

Defense Industries In Developing Countries : Some Observations

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Abstract

ملخص

الصناعات العسكرية فى البلدان النامية بعض الملاحظات

تنقسم هذه الورقة إلى سبعة أقسام. يعالج القسم الأول، ويشكل ملخص : العلاقة ما بين الإنفاق على الدفاع وبعض المؤشرات الاقتصادية العامة، ومعدل النمو بشكل خاص. ويشير هذا القسم بأنه قبل الوصول إلى أية استنتاجات قوية حول هذه العلاقة لابد أولاً من التعرف على بعض المعطيات للبلد المعنى مثل حجم الاقتصاد، والطاقة الإنتاجية المستخدمة، ووضع المديونية، والقدرات الإنتاجية والتكنولوجية .. إلخ، وعلى العموم، يمكن القول أنه فى حالة الاقتصادات غير مقيدة الموارد، والمتقدمة تكنولوجياً، فإنه يمكن توقع علاقة طردية ما بين الإنفاق على الدفاع ومعدل النمو. ويتناول القسم الثانى دور البلدان النامية فى الإنتاج العسكرى العالمى، والذى يعتبر متواضعاً إلى حد بعيد، ذلك على أساس القيمة الدولارىة للصادرات العسكرىة، أو عدد البلدان النامية المنضوية فى سوق الإنتاج العسكرى. أما القسم الثالث فيوضح العلاقة، ما بين نمط الأسلحة المنتجة، ودرجة التنمية. فكلما تطورت هذه الدرجة كلما تعقدت الأسلحة المنتجة. فى حين يهتم القسم الرابع بالقيود التكنولوجية التى تواجه البلدان النامية لدخول سوق الإنتاج العسكرى. ويلاحظ هنا أن أغلب الأسلحة المنتجة فى هذه البلدان تم تصميمها وتطويرها قبل حوالى عشرين سنة سابقة. ويشير القسم الخامس إلى تجارة الأسلحة بالبلدان النامية، حيث يظهر هنا أن حوالى (٥٠٪) من تجارة الأسلحة مع البلدان النامية مصنفة تحت فئة أسلحة الطيران. أما البقية فتشارك بها الدروع والمدفعية، وأنظمة الرادار والتوجيه، والصواريخ والسفن. ويهتم القسم السادس بالأقطار العربية مع البحث عن أفضل مجالات للتعاون العربى، مع الأخذ بنظر الاعتبار القيود المشار إليها أعلاه والحساسية السياسية. وأخيراً يشير القسم السابع إلى بعض الاعتبارات الواجب مراعاتها فى مجال السياسات.

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Abstract

This paper is divided into 7 sections. Section 1 concerns with presenting a brief view on the relationship between defense expenditure and some economic indicators in general, and the rate of growth in particular. Before arriving at a concrete conclusion, in this respect, many economic factors have to be taken into consideration, such as the size of the economy, capacity utilisation, indebtedness situation, production and technological capabilities, etc. By and large, it is suggested that big, unconstrained resources, and technologically advanced countries are expected to enjoy a positive relation between defense expenditure and the rate of growth. Moreover, it can be argued that classical theory is usually in operation where supply side is considered as a main constraint against militarisation, whereas the keynesian theory is prevailing where the demand side is the constraint.

Section 2 is devoted to the role of developing countries in the world's arms production, which is considered too modest whether in terms of the dollar value of arms exports or their number entering the arms production market.

Section 3 shows that there is a direct relationship between the type of weapons produced and the degree of development. The higher the stage of economic progress, the most complicated weapons are produced.

Section 4 mentions some findings concerning the technological barriers facing developing countries entering the arms production activities. In general, most of the military technologies produced by those countries were, on average, designed and developed twenty years earlier.

Section 5 points out to the arms trade and developing countries. Recently, more than 50 percent of arms trade with the Third World is classified under aircraft weapons category. The rest was shared by armour and artillery, guidance and radar systems, missiles and ships.

Section 6 deals with the Arab countries, as case study, in searching for a proper area of arms production, where an Arab co-operation can be established, taking into account all the barriers mentioned in the previous sections, besides the political sensitivity involved in such an issue.

Finally, Section 7 lists some policy implications concluded from the different sections of the paper.

1. General Theoretical Background :

As M.D. Intriligator puts it : " The field of defence economics is one in which the tools of economics are applied to the defence sector to analyse its domestic and

international implications". (1)

Since the publication of the pioneering work of E. Benit (1945 - 1965) where he dismissed the negative effects of military expenditures on economic growth, (2) many researches have emerged to question this and other conclusions. Smith (1965 - 1973), Frederiksen and Looney (1950 - 1965), and Francis and Taylor have questioned Benoit's conclusion and reached an opposite verdict. (3) R. Looney, on the other hand, has tested the correlation between military spending and income distribution. His conclusion was that the latter deteriorated through the shifting of resources from wage goods to investment and durables. (4) In terms of spin-offs, S. Deger and R. Smith stated that despite the restrictions of long series of consistent data used in time series and cross section analysis, and the need for careful interpretation, it seems, in general, that : "Defence budget can have positive effects on development by boosting aggregate effective demand and creating new technical progress". Adversely, "the different channels through which military spending may hinder development have been shown to relate to the saving, investment and balance of payments process". (5)

2. Developing Countries and Defence Industries :

Most, if not all, the evidences available indicate that the arms production in the Third World countries are still, and will remain at least within the near future, a small fraction of the world's arms production and trade. This is true, whether in terms of the dollar value of the arms exports by the Third World countries, which represent (2.2 %) and (3.8 %) of the total world export for the year 1985 and 1986 respectively, (6) or the number of Third world countries entering the arms production market, which seems to have stabilised in recent years. While this number almost tripled between 1950 to 1960 (from 4 to 14), it slowed down between 1961 to 1970 (from 14 to 21) and maintained, approximately, the same trend between 1971 to 1980 (from 21 to 26). Since 1980, the number has fairly stabilised. (7) Table (1) shows the values of arms production in early eighties for a number of developing countries.

Table 1
Values of Arms Production in A Number of Developing Countries, 1982

Country	Millions of U.S. Dollars
Algeria	4
Iran	8
Iraq	3
Jordan	1
Morocco	8
Pakistan	6
Bangladesh	1
Sudan	1
Tunisia	1
Egypt	14

Source : R.M. Rosh, Third World Arms Production and the Evolving Interstate System, Journal of Conflict Resolution, Vol. 34, No. 1, March 1990, P. 63.

3. Stage of Development and Arms Production :

It seems that there is a sort of an inverse relationship between the type of weapons produced and the degree of development. The higher the stage of economic progress, the most complicated weapons are produced. Speaking of tanks weapons, as an example, it is evident that they are among the most costly and technically advanced major military system to manufacture, and produced by the smallest number of Third World countries. Ships, and its broken down type of vesseles, as another example, have been showing that since 1950 only 24 states manufactured small naval craft in comparison to 8 Third World countries producers of frigates and corvettes, 3 of destroyers, and 4 of submarines. Besides, those countries have produced 86 models of small naval crafts but only 3 types of destroyers, 12 types of frigates and corvettes, and 6 types of submarines.. (8) Almost the same pattern characterises the other arms production items. Table (2) illustrates the arms production structure of a number of developomg countries for the year 1989/1990.

As it is apparent from Table (2), none of the countries covered is fully manufacturing the four categories of weapons, or what is called " across-the-board capabilities " " Aircraft, missiles, ships and armored fighting vehicles.

Table 2
Arms Production in A Number of Islamic Countries 1989 - 1990

ARMY EQUIPMENT					AIR - FORCE EQUIPMENT			
Country	Manufacture	Production under License	Assembly	Not Classified	Manufacture	Production under License	Assembly	Not Classified
Algeria	—	Diesel Engines (with Italy and Tunisia); Trucks, (with France).	—	—	—	Czech ten passenger transport aircraft and four passenger light-craft	—	—
Egypt	120 mm Mortars (planned), 122mm saqr 10/18/30 MRLs, saqr 80 surface-to-surface rockets; Still experimental; ammunition for artillery, tanks and small arms; mines; rifles; short range SAMs; conversion of 122 mm D-30 howitzers, still experimental; 23 mm SP AAGs; add-on armor to M-113 APCs; toxic gas (partly with assistance from a Swiss company).	Dragon AIGMs, (under development); 130 mm artillery pieces; British tank guns; tank trucks; upgrading of Soviet trucks (with British, U.S.A. and Austrian assistance); trucks and jeeps (with U.S.A.); Fahd APCs (with FRG assistance); Soviet design AAGs; MGs and small arms; tank (with U.S.A., under development); mine-field crossing systems (similar to viper).	Short-range SAMS AAGs.	—	—	CBUs (U.S. design), Anti-r runway bombs; parts for F-16; parts for Mirage 2000; Aircraft fuel pods; Aerial bombs.	Alpha jet trainers; SA-342 Gazelle helicopters; Embraer EMB-312 Tucano.	—

Continued ...

Table 2

Arms Production in A Number of Islamic Countries 1989 - 1990

Country	ARMY EQUIPMENT				AIR - FORCE EQUIPMENT			
	Manufacture	Production under License	Assembly	Not Classified	Manufacture	Production under License	Assembly	Not Classified
IRAN		Rifles (Heckler & Koch G-3 AR); Machine guns MG-1A1.	Artillery; MRLs; SSMs; Small arms, mortars and artillery, ammunition; spare parts; trucks; toxic gas; gas masks; ATRLs (not confirmed); ATGMs (with assistance from Czechoslovakia).	Radio transceivers (copy of USA model)	—	—	—	250 tons LCU (Foque 101), PBs, mines, 8.4 meter hovercraft.
IRAQ *	Small arms and artillery ammunition (with Soviet, Yugoslav & Italian assistance), toxic gas: mustard, sarin, biological weapons (unconfirmed); SSMs under development (some in cooperation with Argentina and Egypt and other foreign companies, possibly cooperation with Argentina discontinued); upgrading of Soviet - designed Scud B SSMs (with assistance from Egypt, companies and Experts from FRG); Super-gun: Capable of firing projectiles (with assistance from companies in Belgium and Britain).	ATRLs, rifles, artillery, MRLs (Brazilian and Yugoslav license); tank (Soviet model).	—		—	Chile-designed Car-doen aerial CBU (unconfirmed); Aerial bombs; mini RPVs (unconfirmed); AEW aircraft (Soviet, with French electronics).		

* The Iraqi military information reflects the situation before the crisis of Kuwait and the U.N. Resolutions to dismantle the Iraqi military capabilities

Continued ...

Table 2
Arms Production in A Number of Islamic Countries 1989 - 1990

Country	ARMY EQUIPMENT				AIR - FORCE EQUIPMENT			
	Manufacture	Production under License	Assembly	Not Classified	Manufacture	Production under License	Assembly	Not Classified
Jordan	—	—	—	—	—	—	—	—
Libya	—	—	—	Toxic gas.	—	—	—	—
Saudi Arabia	Small arms ammunition, electronic components.	G-3 ARs planned; tanks and tank guns under FRG license; electronic equipment under British, French and U.S.A. license and cooperation; APCs; Artillery and AMMs in cooperation with British; ATGMs in cooperation with FRG.	—	—	—	—	—	—
Syria	—	—	—	Ammunition; toxic gases; chemicals warheads for SSMS (unconfirmed); upgrading of tanks; upgrading of SSMS (with assistance from North Korea, (unconfirmed)	—	—	—	—
						Schweizer Model 330 helicopters, to begin 1990.	Light aircraft.	

Continued ...

Table 2
Arms Production in A Number of Islamic Countries 1989 - 1990

Country	NAVAL CRAFT			ELECTRONICS			Optronics
	Manufacture	Production under License	Assembly	Not Classified	Manufacture	Production under License	
Egypt	—	—	U.S. Swiftships patrol boats.	—	Basal artillery fire control system.	AN/TPS-63 Radars (assembly with 30% of components locally produced); radio transceivers (in collaboration with Britain); fire control system.	—
Iran	—	—	—	250 tons LCU (Foque 101) PBs, mines, 8.4 meter hovercraft.	—	—	Development of a spy satellite (with assistance from Brazilian, French and other foreign companies).
Iraq	—	—	—	Small patrol boats; rubber boats.	—	—	—
Jordan	—	—	—	—	—	—	—
Saudi Arabia	—	—	—	—	—	—	—
Tunisia	20 mts patrol craft, with assistance from South Korea.	—	—	—	—	—	—
U.A.E.	—	—	—	Construction of patrol boats at Ajman with British cooperation.	—	—	Radio transceivers.

Source: J. Alpher (Ed.), The Middle East Military Balance, 1989 - 1990, PP. 187 - 353. The military information stated above was retabulated.

4. Technological Barriers :

It is evident that few developing countries have reached undeniable advances in arms manufacturing capabilities, but the fact still remains that a large technological gap between industrialised and developing countries has been widening. This can be substantiated by following different approach of which two are presented : First, through the time lag associated with the adaptation of military technologies. Table (3) breaks down this criterion for a sample of weapons.

Table 3
Average Age of Military Items Produced Under License By Developing Countries in 1980 By Category of Weapons *

Country	Aircraft	Naval Vessels	Missiles	Armored Fighting Vehicles	Aircraft Engines
Argentina	20	10	-	-	-
Brazil	18	-	20	20	29
China	27	31	-	-	30
Egypt	-	-	22	22	30
India	17	19	21	21	30
Indonesia	12	-	-	-	-
Israel	-	-	-	-	25
Korea N.	-	-	-	-	-
Korea S.	16	16	-	-	20
Pakistan	24	-	23	23	-
Paraguay	23	-	-	-	-
Philippines	20	-	-	-	-
South Africa	11	8	15	15	29
Average :	19	19	20	25	27
Grand Average Total is 22 years					

* The main findings of this table have not changed drastically since 1980, see : R. Vayrynen, Military Industrialisation and Economic Development, UNIDIR, Dartmouth Publishing co., 1992, ch. 1, One size, Technology and Arms Race. Source ; Ibid., p. 180.

The self-exploratory nature of this table shows that military technologies produced by developing countries were, on average, designed and developed twenty years earlier. To be more specific, chinese version of the Soviet MIG-19 is 1950's technology. Similarly, the Y-10 turbojet transport aircraft is inspired by Boeing 707, a U.S. design of 1950 s. Second, through the calculation of an arms index of military production capability. According to Third World arms produces are evaluated according to the relative sophistication of the " weapon " system produced, the type of manufacturing skill used (e.g. fabrication, assembly, overhaul), the proportion of components and sources or both, and the source of R & D. Then a major weapon was coded according to these criteria, later an average was calculated for each of the four following categories of

indigenously produced weapon system : aircraft, ships, armored fighting vehicles and missiles. Finally, a scale of technical capabilities from level 7 (least advanced) to level 1 (most advanced) was established by each developing country, as well as an overall average index of this capability. The ultimate finding was that in spite of real progress within developing countries defence industries, there is a general leveling off at the intermediate stage of production capability, above which most developing countries do not rise. Even the reputedly more advanced producers continue to fabricate simple defence items, engage in extensive licensed production (as it is supported by the finding of table 2) of least advanced systems, and in some instances assemble more advanced components, but the skills required for the most advanced levels of production, R & D, and weapons design continue to act as a constraint. (9)

5. Arms Trade and Developing Countries :

During the last decades, the aircraft weapon category has accounted for more than 50% of the arms trade with the Third World. The rest was shared by armour and artillery, guidance and radar systems, missiles and ships. In contrast, more than 90% of the imported arms were made up of new weapons by mid-1980s. The rest represented refurbished and second-hand weapons. (10)

One can distinguish many phases of the arms trade with Third World countries since the world war II. For our purpose, special attention is paid to the current phase, which is characterised by a set of features. They include :

- (a) The growing number of off-set deals, whereas forward straight cash or credit terms prevailed before 1980's. Those deals include the shapes of regional cooperation, i.e. joint and licensed production, sub-contracting, .. etc.
- (b) In many cases, financial conditions have determined the extent of success in the rate for contracts. Witness the case of the 1982 Al-Thakeb Air Defence between France and Saudi Arabia, in which the former debt due to the latter was written off as payment for the development and production of the missiles and launchers.
- (c) There has been a growing tendency towards producing specially designed arms for Third World countries (" Export " Weapon). For instance, most of Western Europe's weapons have been tailor - made to the specifications determined by the Third World recipients. This was considered as a commercial success for the arms industries in France, Germany and Italy. But this is not the case with the U.S.A. and Ex - U.S.S.R., where such terms, i.e. Export Weapon, was meant to be less capable version of its front - line aircraft and tanks. The U.S.A. FX fighters and the U.S.S.R. MIG-29 are good examples in this respect. Finally.
- (d) the transition from multi-polar to uni-polar world will erode the leverage of the arms recipients which had been apparent before the role of the U.S.S.R. began to decline.

The last feature, i.e. (d) is supposed to be analysed thoroughly and carefully due to its expected negative consequences on arms trade with the Third World. The growing uni-polar process mentioned earlier is not working in vacuum but rather through a group of mechanisms which are working effectively to reshape the arms trade structure in its relation with the Third World. The first mechanism is the commercialisation trend. As S. Deger puts it : " During 1980s the arms industries in developed countries of the West became increasingly commercialised. Until then, most national industries, except in the U.S. were operated and owned by the state. In recent years, privatisation has increased dramatically. Taking the larger national suppliers of arms exports : in the U.S., the U.K. and Germany, the armament industry is concerned in the private sector; in France the call for privatisation is increasing; in companies have been set up to promote exports; in the Soviet Union the defence enterprises, though controlled by the government, are also expected to be self-financing and earn profits. " (11)

This entails, among other things, the growing tendency towards commercial rather than political motivation in setting the arms deals with the Third World countries, which will worsen the financial burden on those countries. The commercialisation phenomenon, coupled with the monopolistic nature of arms producers makes it much more difficult to the Third World countries to manoeuvre as relatively freely as before.

Second, as a natural market-based reaction to the enforcement of competitive policy, many arms suppliers have been merging. To cite the British example, the year 1988/1989 saw major changes in this context. The GEC-Siemens bid for Plassey, the Daimler-Benz acquisition of MBB, the merging of Aerospatiale's avionics interests into Thomson CSF.⁽¹²⁾ This, and other similar trends, will enhance the increase concentration within arms suppliers. Deger and Sen have developed two concentration indices for six of the top fifteen arms importers in the Third World during the 1980s. The first provides a measure of the arm trade intensity of a recipient country with respect to its major supplier, the U.S. or U.S.S.R. According to this index, Egypt's, for example imports weapons from U.S. were about two and half times as great as would be expected on the basis of the U.S. share in total arms sales, wherears the second index measues the ratio of a country's arms imports from its two largest suppliers to its total arms imports. Accordingly, Pakistan imported 76% from the U.S. and China. ⁽¹³⁾

As the foregoing sections have revealed, it is a serious challenge to establish a fully independent arms industries in Third World countries, at least under the current political circumstances, either because of production and technological barriers, or due to the end of the cold war, the structural changes in Eastern Europe, the Gulf war, the dissolution of Warsaw Pact and the former President Bush's as yet undefined " New World Order " which entails that the concept of " security " has been changing from national and international focus toward a new view of global security, which is defined as the absence of threats to the vital interests of the planet, ⁽¹⁴⁾ or as R. McNammara called it a " System of Collective Security ". ⁽¹⁵⁾

Moreover, the financial burden experienced by most Islamic countries makes it more challengeable to intensify the militarisation trend on local and regional level alike. Table (4) shows the military expenditure and financial burden in terms of total external debt, as percentage of GNP.

Table 4
Military Expend & External Debts as A Percentage of GND For A Number
of Developing Countries - 1988

	Military Expenditure As % of GNP (1)	Total External Debt As % of GNP (2)
Algeria	3.4	47.2
Bahrain	6.4	-
Bangladesh	1.8	48.8
Egypt	7.8	145.8
Indonesia	1.8	70.2
Iran	20.0	N.A.
Iraq	32.0	N.A.
Jordan	21.0	130.3
Kuwait	5.1	-
Malaysia	2.8	62.7
Morocco	6.0	90.7
Niger	0.9	70.5
Oman	19.1	41.0
Pakistan	6.9	44.1
Saudi Arabia	16.5	-
Somalia	3.2	197.4
Sudan	2.4	97.0
Syria	10.9	33.1
Tunisia	2.7	67.1
U.A.E.	6.8	-
Yemen, Arab Rep.	9.9	51.7
Yemen, PDR	22.0	211.3

N.A. : Not available.

: Not published debt.

Source : column (1) : R.S. McNamara, *Ibid.*, pp. 122-123.

column (2) : The world bank, world debt tables 1989-90, first supplement, Washington, D.C., 1990, pp. 38-244.

Therefore, and under such circumstances, the utmost achievement one can expect is to establish a sort of cooperation in the context of arms production within the Third World countries. Such cooperation, instead of complementarity, has to be agreed upon. In other words, all production areas have to be analysed thoroughly, bearing in mind the political, technological, institutional, financial and market considerations. Due to the lack of proper information, the next section will site the Arab countries as a case study in this respect.

6. Arab Countries : A Case for Cooperation :

6.1 Arab Defense Production :

In is almost evident that Egypt, Iraq and Saudi Arabia are the most prominent arms producers among the Arab Islamic Countries. The hierarchy of the Egyptian defense production consists of three authorities. First, the National Authority of Defense production, which supervises about fifteen plants coming under five categories : Military production factories group, ammunition production factories group, chemical and explosive materials production factories group, metal production factories group and electronics group. Second, The Arab Authority for Industrialisation, which manages nine factories : SAKER Factory for Advanced Industries, Aircraft Factory, KADER Factory, HELWAN Factory for Engines, Electronics Factory, Arab-American Car Factory, Arab-British Helicopter Company. Third, The Army Factories, and Fourth, Private companies, such as The International Arab Company for the Optical Electronics, Compuland Company, Hi-Tech Company, Electro-Lab and the Egyptian Company for Training Equipments and Specialised Electronics Tools. Table (2) gives the details on the Egyptian military products.

Iraq, on the other hand, was considered until recently, as one of the major Arab weapons producers, especially in the late eighties. ⁽¹⁶⁾ The structure of the Iraqi defense industry is dominated completely by the state, through the " Military Industrialisation Authority " and the " General Establishment of Technical Industries ". Until 1987, the former was responsible for supervising the ammunition industries, whereas the latter was in charge of research on advance military technologies.

This arrangement was changed in 1989, when both bodies were affiliated to the Ministry of Industry and Military Industry. The Iraqi defence capabilities embrace many activities. The first one, gunpowder and explosive materials, was established during the period 1976-1978 as a turn-key project delivered by the ex-Soviet Union. ⁽¹⁷⁾ Table (2) illustrates the Iraqi defense structure in detail.

As regards Saudi Arabia, the defense industry dates back to the year 1949 when the first ammunition factory was established. In 1982, the General Authority for Defense Industries was brought into action and after three years the Defense Industries Establishment was created. Accordingly, a new plan was designed to build king Sultan Military City in kharj which includes five plants and research and development centers besides other administrative and housing facilities. ⁽¹⁸⁾ Since mid-eighties the private and joint companies started participating in some defense activities such as Abdulla Al-Faris Co. for Heavy Industries which designed and developed an armored vehicle. ⁽¹⁹⁾

Speaking of the rest of Arab countries, it seems that none of them have reached the level attained by the first three Arab countries mentioned above. Syria, for example has initiated almost two decades ago, the military factories establishment to produce ammunition used by pistols, rifles. This, besides producing self propelled Howitzers 122

mm. (20) Algeria, on the other hand, concentrates on the naval craft. Hence, this country produced a patrol craft named KABEER under license from an American Company, Brock Marine. Four crafts were produced between 1985 and 1986 and the other three in 1989. (21) As far as Jordan is concerned, there are many militarisation projects. The first, deals with modernisation of the British Centurion tanks. The modified tank is called TAREK tank. The second relates to the efforts associated with the Jordanian Technological Group which aims to transfer the Western military high technology to the Arab region, based on the Jordanian highly skilled labour. As a result, this group has signed a contract with an American Schweizer Company, to produce a training helicopter, Schweizer 330. (22) This group plans, also to maintain the aircraft engines, especially those of Mirage F-1 and Mirage 2000. Other eight military projects are planned, as well.

6.2 Towards an Evaluation of The Arab Military Capabilities :

Such an evaluation can be analysed by distinguishing between the technical or production methods, and operational aspects.

6.2.1 Technical Aspects :

It is apparent that the Arab defense industries are characterised by obvious relationship between the method of production and the technological level of the product. That is to say that all technologically advanced products, such as aircrafts, and armored vehicles, are manufactured through assembling, whereas other less technologically advanced products, such as ammunitions, are locally manufactured.

6.2.1.1 Assembly :

This method of production is conspicuous in both aircrafts and armored vehicles. Among seven programmes initiated to produce aircrafts in the Arab world (all in Egypt) since the Fifties, six have been based on partial or complete assembly. The only exception was Fighter H.A. 300 which started in the Sixties and was suspended later. It is said that for AL-JOMHORIA H.A. 200 and TUCANO aircrafts, the production method went ahead at the expense of assembly, whereas this did not materialise in case of ALPHA JET, F-7 and GAZELLE helicopter. Moreover, the two other projects, MIRAGE 2000 and LINEX helicopter, contracted by Egypt, but did not implement, were also involved in a sort of assembly. What is important in this respect is that the movement from assembly to local manufacturing stage has not meant the fully manufactured aircraft, but rather the manufacturing of the aircraft structure with few small parts without any tangible achievement, as far as the engine and electronics parts are concerned. And it is worth mentioning here that when it is said that about 70% of the TUCANO aircraft has been produced locally, this percentage does not include all the costs and parts involved in producing the aircraft. This is due to the very fact that many parts are imported in all aircraft plants, and therefore, this 70% covers only those parts produced by the original plants without the imported ones.

The same argument is applied in case of assembling armored vehicles in general, and tanks in particular, which is considered, as mentioned in section 3, among the most costly and technically advanced major military system to manufacture. The proposed programme to produce M-1 tank in Egypt assumes to raise local contribution to 19% excluding the engine, gear and fire control. The same is the case with the Iraqi proposal regarding T-72 tank, which was suspended after the Gulf crisis.

6.2.1.2 Production :

This includes production under license, imported designs or reverse engineering. Most of the Arab weapons and ammunitions which are manufactured locally are based on imported designs. This category includes, for instance, machine gear A.K 47, 7.62 mm, G-3 anti tank missiles R.B.G-7, ... etc.

Nevertheless, there are few original unimported Arab designed weapons. Egyptian and Saudi FAHAD and AL-GEZERA armored vehicles, Egyptian missile system VAB, D-3000, D-6000, SAKER 80 and the Iraqi missile system SAJJEEL 81 mm, NASER 240 mm, and ABABEEL 400 mm. One of the most big achievements in the field of Arab missiles in the late Eighties was the development of the Egyptian ballistic missile BADER-2000, and the Iraqi ballistic missile WALID and anti ballistic missile FAO.

6.2.2 Operational Aspects :

Among many factors determining the performance of military industries, five are considered as having a special importance in the Arab world (23) :

A) The Relationship Between Civil and Military Industries :

Taking Egypt, Saudi Arabia and Iraq as an example, it appears that the first country is having the highest relationships. Almost 45-50% of the total production capacity of the military industries in Egypt is devoted to civil goods. The weak interaction between these two industries is apparent in Iraq. The utmost participation made by the military industrialisation authorities in this Arab country was the construction of some bridges. The government ammunition factories in Saudi Arabia do not involve in civil production, but things are different for the private companies which are partially participating in the military production.

B) The Role of Private Sector :

In this respect, the Egyptian private sector gained almost 15% of the military sales in 1989, which is equivalent to about \$ 60 million. For Iraq, this gain is almost nil. Saudi Arabia, on the other hand, has dealt with this issue by making use of off-set deals in order to establish private companies engaging in military sector.

C) Source of Funds :

The importance of this factor is very well reflected in the Egyptian decision, to reduce its military purchases from \$ 2.3 billion in 1984 to \$ 300 million in 1988. (24) Fund is one of the main constraints against any effort towards military industrialisation. After the Gulf crisis, this factor is expected to play an increasing role in determining the future of militarisation in the Arab region.

D) Labour Force :

The Arab defence industries suffer from a serious lack of highly skilled labour. While Egypt and Iraq employ about 100,000 labourers in these industries, Saudi Arabia, for example, suffers from the highly qualified industrial labour force particularly in defense industries. Therefore, promising plans were drawn up to graduate more technicians and engineers (especially in Prince Sultan military city).

E) Exports Size :

Among the biggest three Arab weapons producers, Egypt is the only country which exports weapons. This trend started in the early Eighties as a response to the Iraqi needs during the Iraq-Iran war. The peak of such exports has reached about \$ 500 million during the period 1983-1987. As Iraq started producing some of its military needs locally, this peak has declined to reach \$ 300 million and \$ 50 million by the end of this war. According to the Stockholm International Peace Research Institute (SIPRI), the Egyptian military exports share in domestic product stands for about 5% for the period 1981-1985. (25) The more this percentage increases, the more better perspectives for research and development.

6.3 Towards a Common Arab Action for Defense Industrialisation :

Before Proceeding to spell out the main characteristics of such action, it has to be kept in mind that a set of assumptions have to be clear from the very beginning : First, a well defined political intention to go ahead with improving and developing the Arab defense industries. Second, there are economic and non-economic justifications for such action, and Third, availability of fund. Having said that, the following are the main components of the suggested action :

6.3.1 Military Needs :

The determination of such needs is not an easy job. Most of the Arab armies are using almost similar equipments. Interceptor fighters, night division devices, tank with laser range finder equipments, surface-to-air missiles, advance radar systems and personal productive equipment are being used by most, if not all Arab armies. Such items, and others, have become an important part of the Arab purchases Therefore, it seems that it would be advisable and essential to set the main arms needs as a necessary, but not sufficient, condition for successful Arab cooperation.

Among other views, there is a growing tendency which believes in the necessity of having a very well advanced and competitive military capabilities in conventional weapons, on the assumption that few Arab states have already achieved and developed some chemical weapons and ballistic missiles as an alternative to face the Israeli nuclear weapons.

Following such tendency means a huge amount of investment, besides depreciating many resources of Arab comparative advantages in this respect. The changing in the war philosophy may require less investments and resources than advancing in the conventional weapons. Citing the 1973 Arab-Israeli war as an example, the use of anti-tank missiles R.B.G. 7, anti-tank guided missiles SAGGER, man portable SAM-7 missiles and anti-tank attack SAM-2 and 3, have signaled out the significance of emphasizing on the war doctrine which depends on the accurately guided ammunitions and its associated high technologies and services. The cost aspect involved with the latter approach is by all means less than the one mentioned earlier, i.e. conventional weapons.

6.3.2 Types of Products and Technology :

It is usually asked : What are the main military products should the Arab countries produce ? Departing from the conclusion of previous section, it is not recommended to produce that kind of highly technologically sophisticated weapons, such as fighters and armoured vehicles. Beside the justification mentioned above, derived from the war doctrine, the technological obsolescence of aircraft and armoured vehicles is another serious challenge. For instance, Britain suspended manufacturing one of the anti-tank weapons in 1989 having spent about Stg.Pounds 400 million because of its deteriorated technological capability vis-a-vis the Russian tanks. Another example from the Indian light aircrafts and tanks production programme which, despite its relative success, have faced many quality and cost difficulties.

Accordingly, there is sort of common agreement that it is much better for Arab countries to concentrate the research and development on the types of weapon mentioned in the previous section rather than wasting their effort and resources on those types of weapons which are vulnerable to quick obsolescence.

6.4 Scenario for Cooperation :

To start manufacturing those types of products suggested in Sections 6.3.1 and 6.3.2 a Pan-Arab organization has to be set with diversified fields. This may be called an " Arab Authority for Defense Industries ". A network has to be established with all the governments concerned, financial organizations, research and development institutes, manufacturers, services sectors and private enterprises, The assignments attached to this authority can be listed as follows :

- A) To determine the military needs of all parties concerned.

- B) To gather information on all the experts; skilled labour, technical and natural resources available.
- C) To mobilise the fund requirements.
- D) To establish data base and research and development capabilities.
- E) To enhance the administrative and marketing services.
- F) To organise training programmes and manpower development.
- G) To legalise the trade transactions.
- H) To enhance the forward and backward linkages among civil and military industries.
- I) To accommodate the environmental aspects.
- J) To mobilise the idle industrial capacities.
- K) To standardise the products.

Having organised all these assignments, a tremendous potential demand is expected from different Arab countries to serve the goal of producing highly accurate guided ammunitions and its technologies and services mentioned earlier. This approach will be enhanced and developed if we take into consideration the similarity of the weapons owned by Arab armies, such as tanks T-54, T-55, T-62, T-72, MIG-21, 23, 27, and 29 ...etc., which justify the mass production of spare parts and services.

Finally, a transition from the multi-polar to uni-polar world mentioned in Section 5, item (D) in this paper, has to be taken seriously as one of the most driving forces towards neutralising any political differences prevailing among Arab and other developing countries. The mutual economic and peaceful future interests have to receive special attention as well in the process of any fruitful measures towards cooperative action in this respect.

7. Brief Note on Some Policy Implications

In general, a number of policy based findings, among others, can be mentioned as follows :

- 7.1 The recent studies have indicated that resource unconstrained developing countries have been able to get positive impact on their economies from increasing the defense expenditure, while the resource constrained countries have different results. This conclusion is related to the issue of studying the structure environment of arms production (classical theory).
- 7.2 Following the keynesian theory, on the other hand, it is expected that military expenditure may have significant multiplier effects, especially where the excess capacity is in operation. This leads to demand generation resulting from increased capacity utilisation, expand output and increase the rate of return, investment and

growth. These direct and favourable effects may be offset by indirect effects in reducing and crowding out the civilian investment, which will affect the productivity and long-run growth.

- 7.3 Apart from expenditure based economic policies mentioned above, another policy implication is related to foreign exchange requirements, which are accelerated during the militarisation process due to the fact that Third World arms producers are not yet completely self sufficient in their technical and other inputs required for such production. It is estimated that in the late sixties, military claims on foreign exchange in India, for example, was nearly half of India's civil imports of machineries and equipments. Therefore, it is expected that in resource constrained countries, a high level of external indebtedness prevails. The intensive use of foreign exchange is supported by the nature of import substitution policy (especially during its first stages) adopted by most developing countries, where most intermediate inputs are imported, but serviced locally. As this policy advances, a license to produce arms is acquired but huge technical and personnel assistance are still provided by suppliers.
- 7.4 In resource constrained countries, tax burden is gradually risen, as one of the main economic policy tools to mobilise local resources for financing militarisation process. Coupled with crowd out effect, this will lead, in interaction with other factors, to a raise in price levels. In this respect, it is worth mentioning that policy maker has to pay special attention to the types of taxes devoted to weaponry investments. That means, to distinguish between lumpsum or non-distortionary and distortionary taxes and their influences on labour income, employment, output and consumption. Such influences have to be thoroughly investigated in case of regional cooperation.
- 7.5 The recent commercially (instead of politically) motivated arms production have enforced the role of market mechanism. This, in turn, have been restructuring the arms market in such a way to be run by market oriented policies, mainly aimed to profit maximisation, rather than administratively oriented ones. The large market size is considered one of the main pre-requisites for a successful free market economic policies.
- 7.6 Due to the very fact that technological advances rarely improved and developed under limited market conditions, it is doubtful to expect a big achievement in technologically recognised arms production in developing countries, unless and until a very well prepared technological policies had been adopted on a regional level because of the high cost of R&D involved and other size based considerations.
- 7.7 Any isolated development in military industrialisation from the civilian sectors will deter the spin-off effects and polarise the economy by creating sort of an enclave economy.

- 7.8 The variety of arms production areas are not equally opened to developing countries. Besides some political considerations, technological obsolescence of heavy weapons, such as aircrafts and armoured vehicles has to be evaluated carefully, before any investment action is oriented toward such a direction.
- 7.9 Inter-industry based policy package has to be designed regionally to facilitate identifying those areas where a proper military investment can be allocated. The paper suggested the accurately guided ammunitions and its associated technologies and services as one of the choices.
- 7.10 The policy making process in developing countries has to take notes of the urgency to minimise the political differences and design their policies on a mutual economic interest.

Foot Notes & References

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