

## **Scientific and Technological Underdevelopment and Militarization in the Muslim World**

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**Abstract:** *The Muslim world is characterised, in part, by the persistent neglect of research and training in basic as well as applied sciences. There is neither appreciation nor the felt need for indigenous science and technology. This state of affairs is largely due to the nature of weak state formation, perceived elite illegitimacy and consequent militarization of the state. Militarization has deprived the Muslim world of its resources which could have been deployed in more productive services. As such, there is a marked increase in the signs of decay in the Muslim world exemplified by crumbling infrastructures, broken down communications, abandoned projects, and consequent increasing perception of the illegitimacy of those in power. Until the Muslim world succeeds in breaking the vicious cycle of illegitimacy leading to militarization, bringing about further illegitimacy, science and technology cannot prosper.*

The Qur'ān repeatedly exhorts the believers to reflect and discover the laws of nature and to acquire mastery over the universe through technology.<sup>1</sup> The Qur'anic emphasis on science and technology is understandable. Science provides an understanding of the world and the design of Allah (SWT) in its creation. Science also helps in alleviating poverty as it is the major instrument of material progress. The prophetic ḥadīth positing the close proximity of "poverty and *kufr*" makes the pursuit of science and technology an obligation of the Muslim community.

The Muslim world, in the forefront of science from the 8th to 11th

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centuries, has lost out in the pursuit of scientific knowledge. Every potent life-saving medicament of today, for instance, has been created without any contribution from the Muslim world.<sup>2</sup> There is utter neglect of the importance of research and training for basic or applied sciences and indeed, no Muslim country possesses high-level scientific and technological competence attaining to any international levels.<sup>3</sup> There is neither appreciation nor any felt need for indigenous science and technology. There has been persistent disregard, on the part of governments and society, of the need to acquire such competence.<sup>4</sup>

### **The Approach**

In terms of government commitment to science and technology, the Muslim world's experience is at variance with that of scientifically advanced countries. This paper accounts for this variance by looking at state formation in the Muslim world and the "militarization" it has engendered. State formation and its corollary, militarization, have their roots in the colonial past, in the attitude of political elites, and in the dependency which the international system has fostered and to which the Muslim governing elites have willingly subscribed.<sup>5</sup> In what follows, an attempt is made, first, to examine the historical, attitudinal, and the dominance structure in the international system conditioning Muslim world state formation in ways consequential for militarization. Second, to adduce empirical evidence detailing the degree and intensity of militarization being pursued by Muslim political elites. Third, to analyze the impact of militarization on science and technology in the Muslim world. The concluding section considers some options to change the deplorable condition of science and technology in the Muslim world and to alleviate the sufferings of the Muslim masses.

### **The Muslim World State Formation**

The Muslim world, with a population of about 1.2 billion, stretches over a vast area of the globe. Consisting of 51 independent countries, the Muslim world is rich with ample natural resources. It controls vital sea links, straits and choke points from the Pacific to the Afro-Asian Ocean and the Mediterranean Sea. In structural terms, however, the Muslim world has what are known as "weak states" characterized by ethnic fragmentation, alien governmental structures, domestic instability, and internal and international wars. Of the 269 international armed conflicts accounted for by Tillema, over 46

percent involved the Muslim world.<sup>6</sup>

The major source of state weakness is the political legacy of colonialism. Most Muslim states are ex-colonies. Outside powers created states where none had existed. In their quest for global empire, the colonial powers arbitrarily divided their conquered territory along unnatural boundaries as part of a post-World War I diplomatic bargain. Most states are host to a multitude of ethnic communities, many of which have nothing in common apart from geographic proximity. This divisiveness makes governing difficult and, instead of serving as a source of unity, the government becomes the prize in a state-wide struggle, particularly since it controls the instruments of taxation and enjoys access to international loans and donations. If the government is controlled by one group, as is often the case, it is considered illegitimate by the rest of the population. The consequence is a weak state constantly at war with its own population, a situation which creates a demand for militarization.

The colonial legacy also contributes measurably to post-colonial inter-state conflicts. Mohammed Ayoob offers three reasons:

(1) by dividing ethnic groups into more than one state and thereby igniting the embers of irredentism, as in the Horn of Africa; (2) by denying self-determination to certain ethnic groups like the Kurds, who possibly qualified for statehood better than many that were granted that status; and (3) by leaving behind extremely messy situations, as in Palestine and in Kashmir, that have contributed tremendously to regional tension and conflicts in the Middle East and South Asia...<sup>7</sup>

Another source of state weakness is the limited time Muslim states have had to conduct the process of state-building. The states considered "strong" in the international system (such as the Advanced Industrial Countries of North America, Australia and Japan), developed over long periods of time.

They went through a long period of gestation (during which most embryonic and also some not-so-embryonic states were aborted) before they acquired the functional capacities as well as the legitimacy they have today in the eyes of the populace that they encompass territorially and over which they preside institutionally.<sup>8</sup>

This historical process of "state-building" was inevitably a long and violent struggle pitting the agents of "state centralization against myriad local and regional opponents..."<sup>9</sup> Seen in this light, the

conflicts that are so characteristic of life in the Muslim world are perhaps endemic to the state-building process. The fact that some states (like Malaysia) managed to establish a degree of internal legitimacy at all is a substantial feat given the time constraints they have had to work within.

Governmental structures in the Muslim world are usually derivative of capitalist or socialist sources or a combination of them. These structures are often alien to the governed. A few Muslim countries, such as Malaysia, have governmental structures based on the British model of the fusion of power. Some have used the U.S. model of the separation of powers, at least in theory. However, in a majority of Muslim countries, power is concentrated in the hands of either military leaders (e.g., Nigeria, Algeria, Libya and Sudan), traditional monarchs and sheikhs (like Saudi Arabia, Bahrain, Kuwait and United Arab Emirates), or in a tightly-controlled single party as in Egypt. Some Muslim countries have experimented with military as well as civilian rule, as in the case of Nigeria, Pakistan, and Bangladesh. In almost all the countries, the legislature and judiciary are subordinate to the executive. In some countries legislatures are suspended and laws are made by executive decree. Elections are held merely to give the appearance of legitimacy to otherwise authoritarian regimes. These authoritarian elites follow the colonial practice of securing themselves by military coercion rather than consent.

The position of most Muslim states in the evolving world economy has exacerbated the legitimacy problem further. The economic condition of most Muslim countries is poor. Between 1985 and 1994, the Muslim world achieved an aggregate average annual growth rate of 3.6 percent. However, states in Africa managed only a 1.8 percent rise which did not keep pace with its population increase. As a matter of fact, the Muslim-majority countries in Africa saw their per capita GDP drop by 2.3 percent between 1985 and 1994. This decline in growth robbed many states of the capital needed to attend to basic social services, such as sanitation or health-care. The economic burden of high debt loads in many Muslim countries only aggravated this problem, contributing to the misery of the masses and intensifying their hatred of the regime in power.

It would be erroneous to say that Muslim political elites are not concerned about the legitimacy of their regimes. Some regimes (like the conservative monarchies in the Gulf) try to build up their legitimacy by appealing to traditional norms and values, others (like

Muammar al-Qadhafi of Libya) through their exercise of personal charisma and ideological manipulation. Such manoeuvres, however, rarely sustain political legitimacy, giving rise to domestic threats to authority. Such threats have taken on many forms including military coups (Sudan, Nigeria), mass uprisings (Iran, Bangladesh), secessionist movements (Ethiopia, Iraq) and political factionalism (South Yemen, Afghanistan). The armed forces and the resultant heavy defence expenditures "are needed primarily, if not exclusively, for the suppression of external popular movements for national and social liberations".<sup>10</sup>

The political elites of the Muslim world, however, have cultivated extensive military and economic alliances with the West and hence are the beneficiaries of substantial military and economic aid. They have also been continuing with the colonial strategy of economic development (export-oriented industrialization) and thus have been integrated into the world economy. The availability of revenue provided by external economic and military ties has enabled elites controlling state power to consolidate their internal security position vis-a-vis that threat and avoid the painful process of legitimation through accommodation of the masses in the country's political set-up. Improved capabilities for suppression have made such illegitimate leaders less vulnerable to uprisings, coups, or revolutions. Saddam Hussein is a vivid proof that a ruthless leader can survive eight years of ruinous stalemate with one adversary and a crushing defeat at the hands of another. There are many more examples of Muslim leaders for whom lack of legitimacy has done little to shake their hold on power.

### **The Extent of Militarization**

It is difficult to give an accurate account of militarization in the Muslim world. Most Muslim countries do not release such statistics while some camouflage arms purchase as "transportation and other equipment costs." In some cases, defence expenditures reach one-fourth to almost one half of total expenditure. Pakistan had a defence expenditure of about 33.92% in 1985; Jordan had an expenditure of 25.92% and 21.62% in 1988 and 1990 respectively; Syria, for the same years, had an expenditure of 34.78% and 31.51%; and U.A.E. had about 44.19% and 43.93% in 1988 and 1989 respectively.<sup>11</sup> According to the SIPRI arms trade data base, the volume of major weapons transferred to the Third World (excluding China) more than

doubled between 1970 and 1980.<sup>12</sup> The top ten Third World countries importing major weapons during 1981-1985, in descending order, were: Iraq, Egypt, Syria, India, Saudi Arabia, Libya, Argentina, Israel, Taiwan and Pakistan. Together, they accounted for 61.2% of total Third World imports.<sup>13</sup> Clearly, six of the top ten were Muslim countries and these six accounted for 44.6% of total Third World imports.

**Table 1: The leading Muslim importers of conventional weapons, 1986-90 (in US \$m. at constant, 1985, prices)**

<i>Importers</i>	<i>1986-90</i>	<i>Importers</i>	<i>1986-90</i>
Saudi Arabia	10838	Iraq	10314
Afghanistan	5742	Egypt	4717
Syria	4191	Iran	2913
Pakistan	2693	Libya	2247

Source: Derived from SIPRI, *SIPRI Yearbook 1991: World Armaments and Disarmament* (Oxford: Oxford University Press, 1991), 199.

It must, however, be noted that military expenditure has been falling in the Muslim world, since around 1985, initially prompted by structural factors such as excessive cost increases and economic constraints. The reduction in expenditure, however, has been modest, falling by no more than 2 percent per annum during 1987-89 when one such reduction took place. Furthermore, the trend towards shrinking expenditure did not continue for long. Most Middle Eastern countries increased their weapons capability following of the Gulf crisis. Table 1 shows the rank ordering of the eight leading Muslim importers of major conventional weapons for the period 1986-90.

### **The Impact of Militarization**

The high cost of militarization has disastrous consequences for the Muslim world in many ways. In particular, it depletes natural and human resources, and by diverting funds from the socio-economic sector it inhibits improvement in living conditions and in the productive capacity of people.

**Table 2: Gross Domestic Savings Ratios in Selected Muslim Countries, 1991-1994**

<i>Country</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>	<i>1994</i>
Bangladesh	4.3	6.2	7.5	7.9
Benin	5.4	3.9	3.5	9.4
Burkina Faso	4.2	2.9	2.2	n.a.
Chad	-17.0	-13.6	9.9	n.a.
Comoros	-3.7	0.6	1.1	4.5
Djibouti	-6.3	-10.7	-14.1	n.a.
Gambia	3.9	6.8	8.5	n.a.
Guinea	13.9	10.0	9.0	9.3
Guinea-Bissau	-6.0	-18.0	-0.3	1.9
Mali	6.2	4.6	6.3	4.7
Mauritania	10.0	7.2	9.7	9.5
Mozambique	-9.2	1.4	7.2	4.7
Niger	7.5	1.8	1.3	n.a.
Sirre Leone	11.6	10.5	5.1	3.1
Yemen	1.1	-11.7	-16.9	4.9

*Source:* Statistical, Economic and Social Research and Training Centre for Islamic Countries, *Report of the Director General of the Ankara Centre: Twenty-Third Islamic Conference of Foreign Ministers* (Ankara, Turkey: Statistical, Economic and Social Research and Training Centre for Islamic Countries, 1995), Table VIII, p. 29.

It has been observed that the countries that have progressed in science and technology did so through minimum expenditure on militarization and maximum investment in education and in

manufacturing and commerce made possible by a high level of national savings. Japan's technological and scientific success is clearly assisted by macroeconomic and structural features such as the education system and low interest rates. A further advantage was Japan's virtually demilitarized status after 1945; sheltered under the American strategic umbrella, Japan has spent only one percent of its GNP upon defense annually. Savings in that sphere have released funds for the continued development of science and technology enabling it to make breakthroughs in microelectronics, telecommunications equipment, machine tools and robotics.

Similar observations can be made with respect to the four East Asian "tigers" (Singapore, Hong Kong, Taiwan and South Korea) as well as the larger Southeast Asian states of Thailand, Malaysia, and Indonesia. The critical elements in their technological and manufacturing success have been emphasis on education, a high level of national savings, and a strong political framework within which economic growth is fostered.<sup>14</sup> As pointed out by the Economic Adviser to the Malaysian Government, Tun Daim Zainuddin, Malaysia's high sustained growth is due to "getting the basics right," which included sound development policies, good economic management, political and social stability and quality of human resources. To Daim Zainuddin:

Development thrives best in an environment of social and political stability. This can only be accomplished if the people benefit through better access to housing, basic services and amenities, and command high incomes...<sup>15</sup>

The Muslim world, apparently, did not get "the basics right." Militarization, resulting from inherited weak states and illegitimacy of the ruling elites, has deprived the Muslim world of resources which could have been employed in more productive services. Almost all Muslim countries appear to be in substantial difficulties regarding external debt. "As a group, the ratio of total external debt to GNP in Muslim countries has been above 100 percent for most of the 1990s, which is considered serious. Debt services to export ratios, on the other hand, have fluctuated and have not been higher than 25 percent."<sup>16</sup> Although much international aid goes to the Muslim world, far more money flows out of impoverished countries of Africa and Asia and into the richer economies of Europe, North America, and Japan. This outward flow of interest repayments, repatriated profits, capital flight, royalties, and fees for patents and information



services makes it difficult for Muslim countries to stand on their own feet. The overall savings ratio of the Muslim world, in general, is very low and, in some cases, declining. The data provided by the Organization of Islamic Conference on some of the poorer Muslim countries (Table 2) show that Chad, Djibouti and Guinea-Bissau registered negative growth rates in savings during 1991-1993, while Yemen registered negative growth rates in 1992 and 1993. The remaining 11 countries registered very low (below 10 percent) positive saving rates.

Evidently, these countries do not have large amounts of capital to funnel resources into industrial and technological growth. What is further distressing is the fact that the ruling elites of the Muslim world divert funds from the social sector in order to maintain funds for war-related and to sustain the inherited weak states. The ratio of military expenditure to combined education and health expenditure in Muslim countries ranges from 121 to 373 percent as opposed to the average of industrial countries, which was about 33 percent for the year 1990-91.<sup>17</sup> Such diversion of funds inhibits improvement in literacy rates, living conditions and the productive capacity of people.

The Muslim world is characterized by neglect and underinvestment in education. Unlike the developed world, the educational system in Muslim countries is marred by sporadic and uneven levels of access at virtually all levels, and by the very low ratio of skilled to unskilled people. Equally distressing is the proportion of students dropping out after secondary school. The adult literacy rate in sub-Saharan Africa and South Asia, ranging between 21 and 52 percent, shows the extent of the problem.

There is almost total neglect of the need to develop a culture of entrepreneurship, scientific inquiry, and technical prowess. The number of scientists and engineers per million of population for Arab states is 202 as opposed to the figure of 3,548 for Japan and 2,685 for the United States (Table 3).

In some countries, the figure drops to as low as 15. Where engineers and technicians exist, their expertise has all too often been mobilized for war purposes, as in Iraq. Tragically, Egypt possesses a large and bustling university system but a totally inadequate number of jobs for graduates and skilled workers, resulting in the fact that millions are underemployed. In Yemen, Bangladesh and Pakistan, the overall state of education is dismal. By contrast, the oil-rich states have poured massive resources into schools, technical institutes, and

universities, but that alone is insufficient to create an "enterprise culture" that would produce export-led manufacturing along East Asian lines. Ironically, possession of vast oil reserves could be a disadvantage, since it reduces the incentive to develop the skills and quality of the people, as is the case in countries with few natural resources (e.g., Japan, Switzerland). Such discouraging circumstances may also explain why many educated and entrepreneurial Arabs have migrated.

**Table 3: Number of Scientists and Engineers per Million of Population**

<i>Country</i>	<i>Number</i>
Japan	3,548
United States	2,685
Europe	1,632
Latin America	209
Arab States	202
Asia (minus Japan)	99
Africa	53

Source: T.R. Odhiambo, "Human Resources Development: Problems and Prospects in Developing Countries," *Impact of Science on Society*, 155 (1989):214.

### **Conclusions**

The socio-economic profile of the Muslim world seems to confirm the implied hypothesis linking strong militarization with little or no prospect of education or advancement in science and technology. Militarization qualitatively distorts the patterns of international trade, foreign aid, technology transfer, scientific cooperation, and sociocultural exchange among nations. It has created a ruling elite subservient to foreign suppliers and military advisors who together form a community of common interests that run counter to the real interests of the client state. There is a marked increase in signs of decay in the Muslim world: crumbling infrastructure, frequent power failures, broken-down communications, abandoned projects, and the consequent erosion of the legitimacy of those in power.

The Muslim world, apparently, is caught in a vicious cycle of perceived elite illegitimacy leading to increased militarization (implying greater diversion of funds from investment and infrastructure) which, in turn, further erodes legitimacy. Obviously, a society satisfied with only being spiritually healthy would neither try to nor succeed in breaking the vicious cycle. Nor would countries dominated by self-serving authoritarian elites bent upon enhancing their military power will rush to imitate Japan or Malaysia.

Western critics who point to Islamic fundamentalism, intolerance, and a feudal cast of mind often forget that centuries before the Reformation, Islam led the world in science and technology and contained libraries, universities and observatories which Japan, America and Europe could not rival. To bring that greatness back, the Muslim world needs, among other things, a "strong state" apparatus; legal and legitimate executives whose exercise of power is in accord with the broad principles of justice and equity; reduced defence expenditure without compromising security of the political order; and increased investment in health, education and research and development. The Muslim world suffers from many self-inflicted pains; it would lose further if it were to stand in angry resentment of global forces for change instead of selectively responding to such trends.

## Notes

1. See al-Qur'ān, 31:20; 35:39,44; 45:12-13.
2. See Z. Hassan and C. H. Lai, eds., *Ideals and Realities: Selected Essays of Abdus Salam* (Singapore: World Scientific, 1984), 254-56.
3. See Muhammad Abdus Salam, "Notes on Science, High Technology and Development for Arab and Islamic Countries," *MAAS Journal of Islamic Science* 7 (1991)2: 83-99.
4. *Ibid.*, 88.
5. "State formation" refers to both the building of institutions for territorial control, and the process by which one constellation of societal interests achieves state power and international recognition rather than another. "Militarization" refers to the accumulation of capacity for organized violence, to a military build-up, see Andrew Ross, "Dimensions of Militarization in the Third World," *Armed Forces and Society*, 13 (1987): 564. Militarization should not be confused with "militarism" which refers to a disposition to use

organized violence. Militarization has "military capacity" as its outcome and includes not only weapons-accumulation but the training of personnel, construction of fortifications, and logistical and productive infrastructure.

6. Herbert K. Tillema, *International Armed Conflict Since 1945* (Boulder, Colorado: Westview Press, 1991).

7. Mohammed Ayoob, "The Security Problematic of the Third World," *World Politics* 43, (1990)2: 257-83, 272.

8. *Ibid.*, 266.

9. Youssef Cohen, Brian R. Brown and A.F.K. Organski, "The Paradoxical Nature of State-Making: The Violent Creation of Order," *The American Political Science Review*, 75, (1980)4: 902.

10. Paul Bran, *The Political Economy of Growth* (New York: Monthly Review Press, 1957), 414.

11. See International Monetary Fund, *Government Finance Statistics Yearbook 1992* (Washington, D.C.: International Monetary Fund, 1992), 63.

12. See SIPRI, *SIPRI Yearbook, 1989; World Armament and Disarmament* (Oxford: Oxford University Press, 1989), Appendix 6A, pp. 226-29.

13. Michael Brzoska and Thomas Ohlson, *Arms Transfers to the Third World, 1971-85* (Oxford: Oxford University Press for SIPRI, 1987), Table 1.3, p. 7.

14. Savings as % of GDP of some of these countries (as reported in *Asiaweek*, June 14, 1996, p. 63) are as follows:

Singapore	52%
Malaysia	37%
South Korea	37%
Indonesia	36%
Japan	34%
Taiwan	26%

15. See *New Sunday Times*, July 7, 1996, p. 10.

16. Statistical, Economic and Social Research and Training Centre for Islamic Countries, *Report of the Director General of the Ankara Centre: Twenty-Third Islamic Conference of Foreign Ministers* (Ankara, Turkey: Statistical, Economic and Social Research and Training Centre for Islamic Countries, 1995), 12.

17. United Nations Development Program, *Human Development Report 1995* (New York: Oxford University Press, 1995), 182-83.