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INDUSTRY INVOLVEMENT FOR DEFENCE IN AUSTRALIA

Since the 1990s, Australian governments have shunned offsets policies. This is despite the continued use of such policies by many countries to meet a range of defence industrial objectives. These include countries with which Australia trades in defence goods, and countries with which Australia has joint projects. Countries include America, Canada, Great Britain, Israel, Spain and Turkey.

The emphasis placed on such policies is evidenced by a recent announcement by the Canadian Defence and Industry ministers. Under the banner of a new Defence Procurement Strategy, they have just strengthened their offset requirements to achieve local industrial benefits and jobs. This is already leading to the major defence companies positioning themselves to meet the requirements, including Boeing reported as offering 100% offsets if Canada buys the Super Hornet and Lockheed highlighting local jobs that would result from an F-35 purchase.

Offset policies are used to derive a range of benefits. These include:

- technology transfer;
- establishment of licenced production, co-production, joint ventures and partnerships;
- involvement in global supply chains;
- economic development including job creation;
- skills development; and
- technological self-sufficiency.

Policies can be tailored to meet a range of such objectives.

One consequence of dealing with countries which have offsets policies is that any premium resulting from such policies is built into the price Australia pays. For joint projects, the premium will include those resulting from the policies of each of the partners.

In today's economic environment, with a shrinking industrial base and significant job losses, AIDN considers it time to revisit industry involvement policy for defence. Such a policy has potential to enhance outcomes arising from AIDN's SME Participation Plan for Defence and National Security by achieving more strategically important industry capability in Australia without incurring premiums. Consequently, it has produced this paper and invited the Australian Strategic Policy Institute to comment on how such a policy might be structured to best achieve the benefits in Australia currently enjoyed by our trading partners.

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INDUSTRY INVOLVEMENT IN THE AUSTRALIAN DEFENCE ENVIRONMENT

INTRODUCTION

Australian Defence Industry is increasingly operating in a global environment. This is not only the case when they contend for exports, but also locally as international suppliers compete for our Defence dollar. As such, the need for fair competition and a level playing field is very significant if we are to keep a Defence industry capability. This is particularly the case as the concept of preference for local industry is practiced widely by our global competitors and customers under many titles including "Defence Offsets".

In March 2012, the Australian Industry & Defence Network (AIDN) released its "SME Participation Plan for Defence and National Security". Subsequently in November 2013 to meet current challenges for industry, AIDN has amended this Plan to include a more focussed approach to Value for Money and a Strategic Sourcing Program (SSP). The Plan calls for a more rigorous implementation of the policies that already exist, and the broadening of the Priority Industry Capabilities (PICs) and Strategic Industry Capabilities (SICs) domain to include associated and enabling capabilities creating a Defence Industry Capability Map (DICM) as part of the implementation of the SSP.

In addition to the SSP proposal above, this paper examines a range of overseas programs aimed at ensuring that local industry benefits accrue from overseas purchases of defence equipment and platforms. These benefits are then analysed with a view to determining their applicability as enhancements to the current Defence Australian Industry Capability (AIC) and the Global Supply Chains (GSC) programs. Priority in this analysis has been given to achieving long term, meaningful, strategic industry capability benefits that will enhance Defence self-reliance. However, it is anticipated that further research will be needed to quantify benefits and structure a program to maximise them for Australia.

BACKGROUND

With North American and European Defence budgets declining since the end of the cold war, multinational Defence prime contractors are consolidating and reducing in numbers. They are also more active in the pursuit of export markets, and Australia is becoming high on the target list as a significant Defence equipment importer. The Stockholm International Peace Research Institute (SIPRI), considering 2011 and 2012 figures, ranks Australia as the fourth largest Defence importer in the world after India, China and South Korea.

Notwithstanding the scrapping of the Australian Defence Offsets Program in the early 1990s, the Australian Defence industry policy makers have always acknowledged the importance of maintaining a capable Australian Defence industry, and implemented some measures and programs for that purpose. On the other hand, a clear message has been maintained that Defence will not pay a premium to maintain local capabilities, and that "value for money" will be the main criteria for acquisition decisions, with very few exceptions. As such, the message to Australian industry has constantly been to work harder and smarter to be globally competitive.

However, while Australia is adopting an open market approach, with no hurdles for foreign suppliers to compete for its Defence projects, governments around the world are using many policies and programs to preference and guard their indigenous Defence industries. The measures implemented by the Australian Department of Defence to encourage its Defence industry, such as AIC and GSC, are dwarfed by those enforced by other countries. Programs implemented by other governments favouring their indigenous industries are offered under many titles and definitions including Offsets, Industrial Cooperation, Industrial participation and others.

The 2010 Defence Industry Policy Statement (DIPS) used the theme: "A Policy For Smarter & More Agile Defence Industry Base". In reality, the result of that policy is a declining Defence Industry that, unless strategic change is implemented over the next couple of decades, will all but disappear or be reduced to only small offices representing the multi-national prime contractors, and importing most, if not all Defence requirements. This is not a very smart or agile result for Australia or all the Australians who develop, maintain and sustain Australia's Defence Capability.

It is all too easy to forget in times of Peacekeeping and low intensity conflicts that Australia is an island at the end of a very long supply chain. A long term Australian Defence Industry is a national asset that is absolutely vital to ensure Australia's strategic self-reliance.

AUSTRALIAN DEFENCE INDUSTRY PREDICAMENTS

Increasingly, Australian Industry is not able to compete globally when judged on price alone. The reasons are many including:

- Between 2009 and 2013, the strong Australian resource sector has caused the value of the Australian dollar to be inflated against its major trading partners. As such the price of Australian products rose when compared with similar international products.

Source: ozforex.com.au

- That high dollar value does not reflect the strength of the Australian economy in other sectors. However as the manufacturing sector competes with mining for skilled labour, labour rates rose significantly.
- In the same period, as the world suffered from the Global Financial Crises (GFC), international suppliers became more desperate, and dropped their prices to be able to survive. In many cases those competitors benefited from Government programs designed to make them more competitive.

- Australian manufacturers are also suffering from other high costs including energy, materials and taxes when compared with most competitors.
- With a relatively small armed force, Australian Defence industry does not have enough local economy-of-scale and as such, unless significant exports are achieved, Australian products are more costly.
- With no policy measures in place to favour local products, Australian industry is faced with a price disadvantage at home as well in its potential export markets.

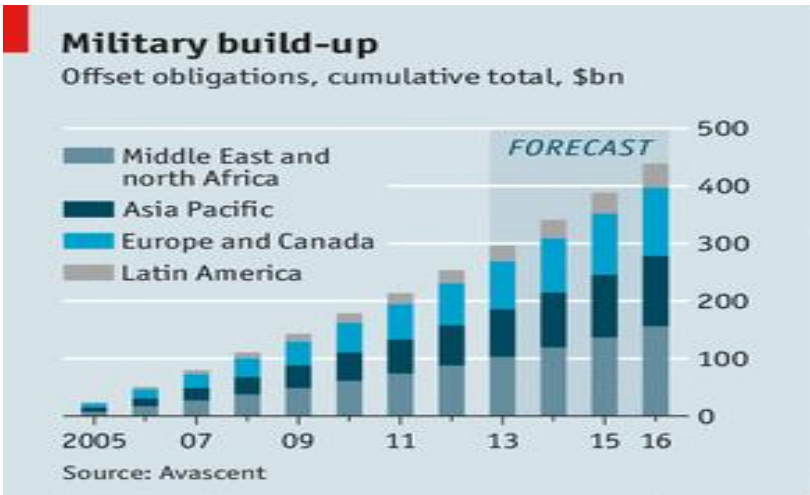
As a result, Australian Defence industry is in consistent decline, and regions that were traditionally considered as export markets such as India and South Korea are now targeting Australia as an export destination. Moreover, multi-national Defence suppliers, particularly for Defence support equipment, are increasingly using Chinese or Mexican factories to partly manufacture their equipment, making it almost impossible for Australian Defence manufacturers to compete.

FREE TRADE COMPLIANCE

One of the reasons behind the reluctance to implement Offsets or similar measures is the perception that this practice contradicts our commitment to the Free Market Principles.
It is important to note however that offsets are permitted by the World Trade Organisation (WTO) in Defence procurement:

> *"World Trade Organization's Agreement on Government Procurement prohibits the use of offsets in government procurement generally, but explicitly exempts a nation's "action…necessary for the protection of its essential security interests relating to the procurement of arms, ammunition or war materials, or to procurement indispensable for national security or national defense purposes"*
> *(Presidential Commission on Arms Trade Offsets, 2001: 13)."*

As such the practice is well spread as seen by the Chart below by the Offset research company "Avascent", presenting a forecast for Offset Obligations from 2005 to 2016.



INDUSTRY INVOLVEMENT BY ANOTHER NAME?

Notwithstanding the above, Offsets are often frowned upon, particularly by typical Defence exporters, and described as a protectionist anti free trade practice. The May 25th 2013 edition of the Economist magazine included an article by the title: "Guns and Sugar". The article is critical of the use of Offset policies. It states:

> *"Offset" has become a dirty word; the industry now prefers the euphemistic "industrial participation".*

It is often argued that introducing obligatory limits and targets for local industry involvement, rather than "best endeavors", the policy becomes an "Offsets" policy. However, the objectives and results matter more than the name or title of the policy. Indeed, in international forums, Defence researchers and multi-national prime contractors, active in the Australian Defence market, call our AIC and GSC programs the "Australian Offsets".
Asia-Pacific Aerospace Report, 1 May 2013, included the following article:

> *"Offset Deal Emphasises Poor Australian Contract:*
>
> *A 10-15 year offset deal worth US$2.5 billion signed by progressive Israeli Aircraft Industries (IAI) and Lockheed Martin to build wings for the F-35 Joint Strike Fighter has given emphasise to the poor contracting for JSF component production carried out by the Australian defence department.*
> *Lockheed Martin recently told the Australian industry that if the country's JSF order is reduced from the planned 100 the work allocated to local industry will be cut proportionally. Australian JSF businesses contracts are now worth A$300m.*
> *Australia may soon order more Boeing F/A-18F Super Hornets which will reduce its financial and operational capability to acquire the 100 JSFs originally proposed. It has been suggested the JSF order may be cut to 50 units.*
> *Israel is a Security Cooperation Participant and signed a letter of agreement in 2006 paying US$20m for its involvement. Australia paid A$150m for its participation in the project as a Level three participant in 2002…."*

Questioned later on that article at the Hunter Defence Conference 22 May 2013, Lockheed Martin asserted that this was not an "Offset" deal. For Industry however, it did not matter what the deal was called. What matters is that it was a contractually binding package of work, given to Israeli industry as a result of Israel's acquisition of the F-35 Joint strike Fighter.

As such, this paper looks into offsets practices and similar policies implemented globally. The purpose of this is to highlight:

- some aspects that might be considered and adopted as adjustments to existing relevant Australian programs; and
- possible additional measures to ensure fairness for Australian industry when competing for the Defence funds invested by its own tax payers.

CASE STUDIES

Canada

Canada implements the Industrial and Regional Benefits (IRB) policy. The policy is explained in details on the "Industry Canada" website:
http://www.ic.gc.ca/eic/site/042.nsf/eng/h_00016.html :

> *"The IRB Policy ensures that Government of Canada defence and security procurements generate high value-added business activity for Canadian industry. The IRB Policy requires companies undertake business activities in Canada valued at 100 percent of the value of the defence or security contract they have been awarded by the Government of Canada. The IRB obligation is a contractual commitment and part of the overall government procurement contract."*
> *Following are some of the examples listed in that website: of them:*

CF-18 Modernization Project

IRB Contractor: The Boeing Company
Total IRB obligation: $372 million
Timeline: December 2000-December 2008

Examples of type of work:

- Direct: L-3 MAS (Quebec) — installation work of the radars and displays
- Indirect: ASCO and Avcorp (British Columbia) producing parts for Boeing Commercial Division

Jroberts Manufacturing Inc.

Daimler, and its Canadian division Mercedes-Benz Canada, delivered its G-Wagon to the Canadian Forces in 2004 and provides in-service support through contracts under the Light Utility Vehicle Wheeled (LUVW) project. As part of its IRB obligation, Daimler is working with Jroberts Manufacturing Inc., a precision machining and fabrication company located in Woodbridge, Ontario. Jroberts has performed design upgrades, manufacturing and overhaul services to the LUVW vehicle's turret assembly.

For Jroberts, the LUVW success reflects years of hard work, wherein Jroberts thoroughly researched Daimler and its LUVW vehicle, proactively engineered an improved turret and sold the idea to Daimler officials. Jroberts is now reaping the benefits of increased employment and the opening of a new repair and overhaul facility operating a CARC (chemical agent resistant coating) system in Toronto. Jroberts is delivering technical solutions for military work in other areas.

Mil-Aero Electronics

Mil-Aero Electronics, located in Dartmouth, Nova Scotia specializes in the manufacture and integration of high performance electrical assemblies, build-to-

print electrical cables and harness assemblies, electrical control boxes and other value-added parts for the defence, aerospace, and industrial markets.

Raytheon Space and Airborne Systems has contracted Mil-Aero for the production of Radio Frequency cable assemblies. Mil-Aero's success with this work has positioned the company to participate in future opportunities, not only with Raytheon but with other leading international aerospace and defence manufacturers.

This relationship was developed because of Raytheon's Industrial and Regional Benefits (IRB) obligations to Canada as a result of the CF-18 Defensive Electronic Warfare Suites project. For Mil-Aero it has provided the opportunity to integrate into the supply chain of a world leader in the industry, and to demonstrate the quality of their products and services to other global contractors.

Finland

The Ministry of Defence of Finland introduces "Defence Materiel Industry and Industrial Participation" as follows:
http://www.defmin.fi/en/tasks_and_activities/resources_of_the_defence_administration/defence_materiel_industry_and_industrial_participation

"DEFENCE MATERIEL INDUSTRY AND INDUSTRIAL PARTICIPATION

The Finnish defence materiel industry plays an important part in the upholding and development of the Defence Forces.

When the Finnish Defence Forces make large purchases of defence material from foreign suppliers industrial participation (formerly offset deals) is required. Supply contracts are subject to the condition of offset usually when the value of the procurement exceeds 10 million. Industrial participation is designed to safeguard domestic security of supply. The aim is to involve the industry in materiel and technology projects already at the planning stage.

The Finnish defence materiel industry must manage three areas of competence that are essential from the point of view of defence

- *The assemblage, maintenance and repairing of large, technologically demanding systems*
- *The management of information systems technology and systems integration*
- *Availability (and if necessary, manufacture) of critical components and spare parts*

In any case competence in gunpowder and ammunition production and in various production methods will continue to be needed in Finland in the future. This competence could be maintained in, for instance, centres of excellence jointly run by the industry, research institutions and defence administration."

UAE

In 2012, UAE Offset Programme Bureau renamed as Tawazun Economic Council. Tawazun establishes Joint Venture companies with multinational companies, creating local capabilities. The multinationals may only own 49% of the company, and are given offset credits relevant to the degree of success of the companies created.

> Tawazun Economic Council's Abu Dhabi International Offset Conference 15 Feb 2013:
> *"The booming strategic manufacturing industry in the UAE is being driven by robust and long term partnerships between government and global and local private sector industrial leaders. A recent example is the creation of Tawazun Dynamics, which is a joint venture between Tawazun and the Dynamics division of Denel, owned by the Government of South Africa and South Africa's largest defense manufacturer. Tawazun Dynamics is focused on the production of eight different configurations of its flagship product, the Al Tariq System, which is a precision guided weapons system being designed, developed, manufactured and assembled in the UAE."*

Tawazun website includes many other examples of companies established with most of the Defence global multinational companies.

USA

The May 25th 2013 edition of the Economist magazine included an article by the title: "Guns and Sugar", while critical of the use of Offsets policies by the buyers, adds:

> *"America has long been officially against offsets, though it practices something similar at home under the Buy American Act of 1933, which requires foreign arms-makers to source much of the work locally. (Some circumvent the rules by forming partnerships with American contractors in order to qualify as domestic suppliers.) And as embassy cables published by WikiLeaks make clear, America's diplomats are sometimes closely involved in its firms' discussions with foreign governments, including even squeaky-clean Norway's, over proposed offsets."*

In fact, the USA is using a number of legislations and practices to offer advantages to its own Defence industry against any potential off-shore suppliers, making it extremely difficult to compete against a US company in the USA. Those measures include:

- **Buy American Act, including the Berry Amendment.**
  Congressional Research Service, Domestic Content Legislation: The Buy American Act and Complimentary Little Buy American Provisions (April 25 2012): "Essentially, the Buy American Act6 attempts to protect domestic labor by providing a required preference for American goods in direct government purchases. In determining what are American goods, the place of mining, production, or manufacture is controlling. The nationality of the contractor is not considered when determining if a product is of domestic origin. Manufactured articles are considered domestic if they have been manufactured in the United States from components, "substantially all" of which have been mined, produced, or manufactured in the United States. The term

"substantially all" is defined in the regulations to mean that the cost of foreign components does not exceed 50% of the cost of all components."

"The Berry Amendment is a "super percentage" statute which requires that certain purchases of the Department of Defense be 100% American in origin. The Berry Amendment is an example of a provision where Congress has decided that a greater percentage of American content should be required in acquisitions that are subject to the "big" Buy American Act."

- **Little Buy American Provisions.**
  Congressional Research Service, Domestic Content Legislation: The Buy American Act and Complimentary Little Buy American Provisions (April 25 2012): "Congress has enacted "Little Buy American Acts" to restrict procurements that do not fall under the application of the Buy American Act or to adjust the percentage content standard. The Buy America Act, which attaches a domestic content requirement to purchases made with federal transportation funds, is illustrative of provisions that govern purchases not made directly by a federal entity, but which use federal funds. The majority of the Little Buy American Acts are this type of legislation. Unless the provisions specifically reference the definitions of the Buy American Act, they generally require the purchase of 100% American made products."

- **Buy America Provisions**
  US Department of Transportation Website, http://www.dot.gov/highlights/buyamerica : "The Department of Transportation is committed to maximizing the economic benefits of the Obama Administration's historic infrastructure investments through Buy America provisions that keep American companies healthy and families working. Buy America provisions ensure that transportation infrastructure projects are built with American-made products. That means that Department of Transportation investments are able to support an entire supply chain of American companies and their employees."

Furthermore, the US offers loans, grants, surety bonds, venture capital and other financial assistance to its own SMEs through the US Small Business Administration (SBA). The assistance also extends to contracting advantages offered through a wide range of programs including:

- Small Business Set-Aside (SBSP)
- Service-Disabled Veteran-Owned Small Business Set-Aside,
- Women Owned Small Business WOSB Set Aside
- Economically Disadvantaged Women Owned Small Business EDWOSB Set-Aside
- Historically Underutilized Business Zone (HUB Zone) Set Aside.

The U.S. Department of Commerce, Bureau of Industry and Security produces an annual report "Offsets in Defense Trade" to Congress. The Executive Summary of the February 2013 report states:

This report notes that exports of defense articles and services can: lower overhead costs for the Department of Defense; help sustain production facilities, workforce

expertise, and the supplier base to support current and future U.S. defense requirements; promote interoperability of defense systems, subsystems and components between the United States and friends and allies; and contribute positively to U.S. international account balances.

However, offset agreements and associated offset transactions can negate some of the potential economic and industrial base benefits accrued through defense exports if the offset activity displaces work that would otherwise have been conducted in the United States.

It is fair to conclude that this perceived loss to the seller, at least partly, is a gain for the buyer.
The December 2007 version of that report contains the information in the table below. It includes Australia as one of the offsets countries based on our former AII program. The minimum value of contract (threshold) attributed to the Australian program seems to be mistakenly based on the discontinued Australian Offsets Program, which was AUD$5 million, around US$3.75 million in 2007 figures. It is interesting to note the minimum offset required by Australia (nil), compared to the rest of the world.

S.No.	Country	Title of Policy	Minimum Value of Defence Contract	Minimum Offset Required	Offset Sector	Multiplier
1	Australia	Australia Industry Involvement Programme	US $3.75 million	No Specific Min. of Max	Defence	None in policy
2	Canada	Industrial & Regional Benefits Policy		100%	Defence & Civilian	None in policy
3	Finland	Industrial Cooperation Program		100%	Defence	0.3-3 for exports of finish products; for others multiplies are negotiated
4	Greece	Policy of Offsets Benefits	10 € million	120%	Defence	Up to 10
5	Israel	Industry Cooperation Program	US $0.5 million	35%	Defence & Civilian	1-1.5
6	Italy	Not Codified	US $6.6 million	Not less than 70%	Defence	Maximum of 3
7	Netherlands	Industrial Benefits and Offsets Policy	5 € million	100%	Defence & Civilian	Negotiable; ranges of 1-5, 5-10, and 10-30
8	Norway	Guidelines for the Establishment and Implementation of Offsets in Connection with Defense Procurements	US $6.7 million	100%	Defence & Civilian	0-5

S.No.	Country	Title of Policy	Minimum Value of Defence Contract	Minimum Offset Required	Offset Sector	Multiplier
9	Poland	Korean Defense Offset Program	5 € million	100% (defence 50% min)	Defence & Civilian	Negotiable up to 2-5%
10	South Korea	Policy of Armament and Material Agency	US $10 million	30%	Defence	Determined by authorities
11	Spain	Spanish Offset Policy	NA	100%, but may vary	Defence & Civilian	Between 2 and 5, when used
12	Switzerland	Industrial Cooperation Program	US $17 million (may vary)	100%	Defence & Civilian	Maximum of 2-3
13	Taiwan	Industrial Participation/Offset Directive	US $10 million	Will be increasing to 70%	Defence	1-10
14	Turkey	Industrial Participation Policy	US $10 million	50%	Defence & Civilian	1-5
15	UK		US $17.2 million; £50 million for French & German Companies	100% target	Defence	No multiplier for IP credit

Source: U.S. Department of Commerce, Bureau of Industry and Security, "Offsets in Defense Trade: Twelfth Report to Congress", December 2007.

Other Countries

The paper at Attachment 1: "A Survey of Successful Offset Experiences Worldwide" by Journal of Defence Studies Vol.3 No. 1, explores how the Offset Policy should be tailored to suit the objectives of the nation applying it. The paper examines Offset success in Saudi Arabia, Israel, Japan, Spain, and Brazil, and how the structure of the program varied to suit the objectives.

Other success is also documented in India, Turkey, and Indonesia.

GENERAL CONCLUSIONS FROM OTHER COUNTRY OFFSET PROGRAMS

From the case studies above and in the attached paper, it is clear that:

- Long-term industry benefits can be obtained from offsets programs. Benefits may include:
  - direct technology transfer and licencing
  - establishment of licenced production, co-production, joint ventures and partnerships through which technology is transferred, capability created and ongoing investment in R&D and know-how made to ensure the long term viability of the capability
  - fostering greater involvement in global supply chains

- economic development including industrialisation and job creation
- creation of dual-use and commercial capability and strategic civil industries
- long term strategic partnering between national and foreign companies
- establishment of technological self-sufficiency

- There are generally costs associated with achieving offset benefits. These may take the form of direct funding by specific government programs to aid in establishment of capability, tax breaks and holidays, and premiums in prices for local goods and services
- Broader economic benefits, multiplier effects on local work and taxes collected on profits, wages and goods and services may offset some or all of the costs
- Offset programs can be tailored to meet the particular needs of nations and should be strategically focussed to do so.

AUSTRALIAN EXPERIENCE

Defence had an offset program, with the threshold of $5m. This program was discontinued as a result of the Defence Strategic Review of 1993 and a review in 1994 by the Industry Commission into Defence Procurement Industry Programs. Based on that report, the Defence Industry Policy Statement 2010 argues against Offsets, presenting Case Study 6: Why Offsets Don't Work, with the 1981 F/A-18 Hornet program as an example.

But a number of questions should be examined:

- **Was it a complete Failure?**
  While the industry participation program did not deliver as many benefits as it should have, it is not entirely to conclude that it was a total failure. Much of the current Australian Aviation industry capability can trace its roots to that program. While Hawker de Havilland (HDH), Government Aircraft Factory (GAF), and Commonwealth Aircraft Corporation (CAC) no longer exist, the capabilities and the know-how acquired by those companies through the F/A-18 and other defence and civil offset programs are now the back-bone of Australian Aerospace and Aviation industry capabilities. Much of the expertise gained is now at work at in a number of Aerospace/Defence companies in Aero-structure, Radar, upgrade, support, MRO and other related capabilities.

- **Were the failures in the policy or the implementation?**
  Instead of dismissing the concept of offsets altogether, with the benefit of hindsight we can identify the shortcomings of our earlier Offset Program, and make sure that any future industrial involvement measures do not fall into the same traps. As an example, we should include contractual obligations to make sure that the benefits gained are enduring, the capabilities established are applicable beyond the particular project, and that technology transfer obligations are adhered to.

- **Did the Department of Defence use its buying power effectively?**
  The total premium paid by Defence in the case of 1981 F/A-18 was quoted as 17% of the acquisition and support costs. However, according to "The Arms Trade as Illiberal Trade by Ann Markusen (2001)", premiums are typically between 7 and 10% of the contract value. This is another case of the Australian Defence Department lack of ability to leverage its buying power in dealing with multi-nationals. The 17% additional cost to Defence does not take into consideration the additional Tax clawbacks from Personal Income Tax and Company Income Tax when considered on a whole of Government basis.

The Current Environment for Australia

It is acknowledge that an offset program under any title would have some cost associated with its implementation. However any associated costs must be weighed against the benefits returned. In a whole of government approach, economic benefits such as job creation, export opportunities, technology transfer and the associated multiplier effects should not be ignored. They should be measured along with the enhancement to self-reliance that the additional industry capability would bring.

As we can see from the experiences of other cases above, offsets or other industrial involvement measures should not have to amount to a net premium paid by the Australian tax payer. Long term, it can actually pay both capability and economic dividends.

In a Boeing presentation to the Abu Dhabi International Offset Conference, 19 Feb 2009, Mr Dennis Swanson, Regional Director, Industrial Participation and Alliances described the arrangement as *"Focused on Win-Win-Win Collaborative Relationships"* noting that:

"

- *Multiple opportunities to create value across the region through offset initiatives.*
- *Developing opportunities takes time to mature.*
- *Well-structured offset initiatives can become strategic long-term partnerships."*

It should also be acknowledged that, with most of Australia's potential partners in very large joint military projects already requiring offsets programs in their share of the projects, Australia may in fact pay a premium for not having a similar program. This will arise as contractors will prefer to place work where it meets their offset obligations, and consequently are likely to pay a premium to do so. Australia will both pay that premium in its price, and fail to support an Australian capability that otherwise may have provided the best value for money.

AN AUSTRALIAN INDUSTRY INVOLVEMENT PROGRAM

It is considered from the case studies and analysis presented above, there is a strong case for Australian implementation of its own Industry Involvement Program (IIP). The question becomes what form of Program would suit Australia best. Given the mature and broadly based industrial capabilities already existing in Australia, there is not a strong case for a Program aimed at broader economic benefit, or any particular commercial technologies. Clearly the focus should be Defence self-reliance. And self-reliance objectives would themselves be focussed on platform enhancement and adaption, and through-life support.

As the existing industry policy already contains two specific policies aimed at self-reliance – the Australian Industry Capability (AIC) and Global Supply Chain (GSC) policies – the most beneficial approach would likely be to expand their requirements by incorporation of an IIP within them. The primary features of the IIP in each of these programs might be:

- **Australian Industry Capability Enhancement**
  The current AIC Program would first be expanded by incorporation of the Strategic Sourcing Program as proposed by AIDN. Then, mandatory targets expressed as a percentage of project cost could be enforced where the enhanced AIC Plan falls short of the target

- **Global Supply Chain Enhancement**
  The current "best endeavours" GSC deeds with prime contractors could be replaced by similar deeds but with mandatory targets expressed as a percentage of the value of Australian contracts held by the primes and could be enforced where GSC outcomes are falling short of the target. Successes achieved could count towards meeting their enhanced GSC and their enhanced AIC obligations as applicable.

The clear attraction and benefits of implementing such an IIP must still be balanced against any premiums associated with its implementation. Further, short term project benefits and costs should not override achievement of longer term self-reliance objectives.

As there is currently insufficient data to support the implementation of such an IIP to meet Australian requirements, more research is needed to structure a program that could leverage from the benefits achieved by overseas programs and maximise enhancement to self-reliance.

RECOMMENDATION

Investigation is recommended into the implementation of an Australian Industry Involvement Program including possible enhancement of the current Australian Industry Capability (AIC), and the Global Supply Chain (GSC) Programs by introducing minimum obligatory limits to be achieved as contractually binding deliverables. Investigation should include research into:

- How overseas programs are able to maximise benefits while avoiding premiums and costs, and
- The best structure for an Australian IIP to achieve long-term self-reliance objectives

A Survey of Successful Offset Experiences Worldwide

*Anuradha Mitra**

In venturing to write about successful offset policy and experience in different countries, the basic problem faced is that of unavailability of data. There are no universally laid down parameters or measures to weigh the costs and benefits of offset programmes. Even if some countries have individually undertaken an exercise to evaluate such costs and benefits, the information is not always available in the public domain. Cross country comparisons would also not yield consistent results.

Nearly all governments make purchases of defence equipment, and a majority of them have some form of offset policy. The objectives of the policy may vary, but are usually stated with a fair degree of clarity. One approach to the evaluation of offset programmes could be to make a general assessment, based on such empirical evidence as is available, of the direction and degree of the achievements, viewed against the stated objectives. Another approach could be to look at the results for the buyer country of offset provisions embedded in particular defence acquisition programs. From a survey of country-wide experience, it is also possible to discern common trends in the growth path of offset policies, which could impart useful lessons for the future. This paper is an effort in these general directions.

The Middle East: Saudi Arabia

Saudi Arabian policy has focused on the need to transform the economy and to reduce the overall dependence of the country on the export of

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petroleum. Their economic plans prioritise the development of agriculture and industry; they seek to diversify the production base and to improve the skill levels of workers for the benefit of the national economy. There is also an emphasis on promotion of private sector participation and encouragement to the investment of capital in business ventures within Saudi Arabia.

In Saudi Arabia, offset programmes are not regarded as instruments for counter-trade. The objective of the offset programme is to create a number of private sector business projects, mutually beneficial partnerships between Saudi and foreign companies, usually in the form of joint ventures. The Saudi government is looking for technology transfer to upgrade its own capabilities for an overall diversification and strengthening of the economy. Other objectives are to make the best use of the country's natural resources, to improve potential for long term export, and to develop various service industries which are needed for supporting infrastructure.

The three major programmes through which the Saudi offsets policy has evolved are discussed below:

(a) Peace Shield: This was a programme with Boeing of the USA as prime contractor for establishment of a ground based air defence facility in which the Saudi government pursued an offset programme aimed at bringing in high technology transfer content. The Boeing group set up four Peace Shield offset companies-

- The Advanced Electronic Company, to manufacture the latest and most advanced military and commercial electronic equipment within Saudi Arabia.
- Aircraft Accessories and Components Company, for maintenance, repair and overhaul of aircraft components like flight controls, pneumatic fuel and hydraulic systems.

- Al -Salam Aircraft Company for MRO, upgrade and modification of civil and military aircraft.
- International Systems Engineering is a company that specializes in information technology, systems integration and development.

(b) Al-Yamamah: This was a major defence contract between the UK and Saudi Arabia for purchase of military and civil aircraft, helicopters and ships, with associated training and support, as well as construction projects, with British Aerospace as the prime contractor. The total value of this programme was around $7-8 billion i.e. about four to six times larger than the Peace Shield programme. The contract had an investment target of about $1.5 billion. Investments in pharmaceuticals, vegetable oil manufacturing, petroleum, food processing, health care and environment care equipment were also welcomed. The objective was to acquire fully developed, proven technology for immediate commercial application.

(c) Al-Sawary II: This was a programme for purchase of frigates from France for the Saudi Navy at a cost of $3 billion, carrying an offset investment obligation of about 35per cent, in various fields including glass, precious metals, smart cards and agro industry.

Offsets have certainly helped to contribute to the industrialization of Saudi Arabia, diversification of the economy, and participation by the private sector in national economic development. A number of high technology ventures which otherwise may not have fructified, came into existence. Ventures lower in technology content, but with favourable long term business prospects, have also been established. As per the Secretary General of the Economic Offset Program, as many as 36 industrial service projects have come up, with investments totalling about $4.5 billion. These projects have created more than 6,500 new job opportunities. In 2006, the total sales of the companies created under the offset program reached $8 billion and exports about $1.5 billion. The main investments have been in

the aircraft, electronic and electric industries (13 per cent), food and medicine (12 per cent), and chemicals and petrochemicals (6 per cent). Health management through specialist medical colleges, nursing schools, nanotechnology research centres and production of specialist medical equipment are the next focus areas.

Technology transfer was always important in the Saudi offset programme. In the beginning, some of the offset proposals were attractively "high technology"; however, high technology is not always easy to transfer. Cutting edge technology is generally not shared. What may be passed on is technology that is shortly about to be replaced by new developments. Even so, there has to be a work force with high skill level and capabilities in the buying country to fully utilize the benefits of the technology. Further, there should not only be an ability to use the technology, but also to carry forward the technological developments, without which the acquired technology will rapidly become obsolete. Recognizing these inherent problems, the Saudi offset program has progressively stressed on the transfer of medium, commercial exploitable technology, rather than "high" technology.

Saudi Arabia also did not embark on the route of trying to manufacture components and sub assemblies of main systems under license as was done in some other countries. They did not have a huge skilled workforce, for whom it was necessary to find jobs. The market for such items is also quite limited. Besides, the sale of items manufactured under license is generally controlled by the license giver. The Saudis preferred to concentrate on the establishment of industry and R&D for commercial and dual use products with wider markets.

Measured against the total available resources for investment actually available, the investments that have been made may be somewhat small. Some of the reasons put forward are: lack of progress in identifying good

business opportunities, lack of reliable market data on local partners, and complexity of the government procedures / organizations that foreign vendors have to deal with. The Saudi government has tried to put in place a friendlier organization to smooth over bureaucratic hurdles, and provides advice through a one stop administration under Saudi Arabian General Investment Authority (SAGIA). SAGIA holds international road shows, and coordinates with regional chambers of commerce and industry to achieve better results. Offset financing is made available to reduce upfront investment risks. Loans up to $10 million are available on a seven year term basis. Joint ventures are recipients of number of facilities such as tax holiday, freedom to repatriate capital/profits, exemption from import duty on essential imports, and tariff protection up to certain levels. They also have access to reasonably priced infrastructural amenities.

Israel

The offset philosophy of the Israeli government is different from that of Saudi Arabia. The policy in Israel is one of encouraging industrial co-operation i.e. the offset programme aims to promote close co-operative working between Israeli and foreign firms, with the long range perspective of enabling the former to add value through such strategic partnering. In fact, the Israeli government agency that promotes and administers offsets is called, appropriately, the Industrial Co-operation Authority.

To understand this philosophy one has to consider the general economic conditions in Israel and the level of their technological capabilities. A dominant characteristic of the Israeli environment is the extremely high skill levels of their work force. It is estimated that more than a quarter of the work force has acquired higher technical and academic qualifications. At the same time, manpower costs in Israel are quite competitive when compared the Western world. The Israeli government also chips in with large subsidies and other kinds of assistance including financial incentives

and tax holidays for R&D investments, further reducing the cost of technological and research efforts.

By leveraging the unique skill sets of the work force, within a period of about 50 years, the economy has been transformed from agrarian to fully industrialized, with special capabilities in niche markets such as medical aids and equipment, digital communication and information technology, defence electronics, advanced agricultural technologies, etc. Israel is today recognized the world over as a centre for high technology. Israeli companies are known for their state-of-the-art technologies and quality products. This makes it easier for foreign companies to place high tech work in quite substantial quantities, with Israel.

As mentioned above, the government of Israel has, as a conscious policy, spent large amounts of money in the promotion of research and development. Israel spends about 3 per cent of its GDP on R&D, which is at par with the most advanced economies of the world.

In spite of the high levels of technical sophistication, the problem that Israeli companies faced was that of lack of access to large global markets. There was a need to link these firms with the global economy. This is what the offsets were used for. Offset helped to bring the Israeli firms into contact with some of the world's technological and industrial leaders, and by partnering with them the Israeli firms have been able to get an entry into the world market and add to their value. Offsets have enabled these firms to undertake high tech subcontracting and R&D, and given them world wide exposure and market openings.

Offsets have also led to additional investment, new jobs and technology transfer, which the Israeli economy was in a very good position to absorb.

One of the important principles underlying the Israeli offset policy is that

the projects and activities pursued under programme should be of mutual benefit to both parties. The underlying intention is to forge long term strategic alliances between foreign and Israeli firms which will outlast the requirement of the offset contract; if the policy tries to extract too much out of the foreign firms it will lead only to short term opportunistic projects and the offset partner will try to exit at the earliest opportunity.

For this reason, the Israeli offset policy is quite lenient in several respects. There is no clause for liquidated damages or other formal penalties. A reasonable percentage (minimum 35 per cent in the case of civil procurements and 50 per cent in the case of military procurements) is asked for by way of offset. The policy does not lay down precisely what sectors the offsets are to be directed at; the general principle is of direct or other high tech technology transfer and defence industry investments. This gives the country the required flexibility to take advantage of any good proposal that may come its way. There are arrangements for pre-offsets i.e. offsets without specific obligation and for banking of offsets. At least 20 per cent of the offset should be direct offset. The time period for completion of the offset obligation is also flexible and negotiable – usually it is stipulated at three years.

There are two aspects of offset policy in Israel- offsets programmes that are created as a result of government purchases and offset programmes that are created out of private sector procurement activity. The Israeli government requires mandatory offsets on its procurements. However, the volume of voluntary offsets in the private sector is greater than that of mandatory offsets required by the commercial activities of the government. The Industrial Co-operation Authority (ICA) monitors and co-ordinates the offset policy both in the government and in the private sector, although it does not formally approve projects; conclusion of agreements is in the domain of the respective parties that are taking part in the trade. The approach followed by the ICA is of active support and openness to

innovative ideas and out-of-the-box proposals for fulfilment of offset obligations.

The success of the Israeli offset policy can be gauged from the following statistics for 2000-2006 put out by the ICA:

Obligations-	Civil	$2167 million
	Military	$2299 million
Fulfilment-	Civil	$5583 million
	Military	$3168 million

One of the larger and more successful offset programmes finalized by the Israeli government was associated with the $2 billion purchase of combat aircraft in the nineties. Mc Donnell Douglas, who won the bid, agreed to provide liberal offset package of about 100 per cent of the sale value. The technology transfers that came out of these offsets have helped Israeli companies such as Israel Aircraft Industries, Cyclone Aviation Products, Israel Military Industries, and TAT Aero to develop their own weapons and systems that now enable them to compete for export orders.

Asia: Japan

Japan is a good example of a country which has utilized its strategic importance and favoured relationship with a world superpower to develop its indigenous defence industry in the post World War II years.

Japan's industrial policy since the second half of the 19th century, has been based on the principle that technology transfer and absorption from the western powers with the idea of first emulating their state-of-the-art techniques and finally overtaking them, is the key to rapid, robust and diversified industrialization. In the realm of defence industrialization, Japan has used its special position vis-à-vis the United States to obtain

substantial offsets in the form of technology transfer and rights to undertake licensed production of high tech military equipments and systems. It has built up a sizeable military industrial complex of its own. Moreover, the spin-off benefits from the technological developments in defence industry have resulted in huge gains in the civilian sector as well.

The Japanese policy of indigenization of defence production is shaped by its overall view with regard to technological self-sufficiency and ascendance. The Japanese belief is that there cannot be real security unless the country is independent with regard to technological knowledge and competence, and self sufficient in the production of armaments. A general unease on account of the excessive dependence on American military support, misgivings about the state of the US economy and its continued commitment and interest in backing Japan, and the rising life-cycle costs being incurred on the maintenance and upgrade of foreign systems, were other factors that propelled Japan to strive for self reliance in arms production. Last but not the least, there was a clear vision that the absorption of military technology and the creation of domestic arms production capacity would have important spread effects in the development of civil commercial technologies that would serve Japan's long term goal of becoming an industrial and technological superpower.

A major source of the technology inflows into Japan came from defence offsets. Japan has received from the US licence rights for a larger number of defence equipments and systems than any other country in the world. As per the US government data, between 1960 and 1988, licences for 28 major systems were given to Japan. These include several programmes under fixed wing and rotary wing aircraft, aircraft parts, sub-systems and engines, and missiles.

Transfer of licences helped in a rapid indigenization of the Japanese military industry. Japan has made major progress in self sufficiency and

more than 90 per cent of Japan's requirements for military products are now met within the country. There have been a number of important developments in the aerospace sector. For the F1 fighter there was a Japanese fire control design; for the T4 intermediate jet trainer the fuselage and engine were developed in Japan; 80 per cent of the materials and systems for the P3-C Orion are sourced from within the country; the FS-X advanced fighter bomber has been built indigenously with Mitsubishi as the prime contractor in collaboration with General Dynamics (later Lockheed Martin); almost all the air defence missiles required by Japan are locally produced. On the naval side, Japan indigenously manufactures all the combat vessels and submarines that it uses. In land systems, Japan has a huge capability for all kind of infantry weapons. Japan's main battle tank in earlier years was the Type 74 produced by Mitsubishi Heavy Industries, with many of the systems and sub systems of Japan design and make, and the tank's 105mm gun manufactured under licence from Royal Ordnance, a British company. This MBT was replaced by the Type 90 - a completely indigenous tank again manufactured by MHI as prime contractor, using several advanced materials and technologies including modular composite ceramic armour developed by local industry.

The technological developments from offsets also had important spin-offs in the promotion of strategic civil industries in Japan. The technology for the brakes of Japan's famous Bullet train came out of the knowledge gained from production of F-86 aircraft. In a unique example of sharing of learning and experience, Mitsubishi Heavy Industries that produces the FS X fighters, use the same premises, machinery and skilled operatives for doing works connected with Boeing civil jets. Japanese firms have acquired much knowledge in the manufacture of composites from work experience on tanks and aircraft wing structures. Licensed production of military radio equipment led to the establishment of the radio production industry in Japan.

Other kinds of spin-offs are with regard to soft skills including advanced project management from handling complex military projects, expertise in systems integration, production, inventory and quality control, standardization of products, industrial engineering, etc. In enabling the country to absorb such technologies, Japan's early investment in human resources and education paid rich dividends.

In Japan, development of military and civil productive activities has remained closely co-operative and interwoven. The military and civilian industries have evolved together, not isolated or separate from each other. Japan's strategic industries specialize in dual use technologies i.e. technologies which have commercial as well military uses. These technologies are great drivers of economic growth and pervade the aerospace, electronics and telecommunications, materials, machine tool, and automobile industries. In respect of a number of critical dual use technologies such as micro-electronic circuitry, semi-conductor compounds and robotics, Japanese industry is perceived to be ahead even of the US. The dual use industries permit reverse spin-offs with the advancements taking place in the civilian sphere aiding new developments of military items and processes.

Also noteworthy is the fact that the benefits of development and production of military equipment was not confined to the primary contractors who won the initial contracts but was allowed to diffuse downwards to a larger number of companies through the mechanism of sub contracting, many of whom might have been losers in the primary bid. This unique system has helped to build up a body of expertise in the different industries of suitable scale without over-concentration or over-dispersion. The Japanese defence contractors are diversified companies dealing in a wide range of civilian goods. This helps them to tide over periods of contraction in defence demand as they are not dependent on defence sales for their survival.

Japan's R&D funding is also interesting. Nearly 95 per cent of the R&D expenditure, government and private, is devoted to commercial applications with maximum economic and social returns. Government is more of a facilitator, rather than a funding agency, for promising projects. The major share of funding comes from the private sector. In case the R&D efforts result in the development of a marketable product, the investment can be recovered from the price of the item. However, the R&D risks in the event of failure have to be shared by the private sector as well.

Today, Japan is a serious competitor to its erstwhile suppliers in the US in respect of a number of products, components, systems and sub-systems. As the US gets more cautious about parting with cutting-edge technologies to Japan, the Japanese authorities have also tempered their stand on complete technological self reliance, to focus more on the benefits of co-development and co-production programmes to sustain their research and development base and retain access to the best technologies of the world.

Europe: Spain

Spain is a good example of a country which has used offsets and allied programmes to stimulate defence industry and use it as an instrument for re-industrialisation. By stimulating demand through government owned production entities, providing tariff protection to new industries and creating high volume export oriented sectors, the government aimed at propelling the Spanish armaments industry to European standards. In particular, the electronic industry was seen as a possible high tech industrial niche. The mechanisms employed were offsets on foreign military purchases, encouragement to R&D projects and subsidy support to military electronic and engineering industries.

In 1983, Spain entered into agreement with McDonnell Douglas Corporation, USA, to buy 84 F 18 aircraft, in what was the first major

acquisition effort of the Spanish armed forces in the post Franco years. McDonnell Douglas Corporation agreed to provide offsets of $ 1.8 billion. An Offset Management Office was set up in Spain to oversee the implementation of the offset programme.

The government's objectives were: *first*, to spur the development of Spanish firms, particularly in the aerospace and electronics sectors, *second* to enhance the technological base of Spanish industry through technology transfer from abroad, *third*, to create export opportunities for Spanish firms to break into the global market, particularly the American market, and *finally*, to create employment in Spain so that the negative effects of the purchase of aircraft on the Spanish trade balance were fully compensated.

The offsets were in four groups:

- *Group A*- designated offsets- which referred to work, items or services to be carried out by Spanish firms on the aircraft that were being purchased.
- *Group B*- aerospace co-production offsets- which referred to work to be done by Spanish firms for aircraft meant to be exported to other countries or other aerospace activities.
- *Group C*- indirect offsets- activities involving the use of defence related technologies other than in the aerospace area.
- *Group D*- indirect commercial offset including investments made in Spain and sales from such investments.

The total offsets from groups A and B had to be not less than 17 per cent of the total package and tourism related offsets could not be more than 10 per cent.

When work was subtracted by McDonnell Douglas to Spanish companies, if the costs of production were higher than would be incurred by McDonnell Douglas in normal subcontracts, the additional cost would be

reimbursed to McDonnell Douglas by the Spanish government. For this purpose, the Spanish government set aside US $100 million. Despite the extra costs, the Spanish government was keen to maximize the amount of group A and B offsets during the negotiations phase. Although local assembly could not be taken up being prohibitively expensive, offsets were obtained for equipment, material, avionics and simulators. The offsets were to be implemented over a period of 10 years.

It was found that the fulfilment of the offsets was biased in favour of indirect offsets in the industrial sectors where Spain has been traditionally strong, such as chemicals, pharmaceuticals, iron and steel, foodstuffs and consumer goods and electronics. These industries generated a considerable volume of exports. The increase in exports helped to compensate to some extent the negative effect on the trade balance of the import of F 18 fighters by Spain. There was also an increase in job opportunities and employment in different sectors of the Spanish economy.

There were limitations on the capacity of Spain's defence industry to absorb large amounts of direct offsets. However, technology transfers to an extent did take place also in sectors such as aerospace in which Spain did not have much commercial advantage. Although such transfers were low in terms of comparative volume, they were important in that they created capabilities in areas like micro electronics, radars, automated test beds and simulators, materials and composites.

In the defence sector the benefits of direct offset were reaped by a limited number of firms. Two companies, CASA (aerospace) and INDRA (electronics) received more than 90 per cent of the defence related direct offsets. Technology diffusion has also therefore been confined to these firms. On the other hand, the indirect commercial offsets were dispersed amongst a large number of small firms. An important implication is that

indirect offsets proved to be an administrative challenge for the Offsets Management Office as it had to put in much greater time and effort in overseeing the implementation of the programme through a wide variety of small firms and to appraise a number of individual projects for suitability and calculation of "offset value" to the Spanish economy.

Spain has since been concentrating on smaller and more focused and targeted offset programmes of shorter duration, many of which are structured as co-production or co-development agreements. The Offsets Management Office has been re-named the Industrial Co-operation Management Office to reflect the change in focus. Some of the advantages of co-operation and co-production are:

- Activities to be done by the local partner are finalized before the arms purchase is made;
- Activities usually relate to the field in which the arms purchase is being made;
- There is no need to administer offset applications;
- The Spanish firms are able to interact more closely with their foreign partners and have a greater involvement in the evolution of the project and associated R&D.

The challenge is for countries at lower technological levels to identify areas in which they could meaningfully participate in a co-development programme. The experience gained by Spain from the early offset programmes proved useful as it helped to raise the level of the defence industrial base, demarcated areas of potential development and gave an opening to Spanish exports in niche markets.

In the 1990s, the government evolved a policy to use the arms acquisition programmes to attract foreign partners into investments in domestic companies. As per this policy, a state company with a prime contract from the government could have a foreign subcontractor with a minority share.

It was felt that after making sizeable (though minority) investments to modernize and develop Spanish firms, and to equip them with the latest skills, the foreign partners would display greater long term commitment to Spanish industry.

South America: Brazil

Brazil, though a peaceful nation, has always been a dominant force in the Americas. One of the principles underlying the Brazilian policy is that the country should be able to provide adequately for national security and should not depend for its protection on foreign arms. Development of the armaments industry has therefore been a very important objective. It was also felt that the growth of military industry would have the effect of stimulating the development of the civilian industrial sector as well, while helping the economy to gradually ascend the technology ladder.

The Brazilian government has for many years now, leveraged its armaments purchases to acquire the latest military technologies from abroad through such methods as licensed production, co-production and joint ventures although it has formally articulated its offsets policy quite recently. Technology transfer has always been a key requisite in all Brazilian arms procurements. The state has also been willing to invest a good deal of resources in the indigenous projects, although commercial success of the ventures has been somewhat patchy.

The first big steps in the programme of military industrialization of Brazil were taken in the late sixties. Embraer Corporation, the Brazilian aeronautics major, was established in 1969. It proved to be leader in the absorption and indigenization of foreign aeronautic technologies that accrued to it by way of offset deals. Embraer made good use of the excellent industrial and human resource base that had been painstakingly built up by the government in the run-up to industrialization. The

Embraer's first military plane, the EMB 326 Xavante trainer was manufactured under licence from Aeromacchi, Italy. In the early 1970s, Embraer had a technology transfer agreement with Piper of the US for manufacture of the Piper Seneca light aero-planes. In 1975, when 49 F-5 aircraft were purchased by Brazil from Northrop of the US, Embraer was involved in the manufacture of several fuselage components. Embraer next embarked on a co-production arrangement with Aeromacchi and Aeritalia of Italy a subsonic light attack jet fighter aircraft, the AMX. Different parts and subsystems of this aircraft were made in Brazil under licence arrangements, such as engine components, multi-mode radar, and head-up display. Some 200 of these aircraft have been produced and are in use in the Brazilian and Italian Air Force. SIVAM is a huge monitoring, surveillance, communications and air traffic control system for Brazil's Amazon basin area. It is a $1.4 billion contract and the collaborators are Raytheon, US along with Embraer and other Brazilian companies. Embraer supplied some of the airborne platforms by adapting existing regional jets. The SIVAM programme also gave a new lease of life to Embraer's ALX super Tucano, a light attack turbo prop aircraft which was a collaborative up-grade of the indigenous Tucano trainer, with Aeromacchi of Italy. This apart, a company called ATECH was set up so that Brazil could take part in development, operation, maintenance and up-grades of all the software required under the SIVAM project. The SIVAM project was a major step forward in technology absorption by Brazil and also gave an opportunity for the development of local software capabilities. Brazil is now embarking on a next generation fighter replacement programme.

Brazil has thus experienced a steady increase of its capabilities in the aviation sector and the various projects that have been undertaken have helped to bring about a broad diffusion of technology throughout the economy. The commercial results, especially for military planes, have been mixed- some of the programmes such as the AMX proved to be quite expensive and could not obtain any export orders. This was fortunately

compensated by Embraer's good export performance in the regional civil jet market. Another criticism that is sometimes levelled against the Brazilian paradigm is that there is quite a heavy dependence on imported components and sub-systems and up to 60 per cent of the components of any Embraer aircraft continue to be imported. The counter argument is that this could be a deliberate strategy whereby Embraer concentrated on absorbing technologies in pre-determined critical areas such as fuselage and systems integration rather than pursuing an unattainable goal of complete indigenization.

The first major contract on the naval side was for the construction of six frigates in collaboration with Vosper Thorneycroft of the UK. Local Brazilian capabilities in ship borne weapons and electronics are greater than their ability to construct ships; the up-gradation of their frigates with a dedicated combat system was undertaken by a consortium of one French and four Brazilian firms.

Small arms and ammunition have been manufactured by Brazil under licence from Italian, Belgium and British firms for a long time. Avibras, Brazil's missile producing company uses a lot of indigenous technology, but has had technology sharing arrangements with Canada, former Soviet Union and China.

Brazil has not looked for job creation or correction of balance of trade, but rather only to technological development of its defence and related industries through technology transfers, collaboration, co-production and joint ventures. Foreign companies on their part were attracted by Brazil's cheap labour and raw material supply, efforts and investments made for developing the capability of absorbing technology, conducive government policies and potential access to South American markets. By developing an autonomous technological capability, so much so that Brazil is in a position to take part in international collaborative projects for design,

development and production of advanced aircraft, it can be said that the Brazilian policy makers have achieved the goals they had set for themselves. With the development and up-gradation of military industry, there has also been a strengthening of the entire civilian industrial and technological base.

Whether the programmes have been a thumping commercial success is a different question altogether. It has been noted that costs of some of the projects has been quite high. Because of Brazil's small defence procurement budget, the commercial success of its various projects has always been heavily dependent on exports. In the eighties, Brazil was ranked amongst the top 10 arms exporters of the world. With the end of the Iran- Iraq conflict and the Cold war, arms sales dropped. Although Embraer's military sales expectedly fell, it was able to pull through because of a continued strong export performance for the civilian regional jets. With 40 per cent market share in 1999, it was about equal to Bombardier of Canada. In fact, diversification into civil production was required to maintain viable operations also for Avibras, which went into production of telecommunications and electronic industrial equipment. The defence industry of Brazil is now showing some signs of a small revival. The government is hopeful that the offsets that are likely to flow from the induction of the latest advanced jet fighter will help the process.

Conclusion

Are there any common themes or principles we can arrive at from this study? The following points emerge.

There is no universal “one size fits all” policy applicable to all countries. Each country has to evolve the offset policy that suits it best, taking into account its special requirements, unique capabilities, the depth and extent of its natural and human resources, and the level of its economic

development. The objectives of the offset policy should be based on a realistic assessment of the country's capability to absorb potential inputs.

The desire to acquire and absorb the latest technologies underlies most offset programmes. Technology transfer may sound quite attractive but it is only as effective as the ability to learn and make productive use of that learning. Good use of technology of course requires a highly skilled workforce. Moreover, merely acquiring an existing technology is not enough, there has to be the capability to take that technology forward through continuous and vigorous R&D. Otherwise, the nation receiving the technology becomes at best a branch manufacturing facility for the vendor country. Further, technologies have a way of becoming rapidly obsolete.

An offset policy should have a clear focus. Instead of dissipating energies in broad generalized programmes with multiple objectives, the nation is better served by a concentration of effort in specific objectives.

An offset policy can be successful in the long term only if both the parties in the offset deal find a real interest in the transaction. This is the difficult balancing act for the offset policy maker of achieving equilibrium between the obligations imposed on the foreign party, and the co-operation and benefits it wishes to reap. Imposition of stringent penalties for non-performance of offset contracts may be counter-productive.

Finally, the offset policy should have flexibility. Once an offset programme is in place, its results need to be monitored carefully and based on feedback received from actual implementation, moderations or mid-course corrections could be undertaken. The roll out of an offset programme is likely to be a learning experience for both parties.