizeable proportion of Malaysia's defence budget has been devoted to supporting emerging aerospace companies (Military Balance, 2007).¹ AIROD, as previously mentioned, began life in 1976 as a repair and overhaul depot, providing first- and second-line service to the RMAF. AIROD was incorporated as a private company in 1984, combining Aerospace Industries Malaysia with Lockheed Aircraft Systems, employing 10 managers from Lockheed and 242 Malaysian personnel, mostly from the RMAF.² In 1995, AIROD became a fully Malaysian-owned company, and now employs more than 1200 workers, mostly highly qualified and experienced engineers (AIROD, 2006).

SME Aerospace (SMEA) is another successful Malaysian aerospace company that began operating in 1990, focused solely on defence business. The company was formed through an offsets venture with BAE Systems to produce Hawk pylons. Since that time SMEA has built up its capacity and is presently producing aircraft parts, components and sub-assemblies, integrated into BAE Systems' global military and civil supply chain. Since 2005, SMEA's workforce of 430 personnel has produced Airbus fixed leading-edge parts, sub-spar assemblies, aft pylon fairings and helicopter vertical/horizontal fins.³

¹ Malaysia's 2006 Defence Budget was US\$3.08 billion. See *Military Balance* (2007).

² Fieldwork, Malaysia (May 2005).

³ Telephone interview with the CEO of SMEA, Colonel Chee Ng Boon (February 2006).

More broadly, since the 1990s, Malaysia's defence industry has progressively expanded and diversified. UPECA Engineering Sdn Bhd, for instance, was formed in 1992, initially as a purely civil-based oil and gas company. However, by 2007, UPECA had become dual-focused, producing machinery and equipment for precision manufacture of complex aero-structural parts requiring up to five-axis CNC machining, including high-precision parts for the A400M aircraft. Another 1990s entrant into Malaysia's expanding defence sector was Composite Technology Research Malaysia (CTRM). It too had commenced operations solely focused on civil production, producing, for example, the Eagle light aircraft, the Eagle Unmanned Aerial Reconnaissance Vehicle and the Lancair Columbia 300 light aircraft. In recent years, CTRM has begun to specialise in the design and production of composite structures for both civil and defence aerospace customers. It presently designs and manufactures components for the Airbus 320 and 380, and is the sole supplier of fixed trailing edge panels for the B747, 757 Air Cargo, 767 and 777 aircraft (MIGHT, 2003). In the defence field, CTRM has become a sub-contractor for BAE Systems, with a 2005 programme for the design and production of US\$907 million worth of airframe parts for the A400M (Andres and Wong, 2005).

Another Malaysian defence company involved in services work is Aerospace Technology Systems Corp Sdn Bhd (ATSC).⁴ Established in 1994 with its Russian partner, RAC MIG (now called Rosoboronexport), ATSC was formed to provide repair, overhaul, modification and upgrading services for Malaysia's then newly acquired MIG-29 aircraft. The company's workforce were, and still are, largely ex-Royal Malaysian Air Force personnel, experienced in aircraft maintenance and engineering work. ATSC has cooperated with Germany and India in the provision of maintenance services for the MIG-29; this will likely continue, given that both Malaysia and India have acquired Russian SU-30MKM fighters.

Similar development has occurred in the Land Systems area. For instance, in ordnance production, Syarikat Malaysia Explosives Sdn Bhd (SME) commenced operations in 1972 as a joint-venture company. Equity participation was between the government of Malaysia and two local Malaysian partners: Syarikat Permodalan Kebangsaan and Syarikat Jaya Raya Sdn Bhd, and two foreign partners: Germany's Dynamit Nobel and the Swiss Oerlikon Machine Tools Company. By 1974, SME had become a wholly-owned Malaysian company, achieving private company status in 1990. At about the same time, SME signed an agreement with Austria's Steyr-Mannlicher to license-produce the Steys-AUG assault gun for the MAF (Singh, 1994). SMEO is another specialist manufacturer of explosives, and, as with SME, is a subsidiary of the NADI Corporation. SMEO⁵ commenced operations as a public sector company, specialising in the production of small calibre ammunition. Then, in 1993, SMEO was approved as a preferred supplier of guns and ammunition to Royal Ordnance, BAE Systems. Since that time, through the opportunities created by offsets, SMEO has successfully diversified its activities to develop a portfolio of pyrotechnics, large calibre ammunition and engineering plastics products.

Another major land systems company is DEFTECH. Established in 1996, this company has specialised in the production and maintenance of defence-related equipment, particularly soft-skinned vehicles below three tonnes.⁶ DEFTECH exports trucks to countries such as

⁴ ATSC is divided into three divisions: Combat Aircraft Division (CAD) – located at ATSC's Aircraft Maintenance Centre on the Eastern coast of Peninsular Malaysia, and which is currently performing depot level maintenance and repair of RMAF MIG 29 aircraft; Aviation Support Division (ASD) – located at Terminal 3, Subang, to provide second and third line maintenance, overhaul, airfield specialist vehicles and aerospace support; and Materials and Product Support Division – providing equipment support for the MIG-29 fleet.

⁵ The Standards and Industrial Research Institute of Malaysia (SIRIM) certified and registered SMEO's quality system on 7 December 1993, in compliance with the MS ISO 9002:1991 Quality System.

⁶ DRB HICOM, the holding group, is the producer of Malaysia's National Car, Proton.

Bangladesh and Brunei. The company was also the principal Malaysian partner in the year 2000 joint development and local assembly of 64 Turkish APC 300s. Another local Armoured Vehicle producer is MMC Defence. Formed in 1976, it has been involved in a wide spectrum of offset-related projects, including modernisation of the MAF Ferret Scout Car and development of the turbo-charged diesel engine integrated into the Chrysler A727. In 1993, the Malaysian Army awarded MMC a contract to overhaul 96 Thyssen Henschell German Radpanzer Condor 4×4s, and, later that decade, a further contract was awarded for the overhaul of another 50 Condor 4×4s. In 1995, MMC participated in the upgrade of both the Scorpion and Stormer APCs. In 2000, the company was appointed as the Malaysian offsets beneficiary in the assembly of both the Korean Infantry Vehicle and the Polish MBTs. MMC is one of the few Malaysian companies that, since inception, has specialised solely in defence work.⁷

Finally, in the Maritime sector, there is the Naval Dockyard. This company's roots can be traced all the way back to 1953 when it started life as the Malaysian Shipyard and Engineering Sdn Bhd (MSE). Originally a joint-venture between the Malaysian government and a consortium of local and foreign companies, MSE was re-invented several times. It became the Lumut Dockyard in 1984, was then privatised to be renamed the Naval Dockyard in 1992, before becoming the Penang Naval Dockyard PSCNDSB in 1995. However, PSCNDSB has had a chequered history. In 1997, the government awarded a RM5.35 billion (US\$1.67 billion) contract to PSCNDSB, in partnership with Germany's Thyssen Krupp, for in-country construction of 27 Offshore Patrol Vessels (OPVs) over a 10 year period (*Defense News*, May 2005). The project immediately ran into trouble through delays and technical difficulties, leading to costs soaring by ten times the original budget (*Defense News*, August 2005). To date, only two OPVs have been commissioned into service, with a further four under construction (*Defense News*, August 2005). Due to tortuous delays, the government-owned Malaysian property and palm oil plantation company, Boustead Holdings, acquired PSCNDSB in 2005. Besides shipbuilding and repair capability, the newly named Boustead Naval Dockyard holds a servicing and maintenance contract for all Royal Malaysian Navy ships. Another Malaysian shipyard, Labuan Shipyard and Engineering (LSE), commenced operations in 1972. It is an engineering and construction company with a core competence in shipbuilding, repair, maintenance, and oil and gas fabrication (including power barges). In 2005, the government leased LSE's operations to local company, Realmild, which is now responsible for managing the shipyard on Labuan Island.

OFFSETS PROGRAMME PERFORMANCE: ECONOMIC BENEFITS

Across the Seventh and Eighth Malaysia Plans (1995–2005), 14 major offset programmes were agreed between MINDEF and offshore suppliers.⁸ Within these programmes, 431 separate offsets projects were established, of which 48% have been completed, 30% are ongoing, and 20% yet to begin.⁹ Some 321 of the total 431 projects were focused on direct (defence) offsets related work, targeted mainly on job creation, training and skills enhancement.¹⁰ Table III lists the principal characteristics of the Malaysian offsets programmes undertaken across the Seventh and Eighth Plan periods. During these Plans, offsets activity was driven by technology

⁷ Interview with Colonel (Rtd) Ahda, MMC Defence (20 June 2005). Telephone interview with Colonel (Rtd) Andrew, MMC Defence (15 August 2005).

⁸ Fieldwork, Defence Industry Division, MoD, Malaysia (30 April–31 July 2005).

⁹ Fieldwork, Defence Industry Division, MoD, Malaysia (30 April–31 July 2005).

¹⁰ Fieldwork, Defence Industry Division, MoD, Malaysia (30 April–31 July 2005).

TABLE III Selected Major Defence Acquisition Programmes under the Eighth Malaysia Plan, 2000–2005

Year	Programme	Offset Projects	Contract (Different Currencies) (mn)	Country	Counter Trade Value (mn)	Offsets (Direct & Indirect) (%)	Counter Purchase (%)
2003	SU30MKM	Technical service centre for maintenance and repair; logistics support; development of full mission simulator; training and launching of Malaysian astronaut	US\$900.7	Russia	US\$540.4 (60%)	30%	30%
2003	GFE SU-30MKM	Participation in optronic, avionic, communication ICD definition phase; integration of optronic, avionic, communication equipments; avionics maintenance and repair facilities and optronic maintenance license production for Malaysian industry	EU118.5	France	EU35.5 (30%)	30%	NA
2003	MBT PT 91M	Final assembly, maintenance and repair of MBTs; local production of parts and components; training against NBC weapons; and horse management training in Poland	US\$370.6	Poland	US\$222.4 (60%)	30%	30% (palm oil, rubber and cocoa)
2003	Exocet SM39 missile	Training course (basic, intermediate and advanced), in guided missiles technologies and intermediate level maintenance	E131.7	France	EU26.34 (20%)	NA	NA
2003	LOH 109	Maintenance and service capabilities; multipurpose test bench for gearbox; post design support and documentation; flight training centre set-up; computer based cockpit and mission training; sub-contracts to local industry for production of helicopter sub-assemblies	US\$75.39	France	NA	NA	NA
2003	High Performance Human centrifuge	National hyperbaric medicine centre at the Malaysian school of Medical Sciences (USM); training to RMAF Institute of Aviation Medicine (IAM) on GAT II Spatial Disorientation (SD); local engineering office for the support of the G-FET II and local manufacture and product support	US\$11.055	USA	NA	NA	NA
2003	CN235	Training in aircraft design, composites construction, testing and maintenance	US\$36.280	Indonesia	US\$7.256	Only direct offset, % NA	NA
2002	Scorpene	Training in various handling and management activities	EU920.4	France/Spain	EU460.2 (50%)	15%	35% (palm oil, rubber and cocoa)
2002	Black Shark Torpedo	Support and test equipment (S&TE) adaptation; ILS management; propulsion batteries site design; and industrial and management training	EU87.5	Italy	EU43.8 (50%)	25%	25%
2002	JERNAS Missile	Tri-service electronic warfare training centre; design, manufacture and support of towing vehicle installation kits; design, manufacture and support of combat repair vehicle installation kits (CRVIK)	US\$75.339	UK	NA	NA	NA

TABLE III (Continued)

Year	Programme	Offset Projects	Contract (Different currencies) (mn)	Country	Counter trade value (mn)	Offsets (Direct & Indirect) (%)	Counter purchase (%)
2001	FENNEC AS555N	Cockpit trainer cooperation; loal production of the Ecuireuil/Fennec service station; maintenance support for avionics, radar and communications equipment	EU42.124	France	NA	NA	NA
2000	ACV 300	Local assembly and manufacture of vehicle parts and components, and maintenance training	US\$278.700	Turkey	NA	NA	NA
1999/ 2000	Super Lynx	Maintenance for support of RMN Super Lynx helicopters; certification and provision for manufacture of composite components; inventory control and management system; avionics and computer maintenance; manufacture of helicopter ground support equipment and other aircraft components	£113.3	UK	NA	NA	NA

Source: Defence Industry Division, June 2005, Ministry of Defence, Malaysia.

NA = data not available.

Total countertrade % = offset% + counterpurchase%.

transfer in the form of training, know-how, joint development, local production and sub-assembly. Table III demonstrates Malaysia's wide international supply base, spanning nine countries, and covering a spectrum of counter-trade (counter-purchase and offset) arrangements. Due to the absence, until 2006, of a formal offsets policy, there was a lack of institutional guidance influencing offset negotiations with foreign defence contractors. This led to variations in offsets standards, such as the split between direct and indirect offsets, the threshold value that triggers offsets requirements, and also the specification of percentage offset targets.¹¹

A consequence of Malaysia's lack of formal offsets guidelines were the frequent policy shifts in the composition of offsets. In the early 1990s, for instance, there was a policy emphasis on counter-purchase activities; this ebbed away in the mid-1990s, only to become important again in the latter part of the decade. Malaysia's mood-swings between commodity-based counter-purchase and technology transfer through offsets appear to have been strongly calibrated to the country's economic cycle. Thus, during the economic slowdown, post-1997, Kuala Lumpur sought a quick economic recovery through commodity production and trading, with counter-purchase featuring prominently. Indeed, across the period 1999–2003, the total counter-purchase value was approximately US\$381 million, almost on par with the offsets value of US\$389 million.¹² Over recent years, however, offset deals have increased in importance, incorporating a rising proportion of indirect offsets, due to Malaysia's recognition of the growing importance of dual-use technology in the wider defence economy. These indirect offsets have been mainly targeted on foreign commercial technology ventures, such as GPS and IT projects.¹³

A principal objective of Malaysia's offsets programmes is to foster local employment opportunities, but, given that the other primary aim is to attract high value investment, it is clear that there will be an inevitable policy clash between capital- and labour-intensive projects. It would appear that capital-intensity has taken policy priority, because, as will be discussed later, several hundred Malaysian offsets projects have not created significant numbers of local jobs. However, notwithstanding this negative outcome, there is evidence that offsets have added to capacity, enhanced local skills, deepened industrial specialization, promoted development of local supply chains, and contributed to the beginnings of foreign defence market penetration.

Growing numbers of Malaysian offset programmes are making valuable contributions to the development of local defence and commercial production capacity. In the defence field, the 2006 procurement of the Swiss Pilatus PC7 MK11 aircraft led to a local company, Ikramatic System Sdn Bhd, being awarded an offsets contract for the design and development of a flight simulator visual system. AIROD Bhd has also benefited from a Pilatus Aircraft offset for the upgrade of onboard equipment, and earlier offsets contracts with Lockheed Martin related to Maintenance, Repair and Overhaul (MRO) work on C-130 transport aircraft. AIROD's growing expertise in the MRO field has enabled it to bid for C-130 upgrade contracts against international tender. There is also a Sapura-Thales offsets-related joint-venture that facilitated the development of local skills in the supply of VHS communications equipment to the Malaysian Army. One final example has regard to the ACV 300 Turkish

¹¹ Offsets tend to be characterised as non-monetarised trade, fitting into a taxonomy under the umbrella term, 'countertrade'. The ribs of the umbrella comprise barter trade (guns-for-oil); counterpurchase (short-term commodity-based reciprocal trade); and offsets (long-term technology transfer) directed towards the defence sector (direct offsets) and/or the commercial sector (indirect offsets). Offshore vendor companies are liable for offsets obligations up to a pre-determined value; this being calculated as a target percentage of the primary defence contract value. Vendors can earn credits towards reducing their total offset liability, and these credits may enjoy a 'multiplied' value if offsetting investment is directed towards sectors designated by government to possess high strategic value.

¹² Fieldwork, Defence Industry Division, MoD, Malaysia (June 2005).

¹³ Fieldwork, Defence Industry Division, MoD, Malaysia, where official contract documents specify types of offsets projects.

offsets project: this enabling DEFTECH to win an order from Brunei for the supply of 69 Malaysian 4×4 HICOM Handalan II trucks.

In the commercial arena, offsets have played a prominent role in the development of Malaysian aerospace capability. CTRM, in particular, has benefited greatly from the manufacture of components and composite parts for the Airbus series, extending this expertise to supply similar items on Europe's A400M programme. CTRM presently employs around 100 workers at its Malacca complex, with a further 200 jobs due to be created in the future.¹⁴ Additionally, design and manufacturing capabilities fostered through the Hawk, Airbus and Fennec offsets programmes are now being exploited by a Malaysian consortium (CTRM, Ikramatic and SCS) to design and fabricate a tactical Unmanned Aerial Vehicle (UAV).

Defence industrial contracts have also cultivated a sizeable number of firms producing low-tech 'common-user' items for Malaysia's Armed Forces. These firms supply items such as ration packs, military boots, uniforms and parachutes to both the local and regional markets. Glowtrade, for instance, provides parachutes to the Malaysian Armed Forces and exports them to Brunei and several other ASEAN countries; Pakaian Saling Erti, employs 300 workers and produces uniforms and accessories; and Semenanjung Selatan supplies combat rigid hull inflatable boats.¹⁵ Under the Eighth Malaysian Plan (2000–2005) government expenditure on such diverse items as uniforms and accessories, medical equipment, laundry, tailoring and footwear was worth around US\$28 million, spread across 98 contracts.¹⁶

To expand the high value-added, high technology nature of Malaysia's defence value chain, the government created SMIDEC in 1996. This semi-government agency operates under the Ministry of International Trade and Industry (MITI), providing advisory services, fiscal and financial assistance, infrastructural facilities, market access and other services to facilitate the development of a local sub-contracting base. This initiative represents just one example of a recent broad government push to promote defence-related vendor development programmes.

A major plank of this 'indigenisation' policy has been defence offsets. Since the early 1990s, all Malaysian purchases of major land, sea and air weapons systems have been sourced from foreign suppliers, and all these deals, to a lesser or greater extent, have been linked to offsets. As a consequence, the procurement of Turkish APC 300 tanks, Polish PT91 tanks, South African G-5 guns, the Brazilian MLRS Astros 11, and EADS helicopters, have enhanced the opportunities for local content in foreign-supplied military equipment. The local content has been achieved through the creation of industrial clusters of domestic small- and medium-sized enterprises (SMEs).

Promotion of local sub-contractors through offsets has been aggressively pursued. BAE Systems, for instance, has been active in fostering local value-chains in Malaysia. Hawk aircraft sub-contract work has been spun-off through offsets to domestic producers, with firms engaged in the production of pylons, wire looms and ground support equipment. Indeed, across the period 1990–2004, BAE Systems is reported to have sub-contracted nearly US\$200 million worth of offsets work to the four big Malaysian aerospace companies, CTRM, ACT – a subsidiary of CTRM, SMEA and Excelnet;¹⁷ and, importantly, some of this work has cascaded down to local small and medium-sized enterprises. For instance, SMEA has sub-contracted work to UPECA Engineering, acting as a fourth-tier manufacturer of machined mechanical components.¹⁸ The exacting standards required for defence work has led UPECA to enjoy improvements in process control, internal quality processes and manpower skills in

¹⁴ Fieldwork, Malaysia (February 2008).

¹⁵ Some 70% of the shares are owned by the Armed Forces Pension Fund (Lembaga Tabung Angkatan Tentera).

¹⁶ Procurement Division, MoD, Malaysia (September 2006).

¹⁷ Fieldwork, Malaysia (January 2008).

¹⁸ BAE Systems, Farnborough office, United Kingdom (September 2004).

CNC machining.¹⁹ UPECA has been able to exploit this technology-upgrading to create spin-offs in the development of non-defence, safety and quality measures for the oil and gas sectors. This has enabled UPECA to foster its own local supply-chain in secondary processing, including surface treatment.²⁰

Similarly, offsets work linked to the 2002 MBDA JERNAS short-range Surface-to-Air Missile (SAM) procurement has generated several work packages for vehicle installation kits and stowed-equipment, benefiting both MMC Defence and SMEA. In fact, the contracts to SMEA have supported the development of 12 civil sub-contractors in Selangor, producing tools, drill-jigs and sub-assembly jigs. In addition, Ikramatik – a local business linked to the MIG-29/SU-30 programmes – was awarded US\$350,000 worth of sub-contracts in 2004, covering the production of a diverse range of generic outputs, such as wiring, lighting-generators, mechanical and electronic parts, and complete projects.²¹ Similarly, Zetro Aerospace, a Malaysian company servicing the electronics integrated into the EADS acureil/Eurocopter helicopter, has sub-contracted US\$5 million worth of work to local SMEs in uninterruptible power supply (UPS) and lighting protection systems.²² Eurocopter Malaysia itself has created 20 sub-contractors, providing a further US\$5 million worth of offsets across 2002–2004 (Lubrano, 2005). Reportedly, over 100 local firms have received work through Eurocopter Malaysia's MRO activities, with much of this sub-contract work in the commercial rather than defence arena.²³

OFFSETS PROGRAMME PERFORMANCE: THE DOWNSIDES

MINDEF policymakers have expressed concern at the low value of direct offsets and the associated negative impact on the linked objectives of equipment supply sovereignty and local defence industrial sustainability. These big picture strategic concerns represent a coalescence of several anxieties. In particular, Malaysia faces a number of challenges.

To begin, there is the ongoing difficulty of verifying that the additionality and causality contractual clauses have been achieved. These problems only arise in counter-purchase deals, often distorting commodity market prices through the search for short-term gains. Malaysia's MoD is continuously challenged to prove that counter-purchase contracts have actually 'added' (additionality) to existing commodity sales. Linked to this requirement is also the need to prove that particular counter-purchase deals have 'caused' (causality) this additional commodity-based trade.²⁴ However, similar problems can occur in the offsets field. For example, Malaysia's purchase of two Scorpene-class submarines from France's DCN International (now Amaris) and Spain's Izar (now Navantia) were tied to an offset project to upgrade IT systems at Spain's Barajas airport; but this project would have gone forward irrespective of the offsets provision.²⁵

Secondly, offsets have failed to create defence technology absorptive capacity beyond the development of local maintenance, repair and overhaul capability. There exists little incentive for foreign defence contractors to engage in meaningful technology transfer when local

¹⁹ Interview with Ang Ewe Jin, UPECA Engineering, Malaysia (June 2005).

²⁰ Interview with an executive of a Malaysian offsets recipient aerospace company (15 May 2005).

²¹ Interview with Tuan Syed M. Jamil, CEO Ikramatik, Malaysia, HICOM Glenmaries Industrial Park, Shah Alam (June 2005).

²² Interview with Col (R) Kamaruddin Kamarulzaman, Zetro Aerospace Corporation Sdn Bhd, Jln Yap Kwan Seng, Kuala Lumpur, Malaysia (June 2005).

²³ Fieldwork, Malaysia (January 2008).

²⁴ Interview with Dr Ghaffar Ramli, Director of STRIDE, MoD, Malaysia (June 2006).

²⁵ Fieldwork, Malaysia (2008).

production runs are low and tooling costs high. The problem is compounded by the lack of investment to promote domestic science and technology capacity, both by the government and the offshore OEMs (Original Equipment Manufacturers); the latter more likely committed to securing sales than to the Malaysian MoD's goal of achieving defence-industrial self-reliance. OEMs are reluctant to transfer high technology packages, representing decades of expensive accumulated R&D. The OEMs also harbour scepticism regarding the feasibility of Malaysia becoming a defence platform or even sub-system manufacturer any time soon.²⁶ Again, economic reality dictates that the big global defence contractors perceive 'small' developing countries as economically inefficient, requiring large capital outlays, incurring long lead-times, and carrying much uncertainty in terms of recurrent volume and export performance.²⁷ Thus, while it is argued that OEMs have contributed to the building of local value chains, there is concern that, save for a small measure of design work, the bulk of these subcontracts have been low-level 'metal-bashing' and build-to-print activities.²⁸

A further problem is that advanced weapon systems have been acquired from a wide array of countries, including the UK, the US, Germany, Poland, Russia, France, Italy, Brazil, South Africa and Turkey. These purchases may or may not have reduced single-source vulnerability, but what is certain is that they have created a range of technical and logistical problems for both local defence industry and the military, at second and third level MRO. Principal amongst these problems is the differing technology capabilities and requirements, from West and East, with varying technical standards and specifications that have created complexity in the integration and interoperability of equipment across Malaysia's Armed Forces. The diverse equipment inventory has challenged the indigenous learning process, with defence firms and military maintenance personnel requiring familiarity with different manuals, standards and guidelines in order to be compliant with OEM operating procedures.²⁹

Malaysia's experience of diversified acquisition suggests there are increased costs due to the frequent need to adapt to differing supplier technology processes.³⁰ A major factor forcing such adaptation is the need to modify infrastructure and hardware, such as jigs and tools, to conform to each supplier's requirements. Unsurprisingly, from the OEM's perspective, there is the view that this logistical complexity is high risk, not least because of fears of technology leakage to competitors via Malaysian partner companies.³¹ As a consequence, the majority of offset deals focus on MRO activities, with manufacturing accounting for just 8% of Malaysian offsets, and even less, just 5%, for integrated logistic systems.³²

Although technology transfer has advanced the pace and breadth of Malaysian defence industrialisation, the creation of local value-added remains constrained. Around 38% of offset recipients continue to rely on foreign sources of technology, components, parts and process machinery.³³ Malaysia also exhibits a continuing import dependence on raw materials, such as high-speed steels and composites.³⁴ Overseas dependency extends to the provision of

²⁶ Fieldwork, Malaysia (May–July 2005).

²⁷ Fieldwork, Malaysia (April–July 2005).

²⁸ Fieldwork, Malaysia (May–July 2005).

²⁹ Interview with a Malaysian company representative (July 2005).

³⁰ If this is true, then, of course, it begs the question as to why Malaysia seeks to diversify arms supply sources. Taking Malaysia's purchase of MIG-29 fighters as an example, the acquisition rationale was based on the fighter's competitive price, the need for diversification between Russian and Western military systems, and political considerations. Efforts to reduce life-cycle costs did not figure in the acquisition decision as Russian spares are expensive and difficult to secure due to drawn-out and complicated Russian bureaucratic procedures – interview with Malaysian MoD officials (February 2008).

³¹ Interview with an executive of an offshore defence contractor, Malaysia (June 2005).

³² *Ibid.* (June, 2005).

³³ Fieldwork, Malaysia (30 April–31 July 2005).

³⁴ Interviews with Ng Ewe Jin, UPECA Engineering, Kuala Lumpur (May 2005) and with Richard McKie, BAE, Farnborough (February, 2006).

consultancy services, with almost 50% of offset beneficiary companies dependent on foreign provision.³⁵ Malaysia's continued dependence on foreign supply suggests that, notwithstanding progress in raising local capability in a broad range of fields, offsets have failed to embed high value added activity into the local defence economy.

Compounding the problem, offset programmes have not acted to promote research and development (R&D) activity amongst local beneficiaries. Around 70% of Malaysian defence companies spend less than 10% of annual revenues on R&D, almost 90% lack in-house R&D facilities, and 100% have zero patents.³⁶ The manufacturers blame this paucity of R&D endeavour on the government, arguing that there are insufficient financial incentives, such as tax credits for R&D expenditure. However, offsets have also failed to leverage local R&D investment. Only minimal R&D activity has been sponsored through offsets and, where it has occurred, it has proved short-term, with most of the Malaysian partners participating on programmes that do not develop into commercially viable opportunities. Most offsets-sponsored R&D projects are abandoned after in-depth and extensive training has been provided, creating only 'one-off' superficial benefits.³⁷ The short-termist nature of 'transplanted' offset-related production projects is because production runs are relatively short. There is only limited effective domestic demand for expensive foreign arms and OEM follow-on orders rarely materialize due to customers elsewhere also demanding offset-related local production.³⁸

A further problem is that technology transfer has not proved cost-effective, constrained by institutional and bureaucratic obstacles. The use of offshore vendor technology incurs expensive royalty payments, with fieldwork interviews suggesting that this has acted to deter local technological development. For example, a need arose for facilities to assemble and test components for a Thermal Vacuum Chamber (TVC). These facilities were not available in Malaysia but the cost of using foreign TVC technology proved prohibitive.³⁹ In similar vein, technology access may be constrained by export control regulations imposed by the OEM's government. For instance, Malaysia often faces serious difficulties in sourcing technology from other developing country suppliers, because the latter almost never hold the intellectual property rights (IPR), and invariably has to revert to the OEMs to seek sales authorisation. This happened when Malaysia bought 300 APCs from the Turkish company, FNSS Savunma Systems, which then became involved in a protracted process of referral with its US technology partner to ensure US International Trade in Arms Regulations (ITAR) were not infringed.⁴⁰ The resultant delays were costly, not least because timelines extended beyond the critical path. A further example of export clearance controls stymieing efficient execution of Malaysian offsets projects has regard to the Russian MIG-29 programme. Here, a Malaysian

³⁵ Fieldwork, Malaysia (30 April–31 July 2005).

³⁶ Fieldwork, Malaysia (30 April–31 July 2005).

³⁷ Interview with Col (Rtd) Kamaruddin Kamarulzaman, Zetro Aerospace Corporation Sdn Bhd, Malaysia (June 2005).

³⁸ However, many countries do not possess Singapore's technological capacity and thus absorption can be a problem. An example of this is GKN Sankey's export to the Philippine Army of 150 Piranha (Simba) wheeled armoured personnel carriers and ancillary equipment, worth around \$100 million. The first eight of these vehicles were built in the UK and the remaining 142 were assembled in the Philippines. However, as soon as they were completed, the assembly line and the factory were closed. GKN Sankey fulfilled its contractual obligations of 15% offsets and 100% countertrade, but save for a small amount of local job creation and skill-generation, there was only minimal offset benefits to the Philippines. In retrospect, it is evident that the British defence contractor *and* the Philippine planning authorities had focused on short-term contractual benefits at the cost of long-term sustainability (Matthews, 2004: 97. Original source: Villalon, 1998).

³⁹ Information sourced from the Procurement Division, MoD, Malaysia, and corroborated by an industry representative from ZETRO Aerospace, Colonel (Rtd) Karamarulzaman (June 2005).

⁴⁰ Interview with Colonel (Rtd) Narinder, DEFTECH at the DEFTECH premises in Shah Alam, Selangor (May 2005) and with Mr Salem, FNSS Savunma's representative in Malaysia, based at the DEFTECH plant in Pekan, Pahang (May–June 2005).

company was nominated as the service centre for Malaysia's Russian fighters, but the local firm faced serious technology transfer problems and spare-parts management in its dealings with the Russians. Although RAC MIG (Rosoboronexport) did its best to smooth the process of technology transfer, the Russian company was unable to expedite clearance through Moscow's labyrinth of technology export regulations.⁴¹

Access to vendor 'core' technology remains a major tension point in offsets-related technology transfer. Whilst OEMs are prepared to partner with local firms in the modification of systems supplied, including the sharing of development costs, risks, through-life support, and upgrades, the 'core' technology is the IPR, the ownership of which remains firmly in OEM hands.

Even when Malaysia is able to gain unfettered access to foreign technology, the offsets package normally carries with it further additional costs. Principal amongst these extra, sometimes 'hidden', costs is the cost premium associated with Malaysian offsets projects. The premium, ranging from 4–15%,⁴² arises because of a mix of considerations. First, to a greater or lesser degree, offshore vendors seek to load transactional costs, including risk contingencies, into both the primary defence contract price and the offsets package value. Secondly, amended or additional offsets demands, raised late in negotiations, force offshore suppliers to raise premiums due to the heightened risk of non-fulfilment of obligations; these costs are increased, moreover, if direct offsets are required, as defence-related projects are associated with higher outlays of capital investment, with more distant returns on investment, and a higher risk of non-recurring 'one-off' production projects. Finally, representatives of the Malaysian offsets beneficiary companies argue that Malaysia pays higher prices through offsets to obtain technology that is often available at lower cost through open sources on the global market.

Significantly, given Malaysia's stated policy of developing sustainable defence industrial capacity, the authorities are challenged in fostering manufacturing offsets projects. Long-term commercial viability demands production continuation, but this is no easy objective. For instance, Malaysia's 2002 purchase of military modular suspension bridges from an offshore supplier was linked to a US\$3 million offsets package, enabling local company, CTRM, to supply carbon composite launch rails for the modular suspension composite bridges.⁴³ As part of the offsets package, US\$1.5 million was spent on training Malaysian workers and investing in the jigs and fixtures for the CTRM factory.⁴⁴ After completion of the launch rails, however, no further orders materialised. CTRM closed down its composite rail manufacturing facilities in 2005, transferring all workers to a different site.⁴⁵ A similar experience occurred with Malaysia's acquisition of the ACV300 APCs. The linked offset agreement stipulated that 146 APCs would be produced in Turkey, with a further 65 built in Malaysia; the latter requiring completely knocked-down (CKD) kits to be assembled at Malaysia's DEFTECH plant in Pekan, Pakang.⁴⁶ However, as with the previously cited CTRM experience, upon project completion, the Pekan plant was abandoned.⁴⁷ The foreign partner claimed around US\$17.5 million worth of offset credits linked to investment in infrastructure, jigs, tools and a test track at the Pekan facility, but the majority of this equipment now lies unused.⁴⁸ These examples

⁴¹ Interview with Mr Amasov, Head of Rosoboronexport's offsets programme and Victor Kladov, Russian Defence Attaché to Malaysia (June 2005).

⁴² Interview with offshore vendors that supply defence equipment to Malaysia (April–July 2007).

⁴³ Interview with Colonel (Rtd) Hugh Stott and Alan Harrison, Alvis Bridging, Wolverhampton (February 2005). Email reply from Alan Harrison, dated 21 February 2005.

⁴⁴ *Ibid.*

⁴⁵ Site-visit to the CTRM manufacturing plant in Malacca, Malaysia (May 2005).

⁴⁶ Interview with Colonel (Rtd) Narinder Singh, DEFTECH, Shah Alam, Malaysia (May 2005).

⁴⁷ Fieldwork, Malaysia (May 2005).

⁴⁸ Fieldwork, Malaysia (May 2005).

again highlight the short-termist nature of Malaysia's offset programmes to date. However, this problem is not unique to Malaysia, it afflicts most other developing countries seeking to lever defence industrialisation through offsets.⁴⁹

Finally, arguably the greatest deficiency in Malaysia's offsets performance has regard to the most fundamental economic objective of offsets, that of job creation. Economic diversification and technological deepening are important offsets goals, but job creation, particularly high-skilled jobs, is likely to be the priority objective for developing countries. However, a searing criticism of Malaysia's offset experience is that the number of local jobs created has been minimal. Across an admittedly limited time period, 2000–2004, only approximately 100 jobs were created from the costly offsets programmes then underway, and of equal concern is that the majority of these new jobs were mostly focused on low-end technology activities.⁵⁰ This is a particular disappointment to the government, given that one of the principal aims of defence offsets has been the creation of jobs amongst the local Malays, referred to as *bumiputra*. The government's positive discrimination of *bumiputra* means that nearly 100% of Malaysia's defence companies are Malay-owned, employing mostly Malay workers.⁵¹ The firms are principally small to medium size, with around 80% privately-owned, and 70% having business involvement in both the civil and defence sectors.⁵²

FORMALISING MALAYSIA'S OFFSETS APPROACH

Malaysian defence modernisation has been associated with the search for greater self-reliance. Offsets have been viewed as contributing to this goal through inward technology transfer, impacting directly on efforts to indigenise defence production. The government 'implicitly' recognised the potential for beneficial technology spin-offs arising from defence offsets with the 1991 publication of Malaysia's Vision 2020 policy: this being a plan to re-direct Malaysia's economy away from labour-intensive industrial development, towards instead the development of high-technology sectors, particularly aerospace. The 'Vision' statement was aimed at accelerating Malaysian technological development, enabling the country to join the ranks of the advanced countries by the year 2020. Vision 2020 became the latest in a series of initiatives (including the New Economic Policy, Industrial Master Plan, the Five-Year Plans and the Science and Technology Policy) to foster high technology development. Thus, whilst defence offsets were seen as a catalyst for Malaysian technological transformation, progress through the 1990s was hindered by a lack of policy direction on offsets' strategy and implementation. The only guidance that did exist, related solely to counter-purchase policy. This policy derived from a MITI document, consisting of the terms and conditions for commodity and raw materials deals. In the absence of formal offsets guidelines, the quality and content of offsets projects depended solely on the skills and experience of individual project teams. The situation changed for the better in October 1999 when the Ministry of Finance (MoF) published a brief document specifying the offsets threshold value, as well as the objectives, definitions and various types of offsets to be prioritised. Significantly, the MoF policy document spelt out that offsets should encourage greater

⁴⁹ In the Saudi case, the country's offset companies have been kept afloat, certainly in the initial development phase, by government sole-sourced contracts. Moreover, 'Saudi-isation' had proved a failure, given that offsets investment was mostly capital-intensive, sucking in expatriate labour rather than creating high skilled Saudi jobs (see Matthews, 1996).

⁵⁰ However, the survey results did not record 'new' work generated by offsets, as most of the companies had not captured activity levels prior to and after offsets work.

⁵¹ Fieldwork, Malaysia (May 2005).

⁵² Fieldwork, Malaysia (May 2005).

participation of the *Bumiputra* in trade and industrial development, maximising utilization of local resources, promoting technology transfer to local industries, and enhancing Malaysian export capabilities. Whilst a committee was established within MoF to manage offsets programmes, the offsets policy area continued to operate on the periphery of Malaysia's industrial and technological development framework.

At the close of the 1990s, there was a growing sense that offsets had contributed little to Malaysian defence industrialisation due to minimal progress in securing defence industrial self-reliance. Evidence of the slow pace of indigenisation is reflected by the fact that at the start of the new Millennium, local defence production of complete systems consisted solely of multi-purpose vehicles, for civil and military use, along with a limited number of electronic simulation and support systems. Therefore, the impending expensive defence acquisitions under the Eighth Malaysia Plan (2001–2005), increased the pressure on government to reconsider the efficacy of its offsets management process. The central anxiety was the lack of a structured and comprehensive offsets policy, raising concerns as to whether Malaysia was getting value-for-money from its defence purchases. This led to the commissioning of a 2000 study by the Malaysian Industry Government Group for High Technology (MIGHT) to evaluate the effectiveness of offsets.⁵³ The MIGHT Report highlighted several weaknesses in the offsets regime. There was evidence that contract values had been inflated by up to 5% due to the inclusion of counter-trade agreements in government procurement; that offsets planning prior to equipment purchase was uncoordinated; that serious weaknesses had been exposed in the management of finance, manpower and technology transfer; and that, finally, there was a lack of local capacity to effectively absorb foreign technology and a lack of OEM support to promote technology exports from offsets beneficiaries (MITI, 2004). The MIGHT Report's findings later prompted a 2003 Cabinet decision that MITI should review the appropriateness of Malaysia's rudimentary counter-trade policy.

The resultant MITI offsets Report recommended that counter-purchase be de-emphasised in future government procurement, and that, instead, a more structured and effective offsets policy be established. The MoD, as the largest departmental beneficiary of offsets, was given the task of designing a formal draft offsets policy, tailored to Malaysia's defence industrial priorities. The draft policy was completed in 2003 and received final approval by the Ministry of Finance in 2005. The MoD was also tasked with implementing the policy. The policy objectives included the following considerations: fostering of strategic international partnerships to enhance local enterprise; promotion of industrial capability and marketing potential; maximum use of local content; establishment of a sustainable defence industrial base, including strong logistical capabilities; promotion of inward technology transfer; increased collaboration in research and development projects; and greater co-operation in local human resource development initiatives, thus promoting a high-value Malaysian skill-base.

Malaysia's 2005 offsets policy (*Malaysia Offset Policy*, 2005) captures all the conventional generic features of the offsets 'process', such as credit monitoring, tendering requirements, and timescales for completion. The policy, though, contains several more specific guidelines, as listed below:

- Greater policy emphasis to be given to direct as opposed to indirect offsets.
- Application, exceptionally, of multiplier credits, subject to the extent to which Malaysian companies, universities and R&D-based organisations would be able to exploit the intellectual capital derived from joint projects.

⁵³ The MIGHT report details the benefits accrued by Malaysia through offsets, identifies the challenges faced by local companies, and offers suggestions on how to increase the effectiveness of offsets. See *A Study on Offsets Programmes in National Defence Procurement* (Prime Minister's Department, Putra Jaya, November 2001) (restricted).

- Introduction of a procurement threshold of 10 million to activate offsets requirements.⁵⁴
- Establishment of a counter-trade target representing 100% of the defence contract value, subject to a minimum of 50% of contract value; this being split between counter-purchase and offsets, with offsets forming at least 50% of counter-trade value, subject to review on a case-by-case basis.
- Inclusion of a compensation requirement of 5% of the contract value to be paid to the Malaysian government at contract commencement, representing liquidated damages for any unfulfilled counter-purchase/offsets obligations (Ministry of Defence, 2006).

CRITIQUE OF MALAYSIA'S OFFSETS POLICY

The offset literature is replete with hyperbole on the 'win-win' nature of the vendor–beneficiary offsets relation. However, exploiting the industrial and technological benefits that offsets potentially offer is challenging. Arguably, only first-tier defence industrial nations, such as the US, the UK, France, Germany and Japan, and middle-tier states, such as Israel, South Korea and Singapore, possess the science and technology infrastructure and industrial skill base to effectively absorb, modify, improve and disseminate the technologies transferred. For those States embarking on defence industrialization, but possessing only rudimentary manufacturing capacity and skills, constrained specialized sub-contracting capabilities, and limited research, design, project management and systems integration expertise, the challenges of effective technology absorption at acceptable cost can be daunting. It is in this context, therefore, that Malaysia's defence offsets policy and performance should be evaluated.

Malaysia's offsets policy represents real progress in improving the impact of offsets. First, the policy establishes consistency in approach compared with the hitherto *ad hoc* model, and, secondly, it reduces the attendant uncertainties previously faced by offsets stakeholders. Yet the offsets policy was not introduced without criticism. There have been calls for further detail and clarity in risk assessment and the assorted metrics determining project sustainability.⁵⁵ Moreover, in separate public pronouncements, Malaysia's MoD has indicated that offsets would be used to promote priority 'dual-use' technologies, such as biotechnology, nanotechnology and information systems, but there remains opaqueness as to the process of exploiting the potential for technological spin-offs moving from defence to the private sector as well as technological spin-on moving from the civil to the defence sector.⁵⁶ Additionally, it is common practice for other countries' offset policies to employ multipliers and pre-offsets as a means of encouraging foreign investors to channel funds into priority development fields, but the Malaysian offsets policy treats multipliers as an 'exceptional' occurrence. Moreover, even in the exceptional circumstances, when multipliers are used, there appears to be a lack of consistency and logic applied in the determination of their values. For instance, whilst the submarine project attracted a multiplier value of 5, the SU-30 MKM was awarded 8, and the Hawk programme, an eye-watering 20.⁵⁷

⁵⁴ The choice of a threshold value to trigger offset requirements is not scientifically determined; for Malaysia it is 10 million, whilst in the UK Industrial Participation Policy Guidelines it is £10 million. Malaysia's offset threshold is denominated in Euros because, when the 2006 policy was drafted, the preponderance of Malaysia's defence imports was sourced from Europe.

⁵⁵ This issue was debated at the Defence Industry Blueprint Workshop held in Port Dickson, Malaysia (May 2005). The members of the MDIC and MoD, Malaysia, were critical of the fact that the defence industry was not given sufficient weight within the broad category of general industries.

⁵⁶ Interview with Juan Manuel Garcia, Navantia office, Madrid, Spain (April 2006).

⁵⁷ Fieldwork, Malaysia (2008).

There are also operational deficiencies. Whilst Malaysia's MoD requires submission of the OEM's offset package as part of the Invitation to Tender, operationally, the detail of the package is subject to protracted negotiation. As a consequence, for a number of projects implemented over the last decade, offsets arrangements have seemingly been an afterthought, and not included as part of the procurement tender. This has meant that suppliers were only notified of the offsets requirement 'after' bids had been submitted, creating difficulties for both offshore suppliers and Malaysian defence companies alike. Suppliers were not forewarned of offsets requirements, and thus failed to factor into their bids the costs of offsets investment. Potential beneficiaries, in turn, were not provided with sufficient time to plan for offsets work. A further problem associated with post-contract offsets demands has been the loss of leverage in extracting from the vendor the best possible offsets package. The absence of bespoke offsets project teams participating in the initial stages of procurement planning has exacerbated the problem. Procurement pricing and technical issues should be prioritised, but the quality of the offsets provision needs also to feature prominently in the initial procurement negotiations. This affords the opportunity for both government and the OEMs to plan technology transfer as well as to undertake mutual auditing of possible local technology beneficiary companies, ensuring the matching of local capacity with offset-driven technology transfer. Moreover, there is no central coordinating and long-term planning agency responsible for offset management. This is in contrast to the general trend of countries establishing an offsets office to manage, monitor and plan offset implementation, and also to facilitate greater communication, coordination and awareness of local industrial capability.

CONCLUSIONS

It is a truism that offsets strategy should not adopt a 'one-size-fits-all' approach. Each country's historical, cultural, strategic, economic, political and defence-industrial conditions are different. For several reasons, Malaysia's offsets practices have been in unregulated transition, morphing from a low key, uncoordinated *ad hoc* process to the present considered and formalised policy approach. The push for a tighter institutional offsets policy framework is a reflection of the disappointing progress made since the 1970s. Defence-industrial self-reliance – defined as the possession of design as well as production capability – remains a distant goal for Malaysia's policy-makers. Disappointment, however, should be tempered by the realisation that, in the contemporary era of transformational warfare, comprehensive defence-industrial self-reliance is beyond the reach of even the major industrialised nations and, thus, economically and technologically impossible for small countries.

However, whilst offsets have not forged rapid indigenous technological transformation, they have exerted a positive impact on the local Malaysian defence industrial landscape. Measured success has been achieved in the creation of technological capability, but with 60% of offsets projects targeted on training and through-life equipment support, with a negligible local R&D focus, there is clearly more to be done with respect to the promotion of indigenous defence industrial capability. Offsets have contributed to skill enhancement, but job creation has been woeful. Industrial diversification has been impressive, although much of it has been channelled into commercial activities. This represents a beneficial spin-off, albeit from an offsets policy with a dedicated focus on direct offsets. Particularly in the aerospace and composites fields, offsets have facilitated specialisation, competitiveness and high value-added operations; the latter spliced into supply chains and strategic partnerships at the global level. On balance, however, Malaysia's offsets experience has been disappointing, with the costs seemingly outweighing the benefits. Yet, for much of the period under investigation, offsets packages have been implemented in the absence of formal policy guidelines; and it is

perhaps too early to judge whether the 2005 formal offsets policy will lead to more effective technology transfer through defence offsets.

Offsets are a complex and controversial subject, but even with all their revealed difficulties, most countries view them as a core component of defence acquisition policy. As long as the arms market remains a buyers market, offsets are unlikely to diminish in importance. The challenge for arms purchasers, then, particularly emerging countries such as Malaysia, is to maximise the opportunities for robust technology transfer, with sustainable development remaining the priority. In support of this process, government sponsorship has a powerful role to play: indisputably, it is a critical element in the short-run search for national defence industrial security, and, arguably, also in the long-run pursuit of international competitiveness.

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