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# **GLOBAL DEFENCE INDUSTRY AND THE ASIA- PACIFIC REGION**

**A thesis presented in partial fulfilment of the requirements for the  
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**Juan Carlos Ortiz Torrenova  
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## **ABSTRACT**

Defence industries have become an essential component of nations' security. This dynamic sector has experienced constant transformations since the Second World War. In recent years large national and transnational defence firms have emerged through processes of mergers and acquisitions; dual-use technologies are becoming crucial in the development of modern weapons systems; and the phenomenon of globalisation is increasing the production interdependence among nations.

These new trends, however, have not altered the hierarchical structure of the global defence industry, where a reduced group of nations have a dominant role in the production, innovation and transfer of weapons systems. The decline of their domestic markets has spurred exportation strategies resulting in an increasingly competitive global arms market. The latter may facilitate some nations to develop their defence industrial bases through the transfer of technology associated with weapons systems imports; however may also exacerbate the security dilemma and the proliferation of weapons, producing a detrimental impact on regional stability. Both problems may be ameliorated through cooperative security initiatives such as arms control, and confidence and security building measures.

The study of defence industries has generally been approached from an economic perspective, relating to nations' military spending and arms trade. The less commonly used security approach addresses the security threats that stimulate

the development of arms industries and the potential effects that these may have on the security dilemma.

The present study examines the global defence industry and the relations between the major arms producers and importers, the implications of the global defence industry on the security dilemma; and the prospects of arms control policies in the prevention of arms proliferation. The Asia-Pacific region is used to centre the analysis through four case studies: Singapore, Indonesia, South Korea and China, as the defence industries and military capabilities of these nations are currently experiencing substantial development, supported by the rapid growth of their economies. A comparative analysis demonstrates a lack of commitment to collective security strategies within the Asia-Pacific region which is resulting in the proliferation of arms and potentiating the effects of the security dilemma, with major implications for regional and global security.

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## ABBREVIATIONS AND ACRONYMS

AEW	Early-warning radar Aircraft
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
AWACS	Airborne warning and control systems
BW	Biological weapons
BWC	Biological Weapons Convention
CADMID	Cycle of defence acquisition and management: Concept, Assessment, Demonstration, Manufacture, In-Service and Disposal
CWC	Chemical Weapons Convention
CCWC	Convention on Certain Conventional Weapons
CCM	Convention on Cluster Munitions
C2	Command and Control
C3	Command, Control and Communications
C4ISR	Command and Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CTBT	Comprehensive Nuclear-Test Ban
DIB	Defence industrial base
GDP	Gross Domestic Product
IMF	International Monetary Fund
DPRK	Korean People's Democratic Republic
M&As	Mergers and acquisitions
MNCs	Multinational corporations
NATO	North Atlantic Treaty Organisation
NPT	Non-Proliferation of Nuclear Weapons Treaty
PMO	Programme manager's office
ROK	Republic of Korea
R&D	Research and development
SALW	Small arms and light weapons
DAPA	South Korean Defence Acquisition and Programme Administration
DIDC	South Korean Defence Industry Development Council
SEATO	Southeast Asia Treaty Organisation

SALT	Strategic Arms Limitation Talks
SIPRI	Stockholm International Peace Research Institute
U.S.S.R.	Union of Soviet Socialist Republics
SAM	Surface-to-air missile
CFE	Treaty on Conventional Arms Forces in Europe
U.N.	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNRCA	United Nations Register of Conventional Arms
U.S.A. (U.S.)	United States of America
UAVs	Unmanned aerial vehicles
DoD	U.S. Department of Defence
DoC	U.S. Department of Commerce
WMD	Weapons of Mass Destruction

## INTRODUCTION

Defence industry, the global arms trade and arms control policies have been a focus of increased scholarship within the international security arena in the last decades. This dynamic sector has experienced constant transformations since the Second World War including, in recent years, the emergence of large national and transnational defence firms through processes of mergers and acquisitions; the increased need for dual-use technologies in the development of modern weapons systems; and the globalisation of production resulting in greater interdependence among nations. The transformation process has been particularly evident in the Asia-Pacific, a region that has assumed increasing importance with the proclaiming of the 'Asia-Pacific Century' and also with the continued development of existing and emerging defence industrial capability across the region.

The existing literature on the defence industry uses the phrase and concept of 'defence industry' interchangeably, with it also applying to both arms industry and military industry. Two major approaches have traditionally dominated the development of arms industries: mercantilism and liberalism. Following the realist principles in international relations, *mercantilism* promotes state control and aims for autarky, or self-sufficiency, in the defence industry. On the other hand, *liberalism* supports "free markets and comparative advantages" and consequently

advocates for a limited intervention of the state.<sup>1</sup> Understandably, these divergent points of view result in different strategies and priorities when defining the concept of defence industry.

The defence industry, which typically consists of land, aerospace and naval sectors, has been associated with the production and sale of weapons, military platforms and systems (i.e. vehicles, aircrafts and vessels, ammunition, guns and missiles), and other related electronic and communication systems (such as radars or military satellites). The dynamic nature of the arms industry and the number of different areas related to it (e.g. security, economic, political, technological, strategic and tactical) creates further difficulties to adopt a simple and practical definition of 'defence industry'. Some descriptions are focused specifically on the production of weapons systems, whilst others expand the term to also include the trade of military items and services in general to the defence forces. Furthermore, the location and ownership of defence firms have become more relevant owing to an increasing internationalisation of production and development of modern weapons systems.

Over the last century, nations have measured their influence and power in terms of military strength. During the major conflicts of the 20th century, military production capabilities played a major role in determining the fate of the belligerent nations. The Cold War became a competition between the superpowers' productive and technological bases, which was reflected in the impressive defence industries developed by the United States (U.S.) and the Soviet Union (U.S.S.R.). The rivalry

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<sup>1</sup> Banlaoi R., 'Globalisation's impact on defence industry in Southeast Asia', in Till, G. et al., *Globalisation and Defence in the Asia-Pacific*, Routledge, Abingdon, 2009, pp. 195-196.

between these powers created a bipolar world order where alliances with other nations were consolidated with the establishment of treaties, provision of credits and exportation of weapons. The great powers' national and international policies facilitated the spread of military production and the subsequent increase in arms trade within the *blocs*.<sup>2</sup>

The defence industry and arms trade changed significantly following the end of the Cold War. The collapse of the U.S.S.R. left the U.S. as the hegemonic power. Without the Soviet antagonist, the U.S. and Western allies decreased their military spending significantly. This factor had a great impact on their defence industries (i.e. was faced with the problem of overcapacity). To compensate for the decline of national markets, many defence firms in these countries orientated part of their production to exportation and initiated a process of restructuration and diversification of production. Arms production has become dominated by a few major multinational corporations (MNCs) as a result of a series of mergers and acquisitions (M&As). In addition, the firms have increased international cooperation to achieve economies of scale, gain access to foreign markets and technologies, and reduce costs. The global arms market has become highly competitive increasing the role of arms trade 'offsets' as part of the procurement process.<sup>3</sup>

The globalisation of military production has had significant effects on the arms market and subsequently on international security relations. The geographical

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<sup>2</sup> Kennedy, P., *The rise and fall of the great powers: economic change and military conflict from 1500 to 2000*, Vintage Books, London, 1989, pp. 383-393.

<sup>3</sup> Bitzinger, R., *The Globalization of the Arms Industry: The Next Proliferation Challenge*, MIT Press, Cambridge, 1994, pp. 19, 170-198.

dispersion of the defence industry production may have positive effects on developed countries and a more varied impact on the markets established between developed and developing countries. These effects however, may be more detrimental for developing countries alone for the following reasons: (1) it may cause rapid shifts in military capabilities, (2) it may promote arms proliferation, and (3) it may increase the number of conflict dyads (i.e. those which involve two or more nations).<sup>4</sup>

The globalisation effects on the arms industry are increasingly evident in the Asia-Pacific region. The countries that make up this region account for one-third of the world's population and exports that surpass the combined U.S. and Europe totals. The last decade has seen an impressive economic growth in a number of Asia-Pacific countries (namely China, South Korea, Taiwan, Malaysia, Indonesia and Singapore) which has also been accompanied by a significant increase in military spending, arms procurement, and defence industry development. The latter obviously have security implications, particularly when territorial disputes, historical grievances and internal instabilities combine with an increasing need for natural resources, resulting in increased tensions regionally.<sup>5</sup>

During the last decade, arms proliferation has been a subject of major concern within the international community. Arms control policies have been used to increase international security typically through the restraint and limitation of arms

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<sup>4</sup> Brooks, S., *Producing Security: Multinational Corporations, Globalization, and the Changing Calculus of Conflict*, Princeton University Press, Princeton, NJ, 2005, p. 226

<sup>5</sup> Camilleri, J., *Asia-Pacific Geopolitics: Hegemony versus Human Security*, Edward Elgar Publishing, Cheltenham, 2007, pp. 1-4

and military forces.<sup>6</sup> During the Cold War, arms control and disarmament processes were paramount. The signing of arms control treaties, such as the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and the Strategic Arms Limitation Talks (SALT) of 1972 and 1979 (SALT II), were used as a measure of sound relations between great powers.<sup>7</sup> Since the end of the Cold War, however, arms control and disarmament were no longer perceived as priorities by the great powers.<sup>8</sup>

According to Rotfeld, a former director of the Stockholm International Peace Research Institute (SIPRI), arms control is still a useful tool to enhance security. He described arms control as “*an instrument and integral element of shaping a new inclusive and cooperative security order*”, with emphasis on providing openness, transparency and predictability to prevent the proliferation of weapons of mass destruction and conventional arms, and the outbreak of regional conflicts.<sup>9</sup> The application of arms control policies may therefore have economic and security implications on the global arms industry, while the proliferation of weapons of mass destruction and conventional arms may produce significant instabilities at regional and global levels. The Asia-Pacific in particular requires major consideration owing to the size and heterogeneity of its population, and a growing economic and military sector within the international system.

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<sup>6</sup> Larsen, J. & Smith, J., *Historical Dictionary of Arms Control And Disarmament*, Scarecrow Press, Lanham, MD, 2005, p. 23

<sup>7</sup> Nuclear Non-proliferation Treaty (NPT), Strategic Arms Limitation Treaty (SALT).

<sup>8</sup> Rotfeld, A., ‘SIPRI’s new conceptual approach to arms control and disarmament’, in Rotfeld, A. D., Ekeus, R., Miller, S. E., Lachowski, Z., Omitoogun, W., & Anthony, I., ‘*Arms Control and Disarmament: A New Conceptual Approach*’, United Nations, Department for Disarmament Affairs, New York, 2000, p. 2; Levi, M. & O’Hanlon, M., *The Future of Arms Control*, Brookings Institution Press, Washington D.C., 2005, p. 4

<sup>9</sup> Rotfeld, 2005, pp. 3-4

Arms industry and arms control may arguably be two means for the same end in that both enhance national security. Autarky in arms production is based on realist assumptions, whilst a more liberal approach relies on cooperation, such as more open arms trade and development and arms control initiatives. The fact that national security may be achieved today through the greater availability of weapons within the global market certainly seems contradictory. This happened to an extent during the Cold War where both blocs accumulated enormous amounts of conventional weapons in Europe, and both the U.S. and the U.S.S.R. had amassed thousands of nuclear weapons in their respective arsenals. On the other hand, growing arms competition facilitated the outbreak of two world wars during the 20th century. Fortunately, emerging powers such as China and India are not likely to challenge the world order using military force as Germany and Japan did during the Second World War.

The likelihood of an inter-state war occurring has lessened in recent years owing to the lack of economic gains by belligerent nations.<sup>10</sup> The financial futility of conquest is not new; over a century ago war was not seen as a profitable enterprise in an increasing interdependent world. Angell's theory described in *The Great Illusion* (1909) challenged the established belief that 'military and political power give a nation commercial and social advantages' by demonstrating the negative economic effects produced when the conqueror does not scrupulously respect the enemy's property. According to Angell, 'it is an economic impossibility for one nation to seize or destroy the wealth of another, or for one nation to enrich

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<sup>10</sup> Brown, C. & Ainley, K., *Understanding International Relations*, Palgrave MacMillan, London, 2009, p. 9

itself by subjecting another'.<sup>11</sup> Almost a century later however, Stephen Brooks updated Angell's theories by incorporating the unprecedented phenomenon of the globalisation of production and technological development, which is being dispersed geographically. Brooks concluded that for developed countries, military conquest is futile owing to the impossibility of extracting economic resources from the new conquered territories (i.e. the inflow of foreign direct investments would greatly decline and the formation of inter-firm alliances would disappear).<sup>12</sup> Brooks also recognised that the globalisation of production may have adverse effects on less developed countries. Although Angell's theories were obviously questioned following the historical events that occurred during the First and the Second World War, his thesis today may be considered more relevant in a world that has gained greater interdependency.

## Literature Review

Numerous authors and research institutes have discussed the diversity of factors influencing the development of arms industries and relations with the global defence market and international security.<sup>13</sup> The extraordinary transformation of the arms industrial bases of the nations involved in the Second World War has been a focus of broad academic research. The study of defence industries has predominantly been approached from political, technological and economic

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<sup>11</sup> Angell, N., *The Great Illusion: A study of the relations of military power in nations to their economic and social advantage*, William Heinemann, London, 1911, pp. 25-44

<sup>12</sup> Brooks, 2005, pp. 70, 167-206

<sup>13</sup> The defence industry and arms trade has been analysed by organisations such as the Stockholm International Peace Research Institute (SIPRI), the International Institute for Strategic Studies (IISS), the RAND Corporation, the Royal United Services Institute (RUSI), the IHS Jane's global information company, Business Monitor International Ltd., and the S. Rajaratnam School of International Studies among others.

perspectives. The dynamic of the arms industry and trade has perhaps dominated the existing literature under the new sub-field of economics known as Defence Economics. This area of study applies economic principles to national security problems. One of the first published manuscripts on Defence Economics was Hitch and McKean's *The Economics of Defence in the Nuclear Age* (1967) which analysed the trade-offs between the scarce availability of resources and their efficient allocation between equipment and personnel, nuclear and conventional forces, or among the three services (Army, Air Force and Navy) to *produce security*.<sup>14</sup> During the Cold War, the study of arms industries was closely associated with the international transfer of weapons and production technology from the developed world.<sup>15</sup> The end of the Cold War and the subsequent transformation of the defence industries, arms production and trade were further explored by Forsber in *The Arms Production Dilemma* (1994), Hartley and Sandler in *The Economics of Defence* (1995), Inbar and Zilberfarb in *The Politics and Economics of Global Defence Industries* (1998), and Markusen and Costigan in *Arming the Future: A defence Industry for the 21<sup>st</sup> Century* (1999)<sup>16</sup>. Other authors have addressed specific aspects of the defence industry such as disarmament, the structure of the world arms industry, and the economic impact of offsets.<sup>17</sup> The

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<sup>14</sup> Hitch, C. & McKean, R., *The Economics of Defence in the Nuclear Age*, Harvard University Press, Cambridge, MA, 1967, pp. 1-8

<sup>15</sup> Hoyt, T., *Military Industry and Regional Defence Policy: India, Iraq and Israel*, Routledge, London, 2007, p. 6

<sup>16</sup> Fosberg, R., *The Arms Production Dilemma: Contraction and Restraint in the World Combat Aircraft Industry*, MIT Press, Cambridge, MA, 1994, pp. 1-16 and 269-291; Hartley, K., & Sandler, T., *The Economics of Defence*, Cambridge University Press, Cambridge, 1995, pp. 1-16; Inbar, E. & Zilberfarb, B., *The Politics and Economics of the Global Defence Industries*, Routledge, London, 1998, pp. 29-95; and Markusen, A. & Costigan, S., *Arming the future: a defense industry for the 21st century*, Council on Foreign Relations Press, Washington D.C., 1999, pp. 9-38

<sup>17</sup> Hartley, K., & Hooper, N., *The Economics of Defence, Disarmament, and Peace: An Annotated Bibliography*, Edward Elgar Pub., 1990, pp. 41-48 (equipment procurement), 71-77 (arms races and disarmament), and 79-82 (defence industry conversion), online document, <http://www.dtic.mil/dtic/tr/fulltext/u2/a210701.pdf> [accessed on 16/02/2013]; Hartley, K. & Sandler, T., *The Economics of Defence Spending: an International Survey*, Routledge, London, 1990, pp. 1-

second volume of the *Handbook on Defence Economics* (by Hartley & Sandler in 2007) examined the “*new defence needs, practices, threats, and policies in the era of globalisation*”. It also looked at the impact of new technologies during the age of information and the role of multinational corporations as primary arms contractors<sup>18</sup>.

The defence industry’s dynamic nature and the emergence of a global arms market in the last two decades have been widely discussed in the literature. The most recent has analysed certain aspects of the global arms market in greater detail such as nations’ defence spending, international arms transfers, the structure of defence industries and dependency relations created between arms producers and recipients, and the impact of globalisation.<sup>19</sup> These studies have often addressed the arms industry of an individual nation which, despite the provision of valuable information, have lacked a comparative analysis with other nations.<sup>20</sup> Other studies have compared nations’ defence industries within a region or nations from different regions but sharing similar characteristics within the

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12; Wulf, H., *Developing Countries*, in Ball, N. & Leitenberg, M., *The Structure of the Defence Industry*, Routledge, London, 1983, pp. 310-343; Martin, S., *The Economics of Offsets: Defence Procurement and Countertrade*, Hardwood, Amsterdam, 1996, pp. 1-48

<sup>18</sup> Hartley, K. & Sandler, *Handbook of Defence Economics Volume 2*, Elsevier, Amsterdam, 2007, pp. 609

<sup>19</sup> Krause, K. *Arms and the State: Patterns of Military Production and Trade*, Cambridge University Press, Cambridge, 1992, pp. 171-174; Dombrowsky, P., Gholz, E. & Ross, A. et al., *Military Transformation and the Defence Industry After Next*, Newport Paper 18, Naval War College Press, Newport, RI, 1993, pp. 13-26; Hoyt, 2007, pp. 7-16; Bitzinger, R., *The Modern Defence Industry: Political, Economic and Technological Issues*, ABC-CLIO, Santa Barbara, CA, 2009, pp. 1-13

<sup>20</sup> Drifte, R., *Japan’s Growing Arms Industry*, Programme for Strategic and International Security Studies, The Graduate Institute, Geneva, 1985, pp. 1-16; Reiser, S., *The Israeli Arms Industry: Foreign Policy, Arms Transfers, and Military Doctrine of a Small State*, Holmes & Meier, New York, 1989, pp. 1-17; Alistair, E. & Haglund, D., *Canadian Defence Industry in the New Global Environment*, McGill-Queen’s Press, Montreal, 1995, pp. 139-146; Medeiros, E., Cliff, R., & Crane, K., *A new direction for China’s Defence Industry*, Rand Corporation, Santa Monica, CA, 2005, pp. 1-49

global arms industry.<sup>21</sup> One such example has been provided by Bitzinger (2003) in his study of the challenges currently faced by second tier defence industries, in particular those of Brazil, South Africa, South Korea, Sweden and Taiwan.<sup>22</sup>

The main focus on economic factors however has failed to explain the underlying motivations and ambitions of nations to acquire military capabilities and develop their arms industries. A security approach, which is applied less frequently in the present literature, may provide a better understanding of a nation's rationale for developing its defence industry based on the fact that the latter is greatly influenced by the nation's perception of security threats on national and strategic interests.<sup>23</sup> Furthermore, the existing literature on military strategy tends to discuss the arms industry only in relation to military readiness, the influence of military technology, research and development (R&D), arms control strategies and arms races.<sup>24</sup>

Information on arms production and trade may be found in literature relating to arms control, however these studies have primarily looked at the evolution of

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<sup>21</sup> Kiss, J., *The Defence Industry in East-Central Europe: Restructuring and Conversion*, SIPRI Monographs Publications, Oxford University Press, Oxford, 1997, pp. 13-123; Brzoska, M., *Restructuring of Arms Production in Western Europe*, SIPRI Monographs, Oxford University Press, Oxford, 1992, pp. 81-189; Hoyt, T., *Military Industry and Regional Defence Policy: India, Iraq and Israel*, Routledge, London, 2007, pp. 163-169; Till, G., et al., 2009, pp. 131-260

<sup>22</sup> Bitzinger, R., *Towards a Brave New Arms Industry?*, International Institute for Strategic Studies, Adelphi Paper 356, Oxford University Press, Oxford, 2003, pp. 39-79

<sup>23</sup> Hoyt, 2007, p. 15

<sup>24</sup> Thee, M., *Military Technology, Military Strategy and the Arms Race*, International Peace Research Institute, Croom Helm, London, 1986, pp. 14-41, 101-126; Collins, J., *Military Strategy: Principles, Practices, and Historical Perspectives*, Brassey's Inc., Dulles, VA, 2002, pp. 13-18, 99-106; Shekhar, R. & Singh, N., *Asian Strategic and Military Perspective*, Lancer Publishers, New Delhi, 2005, pp. 1-407; Toft, M., *The fog of Peace and War Planning: Military and Strategic Planning under Uncertainty*. Cass Series—Strategy and History, Taylor & Francis, London, 2006, pp. 1-10; O'Hanlon, M., *The Science of War: Defence Budgeting, Military Technology, Logistics, and Combat Outcomes*, Princeton University Press, Princeton, NJ, 2009, pp. 1-140; Stone, J., *Military Strategy: The Politics and Techniques of War*, Continuum International Publishing Group, London, 2011, pp. 1-17; Till, G., *Asia's Naval expansion: An arms race in the making?*, Adelphi Paper 432-433, International Institute for Strategic Studies, 2012, pp. 1-112

international treaties and collective security since the Second World War and the difficulties encountered by participating states to prevent the proliferation of arms.<sup>25</sup> Studies on arms races, military competition and cooperation, and the security dilemma have provided valuable information on the development and transformations of arms industries and their correlation with the causes and effects of conflicts.<sup>26</sup> The subject of International Relations has also addressed these concepts owing to its close association with the arms industries, however much of the available literature has examined “*the role of international structure in the determination of international order and stability*”, and therefore has not examined the development of arms industries and the global defence market in such a great depth.<sup>27</sup>

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<sup>25</sup> Schelling, T. & Halperin, M., *Strategy and Arms Control*, Pergamon-Brassey's, Washington D.C., 1975, pp. 9-77; Blacker, C. & Duffy, G. (Ed.), *International Arms Control: Issues and Agreements*, Second Edition, Stanford University Press, Palo Alto, CA, 1984, pp. 1-11; Freedman, L., *Arms Control: Management or Reform*, Royal Institute of International Affairs, Routledge, London, 1986, pp. 1-74; Carter, A., *Success and Failure in Arms Control Negotiations*, Stockholm International Peace Research Institute, Oxford University Press, Oxford, 1989, pp. 1-7; Croft, S., *Strategies of Arms Control: A History and Typology*, Manchester University Press, Manchester, 1996, pp. 201-211; Den Dekker, G., *The Law of Arms Control: International Supervision and Enforcement*, Martinus Nijhoff Publishers, Boston, 2001, pp. 35-36, 42-44, and 215-218; Larsen, J., *Arms Control: Cooperative Security in Changing Environment*, Lynne Rienner Pub., Boulder, CO, 2002, pp. 41-42, 79-98, 119-200, 271-290, and 343-352; Levi, M. & O'Hanlon, M., *The Future of Arms Control*, Brookings Institution Press, Washington D.C., 2005, pp. 94-138; Chevrier, M., *Arms Control Policy: A Guide to the Issues*, ABC-CLIO, Santa Barbara, CA, 2012, pp. 156-172; Williams, R., Williams, R. Jr., and Viotti, P., *Arms Control: History, Theory, and Policy*, ABC-CLIO, Santa Barbara, CA, 2012, pp. 1-58

<sup>26</sup> Oye, K., *Cooperation Under Anarchy*, Princeton University Press, Princeton, New Jersey, 1986, pp. 58-146; Gleditsch, N. & Njølstad, O., *Arms races: technological and political dynamics*, International Peace Research Institute, Oslo, 1990, pp. 1-247; Axelrod, R., *The Complexity of Cooperation: Agent-Based Models of Competition and Collaboration*, Princeton University Press, Princeton, NJ, 1997, pp. 3-94; Booth, K. & Wheeler, N., *Security Dilemma: Fear, Cooperation, and Trust in World Politics*, Palgrave Macmillan, London, 2007, pp. 1-20, 38-61, 137-141, and 261-299; Kennedy, P., *The Rise and Fall of the Great Powers: economic change and military conflict from 1500 to 2000*, Unwin Hyman, London, 1988, pp. 438-535

<sup>27</sup> Morgenthau, H. J., *Six principles of political realism*, in Williams, P., Goldstein, D. and Shafritz, J., *Classic Readings of International Relations*, Harcourt Brace College Publishers, Fort Worth, TX, 1999, pp. 43-48; Ikenberry, J., Mastanduno, M., et al., *International Relations Theory and the Asia-Pacific*, Columbia University Press, New York, 2003, pp. 1-22; Kuah, A. & Loo, B., *Examining the defence industrialization - economic growth relationship: the case of Singapore*, RSIS Working Papers, Singapore, 2004, pp. 1-32; Brown, C. & Ainley, K., 2009, pp. 1-15

## **Aims of this study**

This study addresses the security implications of the global arms industry with specific reference to the Asia-Pacific region. It does this by first examining the global defence industry and the relations between the major arms producers and importers, the implications of the global defence industry on the security dilemma and the prospects of arms control policies to prevent arms proliferation. The thesis then gives particular emphasis to the Asia-Pacific with a comparative analysis of four nations (Singapore, Indonesia, South Korea and China) to demonstrate the security implications of the global defence industry and arms control policies.

The Asia Pacific region is increasingly perceived as the century's geopolitical centre. With one-third of the world's population, a significant (and rising) share of the world's trade and production, and three-fourths of the world's foreign monetary reserves, it seems clear that the weight of this region is going to be highly relevant in the foreseeable future. According to Crump, a consistent economic, political and cultural shift from the Atlantic to the Pacific has taken place since the end of the Second World War.<sup>28</sup> For historical reasons the region has been defined in terms of 'old' Pacific (East and Southeast Asia) and 'new' Pacific (Russian Far East, North America, Peru and Chile, and Australasia). It is perhaps the melange of 'old' and 'new' traditions, cultures and perceptions that has caused greater fascination to those who have ventured into this region. The vertiginous pace of economic and cultural change intermingles with the millenarian traditions and vestiges of recent history such as the Second World War and the Cold War.

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<sup>28</sup> Crump, T., *Asia-Pacific: A History of Empire and Conflict*, Hambledon Continuum, London, 2007, pp. 1-3

In over sixty years, the regional transformation has been dramatic: from European colonialism (or commercial domination) to sovereignty, under different circumstances, including a bipolar international order during the Cold War followed by a period of U.S. hegemony to the increasingly multi-polar globalised world of today. It is not surprising that old rivalries that have existed for centuries, such as the rivalry between China and Japan, remain, despite significant cultural exchange and economic growth. Mutual trust and understanding has been demonstrated as fragile as a result of old enmities, ethnic and religious frictions, and maritime and territorial disputes.

Two of the most important and lingering problems that remain unsolved in the international arena are located in this region: the crisis in the Korean Peninsula and the status of Taiwan. The dispute between India and Pakistan over Kashmir also has an effect on Asia-Pacific nations owing to the proximity of the Indian sub-continent. Most nations involved in these areas of tension possess active nuclear programmes which increases the possibility of nuclear arms proliferation as well as conventional weapons competition. The Asia-Pacific community also faces complex challenges such as civil conflicts, geopolitical tensions, and environmental and health challenges that may be a source of security instability. Recently, there have been reports on mounting tensions around the East and South China Sea over disputed islands, demonstrating the significant value of national sovereignty for these countries and their rising demands for natural resources.

Some nations in the Asia-Pacific region are major importers of conventional weapons, including South Korea, Taiwan, Singapore and Australia. There are also defence industries in the region that are being developed towards a more self-sufficient production, such as the industries in North Korea and China. The growing economy of China in particular has facilitated an increase in military spending which provides consistent financial support to their defence industries.

This study first addresses the theoretical foundations of the defence industry and arms control including influencing factors such as military readiness, the security dilemma and the difficulties involved in the transformation of the defence industries from peace to war production and vice versa. It then follows with an analysis of the phenomenon of globalisation and specifically its effect on the arms industry, as globalisation is having an impact on the Asia-Pacific defence industries. Finally, the thesis examines defence industry and arms control policies in the Asia-Pacific region, with particular reference to Singapore, South Korea, Indonesia and China. The defence industries of these countries are currently being developed at a very fast pace. China has been predicted to be a world power in a few decades and accordingly is immersed in an intensive military and industrial build-up. Indonesia's recent economic growth and subsequent rise as a regional power has spurred the nation to rapidly develop an indigenous defence industry. South Korea's security is severely influenced by the threat of North Korea and is therefore compelled to maintain and modernise its defence industry capacities. Lastly, Singapore maintains the most sophisticated arms industry in Southeast Asia, despite the nation's small size and limitations. The analysis of these nations' security environment, major defence industrial developments and challenges, arms trade

strategies, and arms control policies, may highlight the primary motives to develop indigenous defence industries and their potential effects on the security dilemma within the region, and demonstrate the increasing influence of the global arms industry.

## CHAPTER 1

# DEFENCE INDUSTRY, ARMS CONTROL AND THE SECURITY DILEMMA

Rivalry and arms competition among nations are currently accelerating the development of defence industries and consequently increasing the effects of the security dilemma; arms control measures are concurrently being employed in an attempt to prevent the consequential arms proliferation. An understanding of the foundations of defence industry, arms control and the security dilemma, and how these concepts interact with one another is clearly important as they have been shown to have a major influence on global security in general, and more specifically in the Asia-Pacific region.

Nations prepare for the eventuality of war through the maintenance of *military readiness*. This term involves a variety of actual and potential capabilities and resources essential to fulfil the nation's military objectives.<sup>29</sup> Military planners must therefore select and prioritise those capabilities considered indispensable for the military forces to accomplish their missions within a certain timeframe. This process also entails the consideration of multiple trade-offs owing to the limitation

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<sup>29</sup> Betts, R., *Military Readiness: Concepts, Choices, Consequences*, Brookings Institution Press, Washington D.C., 1995, pp. 40-43

of resources normally available. A typical trade-off within the defence industry is the balance between military readiness and long-term economic efficiency. Clearly, when resources are limited, the production of a wide variety of modern weapons prevents the possibility of achieving economies of scale. Likewise, the allocation of resources to research and development (R&D) reduces their availability for the production and maintenance of weapons systems. It is not surprising therefore, that within such a complex scenario, military planners' decisions may have a great impact on military readiness and that arms procurement is a significant factor in this state of readiness.

The procurement of military weapons may enhance the armed forces capabilities providing the following factors are taken into account: (1) the weapon system must be adequate for the country's basic military conditions, doctrine, security environment and military organisation; (2) less sophisticated weapon systems have a greater chance of being successfully deployed and assimilated; (3) a monopolistic and poorly regulated military-industrial complex has negative effects on weapons systems development costs, quality and specifications; and (4) a greater number of organisations and parties involved in the decision process often results in the incorporation of additional requirements (other than doctrine and strategic priorities). The lack of clear strategic objectives and associated military requirements may lead to the procurement of highly sophisticated weapons systems and create a monopolistic relationship between the military and industry.<sup>30</sup>

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<sup>30</sup> Evron, Y., *China's Military Build-up in the early Twenty-First Century: from arms procurement to war-fighting capability*, S. Rajaratnam School of International Studies, Singapore, Working Paper, December 2010, pp. 1-5

Nations' strategic and security environments determine potential military requirements within different timeframes. In most cases, urgent military requirements are covered by procurement from foreign suppliers. The acquisition of medium and long-term military capabilities however, may involve the development of the nation's defence industrial base. These capabilities are often compared in relative terms with those of neighbouring countries. The strategic comparison is one of the main causes of the security dilemma, which occurs when nations' defensive measures to increase security and prevent potential threats are perceived as offensive menaces by other nations.<sup>31</sup> The latter nations respond by undertaking a series of countermeasures which in most cases are subsequently opposed by other threatened nations, ultimately leading to a rise in regional tension and reduced security. The realist international order (based on an uncertain and anarchical system where nations follow their own interests) appears to favour nations' distrust which may fuel a self-fulfilling prophecy about each other's security threats.<sup>32</sup> The perceived threats are not only limited to territorial sovereignty disputes but also to strategic interests such as sea lanes and energy supplies. Growing demand to secure natural resources may spur force projection capabilities, which enhance offensive threats on unsolved territorial disputes, such as those involving China within the South China Sea.

The security dilemma is often addressed by an external arbiter, either in the form of another nation or an international organisation. The external arbiter may engage

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<sup>31</sup> Christensen, T., in Ikenberry, J., *International Relations Theory and the Asia-Pacific*, Columbia University Press, New York, 2003, p. 25

<sup>32</sup> Brown & Ainley, 2009, pp. 103-106

in mediation or offer security to both sides facilitating the conditions for a more durable stability; the arbiter may, however, be perceived by one or both sides as partial and possibly even attempting to obtain political advantage in the region with prolonged or stalled negotiations.<sup>33</sup> Furthermore, if the external arbiter is a nation or a group of nations it may be perceived as following its own interests; and if it is an international organisation it may have insufficient capabilities to reduce tensions among rival nations. For example, the Six-party talks established by North Korea, South Korea, Japan, China, Russia and the U.S.A. to find a peaceful end to the North Korean nuclear weapons programme and resolution of the long-standing conflict with South Korea failed to make any gains.

## **Defence industry foundations**

Both war and peace have been greatly influenced by the arms industry over the last hundred years. During the 19th century, traditional armouries (generally producing rifles and cannons) and shipyards (constructing warships) embraced the advances provided by the Industrial Revolution. By the eve of the First World War, a new era of warfare emerged motivated by the exponential increase in military production capabilities. Technological innovations during this period improved the quality of equipment and weapons and enabled increased manufacture. Augmentation of both the quantity and quality of arms production encouraged major powers to become immersed in an arms competition to achieve naval, air and army supremacy. By the early 1900s, the rivalry that existed among the main European great powers (Great Britain, France, Germany, Austria-Hungary, and

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<sup>33</sup> Derouen, K., Bercovitch, J. And Wei, J., 'Duration of Peace and Civil Wars in Southeast Asia and the Pacific', *Civil Wars*, June 2009, Vol. 11 Issue 2, pp. 116-117

Russia) compelled them to invest in significant resources for their arms industries in preparation for a European war. These nations accounted for approximately three-quarters of the total global defence spending.<sup>34</sup>

The realistic strategic approach has shaped the concept of the defence industrial base for the greater part of the 20th century. A nation develops its defence industry to increase national power and protect interests both at home and abroad; however this may be perceived as a security threat by other powers creating fear and resistance to incorporate 'the rising power' into the established international or regional system.<sup>35</sup> It could be noted that these tensions have been the origin of conflicts and war since at least the 5th century BC.<sup>36</sup>

The development of the defence industry has been approached by two major theoretical concepts: (1) the theories of realism and mercantilism, and (2) the principles of liberalism. *Realism*, which was developed in the late 1940s, perceives the world as a self-help system in which states interact in an anarchical environment and the balance of power deters these states from going to war. States are therefore the key actors of the international system "pursuing their own interests in terms of power".<sup>37</sup> Realism is closely related to *mercantilism*, which is the economic doctrine that deals with defence and national security. Both

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<sup>34</sup> Toft, M., *The fog of Peace and War Planning: Military and Strategic Planning under Uncertainty*, Cass Series—Strategy and History, Taylor & Francis, London, 2006, p. 75

<sup>35</sup> Abbot, G. and Johnson, S. *The Changing Defence Industrial Base*, Strategic Forum - Institute for National Strategic Studies, National Defence University Press, Washington D.C., 1996, pp. 1-5

<sup>36</sup> Thucydides concluded that "the growth of the power of Athens, and the alarm which this inspired in Lacedaemon [Sparta], made war inevitable". Thucydides, R., *History of the Peloponnesian War*. Book 1, online document, [http://en.wikisource.org/wiki/History\\_of\\_the\\_Peloponnesian\\_War/Book\\_1](http://en.wikisource.org/wiki/History_of_the_Peloponnesian_War/Book_1) [Accessed 26/07/2012]

<sup>37</sup> Morgenthau, H. J., Six principles of political realism, in Williams, P., Goldstein, D. and Shafritz, J., *Classic Readings of International Relations*. Harcourt Brace College Publishers, Fort Worth, TX, 1999, pp. 43-48

concepts coincide in that states must seek security and prosperity in an anarchical environment. According to Kuah and Loo, the mercantilist approach supports the interventionist role of the state to guarantee and expand its political, military and economic security, and independence, through the protection and control of key industries, in particular the defence sector.<sup>38</sup>

Defence and national security has also been addressed by the theory of *liberalism*. The liberal proposition is based on the idea that “*free market solutions to economic problems maximise welfare in the system as a whole*”.<sup>39</sup> Smith and Ricardo’s theories provided liberals with solid arguments in favour of foreign trade. In particular, Ricardo’s theory of ‘*comparative advantage*’ of production and trade demonstrated that countries could contribute to their own welfare (as well as to the general good) if they specialised on those products that had a comparative advantage. For example, a nation without direct sea access would incur far higher development costs in the manufacture of naval vessels than a nation with coastal access. Based on these theories, liberals favour the disappearance of barriers and restrictions on trade. Liberals do however recognise national security as the foremost goal of the state and that under certain circumstances fulfilment of this goal entails the intervention of the state to mobilise capital, labour and natural resources.<sup>40</sup>

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<sup>38</sup> Kuah, A. & Loo, B., *Examining the defence industrialization - economic growth relationship: the case of Singapore*, RSIS Working Papers, Singapore, 2004, pp. 6-7

<sup>39</sup> Brown & Ainley, 2009, p. 159

<sup>40</sup> Brown & Ainley, 2009, pp. 159-162; Kapstein, E., *The political economy of national security: a global perspective*, University of South Carolina Press, Columbia, 1992, p. 10

History has demonstrated that national defence and economic wellbeing are closely related.<sup>41</sup> A secure and stable nation facilitates the creation of prosperity; equally, a nation with a wealthy economy and ample resources is able to improve its defences. Although this assumption is shared by both liberals and realists (and mercantilists), the tension between the realists in favour of state interventionism and the liberals '*laissez faire*' doctrine of market forces (opposing any barriers against free trade) remains a subject of dispute particularly under the current process of globalisation. Protectionist measures are often politically more favourable than free trade, even though increasing state interventionism leads to less competition which, according to the economic theory, results in higher prices and a monopoly of profits, fewer incentives to innovate, and greater inefficiency.<sup>42</sup>

The conflicting views which occur between mercantilist and liberal approaches is clearly seen within the defence industry. A state tends to adopt a mercantilist approach to guarantee strategic and defence capabilities (Table 1). On the other hand, defence firms tend to follow a more liberal approach striving for economic efficiency, which may result in the state's loss of indigenous manufacturing capabilities crucial for maintaining national security onshore.<sup>43</sup>

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<sup>41</sup> Kennedy, P., *The rise and fall of the great powers: economic change and military conflict from 1500 to 2000*, cited in Abbot, G. & Johnson, S., *The Changing Defence Industrial Base*, Strategic Forum - Institute for National Strategic Studies, National Defence University Press, Washington D.C., 1996, pp. 1-5

<sup>42</sup> Brown and Ainley, 2009, p. 163; Hartley, K. 'The Economics of the UK Defence Industrial Strategy', *Security Challenges*, June 2007, Volume 3 Number 2, p. 26

<sup>43</sup> U.K. Ministry of Defence, *Defence Industry Strategy*, 2005, p. 7  
<http://www.official-documents.gov.uk/document/cm66/6697/6697.pdf> [accessed on 12/07/20012]

**Table 1: Industrial capabilities to be maintained onshore<sup>44</sup>**

Strategic assurance	Defence capability	Strategic influence
Those that provide technologies or equipment important to safeguard the state, e.g. nuclear deterrent	Those that require particular assurance of continued and consistent equipment performance	Those capabilities that provide influence in military, diplomatic or industrial terms, including potential technologies

The premise that achieving independence in arms production strengthens military capabilities and national security is considered the primary reason for developing an *indigenous* (i.e. domestic) defence industry. The import of arms and military technology is believed to be a security's vulnerability owing to potential supply cut-offs as a result of, for example, embargos or sanctions and any other limitations enforced by the suppliers. Numerous countries embraced the development of an indigenous defence industry, particularly during the Cold War, including South-Africa following the UN-imposed arms embargos of 1963-77, Israel as a result of supplies being cut off in the 1960s and 1970s, Taiwan owing to the growing diplomatic isolation from the late 1970s, and even Sweden following the extension of its neutrality policy in the 1970s and 1980s. The increased globalisation of production and the subsequent growth in the number of suppliers has since reduced the occurrence of supply cut-offs.<sup>45</sup>

Economic and political motives have also spurred the development of domestic arms industries. An example is Indonesia which, during the 1970s, initiated the overambitious development of its aerospace defence sector in an attempt to

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<sup>44</sup> U.K. Ministry of Defence, *Defence Industry Strategy*, 2005, p. 21-22, online document, <http://www.official-documents.gov.uk/document/cm66/6697/6697.pdf> [accessed on 12/07/20012]

<sup>45</sup> Bitzinger, 2003, pp. 11-13

promote economic and industrial growth.<sup>46</sup> As previously noted, an indigenous defence industry strengthens the perception of national political independence and relevance at both regional and global levels. It requires technological and industrialisation developments that promote related sectors such as ship-building, aerospace, electronics and communications. Furthermore, the economic development associated with these industries involves the creation of factories and the subsequent employment of workers, engineers and technicians.<sup>47</sup>

Another motive to promote the development of indigenous arms production is the import substitution strategy when a national product deters the import of a similar product from abroad), which is also linked to the prospects of producing arms for exportation. The subsequent increase in foreign exchange earnings and the improvement of trade imbalances provide further support to the economic benefits of developing a domestic arms sector. These strategies however have their limitations. Firstly, the possibility of achieving the import-substitution of complex weapon systems grossly depends on the industrial capabilities already established. A second consideration is that foreign exchange earnings are at times overstated, particularly when weapon systems produced for export require the prior importation of numerous components. A third consideration is that there is a lack of evidence supporting the net gain for arms exporting countries when compared to the real costs of indigenous production.<sup>48</sup> Nations that failed to anticipate these limitations experienced the collapse of their defence firms or a drastic adjustment in their production. This occurred to Brazil's defence industry

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<sup>46</sup> Crump, 2007, p. 248

<sup>47</sup> Bitzinger, 2003, p. 13-15.

<sup>48</sup> Brauer, J., *The Arms Industry in Developing Nations: History and Post-Cold War assessment*, Paper presented at the conference on Military Expenditures in Developing and Emerging Nations, Middlesex University – U.K., 1998, pp. 9-10

during the late 1980s which, having been one of the largest and most sophisticated in the developing world, had almost disappeared by the mid-1990s.<sup>49</sup>

Nationalism, status and prestige also have an effect on defence industrialisation, particularly for states that aspire to regional or global power status. Nations may acquire and develop weapons systems to strengthen political cohesion and improve their deterrent capabilities.<sup>50</sup> State's arms purchases made from the national defence industry may also be considered by some critics as a form of protectionism, whilst others view the functioning of the indigenous arms industry as an inefficient bureaucratic process of international cooperation as illustrated by the delays and cost overruns in multinational defence programmes such as with the Eurofighter and the A-400M.<sup>51</sup>

It should also be noted that military and strategic war planning involves enormous challenges such as identifying friend and foe, understanding the nature of future war, and determining the timing of a war or conflict. The latter factor perhaps causes most uncertainties. Statesmen and military planners have the difficult tasks of maintaining military readiness and estimating when a conflict could break up and for how long the nation's resources are able to support military operations. Clearly, these capabilities are highly dependent on the nation's defence industrial base (DIB).<sup>52</sup> Numerous nations have experienced significant DIB transformations, particularly in periods immediately preceding and following a conflict. Three cases

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<sup>49</sup> Bitzinger, 2003, pp. 41-44

<sup>50</sup> Collins, 2002, pp. 71-80

<sup>51</sup> Hartley, K., *The Economics of Defence Policy: A New Perspective*, Routledge, London, 2012, pp. 176 & 210

<sup>52</sup> Toft, M., 2006, pp. 1-11

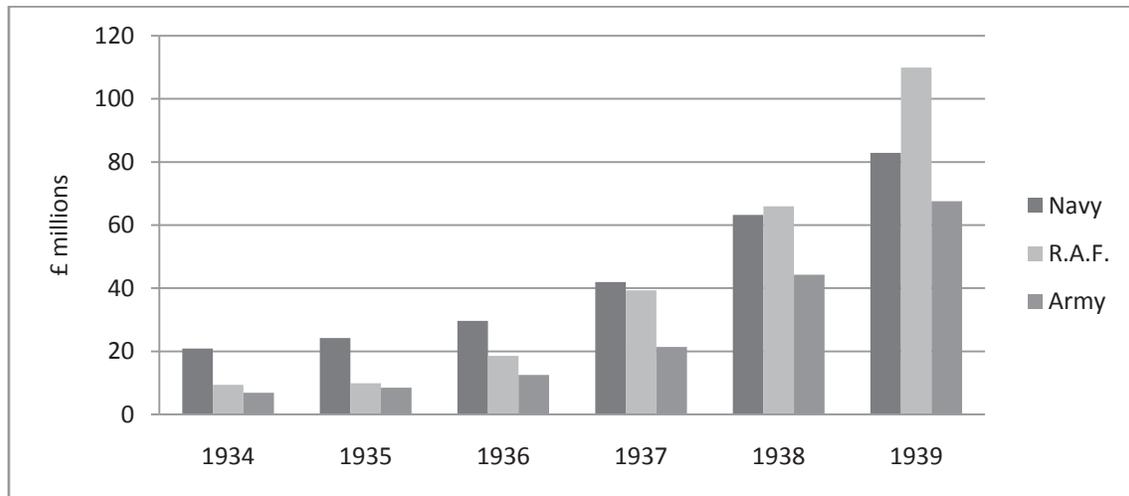
are briefly examined here to illustrate the challenges of reorganising the DIB in the eventuality of war followed by the dismantling of a war production industry.

British preparations for the Second World War clearly illustrate the difficulties of military and strategic planning and the essential role of the defence industrial base. During the 1920s and early 1930s a war in Europe seemed remote. Accordingly, the British Government drastically decreased national expenditure on armaments. The financial constraints severely affected the defence industrial base with the shipbuilding industry declining significantly, most aircraft firms were on the verge of bankruptcy, and production of arms for the Army restricted to three Royal Ordnance Factories. Of the four great armament firms present during the First World War, only one, Vickers-Armstrong, survived the interwar period.<sup>53</sup> Finally, when Germany rearmed and the threat escalated, the British government responded by increasing its defence spending. Timing was crucial in order to transform the defence industrial base and meet the increasing military requirements in the eventuality of war (Fig. 1).

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<sup>53</sup> Postan, M., *British War Production*, Her Majesty's Stationery Office, 1952, p. 8  
<http://www.ibiblio.org/hyperwar/UN/UK/UK-Civil-WarProduction/index.html#contents> [accessed on 09/06/2012]

**Figure 1: British estimated expenditure on rearmaments, 1934-1939<sup>54</sup>**



Across the Atlantic, in 1939, the U.S.A. was probably the least prepared nation for war among the Second World War adversaries.<sup>55</sup> Not only were its armed forces smaller and more poorly equipped but its arms industry had not yet been transformed for war production. By 1944, however, the U.S. war production had clearly exceeded all nations involved in the Second World War. These achievements, whilst remarkable, were a logical consequence of the U.S.'s educated population, technological and industrial bases, abundance of raw materials, and quality of the transportation network.<sup>56</sup>

The U.S. arms industry transformation was particularly noteworthy in the west coast. During the Pacific War (1941-45), major defence firms (particularly in the aerospace and naval sectors) operated from the west coast. Large aircraft manufacturing firms such as Douglas and Lockheed were established in California with a workforce that grew from 25,000 in 1940 to 300,000 in 1943. Likewise, the

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<sup>54</sup> Ibid, p. 12

<sup>55</sup> Gropman, A., *Mobilising U.S. Industry in World War II*, Institute for National Strategic Studies - U.S. National Defence University, Washington D.C., 1996, p. 3

<sup>56</sup> Gropman, 1996, pp. 84-85

wartime shipbuilding industry developed at an astonishing rate, with large shipyards opened especially along the west coast, with the shipyard workforce in San Francisco Bay reaching 244,000 in 1944 (over six times the number employed in the shipbuilding industry across the whole country five years earlier), with peak production of one ship per day.<sup>57</sup>

The defence industry transformation was also observable with the end of the Cold War, which had a catastrophic effect on the arms industrial base of the former Soviet bloc. During the preceding years, the Soviet arms production had been able to challenge the U.S. and European nations in volume under the Communist planned economy, which distributed the arms market among the Soviet armed forces and a number of allies under the Warsaw pact. By the early 1990s, the Soviet arms industry suffered from an alarming overcapacity as the Russian military experienced a large-scale reduction, although fortunately orders from foreign clients continued to be accepted. Between 1990 and 1997, Russian arms orders declined to about 80 percent.<sup>58</sup> The subsequent downsizing and restructuring process of the Russian arms industry resulted in three major consequences: a large-scale shift to export business, a significant process of privatisation and consolidation, and a shift to almost unrestricted technology on arms export. The ability to access Western technologies (particularly in computing and software) allowed Russian weapon systems to begin again to compete with U.S., Israeli and European products; and refurbished former Soviet equipment was offered for export at competitive prices, particularly after the *ruble* devaluation in

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<sup>57</sup> Crump, 2007, pp.17-18

<sup>58</sup> Gidadhubli, R. G., 'Russia's Military Industrial Complex: Struggle for Revival', *Economic and Political Weekly*, June 8-14, 2002, Vol. 37, Issue 23, pp. 2215-2218

1998 which resulted in a 35 percent reduction in cost of Soviet equipment for foreign export. The Russian arms export agency (*Rosvooruzheniye*) marketed the full spectrum of weapon systems focussing primarily on two markets: the Middle East and Asia.<sup>59</sup>

## **Arms control foundations**

Arms control measures, which have possibly been in use for as long as warfare has existed, are employed to minimise the cost and damage of weapons, prevent arms races and maintain the *status quo*. Arms control has been defined as one of a series of alternative approaches to achieving international security and preventing armed conflicts.<sup>60</sup> Arms control fluctuated in importance during the 20th century when periods of intense international commitments to reduce armaments were followed by large scale wars. Williams *et al.* identified three main periods when arms control acquired significant importance: post-World War I, the Cold War, and the current post-Cold War period.<sup>61</sup>

The end of the Cold War is especially significant in relation to arms control as it heralded the current international situation. The collapse of the Soviet Union and the subsequent change in the international order resulted in several treaties to dramatically reduce the blocs' armaments.<sup>62</sup> For example, the implementation of the Treaty on Conventional Arms Forces in Europe (CFE) reduced the

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<sup>59</sup> Vicziany, 2007, pp. 248-249

<sup>60</sup> Larsen, J., 2002, p. 2

<sup>61</sup> Williams, R. *et al.*, 2012, pp. 1-5

<sup>62</sup> In particular, the Conventional Arms Forces in Europe (1990), the Strategic Arms Reduction Treaty I (1991), II (1993) and III (2010).

concentration of armaments and military forces across Europe. Other confidence-building measures were established which further contributed to the region's stability, including significant reductions of both U.S. and Russian nuclear arsenals. Consequently, prospects of a world without nuclear weapons seemed more attainable by the mid-1990s. This optimistic vision dissolved however and the importance of arms control declined by the end of the 1990s when more states started to develop nuclear weapons programmes, including India, Pakistan and North Korea.

Arms control strategies are now centred in three major areas: the ban and limitation of certain weapons, such as the prohibition of landmines and cluster munitions; attempts to block the acquisition of weapons of mass destruction, including the Comprehensive Test Ban Treaty and the Chemical Weapons Convention; and control on arms transfers, such as the Arms Trade Treaty.

Normally, the legal framework for arms control strategies is formed by international treaties. A treaty is defined as "*an international agreement concluded between States in written form and governed by international law, whether embodied in a single instrument or in two or more related instruments and whatever its particular designation*" (The Vienna Convention, 1969 and 1986). To be effective, a treaty should be a binding instrument that creates legal rights and obligations for the signatories; it should be concluded by an international organisation with treaty-making power, in particular the United Nations; it must be governed by international law; and it needs to be in writing. Once nations are committed to respect and fulfil the terms of the treaty, it is necessary to verify its compliance.

Verification normally involves some kind of inspection (and associated procedures) to detect serious violations of the treaty. The treaty should also outline the enforcements to be applied should violations be uncovered; the enforcements could include political or economic sanctions, and occasionally military action.<sup>63</sup>

To become a party of a multilateral treaty, a state must demonstrate its willingness to undertake the legal rights and obligations established in the treaty by signature, ratification, acceptance or approval, and accession. Once a state becomes a party of the treaty it is legally bound to it. The state's signature of an international treaty indicates the state's intention to be bound by the treaty in the future and obliges it to refrain in good faith from acts that would defeat the object and purpose of the treaty, although it is not legally binding yet. The ratification of an international treaty expresses the state's commitment to undertake its obligations. This process normally requires prior ratification at national level, such as integration of the treaty terms within the state's constitutional provisions. A state may accept or approve a treaty following its signature with the same legal effects as ratification. The accession to an international treaty also expresses the state's consent to be legally bound by the terms of the treaty, but the process only has one step: the deposit of an instrument of accession. The latter is undertaken when the period for signature has closed.<sup>64</sup>

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<sup>63</sup> United Nations Publications, *Treaty Handbook*, Treaty Section of the U.N. Office of Legal Affairs, 2012, p. 5 [http://treaties.un.org/Pages/Publications.aspx?pathpub=Publication/TH/Page1\\_en.xml](http://treaties.un.org/Pages/Publications.aspx?pathpub=Publication/TH/Page1_en.xml) [accessed 10/12/2012]

<sup>64</sup> Some treaties (normally bilateral) may be legally bound only upon signature, United Nations Publications, *Treaty Handbook*, Treaty Section of the U.N. Office of Legal Affairs, 2012, p. 6 [http://treaties.un.org/Pages/Publications.aspx?pathpub=Publication/TH/Page1\\_en.xml](http://treaties.un.org/Pages/Publications.aspx?pathpub=Publication/TH/Page1_en.xml) [accessed 10/12/2012]

Arms control and disarmament is based on the notion of security cooperation and on the more developed concept of common security. These views support a more liberal-institutional concept of world politics (which emphasises the role of international organisations on human rights and confidence-building measures).<sup>65</sup> A realist approach, on the other hand, would consider unilateral and independent action to be more effective than security cooperation. The more recent phenomenon of globalisation may have conflicting interpretations: it may act as a security cooperation propeller following the notion that greater inter-dependence is associated to increased security, or it may have a detrimental impact on social and political aspects, and increase economic differences among nations, ultimately leading to reduced international security.<sup>66</sup>

National security policies, military planning and arms control measures have been shown to influence the development of the defence industry, however it is necessary to gain a more in depth understanding of the defence industry and the factors that determine its structure and behaviour within the wider context of the international arena as it is these factors that may not only give rise to but also potentiate the effects of the security dilemma.

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<sup>65</sup> Devetak, R., Burke, A. & George, J., *An introduction to International Relations*, Cambridge University Press, Cambridge, 2011, pp. 181-182

<sup>66</sup> Larsen, 2002, p. 46

## **CHAPTER 2**

### **THE CHARACTER OF DEFENCE INDUSTRY**

There is no simple definition that fully describes the concept of the defence industry. Traditionally, the industry has been greatly influenced by two main factors: the uncertainty of strategic-military planning, and the impact of new technologies. During the last decades, three additional factors have had an effect on the scope and composition of the arms industry, these being: the unprecedented globalisation of production and development of weapons systems; the emergence of dual-use technologies (with both civilian and military applications); and to a lesser degree, the tendency to outsource support tasks and services to the civilian sector, such as strategic lift or satellite imagery.

Defence industry firms, as like any other industrial sector, are not immune to the forces of national and international competition. Foreign weapons systems or subsystems may be more economical and more technologically advanced than the indigenous production. This encourages the defence industries to integrate an increasing amount of more advanced componentry produced abroad, and also to restructure, rationalise and relocate their production to foreign countries in order to increase efficiency and guarantee the return of investment to share holders. The

defence firms focus on economic factors to achieve maximisation of benefits, whereas governments and military planners' aim to guarantee the nation's sovereignty and wellbeing by developing indigenous industrial capabilities. States however face enormous challenges in determining which industrial capabilities are essential in the eventuality of a future conflict.

There are numerous definitions of the defence industry in the relevant literature. For example, the industry has recently been described by Banlaoi (2009) as being "involved in the production of weapons, equipment, military devices and machinery, as well as raw materials needed for producing military products".<sup>1</sup> Prior to this, the defence industrial base was defined by Kuah and Loo (2004) as "the aggregate ability to provide the manufacturing, production, technology, research, development, and resources necessary to produce the materiel for the common defence".<sup>2</sup> Despite the broad similarity of various definitions, most fail to contemplate important factors such as the ownership (state, private, national, or foreign) of the defence firms and their location which can be at home or abroad. Furthermore, factors such as dual-use technologies and the provision of support services by civilian companies have often not been considered in these definitions.<sup>3</sup> The definition provided by the U.K. Ministry of Defence (MoD) has therefore perhaps most accurately described the concept of the defence industrial base. The MoD states that it "embraces all defence suppliers [national and foreign-owned] that create value, employment, technology or intellectual assets in the country", and further specifies that the defence industry should be defined in

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<sup>1</sup> Till, G.*et al.*, 2009, p. 195

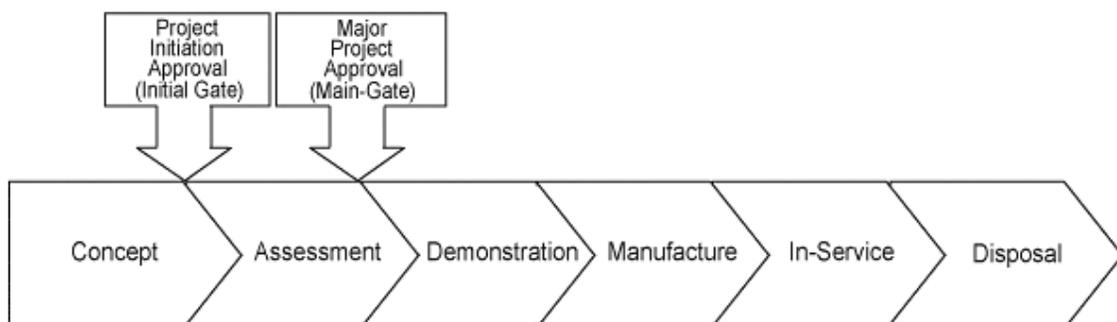
<sup>2</sup> Kuah& Loo, 2004, p. 9

<sup>3</sup> Hartley, K. and Sandler, T., 2007, p. 1141

relation to “where the technology is created, where the skills and the intellectual property reside, where the jobs are created and sustained, and where the investment is made”.<sup>4</sup>

There are normally three main stakeholders involved in the acquisition of weapons systems which are the military contractor (the industry), the programme manager (the government’s representatives), and the user (the military). Governments are the major clients of the defence industry. The process of acquisition entails the following stages: (1) establishing the need of a new item, (2) testing and validating the viability of a design through technical development process, (3) producing the item, frequently in large-scale quantities, and (4) providing support throughout the item’s life-cycle.<sup>5</sup> While the processes vary among countries, illustrative of the general systems is the U.K. Government’s CADMID cycle of acquisition and management, shown in Figure 2.

**Figure 2: The six phases of defence acquisition cycle CADMID<sup>6</sup>**



<sup>4</sup> U.K. Ministry of Defence, *Defence Industry Strategy*, 2005, p. 16

<http://www.official-documents.gov.uk/document/cm66/6697/6697.pdf> [accessed on 12/09/2012]

<sup>5</sup> For more details refer for example to the Phase Armaments Programming Systems (PAPS) followed by NATO (AAP-20), February 2010, [http://www.msb.gov.tr/birimler/tekhiz/doc/ac327/AAP-20\(2\)Ec1.pdf](http://www.msb.gov.tr/birimler/tekhiz/doc/ac327/AAP-20(2)Ec1.pdf) [accessed on 21/08/2012]

<sup>6</sup> UK Ministry of Defence, *Statistics 2011*, online document, <http://www.dasa.mod.uk/modintranet/UKDS/UKDS2011/Contents.php> [accessed on 6/10/2012]

The military normally assesses which capabilities are required and initiates a process of acquisition. The programme manager's office (PMO) determines the specific product details, such as technical and operational requirements and costs generated throughout the complete life-cycle of the product, and then schedules its major milestones before entry into service. The PMO also provides participating defence firms (both domestic and foreign) with a series of specifications that are used by the latter to plan and put forward their designs and proposed costs involved. The most suitable project is subsequently approved by the PMO, thereby initiating the third and fourth stages of the acquisition process. The second stage may either involve considerable research and development (R&D) for weapons systems incorporating the latest technologies, or may only be limited to small-scale modifications on already tested designs.

## **Defence industry structure**

There are commonly four core segments in the defence industry which can be described as: aerospace (the production of aircrafts, engines, missiles and electronics); land equipment (the production of land forces weapons and equipment such as artillery, motor vehicles and small arms and ammunition); naval (shipbuilding); and defence electronics (production and integration of information and communications technologies). The aerospace and naval sectors often require intense R&D and funding, whereas the land equipment sector mostly uses less technologically demanding componentry. The defence electronics sector

commonly provides Command, Control and Communications (C3) systems to the rest.<sup>7</sup>

The structure of the defence industry is essentially hierarchical. Firms are classified in a number of tiers: *prime contractors*, formed by leading platform and weapons systems producers such as Lockheed Martin or BAE Systems; *tier 1 contractors*, composed of specialised producers of complete subsystems or major components, such as Rolls Royce or Groupe Safran; *tier 2 contractors*, involved in producing components and supplying services such as electronic equipment and mechanical engineering; and *tier 3*, formed by commodity and general service suppliers (e.g. transport networks and communications). The latter two groups are normally small or medium sized enterprises (not always listed as defence firms) or subsidiaries of the major defence producers, and are often responsible for the manufacture of dual-use (civilian/military) goods or services.<sup>8</sup>

The industrial hierarchical structure is becoming more complex than ever before. Major defence firms now involve large systems integrators, platform builders, subsystem providers, and a combination of component and raw material suppliers. In addition, firms are increasingly intertwined through complex alliances, cooperation, teams, and prime or supplier contracts.<sup>9</sup>

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<sup>7</sup> Bekkers, F., *et al.*, *Development of a European Defence Technological and Industrial Base*, TNO Report for the European Commission, 2009, pp. 12-29  
[http://ec.europa.eu/enterprise/sectors/defence/files/edem\\_final\\_report\\_en.pdf](http://ec.europa.eu/enterprise/sectors/defence/files/edem_final_report_en.pdf) [accessed on 21/08/2012]

<sup>8</sup> *Ibid*, pp. 9-10

<sup>9</sup> Watts, B., *The U.S. Defence Industrial Base: Past, Present and Future*, Centre for Strategic and Budgetary Assessments, 2008, pp. 40-41  
[http://www.csbaonline.org/4Publications/PubLibrary/R.20081015\\_The\\_US\\_Defense\\_In/R.20081015\\_The\\_US\\_Defense\\_In.pdf](http://www.csbaonline.org/4Publications/PubLibrary/R.20081015_The_US_Defense_In/R.20081015_The_US_Defense_In.pdf) [accessed on 23/08/2012]

The arms industry has a dynamic nature with multiple factors influencing its structure, size, and behaviour. A so-called ‘*iron-triangle*’ (government-industry-military) has frequently been used in the literature to describe the defence industry’s environment and interests.<sup>10</sup> It is also common to analyse firms using the P.E.S.T. (Political, Economic, Social, and Technological) factors that may influence their external macro-environment, such as the degree of government intervention in the economy, the economic growth or the inflation rate, the size of population and age distribution, and the incentive to generate Research and Development (R&D) activities and innovation. In view of the fact that the arms industry has unique features that intertwine strategic and economic interests, it seems appropriate to expand the P.E.S.T. factors into the following categories: national and international policies, military strategy, technology, economy, society and security environment (Fig. 3).<sup>11</sup>

**Figure 3: Main factors influencing the Defence Industrial Base**



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<sup>10</sup> Chapter 8 by Matthews, R., in Till, G. et al., 2009, pp. 135-136

<sup>11</sup> Bekkers, F., *et al.*, 2009, p. 5

The defence industry is primarily driven by national policies and the state's defence strategies.<sup>12</sup> The state's role in the establishment and development of domestic arms industries has been instrumental throughout history. The most direct control of this sector is exercised through the state ownership of arms companies unless these companies are private, in which case the state may exercise its control through tax breaks, low-interest loans and subsidies. States also assume much of the cost related to R&D of advanced technologies applied to modern weapons systems. This is the case with certain industrial segments and technologies, such as laser guidance and 'stealth' technologies that are highly specific to the military and therefore their production cannot be diversified to a commercial market.<sup>13</sup>

The state's defence budget is perhaps the most influential factor in the defence industry, particularly when the arms producing firms rely heavily on the domestic market. An increase in military expenditure normally stimulates arms producing firms and their production; however the opposite tends to occur when military expenditure declines. States may also influence the domestic arms industry by protecting them from foreign competition, and promoting their exposure to state-of-the-art technologies. These two measures need to be in balance with one another in order to avoid detrimental effects on national security. For example, the establishment of barriers and strict regulations on foreign products may encourage national production, however if these regulations are too rigid the defence industry production may eventually become isolated from foreign competition, and the

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<sup>12</sup> Watts, 2008, p. 5

<sup>13</sup> Bitzinger, 2003, p. 23-24

quality of weapons systems may subsequently decline and become technologically obsolete. Hoyt pointed out that “states which function at levels closer to the global ‘state of the art’ have greater military advantages over states operating further from the global standard”.<sup>14</sup> This proximity to modern and global military standards may be improved through experience in modern warfare and sophisticated military technique, or by increasing familiarity and expertise with major military technologies available on the global market.

The participation in conflicts such as the Gulf War, Iraq War and Afghanistan significantly increases the expertise of arms industries. Weapons systems are used on the field under real conditions; performance, endurance and quality may be tested and subsequently improved. This undoubtedly provides competitive advantages over other defence industries whose products are not tested in a real war.<sup>15</sup> This option is not always available (or desirable), therefore states may promote the participation in joint military exercises which permits nations’ defence forces to compare weapons systems and learn to operate alongside coalition forces with different systems.

States may also support the development and mastery of skills associated with military technologies within the society. This has been particularly true since the emergence of dual-use technologies in modern weapons systems and the option of using civilian technological expertise for military purposes. For example, the same industrial knowledge and capability required to develop and launch civilian

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<sup>14</sup> Hoyt, 2007, p. 17

<sup>15</sup> Hartung, W., ‘The Boom at the Arms Bazaar’, *Bulleting of the Atomic Scientists*, October 1991, Vol. 47 Issue 8, pp. 14-20

communications satellites into space may be used to develop military satellites and ballistic missiles, as is the case with the North Korean satellite programme. Likewise, the industrial capacities necessary to produce nuclear energy may also be employed to make further advances in the production of nuclear weapons.

In addition, states may negotiate procurement procedures involving foreign manufacturers, which may involve the signing of a government-level memoranda of understanding in order to increase transparency.<sup>16</sup> These procedures enable defence cooperation and promote rationalisation, standardisation and interoperability of defence equipment.<sup>17</sup>

International policies may have a significant impact on the defence industry and trade. The most illustrative scenario is the approval of an international arms embargo on a specific nation which forces the latter to search for alternative sources of supply in the short-term and to develop a more self-sufficient arms production in the medium to long-term. Nations that have followed this trend include Iraq following the U.N. arms embargo in 1973, Indonesia between 1999 and 2005, China (under U.S. and European arms embargo since 1989), and North Korea which has been under U.N. and European arms embargo since 2006.<sup>18</sup>

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<sup>16</sup> The U.N. defines Memoranda of Understanding as “*an international instrument of a less formal kind...often sets out operational arrangements under a framework international agreement ... also used for the regulation of technical or detailed matters.*”, United Nations Treaty Collection, [http://treaties.un.org/Pages/Overview.aspx?path=overview/definition/page1\\_en.xml#treaties](http://treaties.un.org/Pages/Overview.aspx?path=overview/definition/page1_en.xml#treaties) [accessed on 14/12/2012]

<sup>17</sup> US Department of Commerce, *Offsets in Defence Trade*, 2008, p. 20 [http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/final\\_offsets\\_eleven\\_report.pdf](http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/final_offsets_eleven_report.pdf) [accessed on 1/09/2012]

<sup>18</sup> SIPRI Arms Embargo Database <http://www.sipri.org/databases/embargoes> [accessed on 21/12/2012]

Diplomacy and the relationships between firms and states are important for promoting exports and consequently improving economies of scale through the expansion of arms markets. States may benefit from maintaining their arms industrial base and having more advanced weapon systems available as both may increase national security. The access of foreign multinational firms to small markets however has a huge impact on local producers as their products are usually less competitive. These inequalities are widely recognised by both the supplier and the recipient and have normally been compensated through 'offsets', such as industrial participations, technology transfers, and foreign direct investments (Fig. 4).<sup>19</sup> The U.S. Department of Commerce (DoC) defines offsets as a "range of industrial compensations arrangements required by foreign governments or foreign firms as a condition of the purchase of defence articles and services".<sup>20</sup> The DoC also classifies this concept into direct offsets (those related to the weapons transaction) and indirect offsets (those unrelated to the initial transaction). Primary defence firms see offsets as a necessary part of the international defence market competition, however the U.S. government recognised that offsets may be "economically inefficient and trade distorting", particularly when offsets agreements require a high proportion of subcontracting, co-production, licensed production, or purchases leading to a higher dependency on foreign suppliers and subsequently undermining the local industrial base. Furthermore, the transfer of technology associated with these offsets agreements

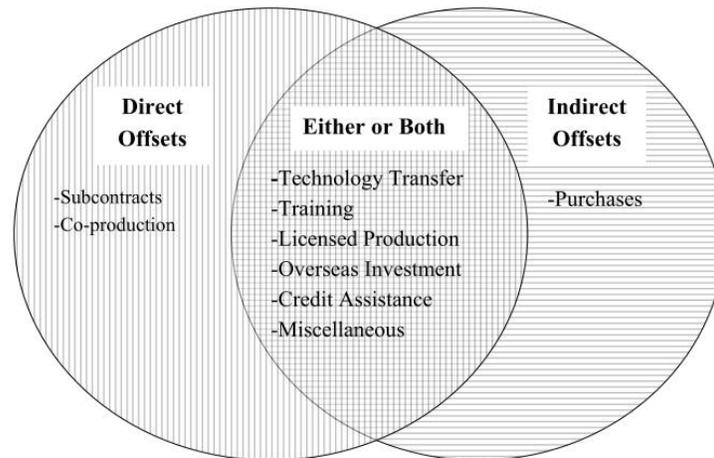
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<sup>19</sup> US Department of Commerce, *Offsets in Defence Trade*, 2008, p. 20

<sup>20</sup> US Department of Commerce, *Offsets in Defence Trade*, 2008, p. 12

may increase international competition in the defence sector as a result of further investments in R&D and arms production made by the recipient nation.<sup>21</sup>

**Figure 4: Classification of Offsets transactions categories<sup>22</sup>**



The detrimental effects produced by offsets have not prevented U.S. defence firms from using them. Between 1993 and 2007, US contracts involved offsets with an average value of 73% of the contract value and in 2003 the offset value surpassed the contract value for that year.<sup>23</sup>

States' policies on defence exports may also be highly controversial within the international community when less developed countries are compelled to purchase military weapons in exchange for financial aid. For example, the construction of the Purgau Dam in Malaysia was the largest aid project ever financed by the U.K.

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Nackman, M., 'A critical examination of offsets in international defence procurement: policy options for the United States', *Public Contract Law Journal*, Winter 2011, Vol. 40 Issue 2, pp. 517-525

<sup>22</sup> US Department of Commerce, *Offsets in Defence Trade*, 2008, p. 9

<sup>23</sup> US Department of Commerce, *Offsets in Defence Trade*, 2008, p. 4

and proved to be linked to a £1 billion Malaysian purchase of British arms in the late 1980s.<sup>24</sup>

In addition to the exportation of arms, nations and firms may cooperate through other arrangements such as licensed production, defined as “the transnational sale or transfer of the rights to manufacture a weapon system that was originally developed by the supplier’s country”. This has been used as one of the initial steps in the development of an indigenous arms industry. The receiver benefits from the use of foreign expertise and technology to manufacture a mature product which facilitates the learning process and familiarisation of the specific weapon system. The supplier also benefits by being able to access foreign markets and reduce production costs (owing to lower salaries in the recipient nation).<sup>25</sup> In addition, there is the possibility of co-production programmes involving the joint manufacture of either an entire weapons system or particular components that were originally produced entirely by the one country. This activity usually occurs for political rather than economic reasons. Consequently, co-production may involve higher costs per unit, such as the F-16 produced in Belgium, Denmark, the Netherlands and Norway, which was reported to cost 34% more per unit than the U.S. counterpart.<sup>26</sup> Finally, there is also the possibility of co-development programmes which entail defence firms from different countries working together to develop and produce common weapon systems; these programmes are often

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<sup>24</sup> Crump, 2007, pp. 198-199

<sup>25</sup> Bitzinger, R. A. *The Globalization of the Arms Industry: The Next Proliferation Challenge*, International Security, International Security, Vol. 19, No. 2, MIT Press, 1994, pp. 170-198

<sup>26</sup> Bitzinger, 1994, p. 177; Hartley, 2012, p. 128.

not government promoted and therefore may result in reduced duplicities in R&D and achieve economies of scale during longer production runs.<sup>27</sup>

## **Military, technology and the arms industry**

The principle of *Qualitative Superiority* – this is that armed forces perform best when personnel, weapons, equipment, and supplies are superior to those of the most capable opponents– has driven the fundamentals of military readiness throughout the history of warfare. Armed forces’ readiness therefore depends significantly on the quality and quantity of weapons systems and equipment supplied by the arms industry.<sup>28</sup>

At the end of the Second World War, governments with significant arms acquisition programmes largely invested in R&D technologies (such as nuclear submarines, high performance jet aircraft, ballistic missiles, satellites, or armoured personnel carriers) to retain military competitiveness and production capability.<sup>29</sup>

The arms industry reached such a scale that it emerged as the largest industrial sector in the U.S. in the late 1950s, exceeding that of automobiles, steel and oil.<sup>30</sup>

As the defence industry matured, governments increased control on military spending, namely on procurement and military R&D technologies; new regulations made it more difficult to enter or exit the arms industry business. The increasing integration of new technologies into modern weapons systems created additional obstacles for the arms industry, as the latter required the maintenance of high

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<sup>27</sup> Bitzinger, 1994, p. 177-181

<sup>28</sup> Collins, 2002, pp. 99-106

<sup>29</sup> Brooks, 2005, p. 80

<sup>30</sup> Watts, 2008, p. 15

levels of engineering skills and capabilities. A more dramatic growth in R&D in the commercial sector occurred at a similar time, resulting in the development of state-of-the-art dual-use technologies. The defence industry is now faced with the challenge of keeping up with the pace of commercial innovations and integrating these developments into modern weapons systems.<sup>31</sup>

Defence innovation is a complex process, requiring the early detection of warfare trends in order that new technologies, doctrines and tactics maybe employed cooperatively to acquire significant superiority over the opponent. The early recognition of these trends would not only save on resources that would otherwise be employed in acquiring obsolete equipment, but would also save time by eliminating the need for training procedures and preparing battle plans that are based on “moribund notions of how doing war”.<sup>32</sup>

Research and development funding has maintained a significant role in the defence industrial base; however, governments have not always been inclined to integrate new technologies into the production of military equipment. This trend is perhaps more marked when military expenditures are limited. The most recent guides on U.S. procurement emphasise the use of proven technologies and a more flexible approach on military requirements.<sup>33</sup> Investment in R&D is proving to be crucial for the maintenance of a competitive defence industrial base, owing to

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<sup>31</sup> Watts, 2008, pp. 18-19

<sup>32</sup> O’Hanlon, 2005, p. 173

<sup>33</sup> U.S. Department of Defence, *U.S. Overview of Fiscal Year 2011 Budget Request*, 2011, pp. 2-5, 2-6

the increasing sophistication of weapons systems. The U.K. MoD devoted as much as 35% of its budget to this activity.<sup>34</sup>

## **Economy and the arms industry**

The defence industry may deal with either a sole buyer (national government) or a limited number of other buyers (other nations). It also works with controlled prices and the manufacture of ad-hoc products; profits are therefore determined by the reimbursement of costs rather than by market competition. This is unlike other manufacturing and service sectors where markets may expand easily and prices are set by supply and demand. Further, the production of weapon systems entails numerous regulations and security barriers that do not exist in other sectors. The return of investment may also be hugely affected when governments cancel or diminish a military programme, often for political or budget control reasons, resulting in the need for large adjustments in production and the loss of valuable skilled personnel (which may be difficult to replace at a later stage). The incentives to enter the defence business have clearly declined in the last decades owing to there being less demand for military hardware, reduced profitability, and greater uncertainty.<sup>35</sup>

The process of military acquisition has greatly evolved since the late 1980s. The traditional process based on the state's strong funding of R&D towards a target defence system, followed by an assured procurement is no longer applied. The

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<sup>34</sup> U.K. Ministry of Defence, *Statistics 2011*, online document, [www.dasa.mod.uk](http://www.dasa.mod.uk) [accessed on 12/11/2012]

<sup>35</sup> Hartley & Sandler, 1995, pp. 113-121

defence systems are currently relying more and more on commercial products, subsequently reducing the willingness of the defence industry to invest in military-related R&D. As noted previously, states are faced with the challenge of capitalising the fast moving commercial market and its economies of scale in order to integrate the latest technologies into new weapons systems. Those nations with a defence industrial base formed by a unique supplier rarely have the means to rapidly exploit new technologies, and therefore fail to take advantage of commercial-sector production economies.<sup>36</sup> Furthermore, political/economic decisions have frequently prevailed over military requirements, with governments often purchasing weapons systems in order to sustain the local industrial base instead of purchasing the best weapons systems available on the global arms market. For example, in 2000 the South Korean government ordered a batch of 20 F-16 fighters to keep its major aerospace defence firm, KAI, afloat despite objections from its Air Force.<sup>37</sup>

The concentration and consolidation of defence firms has resulted in the domination of the industry in some states by one or two major corporations, which in the long run may undermine the industry's competitiveness. For example, U.S. aircraft production is now dominated by Lockheed Martin and Boeing, and UK's procurements are largely supplied by BAE Systems.<sup>38</sup>

The arms industry is nevertheless able to generate numerous jobs across multiple sectors such as engineering, electronics, and business management, often

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<sup>36</sup> Bitzinger, 2009, p. 124

<sup>37</sup> Bitzinger, 2003, p. 51

<sup>38</sup> Bitzinger, 2009, pp. 160-162

providing sub-contracting capability, and even with one or two major players the industry is able to remain beneficial for local economies.

In spite of the positive contributions to society, controversial aspects surrounding the arms industry such as well-reported cost overruns, development and production delays, and reported cases of corruption, have meant that the military industrial complex is not always perceived favourably by society.<sup>39</sup> Sandler and Hartley highlighted how the defence industry, politics and military programmes have influenced one another to execute investments in weapons systems, which during the development phase frequently incur cost overruns and delays, and once entered into service demonstrate unsatisfactory performance.<sup>40</sup> With the cost of weapons often 20-50 percent above original estimates, it is not surprising that the defence industry is often criticised in political and public arenas for its deficiencies and excessive profits, and the procurement agencies are accused of poor project management.<sup>41</sup>

A case in point is the Lockheed Martin F-35 Joint Strike Fighter which is the most expensive military-industrial programme in history, but contrary to promises made has experienced significant delays and a serious cost over-run –with the average cost per unit rising from US\$61 million in 2001 to US\$133 million by 2011. Not surprisingly, the programme has been condemned by many critics of the US defence industry.<sup>42</sup>

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<sup>39</sup> Bitzinger, 2009, p. 113

<sup>40</sup> Hartley & Sandler, 2007, p. 1141

<sup>41</sup> O'Hanlon, 2005, p 30; Naylor, R., *Patriots and Profiteers: Economic Warfare, Embargo Busting, and State-Sponsored Crime*, McGill-Queen's Press - MQUP, 2008, pp. 50-60

<sup>42</sup> The Economist, *The last manned fighter: will the F-35 survive?*, 14 July 2011, online article, <http://www.economist.com/node/18958487> [accessed 9 February 2012]

Arms production has always been a reactive and cyclical industry. The eventuality of war in key periods has fostered arms production, whilst the end of hostilities has compelled further transformation and a reduction of the industry. Despite its dynamic nature, the defence industry receives continual support from governments and will always be needed owing to constant weapons development and upgrading programmes. The controversial aspects that frequently evolve around government defence programmes however, will continue to generate constant political and public scrutiny. The defence industry is one that has a strong presence, especially in Western nations, and with the continued requirement for security will maintain that presence and importance. For most nations in the Asia-Pacific that require both defence and the possibility of having to project force, a national defence industry or participation in the global arms industry will remain a necessity.

## **CHAPTER 3**

### **GLOBAL DEFENCE INDUSTRY**

The tension between defence firms led by liberal postulates and states with different strategic industrial requirements will undoubtedly rise as a result of increasing globalisation. One of the key developments in defence industry over the previous century has been the transition from predominantly national-based defence industrial bases to a transnational (global) defence industry. In the same manner that other industrial processes and outputs are dominated by transnational production in the modern era, the defence industry also is increasingly global. In order to understand the current trends of the defence industry, it is important to consider such industry within the contexts of globalisation, multinational corporations and geographically dispersed production.

The phenomenon of globalisation has been an area of controversy within contemporary international relations (creating a theoretical dispute between realism and liberalism) and for which as yet there is no widely accepted definition. Patman broadly defines globalisation as “the intensification of interconnections

between societies, institutions, cultures, and individuals on a worldwide basis”.<sup>1</sup> Ritzer metaphorically describes globalisation as a set of processes which increases *liquidity* and forms multidirectional *flows*.<sup>2</sup> These interconnections and flows tend to favour the perception of a borderless world and the diminishing relevance of the sovereign nation-state concept. This vision (which is supported by the so-called ‘hyper-globalists’) is contested by those who believe that little has changed in the international arena. It seems appropriate, therefore, to use an approach that not only acknowledges the unprecedented changes that are taking place, but also recognises the continuity of the current international system.<sup>3</sup>

Two significant changes in the world economy have occurred since the early 1980s: the unprecedented emergence of giant corporations operating as ‘multinationals’ and integrating production on a global scale; and the materialisation of the global capital market. These changes, combined with the impact of new technologies (becoming more dependent on cooperative R&D), have resulted in the reliance of national economies on the international market and trade.<sup>4</sup> These trends have greatly fuelled the revival of the liberal political economy, currently described as ‘neo-liberalism’. As mentioned previously, this theory strongly supports the idea of free markets, the disappearance of physical barriers and controls, and the openness of economies. States may exclude or discourage foreign competition in order to protect national production. The cost of these measures is usually very high as local products may become obsolete and

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<sup>1</sup> Patman, R., *Globalization, Civil Conflict and the National Security*, State Contemporary Security Studies, Taylor & Francis, London, 2006, p. 4

<sup>2</sup> Ritzer, G., *Globalization: The Essentials*, Wiley-Blackwell, Chichester, 2011, p. 2

<sup>3</sup> Brown & Ainley, 2009, p. 177-178

<sup>4</sup> Brown & Ainley, 2009, pp. 178-180; Brooks, 2005, pp. 16-46

less attractive than foreign products. This leads to a decline in exports, followed by lower production and higher unemployment.<sup>5</sup>

The increasing expansion of multinational corporations (MNCs), the number of which has been estimated to be approximately 61,000 with over 900,000 affiliates, also has an important effect on the global arms industry.<sup>6</sup> The arms production has become dominated by a few giant firms and the development of modern weapons systems is becoming highly internationalised. A study of the *Verdin* (a shore-to-ship communications system used by the U.S. Navy in 1992) revealed that the production of this system involved 40% second-tier procurements from foreign subcontractors based in 23 different countries.<sup>7</sup> In general, this internationalisation of production has been motivated by three main factors: the need to restructure and become more efficient, the focus on emergent markets as a result of rapid growth of these economies, and the significant rise in the number of multinational corporations from developing countries, including state-owned firms.

The increasing influence of international organisations, such as the World Bank and the International Monetary Fund (IMF), and multinational firms may limit the intervention capabilities of states in their national economy. National wellbeing and economic growth depend more greatly on there being good relations with international markets and a state's strength is now a measure of its ability to 'use MNCs for its own ends'.<sup>8</sup> Although the global economy has certainly influenced the

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<sup>5</sup> Brown and Ainley, 2009, p. 181

<sup>6</sup> Brooks quantifies the number of MNCs in 65,000 with 850,000 affiliates, Brooks, 2005, p. 16; Ritzer, 2011, p. 73

<sup>7</sup> Brooks, 2005, p. 84-92

<sup>8</sup> Brown & Ainley, 2009, p. 185

concept of sovereignty, the security aspects of sovereignty have probably remained largely unaltered.

The defence industry clearly manifests the tension that exists between global economy, national security and sovereignty, which is also a feature of globalisation. This complex scenario is exacerbated by the dynamic nature of the defence industry and the difficulties to adapt traditional structures and procedures (often involving hundreds or thousands of subcontractors) to new technologies and a more broadly dispersed production.

States have different industrial capacities which may create relations of technological dependency amongst them. Some countries have defence industries with technological innovation capacities whilst others are more limited to the assembly of imported components or to simple licensed production. Arms-producing capabilities and the assimilation of technologies are commonly classified into a number of stages which together form the 'ladder of production' (Table 2 and 3 below). Defence scholars have not reached an agreement on the actual number of steps that this process involves, however for all models the 'ladder of production' describes the progressive development towards a self-sufficient industry and therefore a gradual decrease in foreign dependency on technology and innovation. The state plays an essential role in this process, particularly if it does not have an established industrial base.

**Table 2: The ladder of Production Model 1 (Krause)<sup>9</sup>**

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1. Capability to perform simple maintenance
  2. Overhaul, refurbishment and rudimentary modification capabilities
  3. Assembly of imported components, simple licensed production
  4. Local production of components or raw materials
  5. Final assembly of less sophisticated weapons; some local component production
  6. Co-production or complete licensed production of less sophisticated weapons
  7. Limited R&D improvements to local licensed-produced arms
  8. Limited independent production of less sophisticated weapons; limited production [with foreign assistance] of more sophisticated weapons
  9. Independent R&D and production of less sophisticated weapons
  10. Independent R&D and production of advanced arms with foreign components
  11. Completely independent R&D and production
- 

**Table 3: The ladder of production Model 2 (Hoyt)<sup>10</sup>**

- 
1. Under-industrialised nations purchase foreign weapons systems, and relies heavily on foreign trainers, technicians and advisors
  2. As the industrial and technical base mature, [nations] assume greater responsibility for upkeep, maintenance, and repair of weapons, decreasing reliance on advisors and trainers
  3. Extensive familiarisation with new technologies, [nations] move to local assembly of foreign weapons from imported components
  4. Assembly, in time, leads to licensed production with increasing portions of local content and decreasing reliance on imported components and parts
  5. Technological assimilations through use and production, in theory, leads to eventual use of acquired infrastructure for local R&D, weapons design, and completely indigenous production
- 

Once an initial investment in infrastructure, specialised machinery and skilled labour has been made, the production of simple weapons systems such as small

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<sup>9</sup> Krause, 1992, p. 170

<sup>10</sup> Hoyt, 2007, p. 9

arms or trainer aircraft may progress up the ladder of production without significant additional costs.<sup>11</sup> The manufacture of more complex weapons systems, however, indicates a different scenario. The cost of licensed production for both simple and relatively more complex weapons systems is similar during the initial and intermediate stages of the ladder of production. The production costs however increase once nations advance towards a more indigenous production. Countries that achieve this may begin to develop and produce more advanced weapons systems and cooperate with foreign firms and governments. These products obviously require advanced technologies, which in most cases involve significant and regular investments in R&D. Additionally, new technologies often lack maturity so their integration may add complexity, time and cost to the development of more advanced weapons systems.<sup>12</sup>

Progressing up the ladder of production towards autarky entails significant challenges, which may exceed the industrial capabilities of most arms producers. The success of manufacturing less sophisticated weapons systems has led some countries to expand their production capacities and advance towards an indigenous industry. If, however, the military programmes that spurred these decisions come to an end or are abruptly interrupted, these countries may experience a series of problems including overcapacity; the inability to access foreign markets (resulting in poor economies of scale); and a subsequent increase in costs per unit and reduction of their competitiveness. These negative effects are

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<sup>11</sup> Bitzinger, 2003, p. 36

<sup>12</sup> Bitzinger, 2003, p. 33-38

particularly damaging to the defence industry in a highly competitive arms market.<sup>13</sup>

The ladder of production also demonstrates the hierarchical structure of the global arms industry. Most systematic studies categorise arms production into a number of tiers (normally between two and five) depending on their industrial capabilities. The table below compares and contrasts the criteria used by four authors who have studied this aspect of the defence industry (Hoyt, Krause, Ross, and Bitzinger). Within the second tier, Bitzinger distinctly groups nations into three categories, demonstrating that there is an increasing number of less dominant countries (within the defence industry) with similar levels of technologies: (1) small but advanced arms industries (e.g. Australia and Japan); (2) developing countries with established military industrial complexes (e.g. Singapore, Taiwan or South Korea); and (3) developing nations with large defence industries but lacking the industrial capabilities to develop and produce the most advanced weapons systems (e.g. China and India). Nations' industrial capabilities have naturally evolved over time which may explain variations in the classification of certain countries by different authors. France, Germany and the U.K. obviously formed part of the first tier before the Second World War, however dropped down to the second tier during the Cold War and are appearing again in the first tier in the last two decades.<sup>14</sup>

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<sup>13</sup> Bitzinger, 2003, p. 32

<sup>14</sup> Ross, A. et al., *Military Transformation and the Defence Industry After Next*, Newport Paper 18, U.S. Naval War College Press, 1993, pp. 21-28; Bitzinger, 2009, p. 2

**Table 4: The hierarchy of arms production – models comparison (Krause, Ross, Hoyt and Bitzinger)<sup>15</sup>**

	Krause (1992)	Ross (1993)	Hoyt (2007)	Bitzinger (2009)
Tier 1	The U.S. and the Soviet Union	The U.S. and the Soviet Union	States which are able to innovate and become the sole or dominant producers of a given arms technology.	United States, Britain, France, Germany, Italy [and Russia]
Tier 2	Western Europe	France, Germany, Italy, Japan, Sweden, the United Kingdom and China	States which are able to adapt state-of-the-art technologies to military production.	Small but advanced defence industries (e.g. Australia, Canada, the Czech Republic, Norway, Japan and Sweden)
				Developing countries with established military industrial complexes (e.g. Argentina, Brazil, Indonesia, Iran, Israel, Singapore, South Africa, South Korea, Taiwan, and Turkey)
				Developing states with large defence industries without independent (R&D) and limited industrial capacities to develop and produce advanced conventional arms (i.e., China and India).
Tier 3	Rest	Developing, newly or smaller industrialised nations e.g. Brazil, Israel, India, South Korea and Taiwan	States which copy and reproduce (apply) existing technologies	Egypt, Mexico, and Nigeria

<sup>15</sup> Tiers adapted from Hoyt, 2007, p. 13 and Bitzinger, 2009, p. 2-4

Tier 4		México and Nigeria	States which acquire and use existing technologies, but are incapable of production.	
Tier 5			States which both acquire technologies and cannot use them or which do not obtain them at all.	

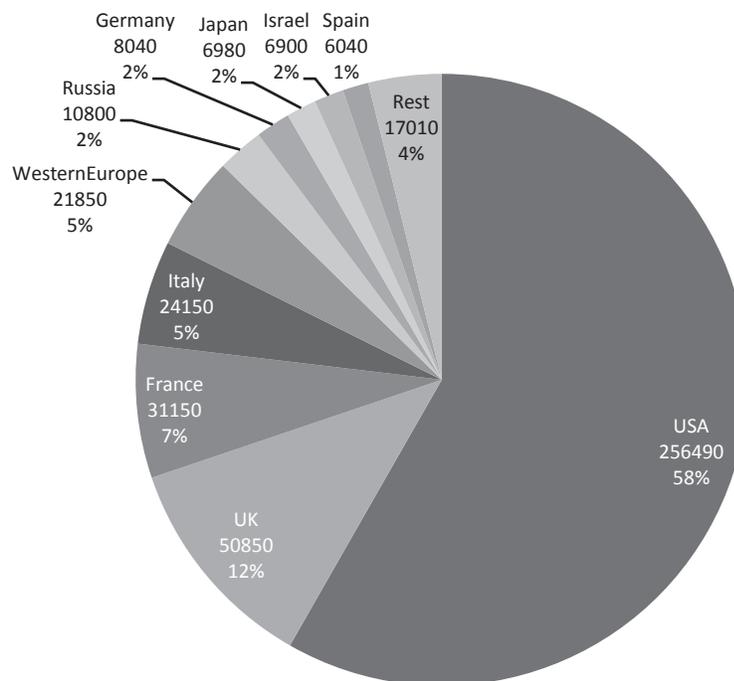
The relative position of a nation in the hierarchy indicates the degree of influence it may have over other nations within the global arms industry and how it may be affected by other nations' developments. The U.S. (and to a lesser degree other first tier nations) allocates enormous resources to R&D which increase its capability to innovate new weapons systems and maintain its technological superiority in the defence sector. Second tier nations have more limited resources and so are only able to excel in a few specific technological niches. One such example is the South African mine-resistant wheeled military vehicle, the Land Systems OMC RG-31 Nyala, which is considered a vehicle of choice for peacekeeping operations by the U.N. and by a number of individual countries including the U.S., Canada and Spain.<sup>16</sup> This particular case illustrates that although the RG-31 is based on an indigenous design with a long history of manufacture in South Africa (i.e. the Mamba Armoured Personnel Carrier, which entered South Africa National Defence Force service in 1995), Land Systems OMC [however,] is actually a division of the multinational corporation BAE Systems, clearly illustrating the effects of globalisation on the defence industry.

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<sup>16</sup> Hasik, J., *Arms and Innovation: Entrepreneurship and Alliances in the Twenty-First Century Defence Industry*, University of Chicago Press, Chicago, 2008, pp. 112-114

There is a small group of dominant countries (mainly the U.S. and West European countries) that account for almost 85 percent of global arms production and lead (either individually or collectively) the R&D in the military industry. In 2000, the defence firms of these countries accounted for 56 per cent and 36 per cent respectively of the total arms sales. These rates only marginally differed in 2010, when the U.S. and West European companies were responsible for around 60 percent and 30 percent, respectively, of the total arms sales.<sup>17</sup>

**Figure 5: Distribution by country of the top 100 arms producer firms in 2008. It includes the nations' arms sales in US\$ million and percentage of arms producing firms<sup>18</sup>**



<sup>17</sup> Arms sales involving member states of the Organisation for Economic Co-operation and Development (OCDE) and developing countries excluding China. This distribution by country refers to the location of the company headquarter, not necessarily the location of production. Noted by SIPRI, *Top 100 Arms Producing Firms by country*, online document, <http://www.sipri.org/research/armaments/production/Top100> [accessed on 10/09/2012]

<sup>18</sup> Ibid

Analysis of the of the world's 100 largest arms-producing and military service companies (excluding Chinese firms) in the last two decades demonstrates a concentration of the global arms production in the few large corporations. The table below illustrates that the top five firms accounted for 43 per cent of the total arms sales in 2005. A similar pattern was observed in a subsequent analysis of the 20 largest arms-producing firms, which became responsible for almost three-quarters of the total arms sales in 2005. They increased from 57 per cent of the global arms sales in 1990 to 74 per cent in 2005.<sup>19</sup>

**Table 5: Arms sales percentages of the largest arms-producers firms between 1990 and 2005<sup>20</sup>**

	1990	1995	2000	2005
5 Largest Companies	22%	28%	41%	43%
10 Largest Companies	37%	42%	57%	62%
15 Largest Companies	48%	53%	65%	69%
20 Largest Companies	57%	61%	70%	74%

## The impact of military spending and international trade

The defence industry is most greatly affected by states' available defence funds allocated to military expenditure. Two important factors that have commonly influenced military spending are the perception of threats on national security, and the condition of the national economy. There are numerous examples that illustrate how security threats have spurred military spending, such as the British military build-up in the late 1930s, the arms race during the Cold War, and more

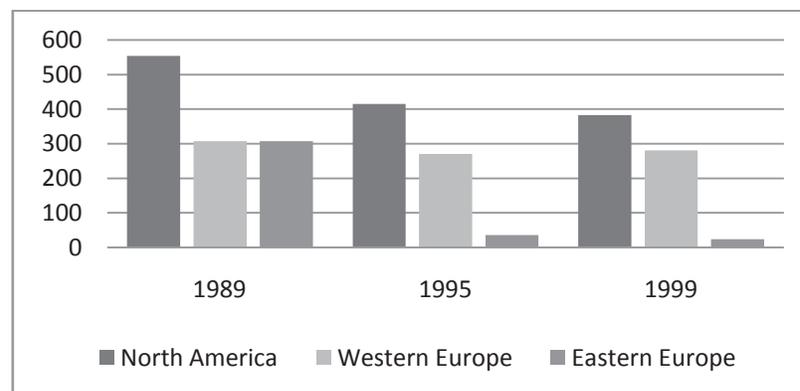
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<sup>19</sup> SIPRI, *Concentration ratios of the Top 100 arms-producers companies*, online document, [http://www.sipri.org/research/armaments/production/researchissues/concentration\\_aprod/ratios](http://www.sipri.org/research/armaments/production/researchissues/concentration_aprod/ratios) [Accessed 10/08/2012]

<sup>20</sup> Ibid

recently the increased expenditures associated with the War on Terror. Likewise, the absence of serious threats has had the opposite effect, with for example military spending having declined significantly following the First World War and then again after the Cold War. Results from Bitzinger's analysis on the impact of military spending found that during the 1990s global defence budgets fell by nearly 35 per cent and the size of the world's armed forces dropped from 28.6 million personnel in 1989 to 21.3 million in 1999. This general trend was particularly severe in Eastern Europe, as shown in the table below.<sup>21</sup>

**Figure 6: Military expenditure of selected regions in constant (2010) US\$ (billions)<sup>22</sup>**



The major downsizing experienced by the arms industry between 1990 and 1995 created an overcapacity of arms producing firms, compelling factories to cut back on their production or even to close down, with hundreds of thousands of defence workers made redundant.<sup>23</sup> Furthermore, the global defence industry underwent important restructuring, with the number of defence firms worldwide having

<sup>21</sup> Ibid

<sup>22</sup> Information elaborated from data obtained at SIPRI Military Expenditure Database, SIPRI, online document, <http://www.sipri.org/databases/milex> [accessed on 02/08/2012]

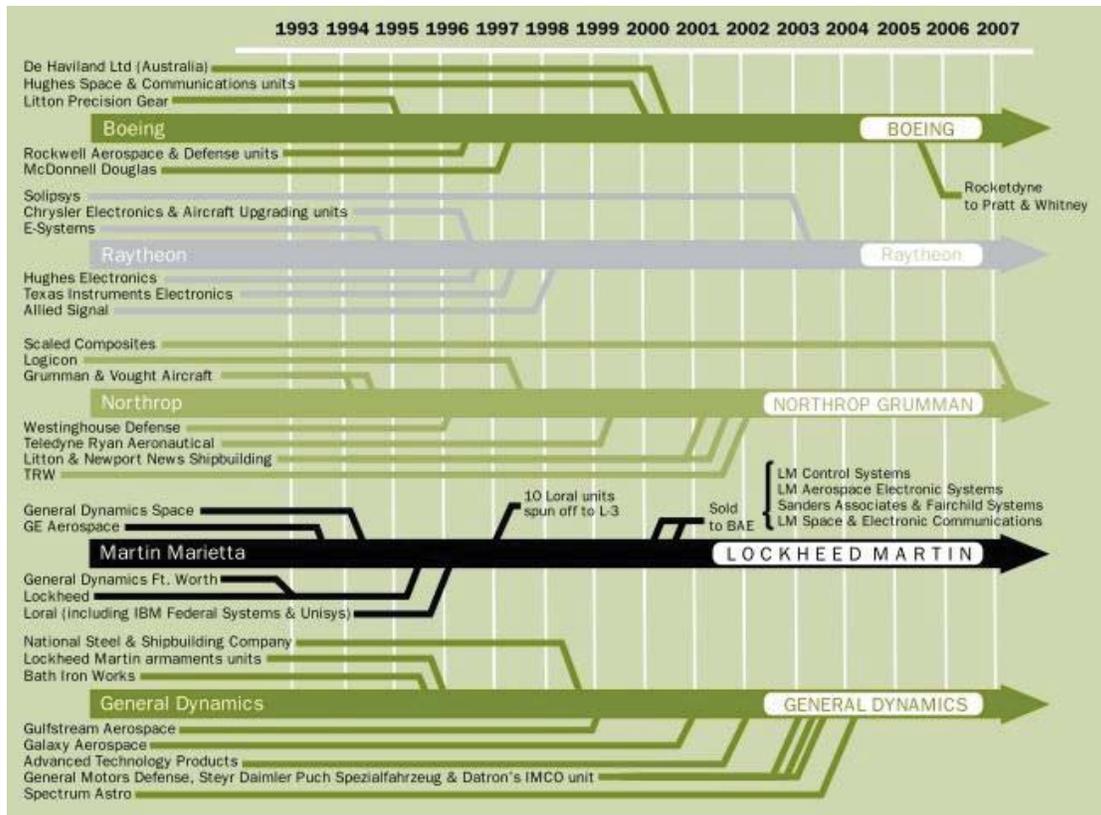
<sup>23</sup> Inbar, E. & Zilberfarb, B., *The Politics and Economics of Global Defence Industries*, Routledge, London, 1998, pp. 55-58

declined considerably through a series of mergers and acquisitions. The remaining firms subsequently emerged as the enormous corporations reflective of globalisation, in particular Lockheed Martin, Northrop Grumman, Boeing, Raytheon and General Dynamics in the U.S.A., and DaimlerChrysler Aerospace/DASA, EADS, BAE Systems and Thales in Europe. In the U.S.A., the concentration of arms production in the five North American mega-firms (which also have international feeder companies) has resulted in a decrease in competition within the defence industry. These firms, shown in the figure below, have received nearly one-third of all the U.S. defence procurement expenditures and are controlling most key U.S. military programmes. They have additionally benefited from significant portions (approximately 50 per cent) of defence funding allocated to R&D.<sup>24</sup>

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<sup>24</sup> Watts, B., *The U.S. Defence Industrial Base: Past, Present and Future*, Centre for Strategic and Budgetary Assessments, 2008, p. 32, online document [http://www.csbaonline.org/4Publications/PubLibrary/R.20081015.\\_The\\_US\\_Defense\\_In/R.20081015.\\_The\\_US\\_Defense\\_In.pdf](http://www.csbaonline.org/4Publications/PubLibrary/R.20081015._The_US_Defense_In/R.20081015._The_US_Defense_In.pdf) [accessed on 23/08/2012]

Figure 7: Major mergers and acquisitions of U.S. defence firms, 1993-2007<sup>25</sup>



In Europe, the defence industry is still characterised by the presence of many smaller firms which tends to create problems of overcapacity and duplications. Almost every nation within Europe is still committed to support some indigenous production, which often results in poor economies of scale. Not only is European defence spending on R&D approximately 20 per cent lower than in the U.S.A., but is also decided by each European nation independently, resulting sometimes in duplications of similar research programmes.<sup>26</sup> The increasing pressures for enhancement of R&D in Europe has resulted in some movement within the defence sector, such as the recent plan to merge the two European defence giants

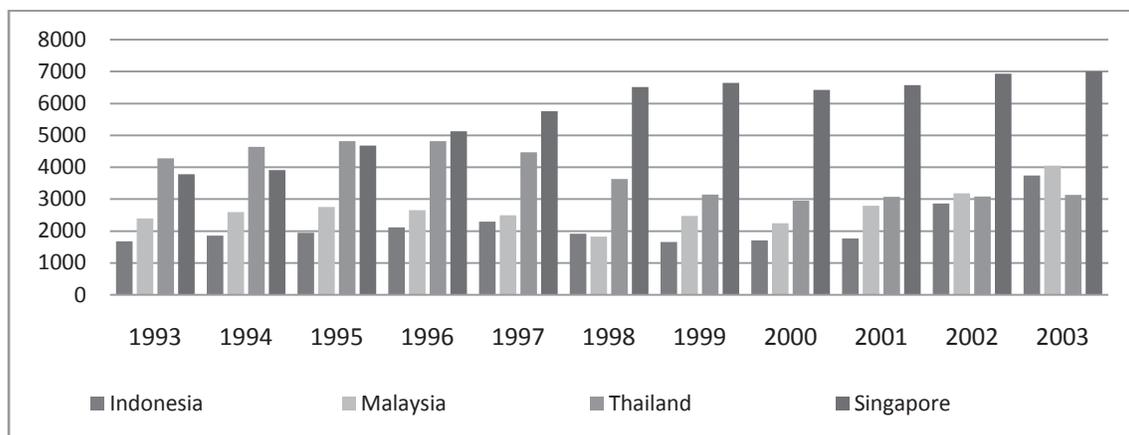
<sup>25</sup> Ibid

<sup>26</sup> Bekkers *et al.*, 2009, pp. 9-11, [http://ec.europa.eu/enterprise/sectors/defence/files/edem\\_final\\_report\\_en.pdf](http://ec.europa.eu/enterprise/sectors/defence/files/edem_final_report_en.pdf) [accessed on 21/08/2012]

BAE Systems and EADS, which would have created the largest aerospace defence corporation in Europe, had the German government not vetoed the proposal.<sup>27</sup>

In the Asia-Pacific, the financial crisis of the late 1990s had a major impact on the defence expenditures of a number of Asian countries. Most emergent economies in Southeast Asia experienced drastic decreases of Gross Domestic Product (GDP), and subsequently also of military expenditure: for example, Indonesia dropped by almost 30 percent between 1997 and 1999, Malaysia by over 30 per cent between 1995 and 1998, and Thailand by almost 40 per cent between 1996 and 2000.<sup>28</sup>

**Figure 8: Military expenditure of selected countries in Southeast Asia (1993-2003) in constant (2010) US\$ (millions)<sup>29</sup>**



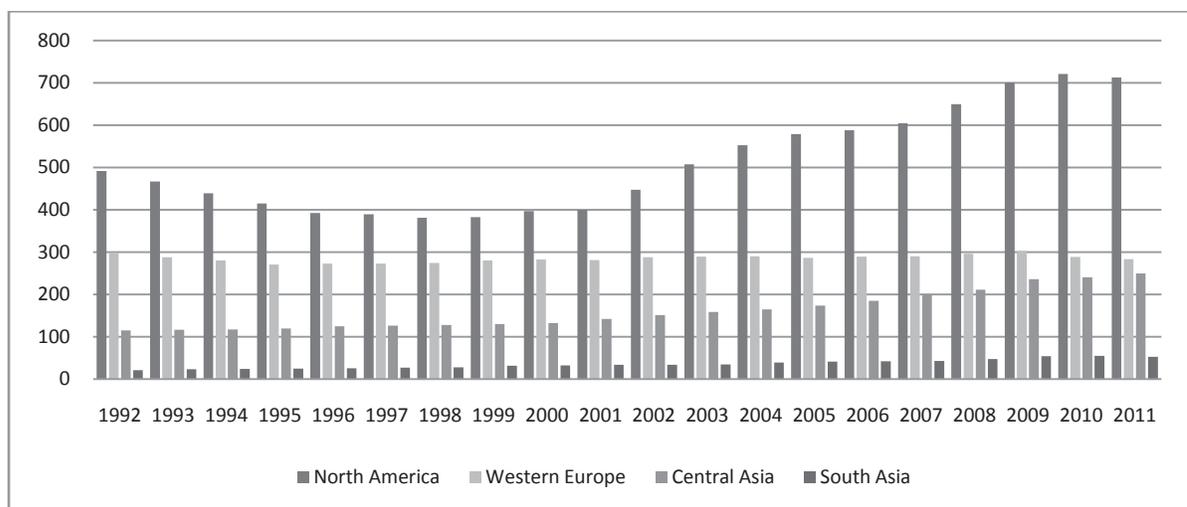
<sup>27</sup> The Economist, *Kaputt*, 13 October 2012, online article, <http://www.economist.com/node/21564569?zid=293&ah=e50f636873b42369614615ba3c16df4a> [accessed on 17/12/2012]; The International Institute for Strategic Studies, *BAE-EADS: facing up to a smaller defence market*, September 2012, online article, <http://www.iiss.org/publications/strategic-comments/past-issues/volume-18-2012/september/bae-eads-facing-up-to-a-smaller-defence-market/> [accessed on 7/12/2012]

<sup>28</sup> Information elaborated from data obtained at SIPRI Military Expenditure Database, <http://www.sipri.org/databases/milex> [accessed on 12/08/2012]

<sup>29</sup> Information elaborated from data obtained at SIPRI Military Expenditure Database, <http://www.sipri.org/databases/milex> [accessed on 12/08/2012]

The declining trend on military spending was reversed at the end of the century and military spending has then continued to climb throughout the last decade. The world's military spending increased by nearly 50 percent between 2000 and 2007. The U.S.A. demonstrated the greatest increase in defence expenditures. Most other nations of the 20 major economies (G20) also increased their military spending, in spite of a period of global financial crisis and an economic recession. In 2011, the world military expenditure was estimated at over US\$ 1.7 trillion (approximately 2.5 per cent of global GDP).<sup>30</sup>

**Figure 9: Military expenditure by selected regions in constant (2010) US\$ (billions)<sup>31</sup>**



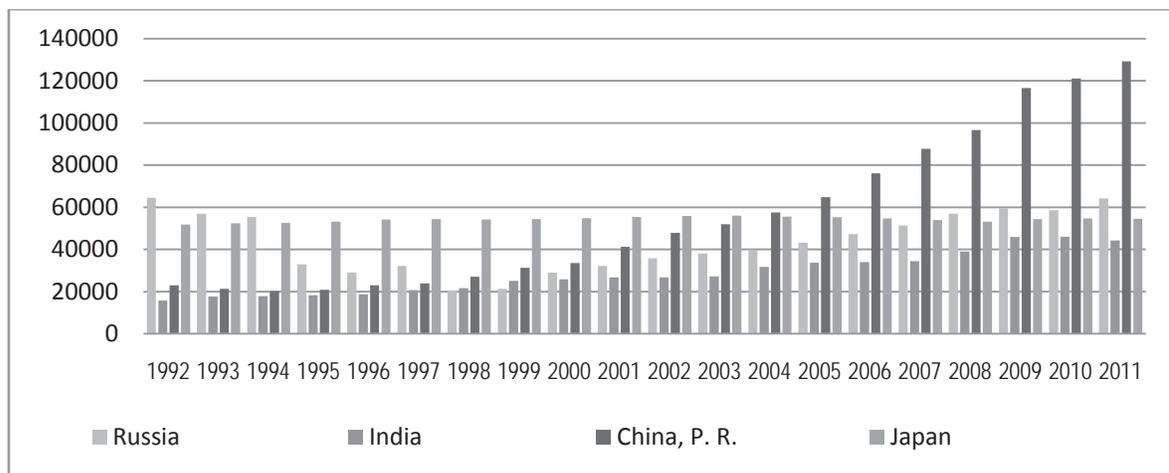
There is now however, strong evidence pointing to a decline in military expenditure. Countries that are unable to maintain large budget deficits and that are highly dependent on commodities exports are forced to reduce military spending. Even the U.S.A. has been strongly affected, with the U.S. Department of

<sup>30</sup> SIPRI, *World Military spending levels out after 13 years of increases*, SIPRI Media Press Releases, 17 April 2012, online document, <http://www.sipri.org/media/pressreleases/17-april-2012-world-military-spending-levels-out-after-13-years-of-increases-says-sipri> [accessed 15/11/2012]

<sup>31</sup> Information elaborated from data obtained at SIPRI Military Expenditure Database, <http://www.sipri.org/databases/milex> [accessed on 16/08/2012]

Defence (DoD) having requested a budgetary allocation of US\$613.9 billion for the Fiscal Year 2013 which represents a decrease of almost 20 percent compared with the 2011 DoD budget. Further, the DoD plans to maintain a constant defence budget until 2017, with any annual increases being less than one per cent.<sup>32</sup> According to the SIPRI Database on military expenditure (2000-2011), China (the world's second largest defence spender) has been maintaining double-digit rates of growth on defence expenditure since 1997, India and Russia have also increased their military expenditures by greater than 50% and 65% respectively since 1998, and Southeast Asian nations have similarly experienced significant increases in defence spending in recent years. Western Europe and Japan on the other hand, have remained relatively static over the last twenty years (Figs. 12 and 13).

**Figure 10: Military expenditure by selected nations in constant (2010) US\$ (millions)<sup>33</sup>**



<sup>32</sup> U.S. Office of the Undersecretary of Defence (COMPTROLLER), *U.S. Overview of Fiscal Year 2013 Budget Request*, February 2012, pp. 1-3, online document, [http://comptroller.defense.gov/defbudget/fy2013/FY2013\\_Budget\\_Request\\_Overview\\_Book.pdf](http://comptroller.defense.gov/defbudget/fy2013/FY2013_Budget_Request_Overview_Book.pdf) [accessed on 30/01/2013]

<sup>33</sup> Information elaborated from data obtained at SIPRI Military Expenditure Database, <http://www.sipri.org/databases/milex> [accessed on 16/08/2012]

Another important factor that greatly influences the global arms industry at this time is international trade. As noted previously, access to foreign markets has become essential to maintain and increase economies of scale. The decline in domestic military spending in the post-Cold War era compelled major firms to concentrate, diversify and expand their businesses with marketing overseas. Whereas US defence firms have been able to depend fundamentally on their domestic market, with only 5-15 percent of sales being generated overseas, European defence firms have been increasingly dependent on foreign sales as a result of reduced government military spending.<sup>34</sup> In fact, a number of the major arms producing firms in Europe such as BAE Systems, Thales, Dassault, and Saab have reportedly generated more than 50 per cent of their revenues through exports.<sup>35</sup> Furthermore, the arms industries in some countries have become essentially export-oriented, in particular Russia and Israel, both of which have marketed their exportations to developing nations mostly in Africa and the Asia-Pacific.<sup>36</sup> The table below demonstrates the extent to which arms supplies especially in Europe are dependent on international sales.

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<sup>34</sup> Bitzinger, 2009, pp. 2-10

<sup>35</sup> Ibid

<sup>36</sup> Bitzinger, 2009, pp. 2-10; Neuman, S., *Power, Influence, and Hierarchy: Defence Industries in a Unipolar World*, Defence and Peace Economics, Routledge, Volume 21 No.1, February 2010, pp. 106-108

**Table 6: Five major arms suppliers and their major recipients, 2007-2011<sup>37</sup>**

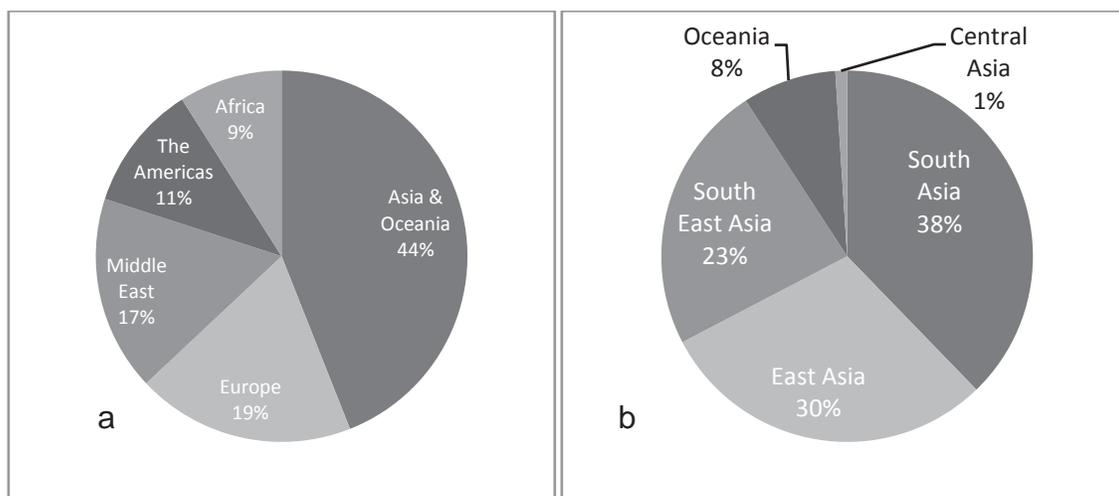
Supplier	Share of international arms exports (%)	Main recipients (share of supplier's total exports)		
		1st	2nd	3rd
United States	30	S. Korea (13%)	Australia (10%)	U.A.E. (7%)
Russia	24	India (33%)	China (16%)	Algeria (14%)
Germany	9	Greece (13%)	S. Korea (10%)	S. Africa (8%)
France	8	Singapore (20%)	Greece (10%)	Morocco (8%)
United Kingdom	4	Saudi Arabia (28%)	United States (21%)	India (15%)

A further important point is that the major recipient nations of defence exports in recent years have been in the Asia-Pacific, which accounted for 44 per cent of export sales. The major recipients (as shown in the table below) of conventional weapons have been India (10% of international arms imports), South Korea (6%), Pakistan (5%), China (5%) and Singapore (4%).<sup>38</sup> With existing tension between India and Pakistan, and other confrontations in Northeast Asia, it is not surprising that countries in these regions feature prominently in the global arms trade. This trend is expected to continue for South Korea owing to its need to procure and upgrade conventional weapons as a result of the rising tensions on the Korean peninsula.

<sup>37</sup> Holtom, P., Bromley, M., Wezeman, P. and Wezeman, S., *Trends in International Arms Transfers 2011*, SIPRI Fact Sheet, 2011, pp. 1-11, online document, <http://www.sipri.org/research/armaments/transfers/measuring/recent-trends-in-arms-transfers> [accessed on 25/08/2012]

<sup>38</sup> Holtom, *et al.*, 2011, p. 4

**Figure 11: Recipients of major conventional arms by region (a) and Asia-Oceania sub-regions (b), 2007-2011<sup>39</sup>**



**Table 7: Five major arms recipients and their major suppliers, 2007-2011<sup>40</sup>**

Recipient	Share of international arms imports (%)	Main suppliers (share of recipient's total imports)		
		1st	2nd	3rd
India	10	Russia (80%)	U.K. (6%)	Israel (4%)
South Korea	6	U.S. (74%)	Germany (17%)	France (7%)
Pakistan	5	China (42%)	U.S. (36%)	Sweden (5%)
China	5	Russia (78%)	France (12%)	Switzerland (5%)
Singapore	4	U.S. (43%)	France (39%)	Germany (8%)

Further driving the demand from these countries is the pace of military technological innovation, in particular in relation to the development of aircraft, ballistic missiles, nuclear weapons, satellite communications, and information technology in general. The increasing complexity and capabilities of Command

<sup>39</sup> Information elaborated from data obtained at SIPRI Arms Transfers Database, <http://www.sipri.org/databases/armstransfers> [accessed on 23/08/2012]

<sup>40</sup> Information elaborated from data obtained at SIPRI Arms Transfers Database, <http://www.sipri.org/databases/armstransfers> [accessed on 22/08/2012]

and Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems also generate demand for transnational cooperation and interoperability in joint and combined operations, requiring nations to invest in upgraded systems.<sup>41</sup> The need for international cooperation and interoperability has added to the advantages of the globalisation of the defence industry. While the increased geographic dispersion of military production and technology development contrasts with the long-established aspiration to achieve self-sufficiency in arms production, it nevertheless increases the capacity to respond to international military requirements.

With the major multinational corporations having numerous subsidiaries throughout the world, they can remain responsive to regional and national requirements and enhance marketability of their product by demonstrating local connection. For this reason, transnational companies such as BAE Systems, Thales, and EADS have actively pursued local military enterprises in countries such as Australia, Brazil, South Africa and South Korea.<sup>42</sup> For example, BAE Systems has acquired Tenix Defence in Australia, United Defense Industries in the U.S.A., and a 20.5 per cent stake of Saab in Sweden, as well as establishing significant regional corporate presences such as BAE Systems Australia, BAE Systems India, BAE Systems Saudi Arabia, and BAE Systems Land Systems South Africa.

The increasingly competitive global arms market and the economic and technological difficulties to maintain an efficient national defence industry are

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<sup>41</sup> O'Hanlon, 2005, p. 174

<sup>42</sup> Bitzinger, 2009, p. 2-10; Neuman, 2010, pp. 106-108

compelling most defence firms to react in a number of ways that include quitting the defence business, in some instances; rationalising and consolidating defence manufacturing operations; diversifying between commercial and military production; leveraging dual-use technologies; increasing arms export; and by committing to the globalisation of development and production.<sup>43</sup> Those firms that remained closed off from the internationalisation of the arms industry in the 1990s and 2000s certainly faced increasing opportunity costs and struggled to sustain competitiveness. Argentina and Brazil's defence industries almost disappeared during the past two decades (with the exception of Brazil's aerospace manufacturer, Embraer), while Sweden reduced and diversified its military products, and Israel and Russia both identified niches to preserve core competences and re-orientated production towards exportation.<sup>44</sup>

The global defence industry therefore has experienced significant structural, technological and compositional changes since the end of the Cold War. The structure has become more concentrated in major multinational corporations. Civilian technologies have become increasingly more important in the development of weapons systems owing to the incorporation of a growing number of civilian-oriented companies in the supply chain of major military contractors, and the greater employment of dual-use technologies by defence firms. Privatisation and outsourcing of services such as logistics, training, and maintenance have contributed to the compositional changes within the arms industry. The process of internationalisation has become a viable solution to maintaining a competitive

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<sup>43</sup> Bitzinger, 2003, p. 40

<sup>44</sup> Brooks, 2005, p. 19

defence industrial base.<sup>45</sup> That the globalisation of the defence industry has an impact on the Asia-Pacific is evidenced by the increased export of arms to Asia-Pacific nations, the internationalisation of weapons development through joint ventures and the acquisition of Asia-Pacific firms by multinational corporations.

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<sup>45</sup> Neuman, 2010, pp. 106-112

## **CHAPTER 4**

# **THE ASIA-PACIFIC, ARMS CONTROL AND THE DEFENCE INDUSTRY**

The Asia-Pacific region's magnitudes greatly surpass European and U.S. parameters in terms of population and geographical size. The hundreds if not thousands of different languages and dialects, numerous ethnic groups and a cultural diversity far from the European classical traditions make the Asia-Pacific not one but many worlds.<sup>1</sup> The increasing geopolitical weight of the Asia-Pacific region in the international arena has an important effect on the global arms industry. It is therefore essential to have understanding of the Asia-Pacific nations' security perceptions and the strategies associated with the development of their defence industry capabilities and arms control policies.

The Asia-Pacific has been all but pacific since the region opened to the world in the 19th century. After the Second World War, the new international order and a clash of ideologies had detrimental effects on the region. Three nations were ideologically divided as a result of civil wars and the separation of states following the surrender of the Japanese in 1945: China, Korea and Vietnam. Ancient

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<sup>1</sup> Crump, 2007, p. 333

rivalries, namely between China and Japan, were also partially veiled by the clash between capitalism and Communism and by confrontations between the region's Communist nations (such as between China and the Soviet Union in 1969, North Vietnam and Cambodia in the early 1970s, and China and Vietnam in 1979 and 1987). The end of the Cold War did not bring complete stability to the Asia-Pacific and tensions have continued to mount owing to unsolved issues, including territorial disputes over the Spratley Islands in the South China Sea, the sovereignty of Taiwan claimed by China, and the long-standing conflict between North and South Korea.

The dynamics of the Asia-Pacific's security are complicated owing to the heterogeneity of the region in terms of ethnicity, culture and religion. The large number of Chinese in Southeast Asia has always been a source of tension. In some cases, ethnic and religious minorities have formed separatist movements or domestic insurgencies searching for more autonomy or even independence (such as the Uighurs and the Tibetans in China, the Karens and Shans in Burma, the Acehese and Papuans in Indonesia, and the Moros in the Philippines). The region's diversity and divergent ideologies have clearly hindered the formation of a transnational identity (similar to that present in Europe), with some nations such as Indonesia and China, maintaining especially strong national and sovereignty values, reinforced by their recent hard won independence. The lack of regional and political integration has not, however, precluded the economic rise of several nations such as Japan, China, South Korea, Singapore and Indonesia, or the creation of regional organisations to promote free trade and cooperation, including

the Asia-Pacific Economic Cooperation (APEC) and the Association of Southeast Asian Nations (ASEAN).<sup>2</sup>

The region is lacking a cooperative security mechanism that is able to coordinate an immediate response to a regional crisis. The Southeast Asia Treaty Organisation (SEATO) was the Asian counterpart of NATO when it was set up in 1954, but SEATO was dissolved by 1977 despite there being four nuclear powers with presence in the region (Russia, China, North Korea and the U.S.A.). ASEAN has been unable to fill the security void owing to its non-intervention policy on territorial and maritime disputes.<sup>3</sup> ASEAN's informal mediation has prevented the escalation of some confrontations, such as that between Malaysia and Indonesia in the contested waters of Ambalat in 2009, demonstrating that there may be a need for a regional security organisation. Unfortunately there remains a perception that ASEAN members "do not trust each other to act beyond their national interests"<sup>4</sup>. The only clear contribution to collective security in Southeast Asia is the Five Power Defence Arrangements (FPDA), although this is really a leftover of the old British Empire, with membership being the United Kingdom, Australia, New Zealand, Malaysia and Singapore and limited now mostly to multilateral exercises

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<sup>2</sup> Crump, 2007, p. 332; APEC Official Website, online document, <http://www.apec.org/About-Us/About-APEC.aspx> [accessed on 07/12/2012]; ASEAN Official website, online document, <http://www.asean.org/asean/about-asean/overview> [accessed on 7/12/2012].

<sup>3</sup> Tan, S. & Acharya, A., *Asia-Pacific Security Cooperation: National Interests and Regional Order*, M.E. Sharpe, Armonk, NY, 2004, p. 12

<sup>4</sup> For more details see Dalpino, C., edited by Singh, D. P., *Southeast Asian Affairs 2009*, Institute of Southeast Asian Studies, Singapore, 2009, pp. 10-11; Haftel, Y., *Regional Economics Institutions and Conflict Mitigation: Design, Implementation and the Promise of Peace*, U.S. University of Michigan Press, Ann Arbor, MI, 2012, pp. 176-179; Simon, S., *ASEAN and its security offspring: facing new challenges*, U.S. Army Strategic Studies Institute, Carlisle Barracks, PA, 2007, p. 30; and Wain, B., edited by Singh, D. & Thambipillai, P., *Southeast Asian Affairs 2012*, Institute of Southeast Asian Studies, Singapore, 2012, pp. 56-58

to ensure interoperability.<sup>5</sup> Security cooperation in the Asia-Pacific is therefore currently dominated by several bilateral alliances, in particular between the U.S.A. and its regional partners, such as Japan and Australia.<sup>6</sup>

The region is actually far from stable owing to the menace of terrorism, territorial and maritime disputes, rising competition between China and the U.S.A., and the consistent increase in arms imports experienced by most countries in the region since the early 1990s.<sup>7</sup> The flow of arms to the Asia Pacific region fortunately did not have major security implications to begin with owing to the fact that states did not seek to acquire power projection capabilities.<sup>8</sup> This however, has started to change, with China's force projection capabilities being enhanced by the rapid development of its defence industry. For example, in 2012 China's first aircraft carrier, based on the hulk of a Soviet aircraft carrier that was sold to China, entered into service, producing a domino effect of counter-reactions from other nations in the region. Taiwan reacted by accelerating the development of a supersonic anti-carrier missile program; Japan is planning to increase its submarine force from 16 to 22; Vietnam is strengthening its navy; India is modernising its navy and acquiring additional projection capabilities through the purchase of an aircraft carrier from Russia; and the U.S.A. has announced a

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<sup>5</sup> Thayer, C., edited by Singh, D. & Thambipillai, P., *Southeast Asian Affairs 2012*, Institute of Southeast Asian Studies, 2012, pp. 66-70

<sup>6</sup> Tan, S. & Acharya, A., 2004, p. 17

<sup>7</sup> Tow, W., *Asia-Pacific Strategic Relations: Seeking Convergent Security*, Cambridge University Press, U.K., 2001, p. 125; Huisken, R., *Asia-Pacific Security: Taking charge, collectively*, Strategic and Defence Studies Centre: Australia, Australian National University, Working Paper 368, 2002, p. 1; and the Business Monitor International assesses that Northeast Asia "will remain a zone of Great Power rivalry for the foreseeable future" and that Southeast Asia faces multiple challenges ahead such as poor governance and political instability (e.g. Thailand, the Philippines and Myanmar), organised crime, terrorism and piracy, Business Monitor International Ltd., *Indonesia Defence and Security Report*, Q1-2013, pp. 18-29 and Business Monitor International Ltd., *Japan Defence and Security Report*, Q1-2013, pp. 18-25

<sup>8</sup> Mack, 1992, p. 11

redistribution of forces into the Asia-Pacific.<sup>9</sup> Some of these nations (namely South Korea, Japan, Taiwan, Singapore and to lesser degree Indonesia) are also modernising their defence capabilities through the acquisition of advanced weapons systems, primarily focusing on combat, surveillance and early-warning radar aircraft (AEW), sophisticated missile systems, air-to-air refuelling capabilities and submarines. These defence systems reflect the strategic geography of the region (formed by thousands of islands, peninsulas and archipelagos), a security focus on external threats, and also the need to acquire a capability to strike distant military targets.<sup>10</sup>

The U.S.A. support of military modernisation of some Asia-Pacific nations may be increasing China's perception of a threatening strategic environment, which could potentially lead to an arms race through a sequence of actions and reactions that follows the classic security dilemma.<sup>11</sup> This is becoming a major concern for security analysts, particularly as some of the nations involved are nuclear powers. The continued emergence of major or minor conflicts cannot be completely discarded owing to a complex strategic environment, rising defence expenditures and an increasing risk of arms proliferation spurred by a highly competitive global arms market.

## **Regional arms control policies**

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<sup>9</sup> Till, G., *Asia's Naval expansion: An arms race in the making?*, International Institute for Strategic Studies, Adelphi Paper 432-433, 2012, pp. 1-112

<sup>10</sup> More details of the Asia's Naval expansion has been provided by Till, G., *Asia's Naval expansion: An arms race in the making?*, International Institute for Strategic Studies, Adelphi Paper 432-433, 2012, pp. 1-112

<sup>11</sup> Minnick, W., *Are U.S. Defence Experts Getting China Wrong?*, DefenceNews, 1 December 2012, online document, <http://www.defensenews.com/article/20121201/DEFREG03/312010002/Are-U-S-Defense-Experts-Getting-China-Wrong-> [accessed on 09/01/2013]

The risk of arms proliferation in the Asia-Pacific has been a subject of concern for several decades. The potential that small nations, insurgencies and terrorists groups in the Asia-Pacific may have or acquire access to weapons of mass destruction (WMD) does exist. In the region there are three nations (Russia, China and more recently North Korea) that possess nuclear weapons, as well as the U.S.A., which maintains a strong presence in the region (being on the eastern edge of the Pacific), and also several other countries that possibly have access to sources of weapons of mass destruction. Of particular concern is North Korea which represents a major threat to regional stability, particularly as the Pyongyang regime continues to develop its nuclear weapon and ballistic missile capabilities. South Korea and Japan would certainly consider developing their own nuclear weapons if it were not for the reassurance of U.S. military protection. This of course could still happen if, for whatever reason, the U.S. strategic position in the region became weaker, in which case the proliferation of nuclear weapons in the region would be exacerbated.<sup>12</sup>

In addition to conventional and nuclear weapons, the integration of radiological material with explosives to form what is known as a 'dirty bomb' may have severe consequences if detonated in large urban areas. These bombs are more affordable and easier to develop than a nuclear weapon, which makes them potentially an attractive option for developing nations as well as for terrorist groups. While the 'dirty bomb' was over-stated as a threat in the early 2000s, the possibility of a nation or terrorist group having access to and using chemical and

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<sup>12</sup> Devetak et al, 2011, pp. 173-174

biological weapons remains a major concern to the international community. It is believed that Russia, China, India, Pakistan and probably North Korea possess or have possessed these types of WMD.<sup>13</sup>

There is no single, simple measure that may deter the proliferation of WMD in the region; however a combination of strategies such as the enforcement of bans, the designation of nuclear-free zones, and the control and limitation of WMD and related technologies may be effective. The present ban on testing nuclear weapons (the Partial Test Ban Treaty set up in 1963) aims to preclude experimentation and the development of these technologies.<sup>14</sup> The restraint of these weapons however, is proving to be a particularly complex task as a number of components used in their manufacture may also be used for civilian purposes. Likewise, the control of the technologies is challenging as these may have both military and commercial applications; for example, the technology used to develop nuclear energy plants may be used to create nuclear weapons. Additionally some nations have demonstrated a lack of commitment towards the non-proliferation policies, namely North Korea, India and Pakistan, which undoubtedly has security implications for the Asia-Pacific region as nations may become immersed in a cycle of weapons modernisation to counterbalance each other's military capabilities, thereby exacerbating the effects of the security dilemma.

Arms control policies may reduce or prevent the effects of the security dilemma by providing transparency, increasing cooperation on arms transfers and establishing

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<sup>13</sup> Collins, 2002, p. 125

<sup>14</sup> Devetak et al, 2011, pp. 174-176

measures to deter proliferation.<sup>15</sup> Accordingly, most Asia-Pacific nations have joined arms control and disarmament international treaties in relation to WMD, some conventional weapons, and confidence and security building measures (CSBM). For example, the proliferation of WMD has been addressed by four major international treaties, of which most Asia-Pacific nations are signatories, including the Non-Proliferation of Nuclear Weapons Treaty (NPT), the Comprehensive Nuclear-Test Ban (CTBT), the Chemical Weapons Convention (CWC), and the Biological Weapons Convention (BWC).<sup>16</sup> The latter, originally known as the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological, Biological and Toxin Weapons and on their Destruction was signed in 1972 and entered into force in 1975. The state-parties are obliged to “destroy, or divert to peaceful purposes ... all [biological weapons] agents, toxins, weapons, equipment, and means of delivery”.<sup>17</sup> The convention also prevents the proliferation of biological weapons (BW) by prohibiting their transfer or the provision of any assistance to acquire them (Article III). Most U.N.-recognised nations have become state-parties of the convention; Myanmar, however, has only signed (but has not yet ratified) the convention and a further small group of 19 nations (some of which are located in the Pacific and include the Federated States of Micronesia, the Marshall Islands, Kiribati, Nauru, Niue, Samoa and Tuvalu) have not joined the BWC.

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<sup>15</sup> Croft, S., *Strategies of Arms Control: A History and Typology*, Manchester University Press, 1996, p.1; and Devetak *et al.*, 2011, p. 174

<sup>16</sup> The term convention is generally used for formal multilateral treaties with a broad number of parties, in Definition of the United Nations Treaty Collection, [http://treaties.un.org/Pages/Overview.aspx?path=overview/definition/page1\\_en.xml#conventions](http://treaties.un.org/Pages/Overview.aspx?path=overview/definition/page1_en.xml#conventions)

<sup>17</sup> United Nations Office at Geneva, Documentation on Biological Weapons Convention, <http://www.unog.ch/80256EE600585943/%28httpPages%29/04FBBDD6315AC720C1257180004B1B2F?OpenDocument> [accessed on 17/12/2012]

The Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (CWC), signed in 1993 and entered into force in 1997, has also achieved wide international support. Again, most states recognised by the U. N. joined the convention (188 out of 196). Only 13 state-parties (including China and Japan) have declared state ownership of chemical weapons production facilities which, according to the Organisation for the Prohibition of Chemical Weapons (OPCW), are currently deactivated.<sup>18</sup> Furthermore, China and Japan are currently in the process of cooperatively destroying Japanese chemical weapons abandoned at the end of the Second World War. Two states in the Asia-Pacific region believed to be in possession of chemical weapons are North Korea, which failed to sign the convention, and Myanmar, which signed but has not yet ratified the convention.

The Treaty on the Non-Proliferation of Nuclear Weapons, signed in 1968 and entered into force in 1970, follows three main principles: non-proliferation, disarmament, and peaceful use. The treaty prohibits the five nuclear states existing before the treaty came into force (U.S.A., Russia, China, France, and U.K.) transferring nuclear weapons to other nations, assisting other nations in the development of nuclear weapons, or using nuclear weapons against a non-nuclear state, whilst the remainder of the state-parties must not accept or develop these weapons.<sup>19</sup> The treaty also obliges the five nuclear states to negotiate the

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<sup>18</sup> According to the Organisation for the Prohibition of Chemical Weapons (OPCW) the following state-parties declared Production facilities: Bosnia and Herzegovina, China, France, India, the Islamic Republic of Iran, Iraq, Japan, the Libyan Arab Jamahiriya, the Russian Federation, Serbia, the United Kingdom of Great Britain and Northern Ireland, the United States of America, and another State Party (which could be South Korea), OPCW, online document, <http://www.opcw.org/our-work/demilitarisation> [accessed on 21/-2/2013]

<sup>19</sup> This compromise is however not explicitly included in the treaty but the five nuclear states have incorporated it with some conditions in their defence policies.

conditions for a complete disarmament of nuclear weapons. Most nations have joined the treaty (189 countries), however North Korea withdrew in 2003 and India, Pakistan and Israel are not state-parties. The NPT has been criticised for its rather discriminatory posture (especially making clear differences between nations with freely acquired nuclear weapons and the others). This perception is exacerbated by the lack of commitment from the five nuclear states to undertake the complete disarmament of their nuclear arsenals. The nuclear weapons tests conducted by India and Pakistan in 1998, followed by those executed by North Korea in 2006, 2009 and 2013, and the apparent aspirations of Iran to become a nuclear state, have posed additional questions about the effectiveness of the NPT.<sup>20</sup>

In addition to the NPT, there are five nuclear free zones which have been declared by other international treaties in Latin America and the Caribbean, in the South Pacific, Southeast Asia, Central Asia, and Africa. The Treaty of Rarotonga bans the use, testing and possession of nuclear weapons within the limits of the zone established by the treaty (the South Pacific). The U.S.A. is the only nation with territory within this zone (American Samoa) that has not ratified the treaty.

ASEAN nations also agreed to establish a nuclear weapons-free zone through the Treaty of Bangkok, which entered into force in 1997 and became fully effective in 2001 following ratification by the Philippines. The ten Southeast Asian state-parties (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam) agreed not to “develop, manufacture or

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<sup>20</sup> Dhanapala, J. (Under-Secretary-General for Disarmament Affairs of the United Nations), *The NPT Regime: External and internal challenges*, Seventh Carnegie International Non Proliferation Conference, U.S. (Washington D.C.), January 1999, pp. 1-8  
[www.un.org/disarmament/HomePage/HR/docs/1999/1999Jan11\\_Washington.pdf](http://www.un.org/disarmament/HomePage/HR/docs/1999/1999Jan11_Washington.pdf) [accessed on 12/01/2013]

otherwise acquire, possess or have control over nuclear weapons". The treaty further prohibits the stationing, transportation and testing of nuclear weapons by these countries. The five recognised nuclear states have not signed or ratified this treaty.<sup>21</sup>

An additional instrument in preventing the proliferation of nuclear weapons deals with the prohibition of carrying out nuclear explosions in *all* environments. The previous Partial Test Ban Treaty in 1963 banned nuclear testing in all but one environment (i.e. the underground). The Comprehensive Nuclear Test Ban Treaty (CTBT), opened for signature in 1996 but not yet entered into force, aims for a complete ban of nuclear tests. Despite being ratified by 158 states, the treaty still requires the signing and/or ratification of the following states in possession of nuclear capabilities: China, Egypt, Iran, Israel and the United States (all of which have signed but not ratified), and India, Pakistan and North Korea (which remain non-signatories).<sup>22</sup>

The control of transfers of materials capable of being used to develop nuclear, chemical and biological weapons, and missile technologies has also been put into effect by various groups of nations as a means of preventing WMD proliferation. The Nuclear Suppliers Group (currently formed by 47 participating nations) controls the export of nuclear equipment, materials and technologies, while the Australian Group (formed by 41 members) controls the export of highly restricted chemical precursors (applying greater stringency to the export regulations than the

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<sup>21</sup> United Nations Office for Disarmament Affairs, *Treaty of Bangkok*, online document, <http://disarmament.un.org/treaties/t/bangkok/text> [accessed 14/12/2012]

<sup>22</sup> United Nations Office for Disarmament Affairs, *The Comprehensive Nuclear Test Ban Treaty*, online document, <http://disarmament.un.org/treaties/t/ctbt> [accessed 15/12/2012]

CWC), and the Missile Technology Control Regime (formed by 34 nations) is aimed at preventing the proliferation of missile and UAV technologies for all weapons of mass destruction.<sup>23</sup> The proliferation of ballistic missiles capable of carrying WMD is also regulated by the Hague Code of Conduct against Ballistic Missile Proliferation (set up in 2002). Member-states are required to provide pre-launch notifications on ballistic missile and space-launch vehicles, and test flights; and to report annually on the national policies that they have in place for these technologies.<sup>24</sup> There are currently 134 signatories, including the U.S.A. and all European countries, including Russia. There are also a number of participating states in the Asia-Pacific including Japan, South Korea, Australia, New Zealand, the Philippines, Timor Leste, Papua New Guinea, and some Pacific Islands (such as the Cook Islands, Fiji, Micronesia, Tonga, Tuvalu and Vanuatu). Admittedly, most of the Asia-Pacific nations (especially those of the South Pacific) lack the capacity to develop and test these platforms and weapons; however through participation these Asia-Pacific nations are perceived to strengthen the international agreements and demonstrate a degree of commitment to non-proliferation policies.

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<sup>23</sup> See Nuclear Suppliers Group Official Web Page <http://www.nuclearsuppliersgroup.org/Leng/default.htm> [accessed on 13/01/2013]; and The Australian Group Official Web Page <http://www.australiagroup.net/en/index.html> [accessed on 14/01/2013]

<sup>24</sup> The Hague Code of Conduct against Ballistic Missile Proliferation, online document, <http://www.hcoc.at/index.php>, <http://www.bmeia.gv.at/en/foreign-ministry/foreign-policy/disarmament/weapons-of-mass-destruction/hcoc.html> and <http://www.armscontrol.org/documents/icoc> [accessed on 13/01/2013]

**Table 8: Status of WMD Treaties in the Asia-Pacific region<sup>25</sup>**

	NPT (Status)	CTBT (Annex / Status)	BWC (Status)	CWC (Status)
<b>Northeast Asia</b>				
Japan	Ratified (1970)	1,2 / Ratified (1997)	Ratified (1972)	Ratified (1997)
South Korea	Ratified (1968)	1,2 / Ratified (1999)	Ratified (1972)	Ratified (1997)
North Korea	Withdrawn (2003)	1,2 / Non signatory	Acceded (1987)	Non signatory
China	Acceded (1992)	1,2 / Signed (1996)	Acceded (1984)	Ratified (1997)
<b>Southeast Asia</b>				
Brunei	Acceded (1985)	1 / Ratified (2013)	Acceded (1991)	Ratified (1997)
Cambodia	Acceded (1972)	1 / Ratified (2000)	Ratified (1972)	Ratified (2005)
Indonesia	Ratified (1970)	1,2 / Ratified (2012)	Ratified (1972)	Ratified (1998)
Laos	Ratified (1968)	1 / Ratified (2000)	Ratified (1972)	Ratified (1997)
Malaysia	Ratified (1968)	1 / Ratified (2008)	Ratified (1972)	Ratified (2000)
Myanmar	Acceded (1992)	1 / Signed (1996)	Signed (1972)	Signed (1993)
Philippines	Ratified (1968)	1 / Ratified (2001)	Ratified (1972)	Ratified (1997)
Singapore	Ratified (1970)	1 / Ratified (2001)	Ratified (1972)	Ratified (1997)
Thailand	Acceded (1972)	1 / Signed (1996)	Ratified (1973)	Ratified (2003)
Vietnam	Acceded (1982)	1,2 / Ratified (2006)	Acceded (1980)	Ratified (1998)
<b>Australasia</b>				
Australia	Ratified (1970)	1,2 / Ratified (1998)	Ratified (1972)	Ratified (1997)
New Zealand	Ratified (1968)	1 / Ratified (1999)	Ratified (1972)	Ratified (1997)
Papua N. G.			Acceded (1980)	Ratified (1997)

There is no comparable treaty to that on Conventional Armed Forces in Europe (CFE) for the Asia-Pacific region. There are, however, three international treaties involving conventional arms with an uneven participation of nations from the Asia-Pacific region: the Convention on Certain Conventional Weapons (CCWC); the Ottawa Treaty on anti-personnel land mines; and the Convention on Cluster Munitions (CCM).

<sup>25</sup> Information elaborated from data obtained at United Nations Treaty Collection website, <http://treaties.un.org/> [accessed on 12/01/2012]

**Table 9: Status of certain conventional weapons treaties in the Asia-Pacific region<sup>26</sup>**

	CCWC	Ottawa Treaty	CCM
Northeast Asia			
Japan	Accepted (1982)	Accepted (1998)	Accepted (2009)
South Korea	Acceded (2001)		
North Korea			
China	Ratified (1982)		
Southeast Asia			
Brunei		Ratified (2006)	
Cambodia	Acceded (1997)	Ratified (1999)	Signed (2008)
Indonesia		Ratified (2007)	Ratified (2009)
Laos	Acceded (1983)		
Malaysia		Ratified (1999)	
Myanmar			
Philippines	Ratified (1996)	Ratified (2000)	Ratified (2008)
Singapore			
Thailand		Ratified (1998)	
Vietnam	Signed (1981)		
Australasia			
Australia	Ratified (1983)	Ratified (1999)	Ratified (2012)
New Zealand	Ratified (1993)	Ratified (1999)	Ratified (2009)
Papua N. G.		Acceded (2004)	

The Convention on Certain Conventional Weapons (CCWC) entered into force in 1983 with the aim of protecting military and civilian personnel from certain weapons considered excessively injurious or able to produce indiscriminate effects, mainly weapons with non-detectable fragments, landmines, incendiary weapons, and blinding laser weapons.<sup>27</sup> The treaty includes a number of protocols restricting these weapons and establishing obligations to clear explosive remnants of war, but it has no verification or enforcement mechanisms. One hundred and

<sup>26</sup> Information elaborated from data obtained at United Nations Treaty Collection website, <http://treaties.un.org/> [accessed on 13/01/2012]

<sup>27</sup> The full name of this treaty is *Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects*, United Nations Treaty Collection, online document, [http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg\\_no=XXVI-2&chapter=26&lang=en#EndDec](http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVI-2&chapter=26&lang=en#EndDec) [accessed 12/01/2013]

fifteen nations have become state-parties and 50 nations have signed the convention but have not ratified.<sup>28</sup>

The Anti-Personnel Mines Ban Convention (also known as Ottawa Treaty) entered into force in 1999 with the aim of eradicating anti-personnel landmines by prohibiting their use, production, stockpiling and transfer, and enforcing their destruction by state-parties. Unexploded landmines remain as a threat to civilians long after the end of a conflict, and their effect was felt within Southeast Asia with several nations requiring post-conflict landmine clearances, including Vietnam and, especially, Cambodia. Despite there being 161 state-parties, major military powers in the Asia-Pacific (namely the U.S.A., Russia, and China) and several other nations within the region (North Korea, South Korea, Myanmar, Laos, Singapore, and Vietnam) remain non-signatories as military and security requirements have prevailed over disarmament policies.<sup>29</sup>

The negative effects of landmines dispersed long after a conflict has ended were also addressed through the Convention on Cluster Munitions (CCM), which entered into force in 2010.<sup>30</sup> The CCM aims to eradicate the production, use, transfer and stockpile of cluster bombs. These explosive weapons are formed by a number of sub-munitions that once launched are able to disperse (as 'bomblets')

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<sup>28</sup> United Nations Office for Disarmament Affairs, *Convention on Certain Conventional Weapons*, online document, <http://disarmament.un.org/treaties/t/ccwc> [accessed 12/01/2013]

<sup>29</sup> The full name is the *Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction*, United Nations Treaty Collection, online document, [http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg\\_no=XXVI-5&chapter=26&lang=en](http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVI-5&chapter=26&lang=en) [accessed on 12/01/2013]; and United Nations Office for Disarmament Affairs, *Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines*, online document, [http://disarmament.un.org/treaties/t/mine\\_ban](http://disarmament.un.org/treaties/t/mine_ban) [accessed on 12/01/2013]

<sup>30</sup> United Nations Office for Disarmament Affairs, *Convention on Cluster Munitions*, online document, [http://disarmament.un.org/treaties/t/cluster\\_munitions](http://disarmament.un.org/treaties/t/cluster_munitions) [accessed 12/01/2013]

within an area. As with landmines, these unexploded 'bomblets' become a threat to the civilian long after the end of a conflict. The treaty entered into force in 2010, and there are currently 77 state-parties and 34 signatory nations. Although all Western European nations have joined the treaty, some of the major powers (the U.S., Russia and China) and a number of other nations (North Korea, South Korea, Egypt, India, Iran, Israel, Singapore and Turkey), representing over 80 per cent of the world's cluster munitions stockpiles prior to the treaty, are not participating in the CCM. In the Asia-Pacific, only a third of the most relevant nations have joined the CCM (namely Japan, Australia, New Zealand and the Philippines). The U.S.A. is more willing to deal with the humanitarian effects of cluster munitions under the framework of the CCWC, which allows for further participation and permits additional rules such as obligations on transparency, cooperation, clearance and technological assistance.<sup>31</sup>

Another category of conventional arms that has attracted major attention in recent years, including in the Asia-Pacific, is that of small arms and light weapons (SALW). These weapons have the common feature of being portable by an individual, a small number of people, an animal, or a light vehicle.<sup>32</sup> They are produced by over 1000 companies in almost 100 countries, with an estimated 875 million of the weapons in circulation and an annual authorised trade exceeding

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<sup>31</sup> Koh, H., *U.S. Position on the CCW negotiations on Cluster Munitions protocol*, U.S. Department of State, Special Briefing, 16 November 2011, online document, <http://www.state.gov/s/l/releases/remarks/177280.htm>, [accessed 13/01/2013]

<sup>32</sup> Small arms involves *rifles and carbines, assault rifles, sub-machine guns and light machine guns*, while light weapons includes heavy machine guns, hand-held under-barrel and mounted grenade launchers, portable anti-aircraft guns, portable anti-tank guns, recoilless rifles, portable launchers of anti-tank missile and rocket systems; portable launchers of anti-aircraft missile systems (MANPADS); and mortars of calibres of less than 100 mm, definition provided by the 1997 U.N. Panel of Governmental Expert, Small Arms Survey, Graduate Institute of International and Development Studies, Geneva, online document, <http://www.smallarmssurvey.org/weapons-and-markets/definitions.html> [accessed on 13/01/2013]

US\$8.5 billion.<sup>33</sup> The rise in armed violence worldwide, resulting in over 500,000 casualties every year, is closely related to SALW proliferation. In Southeast Asia this proliferation has been linked to an increase in violent crimes in Indonesia, Malaysia, the Philippines and Thailand, as well as contributing to the rise in insurgencies in Aceh, Mindanao, and Myanmar.<sup>34</sup> The collapse of order in the Solomon Islands and several other violent incidents in Papua New Guinea, Vanuatu and Fiji in the early 2000s were aggravated by the uncontrolled circulation of small arms. The control and regulations of these types of weapons and their components may therefore help reduce the negative effects of their misuse and diversion to unauthorised users. The management of SALW stockpiles, abandoned arms, ammunition and unexploded ordnance from previous conflicts, and armoury security issues are particularly challenging for countries lacking in resources. Furthermore, the control measures on SALW that are currently in place, face a number of obstacles such as corruption, illicit traffic, lax or inadequate regulations, and lack of resources to enforce them.<sup>35</sup>

Two additional initiatives that are contributing to greater international security and transparency in relation to conventional weapons are the Wassenaar Arrangement and the U.N. Register of Conventional Arms. The Wassenaar Arrangement (1996)

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<sup>33</sup> Small Arms Survey, *Weapons and markets*, Graduate Institute of International and Development Studies, Geneva, <http://www.smallarmssurvey.org/weapons-and-markets.html>, [accessed on 13/01/2013]

<sup>34</sup> Suksai, C., Narag, R., and Menglang, K., *Participatory Research on Armed Violence and Human Insecurity in Southeast Asia*, Report Small Arms Survey, Graduate Institute of International and Development Studies, Geneva, 2003, pp. 7-40, <http://www.smallarmssurvey.org/fileadmin/docs/E-Co-Publications/SAS-NI-2003-whose-security-counts.pdf> [accessed on 14/01/2013]; and Alpers, P., Muggah, R. and Twyford, C., *Trouble in Paradise: Small Arms in the Pacific*, Report Small Arms Survey, Graduate Institute of International and Development Studies, Geneva, 2004, pp. 276-307, <http://www.smallarmssurvey.org/fileadmin/docs/A-Yearbook/2004/en/Small-Arms-Survey-2004-Chapter-09-EN.pdf> [accessed on 14/01/2013]

<sup>35</sup> Capie, D., *Under the Gun: The Small Arms Challenge in the Pacific*, Victoria University Press, Wellington, 2003, pp. 10-14

was established to increase transparency and states' responsibility of transfers of conventional arms and dual-use goods and technologies, thus preventing a destabilising accumulation of arms.<sup>36</sup> Participating states must follow a number of guidelines and procedures related to conventional weapons and dual-use goods and technologies within their national export controls, and are committed to exchange information periodically on these transfers. There are currently 41 participating states including the U.S.A., Russia and all European nations. In the Asia-Pacific, other than the major powers, only Japan, South Korea, Australia and New Zealand have joined the Wassenaar Arrangement.

The U.N. established the register of Conventional Arms (UNRCA) in 1991 in order to provide transparency and build confidence between countries. Participating states should report annually on their arms transactions and acquisitions in a number of different categories (such as battle tanks, armoured combat vehicles, large-calibre artillery systems, combat aircrafts, attack helicopters, warships, missiles and missile launchers, and small arms and light weapons). Participating states should also include details of military holdings, domestic purchases and relevant national policies within their annual report. The UNRCA potentially provides a useful tool for controlling conventional weapons and preventing destabilising arms accumulation. Unfortunately not all nations provide annual reports and there are often discrepancies in the categorisation of weapons systems and dating of the transfers of arms among the reports compiled (some use the contract signing date and others use the transfer date), producing

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<sup>36</sup> The Wassenaar Official Web Page: <http://www.wassenaar.org/introduction/index.html> [accessed on 13/01/2013]

inaccurate data for the register.<sup>37</sup> However, a further attempt to monitor and control global arms trade has occurred with the recent setting up of the Arms Trade Treaty through the U.N. This treaty aims to improve the regulation of international trade of conventional arms, prevent illicit trade of conventional arms, and promote cooperation, transparency and responsibility in relation to the arms trade.<sup>38</sup> The approval of this treaty by a wide majority of U.N. member states would be a significant and historic step to promote security cooperation and non-proliferation measures.

Nations have always searched for greater security by acquiring more arms, thus exacerbating the effects of the security dilemma and raising suspicions and tensions. The aforementioned arms control treaties are mainly focused on a strategy to restrain arms transfers on the supply side, which in a highly competitive global market, faces enormous challenges as there may be numerous suppliers willing to export weapons systems. Furthermore, the reasons to restrain arms transfers are ambiguous and in some cases produce contradictory outcomes. The UN Charter permits arms exports for 'legitimate self-defence'; however the acquisition of foreign weapons for self-defence may potentially prolong and aggravate existing conflicts (which is one of the reasons for prescribing them) and

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<sup>37</sup> The United Nations Register of Conventional Arms is available through <http://www.un-register.org/HeavyWeapons/Index.aspx> [accessed on 12/01/2013]

<sup>38</sup> United Nations General Assembly, *Resolution adopted by the General Assembly on the Report of the United Nations Conference on the Arms Trade Treaty*, New York, 2-27 July 2012, pp. 1-2, online document, [http://www.un.org/ga/search/view\\_doc.asp?symbol=A/RES/67/234&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/67/234&Lang=E) [accessed on 15/12/2013]; *Draft of the Arms Trade Treaty*, pp. 1-12, online document, [http://www.un.org/ga/search/view\\_doc.asp?symbol=A/CONF.217/CRP.1&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/CONF.217/CRP.1&Lang=E) [accessed on 15/02/2013]; and *Compilation of views on the elements of an arms trade Treaty*, U.N. Conference on the Arms Trade Treaty, New York, 2-27 July 2012, pp. 1-121, online document, [http://www.un.org/ga/search/view\\_doc.asp?symbol=A/CONF.217/2&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/CONF.217/2&Lang=E) [accessed on 16/01/2013]

destabilise military capabilities.<sup>39</sup> It is therefore necessary to additionally focus on the security concerns that produce the demand of weapons to successfully reduce the effects of arms proliferation. A strategy orientated at reducing this demand depends on the progress made in the resolution of regional conflicts and which requires a balance between deterrence and reassurance. This balance is clearly not easy to achieve as deterrence used in excess may trigger arms competition, and excessive reassurance may undermine deterrence.<sup>40</sup>

Unfortunately, prospects for reducing arms proliferation in the Asia-Pacific following demand-side strategies are not promising because in this region military superiority is considered to be a better security measure than arms control policies, the replacement of outdated military equipment is regarded as necessary, and sustained economic growth fuels the procurement of weapons systems.<sup>41</sup> In this context, the fear towards the rise of China is a major concern among neighbouring countries (particularly Japan), and another important reason for continued arms procurement. Supply-side strategies to reduce the proliferation of arms also seem bleak because the arms market is well supplied by an increasing number of major defence firms from outside the region, and the arms market competition within the region is expected to grow with defence industrial developments in several regional countries. Of particular concern is that North Korea has demonstrated further advances in its nuclear weapons programme and

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<sup>39</sup> Mack, A., *Arms Proliferation in the Asia-Pacific: causes and prospects for control*, Department of International Relations, Research School of Pacific Studies, Australian National University, Working Paper, 1992, p. 13

<sup>40</sup> Mack, 1992, p. 16

<sup>41</sup> Mack, 1992, p. 19

ballistic missile capabilities, and has exported military equipment to Myanmar and Syria, demonstrating that its nuclear programme is advanced.<sup>42</sup>

## **Regional defence industries**

The defence industries in the Asia-Pacific region are unevenly developed. The most developed arms producers are found on the periphery in the U.S.A., but some other nations in the region have industries that are able to produce or contribute to the development of advanced military equipment or develop specific technological niches within the defence sector; these include Japan, South Korea, and Australia. Other countries in the region are in the process of developing and building up their defence industries, fuelled by a steady economic growth and commitment to modernise their armed forces; this includes China, and to a lesser degree Indonesia, Thailand, and Malaysia. A third group of nations is those positioned in the first stages of the ladder of production, with limited defence industries of varying sizes (generally small), including the Philippines, Vietnam, Cambodia, Myanmar, and Papua New Guinea.

During the Cold War, defence industries in Northeast Asia were recipients of finished weapon systems and subsystems from major Western suppliers. Nations such as Japan, South Korea, China and Taiwan attempted to supplement these

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<sup>42</sup> Kemp, G., *The Control of the Middle East Arms Race*, Carnegie Endowment for International Peace, Washington DC, 1991, p. 10, cited in Mack, pp. 13-14; SIPRI, *European Arms Embargoes: China*, online document, November 2012, [http://www.sipri.org/databases/embargoes/eu\\_arms\\_embargoes/china](http://www.sipri.org/databases/embargoes/eu_arms_embargoes/china) [accessed on 7/01/2013]; Solomon, J., et al., *North Korea's Illegal Weapons Pipeline Flows on*, The Wall Street Journal, 29 November 2012, online article, <http://online.wsj.com/article/SB10001424127887323830404578144981537771060.html> [accessed on 6/01/2013]

supply sources and to ensure local supply by creating indigenous defence industries both for national security and prestige. Most initiated arms production through the final assembly of components manufactured under license or provided by the supplier nation. This generated a certain dependency on overseas manufacturers, with most being aligned with U.S. manufacturers, such as McDonnell Douglas licensing Mitsubishi Heavy Industries to build the F-15 Eagle for the Japanese Self-Defence Force in the 1980s and General Dynamics licensing Korean Defence Industries to build the F-16 Fighting Falcon for the Republic of Korea Air Force in the 1990s. Although this technological dependence has since lessened, it proved to be beneficial at the time in that it enabled a subsequent progression up the ladder of arms production by the Northeast Asian nations.<sup>43</sup>

Japan's industry (including the defence sector) received major support from the U.S.A. after the Second World War, producing several weapons systems under licence for its own forces throughout the following decades. By the late 1970s, the Japanese defence industry was able to produce almost all equipment required by the Japanese Self-Defence Forces, including aircraft, tanks, artillery and major surface and underwater naval combat vessels.<sup>44</sup> Owing to restrictions placed by Japan's national constitution on the export of defence capabilities and therefore limitations for achieving economies of scale, the Japanese defence industry has relied on the integration with the commercial industrial base to develop the indigenous production capability. This integration has allowed Japanese defence firms to produce innovative weapons systems in recent years, although the sector

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<sup>43</sup> Till *et al.*, 2009, Chapter 9 by Ding, A., pp. 148-162

<sup>44</sup> Business Monitor International, *Japan Defence and Security Report*, Q2 2012, p. 75

is now experiencing major financial difficulties. Failures to achieve economies of scale have resulted in the production of domestic weapons systems with a considerably higher cost per unit than that reached in most other defence manufacturing countries. One such example is provided by the Japanese Mitsubishi F-2, a multirole fighter jet based on the McDonnell Douglas F-16, which is over two times the cost per unit of that of its U.S. counterpart. Overall, Japanese defence industry drawbacks are self-imposed by its national constitution and are ameliorated by the fact that, as the Japanese defence sector has become dominated by a few large companies, whose main revenues are provided by commercial products, thus precluding the possibility of major changes to improve cost efficient production in the future.<sup>45</sup>

To the south of Japan, Taiwan has accelerated the development of a self-sufficient defence industry in recent years. The defence sector includes both private and state-owned firms and is currently engaged in the indigenous production of a variety of sophisticated weapons systems including fighter aircraft, a main battle tank, air-defence systems, surveillance and fire-control radars, and anti-ship and anti-aircraft missile systems. The Taiwanese defence industry however, still relies on the procurement of some foreign advanced technologies, mostly from the U.S.A., and particularly in the aerospace sector.<sup>46</sup>

North Korea's defence sector is a major priority in the Pyongyang regime. Accordingly, its defence industry has almost achieved absolute self-sufficiency in

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<sup>45</sup> Bitzinger, R., *Japan's defence industry on the brink*, S. Rajaratnam School of International Studies, Singapore, RSIS Commentaries, 56/2010, May 2010, p. 1-3

<sup>46</sup> Business Monitor International, *Taiwan Defence and Security Report*, Q1-2013, pp. 50-55

conventional weapons production.<sup>47</sup> Chinese and Soviet equipment has been produced indigenously and adapted through reverse-engineering. Currently its defence sector produces unsophisticated armoured personnel carriers, self-propelled artillery, light tanks, Romeo class submarines and a variety of naval craft. Conversely, the North Korean missile production (including anti-tank guided missiles, surface-to-air and surface-to-surface missiles) is perhaps the most technologically advanced within its defence industry. The strong ambition for an autarkic defence sector was spurred following the enforcement of U.N. economic and commercial sanctions placed after the North Korean nuclear test in 2006.<sup>48</sup> These sanctions enforced a total ban on North Korean imports and exports of conventional arms, as well as the abandonment of its nuclear and ballistic missiles programmes. The U.N. resolution, however, has not been altogether successful. A number of incidents have demonstrated that North Korea has continued its arms trade (including the proliferation of nuclear technologies) with certain 'rouge' trading countries, namely Iran, Syria, Libya, Pakistan and Myanmar. Furthermore, in 2009, North Korea demonstrated the continuity of its nuclear programme with a second nuclear test.<sup>49</sup> The economic difficulties in North Korea however finally forced Pyongyang's regime to announce a moratorium on nuclear and long-range missiles tests in exchange for food aid in February 2012.

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<sup>47</sup> North Korea reported to have 134 arms factories, 40 small arms plants, 10 armoured vehicles factories, 10 shipyards and 50 explosive facilities. Business Monitor International Ltd., *North Korea Defence and Security Report*, Q1-2013, pp. 64-65

<sup>48</sup> United Nations Security Council Resolution 1718, <http://www.un.org/News/Press/docs/2006/sc8853.doc.htm> [accessed on 12/10/2012]

<sup>49</sup> In 2009, an Australian-owned ship was seized by the United Arab Emirates with weapons (including rocketed-propelled grenades) from North Korea to Iran. ABC News, *Weapons Seized from Australian-owned ship*, online article, 31/08/2009, <http://www.abc.net.au/news/2009-08-30/weapons-seized-from-australian-owned-ship/1410356> [accessed 21/12/2012]

Despite the promising rapprochement of postures, North Korea has continued to challenge the U.N. resolution in other ways. A long-range rocket with a satellite (as part of its space programme) was successfully launched on December 2012, which was perceived by international security analysts as a continuation of its long-range ballistic missile programme.<sup>50</sup> A third North Korean nuclear weapon test confirmed on February 2013 has since caused major concern and anger in the international community and is expected to result in further economic sanctions.<sup>51</sup> It has also resulted in increased tension on the Korean Peninsula, with South Korea's reaction against North Korean defence industry developments being one of strengthening its own military capabilities through the development of its indigenous industry and procurement of foreign weapons systems.

China has one of the world's most important developing defence sectors. In the last two decades the Chinese arms industry has progressed from producing military equipment that was based on Soviet designs (and considered obsolete by Western standards) to impressing security analysts with sophisticated, indigenously produced weapons systems (although not without accusations of the Chinese stealing commercial and military industrial design secrets from the West).<sup>52</sup> These developments have not been hindered by the existing ban on arms sales to China by the U.S.A. and the European Union, which has been in place

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<sup>50</sup> Kim, J., *North Korea rocket launch raises nuclear stakes*, Reuters, online article, 12 December 2012, <http://www.reuters.com/article/2012/12/12/us-korea-north-rocket-idUSBRE8BB02K20121212> [accessed 09/01/2013]

<sup>51</sup> BBC News Asia, *Regional media: Anger on North Korea Test*, online article, 13 February 2013, <http://www.bbc.co.uk/news/world-asia-21438129> [accessed on 14/02/2013]

<sup>52</sup> Raska, M., *From Copier to Innovator? China's Ballistic Missile Modernisation*, S. Rajaratnam School of International Studies, Singapore, RSIS Commentaries, 21 February 2012, pp. 1-2; Minnick, W., *China Challenges West for Arms Trade: New, Better Products on Display at Zhuhai Show*, DefenceNews, online article, 19 November 2012, <http://www.defensenews.com/article/20121119/DEFREG03/311190001/China-Challenges-West-Arms-Trade> [accessed on 12/01/2013]

since 1989, as China has been able to obtain technological expertise through the acquisition of Russian technology; however, had China been able to access Western technology it probably would have achieved a self-sufficient industry far more rapidly. The Chinese arms production has also been facilitated by an impressive economic growth and the effective use of commercial technologies for military purposes.

The Southeast Asian defence industry production is less developed than that of Northeast Asia. According to Banlaoi, most of Southeast Asia's defence industries (with the exception of Singapore, and to a lesser degree Indonesia and Malaysia) are still in an embryonic state, implying these industries are within the first stages of the ladder of production. Singapore has the most developed arms industrial base in Southeast Asia, having obtained independent R&D and production capabilities, whereas Indonesia and Malaysia are still maintaining an intermediate position in the ladder of production.<sup>53</sup>

There is very limited available information on the defence industrial bases of Cambodia, Laos and Myanmar; only Vietnam provides through official channels some general details on its arms production. It is believed that these defence industries are generally underdeveloped and mostly rely on the acquisition of foreign weapons systems. Vietnam has a small domestic defence industry able to produce small arms, minor weaponry and ammunition, its more sophisticated weapons systems having been supplied by Russia, Poland and Israel.<sup>54</sup>

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<sup>53</sup> Banlaoi qualifies Indonesia with a stage 7 and Malaysia with a stage 6, Till *et al.*, 2009, p. 196

<sup>54</sup> Business Monitor International, Vietnam Defence and Security Report, Q4-2012, pp. 54-56

The main reasons for the failure of most Southeast Asian defence industries to become as developed as those of Northeast Asia are weaker economies and the fact that most of the countries in this area are subject to only minor security threats. The maintenance of a national defence industry is expensive and economically draining, particularly when the industrial capacities and skills bases are weak. Accordingly, most Southeast Asian countries have favoured the purchase of foreign weapons systems and other military equipment over the development of an indigenous production capacity.<sup>55</sup> The general nature of interstate security threats is insufficiently menacing to spur the development of Southeast Asian arms industries; in fact, there have not been any major or minor wars within Southeast Asia since the 1987 Sino-Vietnamese and 1992 Myanmar-Thailand border hostilities.<sup>56</sup> Indonesia, Thailand, the Philippines and Myanmar have, however, experienced intra-state armed conflicts between the state and minority communities which, although do not necessarily require the response of building an indigenous defence industry, may support its development.

The economic and security factors explained in relation to Southeast Asia have not altogether precluded ASEAN states from pursuing the development of a self-sufficient defence industry. Singapore, Malaysia, Indonesia and Thailand in particular have advanced their defence manufacturing capabilities. A nation's main motivation for developing an indigenous defence industry was previously largely political: nationalistic pride and a mercantilist strategy of producing arms indigenously (thereby reducing its dependency on foreign suppliers) were seen to enhance the symbol of national sovereignty. The more recent economic growth of

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<sup>55</sup>Till *et al.*, 2009, pp. 198-200

<sup>56</sup> Alagappa, 2010, pp. 7-9

some nations and the effects of the global arms production are currently enabling ASEAN nations to develop their defence industrial bases through the following main activities: participating in the production of acquired weapons systems from foreign firms; strengthening military cooperation; taking part in joint ventures to develop defence projects with other nations; and stimulating the production of dual-use technologies.<sup>57</sup> However, current ASEAN defence budgets are insufficient to achieve self-sufficiency in arms production, particularly in a highly competitive global defence market that is offering a variety of more affordable weapons systems.

**Table 10: Defence industrial development in ASEAN countries<sup>58</sup>**

ASEAN countries	Defence industrial development (Position in the ladder of production – Krause Model)	Primary foreign suppliers
Brunei	Undeveloped (Level 1-2)	U.K. and France
Cambodia	Undeveloped (2-4).	China and Bulgaria
Indonesia	Developing. (Level 5-7)	U.S., the Netherlands, Russia, France
Laos	Undeveloped (Level 1).	China, France and Russia
Malaysia	Developing. (Level 5-7).	U.K., Russia, France
Myanmar	Undeveloped (Level 3-5).	Russia, Ukraine and China
Philippines	Undeveloped (Level 3-5).	U.S., Italy and South Korea
Singapore	Mostly developed (Level 9-10).	U.S. and Israel
Thailand	Undeveloped (Level 3-5).	U.S., China, and the U.K.
Vietnam	Undeveloped (Level 2-4).	Russia, Poland, Israel and France

<sup>57</sup> Till *et al.*, 2009, pp. 205-206

<sup>58</sup> The position in the ladder of production is expressed in a range owing to the uneven development of the defence sectors. Information was elaborated from data obtained at Till *et al.*, 2009, p. 197; SIPRI Military Expenditure Database, and Business Monitor International Defence and Security Reports.

The access to modern defence products in the global market has recently exacerbated the security dilemma for ASEAN nations which are now cautiously observing one another's new military capabilities. For example, Thailand's plans to acquire McDonnell Douglas F/A-18 fighters from the U.S.A. resulted in a counter-reaction from Malaysia to purchase the same aircraft. Likewise, Myanmar's acquisition of Mikoyan MiG-29 fighters from Russia had a domino effect in the region, with Thailand, Singapore and Indonesia rapidly updating their air defence capabilities through the procurement of the General Dynamics F-16 manufactured in the U.S.A.<sup>59</sup>

The most significant representatives of the Australasian defence industries are found in Australia, and to a lesser degree in New Zealand. Both nations have well established industrial bases and R&D organisations which, despite their relatively low-scale defence production and exports, contribute to the innovation and production of certain advanced military systems or components, particularly in those areas where dual-use technologies may be applied.<sup>60</sup> Accordingly, the Australian arms industry has developed niche capabilities enabling the production of sophisticated components, the provision of support services and the designing and manufacturing of major naval weapons platforms such as amphibious ships, destroyers, and submarines. The process of privatisation has led to an important presence of multinational firms in Australia, mostly notably BAE Systems Australia which became the largest defence contractor in the country following its

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<sup>59</sup> Till *et al.*, 2009, p. 209

<sup>60</sup> Business Monitor International, *Australia Defence and Security Report*, Q2-2012, p. 66; and Jane's International Defence Review, IDR Volume 39, Jane's Information Group, 2006, p. 193

acquisition of Tenix Defence in 2008.<sup>61</sup> The Australian defence budget has increased by 3 per cent annually in the last three years and is planned to reach 3 per cent of Australia's GDP by 2017/18.<sup>62</sup> Australian defence imports are primarily sourced from the U.S. and the U.K., although two major military projects are currently being developed with Spanish Navantia, which won the contract for the designing and manufacture of two strategic projection ships and three air-warfare destroyers. Australian military exports are, however, relatively insignificant, with one of its major clients being the Philippines and the other being Kuwait.<sup>63</sup>

**Table 11: Defence industrial development in Australasian countries<sup>64</sup>**

Australasian countries	Defence industrial development (Position in the ladder of production – Krause Model)	Primary foreign suppliers
Australia	Mostly developed (Level 7-10).	U.S., Spain, Germany, France and U.K.
New Zealand	Mostly developed (Level 5-8).	U.S., Canada, U.K., Germany, France and Australia
Papua New Guinea	Undeveloped (Level 1-2)	Australia

It is evident that the Asia-Pacific defence industry is both a part of, and highly influenced by the globalised defence industry. There are widely varying levels of force capability and threat across the region, Northeast Asia being the least stable

<sup>61</sup> Tenix Defence was Australia's largest defence contractor in multiple sectors such as Aerospace, Land, Marine and Electronics, and was acquired by BAE Systems in 2008, reported by Thomas, D. & Lalor, D., *BAE to buy Australia's Tenix*, Reuters online article, 18 January 2008, <http://uk.reuters.com/article/2008/01/18/uk-tenix-bae-idUKSYU00377220080118> [accessed on 12/01/2013]

<sup>62</sup> Gross Domestic Product (GDP) is defined as "the total value of all goods and services produced domestically by a nation during a year" by the Collins Dictionary. <http://www.collinsdictionary.com/dictionary/english/gross-domestic-product> [accessed 12/10/2012]; Business Monitor International, *Australia Defence and Security Report*, Q2-2012, p. 66

<sup>63</sup> Business Monitor International, *Australia Defence and Security Report*, Q2-2012, pp. 66-68

<sup>64</sup> Information was elaborated from data obtained at SIPRI Military Expenditure Database, and Business Monitor International Defence and Security Reports.

area within the Asia-Pacific. The defence industries of nations in the region are the result of national interests, the numerous attempts at international arms control, and incorporation of the various national defence industries into the global defence industry. One of the main concerns is that dominant nations within the region, in particular the U.S.A. and China, are not signatories to several of the arms control treaties, and at the same time there is strong evidence of escalations of defence industry capabilities in China and North Korea. With this instability and with economic growth across the region, there remains the possibility of a regional arms race and rising instability across the Asia-Pacific region.

## **CHAPTER 5**

### **CASE STUDIES**

The stability of the Asia-Pacific region is attracting major attention owing to its increasing relevance in the current globalised world. In this context, the present chapter examines four nations in detail, namely Singapore, South Korea, Indonesia and China. These countries are particularly important as their defence industries are currently being developed at a very fast pace, motivated by different (although related) security scenarios, and based on diverse defence strategies and economic models. As mentioned previously, China has been predicted to be a world power in a few decades and accordingly is immersed in an intensive military and industrial build-up. The size and progress of development of its defence industry is perhaps one of the most relevant factors influencing the current global arms market and the security stability in the region. Indonesia, despite facing internal political instabilities in recent years, is experiencing an impressive economic growth and subsequent rise as a regional power, which has spurred the nation to rapidly develop an indigenous defence industry. South Korea's security is severely influenced by the threat of North Korea and is therefore compelled to continuously develop and modernise its defence industry, making the latter particularly significant within the Asia-Pacific. Lastly, Singapore has managed to develop the most sophisticated arms industry in Southeast Asia, despite its small

size and geographical limitations, owing to the remarkable defence industrial model adopted in recent years.

A detailed examination of these nations security environments, major defence industrial developments and challenges, arms trade strategies, and arms control policies aims to provide a systemic and comparative coverage of the security concerns for arms proliferation within the region, and in particular determine the nations' primary motives to develop indigenous defence industries and the potential effects that these may have on the security dilemma. Further consideration is given to the concomitant influence of the global arms industry on their national and international security strategies.

### **Singapore and the Total Defence model**

Singapore is a city-state located in Southeast Asia at the southern part of the Malay Peninsula bordered by Malaysia in the north and Indonesia in the south and to both the east and west. Its geographical location has made it a focal point for Southeast Asian sea routes. Singapore was founded as a trading post by the British East India Company, and became one of the British Straits Settlements in 1926. The settlement gradually became the largest harbour in Southeast Asia, shipping rubber, tin and oil (with the oil refinery of Pulau Bukom opening in 1905). During the 1930s, the local economy emerged with a strong financial and services sector, further strengthened by the new international airport. Britain had also developed Singapore as its major military base in the Far East.

During the Second World War, the Japanese invaded and occupied vast areas of the European powers' empires in the Far East including Singapore whose garrison surrendered to the Japanese on 15 February 1942. The three and half years of Japanese occupation during the Second World War had catastrophic effects for Britain and the Commonwealth. With the surrender of Japan in August 1945, Singapore and the rest of the British colonies reverted to British rule. However, by this stage, the process of self-rule was inevitable and Malaysia became an independent federation in 1957; Singapore joined the federation, together with Sabah and Sarawak in the northern coast of Borneo, in 1963. The conflict of interests between the major ethnic groups, especially Malay and Chinese, in Malaysia, Singapore and North Borneo however persisted within the federation, resulting in race riots in Singapore. At the same time, a confrontation between Malaysia and Indonesia took place across the common land frontier in Borneo. In order to preserve the Commonwealth support in Borneo, Malaysia decided not to insist on Singapore remaining in the federation and instead expelled it in 1965.<sup>1</sup> Singapore's dynamic economy has since experienced an impressive development, becoming one of the world's most prosperous countries with strong financial, industrial and services sectors. The Singaporean economy has been spurred by one of the world's most important trading links; located at one of the nautical entrance points to Southeast Asia, resting between the Indian and Pacific Oceans, its port is one of the world's busiest in terms of tonnage handled.<sup>2</sup>

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<sup>1</sup> Crump, 2007, p. 192

<sup>2</sup> U.S. Central Intelligence Agency - The World Factbook, *Country report: Singapore*, February 2013, online document, <https://www.cia.gov/library/publications/the-world-factbook/geos/sn.html> [accessed on 12/02/2013]

Since its expulsion in 1965, Singapore has been ruled by a single political party (the People's Action Party) practically without opposition. The closure of the last British military bases in Singapore in the early 1970s opened new opportunities for the development of housing and infrastructures, including Changi Airport, and new industries such as armament and shipbuilding (as the British naval dockyard provided a splendid base for shipbuilding and repair). Defence was certainly a paramount issue owing to Singapore's inherent structural vulnerabilities including its small geographical area and lack of natural resources. Singapore subsequently set up a modern defence force following the recommendations of Israeli advisers (which was certainly not seen favourably by its two Islamic neighbours, Malaysia and Indonesia) and allocated significant portions of government spending to develop its defence industrial base and procure some of the most sophisticated weapons systems in Southeast Asia.<sup>3</sup>

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<sup>3</sup>Crump, 2007, p. 201

**Table 12: General world, regional and country data (Singapore and Malaysia) comparison, 2011, (in brackets % share of World total)<sup>4</sup>**

	Singapore	Malaysia	Asia Pacific	World
Area (000 sq Km)	0.697	329.847	22,536 (4.42%)	510,072
Population (million)	5.3 (0.07%)	29.2 (0.41%)	2,228(31.7%)	7,021
GDP (US\$ trillion) <sup>5</sup>	0.259 (0.37%)	0.287 (0.41%)	18.9(27%)	69.9
Imports (US\$ billions)	311.7 (1.73%)	168 (0.93%)	5,181(28.7%)	18,000
Exports (US\$ billions)	409.2 (2.30%)	212.7 (1.19%)	5,578(31.3%)	17,779
Oil consumption (million bbl/day) <sup>6</sup>	1.2 (1.36%)	0.55 (0.56%)	23.85 (27.1%)	88.0
Military expenditure (US\$ billions constant 2010) <sup>7</sup>	8.3 (0.51%)	4.22 (0.02%)	273.7 (16.8%)	1625

Despite Singapore's political and economic stability, its international relevance as a financial centre and trading hub makes the city-state a potential target for regional terrorist groups such as Jemaah Islamiyah. Fortunately, internal security has remained relatively stable despite terrorist attacks in Indonesia (Bali in 2002 and 2005) and Malaysia (Jakarta in 2003). Singapore's external security is centred in its relations with neighbouring countries, namely Malaysia and Indonesia. The latter two countries control the sea lanes essential for ships entering or leaving Singaporean waters, and also Malaysia's airspace is critical for operations in Singapore's international airport. Malaysia additionally provides Singapore with

<sup>4</sup> Information elaborated from data obtained at Camilleri, 2007; the CIA World Factbook at <https://www.cia.gov/library/publications/the-world-factbook/>; and SIPRI Military Expenditure Database, <http://www.sipri.org/databases/milex> [accessed on 22/09/2012]

<sup>5</sup> Data differs among the U.N., the I.M.F., the World Bank and the CIA World Factbook.

<sup>6</sup> U.S. Central Intelligence Agency - The World Factbook, *Country report: Singapore*, February 2013, online document, <https://www.cia.gov/library/publications/the-world-factbook/index.html> [accessed on 2/05/2012]

<sup>7</sup> Source SIPRI, *Military Expenditure Database*, 2012, online document, <http://milexdata.sipri.org/> [accessed on 10/07/2012]

basic resources including half of the nation's fresh water supply. Indonesia and Malaysia also benefit from Singapore's dynamic economy with a third of Malaysia's imports and exports and up to one-fifth of Indonesia's imports and exports passing through Singapore. Despite the clear economic ties, the relations among them have not been free of difficulties since Singapore's independence. Malaysia and Singapore still dispute the sovereignty of three tiny islands, and at various times, acrimony has arisen as a result of perceived ethnic discriminations.<sup>8</sup>

Singapore's present economic relevance in Southeast Asia and globally is undeniable. Its political stability, location, relatively corruption-free environment, and respected business facilities have attracted significant foreign direct investment. In the last two decades its real GDP has experienced an average rate of 6.7 per cent growth, which has allowed a military spending of 4-5% of GDP for a defence force sized in 166,000 personnel, mainly composed by conscripts, reservists and a core of professional active military personnel.<sup>9</sup> Singapore's defence expenditure has been focused on developing land, sea and air capabilities to achieve military superiority over neighbouring militaries in Southeast Asia.<sup>10</sup>

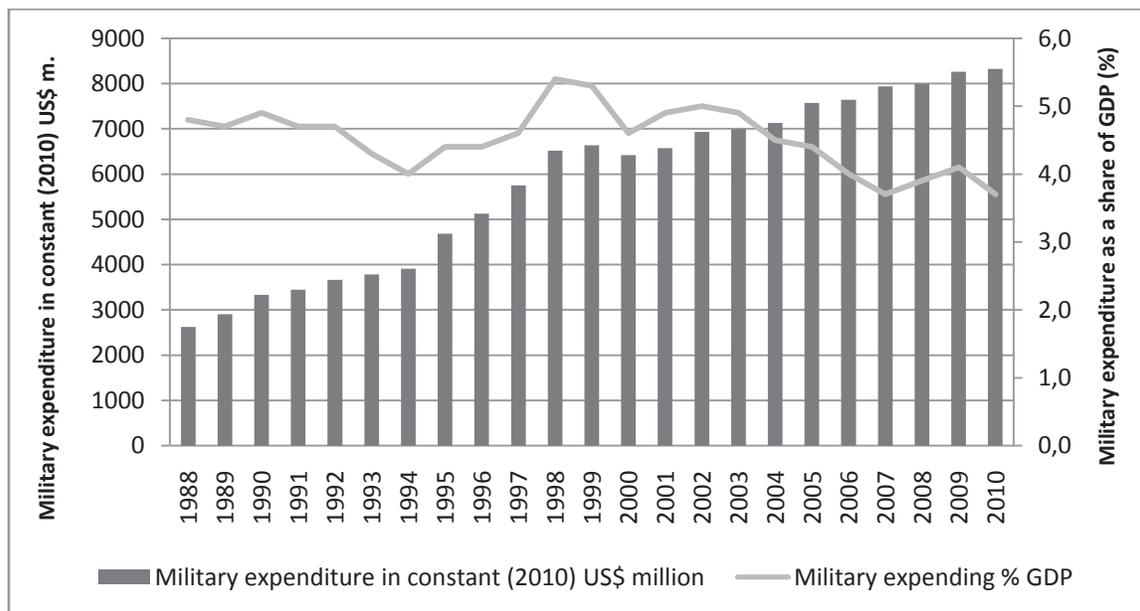
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<sup>8</sup> Crump, 2007, p. 202

<sup>9</sup> Singapore Department of Statistics, *Singapore's Annual GDP at Current Market Prices*, February 2013, online document, <http://www.singstat.gov.sg/stats/themes/economy/hist/gdp2.html> [accessed on 12/02/2013]; SIPRI, *Military Expenditure Database*, 2012, online document, <http://www.sipri.org/databases/milex> [accessed on 22/09/2012]; Business Monitor International Ltd., *Singapore Defence and Security Report*, Q2-2012, p. 64

<sup>10</sup> Business Monitor International Ltd., *Singapore Defence and Security Report*, Q2-2012, p. 66

**Figure 12: Singapore's military expenditure in constant (2010) US\$ (million) versus share of GDP, 1988-2010<sup>11</sup>**



In the mid-1980s, Singapore adopted a 'Total Defence' strategy (adapted from Swiss and Swedish models). This strategy is based on military, civil, economic, social and psychological factors.<sup>12</sup> The first three have been clearly strengthened by a robust economy which has supported a consistent growth in military expenditures and the subsequent acquisition of advanced weapon systems. The thriving economy has also enabled the development of a remarkable military industrial base and R&D capabilities capable of producing small arms and ammunition, brown water ships, artillery, ordinance, and armoured vehicles. Singapore's defence firms are also developing high-technology products to be marketed abroad, achieving significant success in marketing certain product

<sup>11</sup> Information elaborated from data obtained at SIPRI Military Expenditure Database, online document, <http://www.sipri.org/databases/milex> [accessed on 22/12/2012]

<sup>12</sup> Weichong, O., *Singapore's Total Defence: Shaping the Pillars*, S. Rajaratnam School of International Studies, Singapore, RSIS Commentaries, February 2011, p. 1

domains such as UAVs (unmanned aerial vehicles), network solutions and armoured vehicles.<sup>13</sup>

The defence sector however is firmly protected by the Singaporean government, which has closed foreign investment on armament production in Singapore. During the late 1990s, defence firms experienced a process of mergers and consolidation under Singapore Technologies Engineering (ST Engineering) which is mostly controlled by the government-owned holding company, Temasek.<sup>14</sup> The company successfully diversified its production between the commercial and defence sectors to a level where only 40 per cent of the company's total sales corresponded to arms sales by 2010. This diversity of production mirrors the experience of larger, multinational defence industry companies especially in the U.S.A. and Europe. ST Engineering currently has four major divisions: ST Aerospace, ST Electronics, ST Kinetics and ST Marine.

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<sup>13</sup> Business Monitor International Ltd., *Singapore Defence and Security Report*, Q2 2012, p. 69

<sup>14</sup> ST Engineering has been ranked in the 51<sup>st</sup> position of the SIPRI's Top 100 arms-producing companies by sales in 2010 and 52<sup>nd</sup> in 2011, <http://www.sipri.org/research/armaments/production/Top100> [accessed on 19/02/2013]

**Table 13: Singapore's major defence industries<sup>15</sup>**

Company	Sectors	Products
ST Aerospace (commercial and military aircrafts)	Maintenance & Modification Repair and Overhaul Component supplier and R&D	C-130 transport, Fokker 50, Bell and Super Puma helicopters, F-5 fighters and A4 Skyhawks Avionics, mechanical components and engines support Unmanned Aerial Vehicles (UAVs)
ST Electronics	Communications and Sensor Systems Large-Scale Systems Software Systems	Communications, microwave systems, traffic management and mobile commerce Intelligent building management systems and transportation systems Mobile real-time systems, and training and simulation
ST Kinetics (Land Systems for defence and commercial)	Land platforms Weapons and munitions Automotive systems	Armoured vehicles (e.g. all terrain Bronco),
ST Marine (defence and commercial shipbuilding)	Shipbuilding, conversion and repair	Patrol boats, missile corvettes and attack craft, landing and supply craft, mine counter-measure vessels and fast utility craft. Co-production of multi-mission frigates with DCN (France)

Singapore has also forged a working relation among various producers, researchers, developers and users through what has been called 'ecosystem' production.<sup>16</sup> This strategy has enabled the Singaporean defence industry to successfully expand its defence marketing internationally, with foreign defence sales generating an impressive \$1.75 billion in earnings in 2010 alone. A major

<sup>15</sup> Information elaborated from data obtained at the Singapore Defence and Security Report, Business Monitor International, Q2 2012, pp. 82-86

<sup>16</sup> The 'ecosystem' process is based on the close relationships between the development of R&D capabilities, R&D personnel and strengthening local defence industry. Business Monitor International Ltd., *Singapore Defence and Security Report*, Q2 2012, pp. 70-71

achievement was the export of the Bronco All Terrain Tracked Carrier to the U.K. (a first tier arms producing country) in 2010-11 in response to an urgent requirement resulting from the British Army's involvement in the Afghanistan war; the sale of 100 Broncos was valued at £150 million. Other major recipients of Singaporean defence product have been Chad (ex-Singaporean light-helicopters), Indonesia (ex-Singaporean trainer and transport aircraft), Nigeria (maritime patrol craft), the Philippines (ex-Singaporean helicopters), and the United Arab Emirates (mortars).<sup>17</sup>

Despite the substantial progress in establishing an indigenous defence industry, Singapore remains dependent on overseas suppliers for a significant proportion of the high-technology equipment and major weapons platforms. Singapore has become the fourth largest U.S. Foreign Military Sales (FMS) recipient in Asia behind Taiwan, South Korea and Japan. It has acquired advanced weapons systems from the U.S.A. including the F-16 and F-15SG combat aircraft, AH-64D Apache combat helicopters, and various components essential for indigenous production such as diesel engines for armoured vehicles. Furthermore, Singapore participates in co-development processes such as for the F-35 Joint Strike Fighter. Other countries have also provided weapons systems and platforms to Singapore in recent decades, namely Israel (UAVs and electronic systems), France (missiles and *La Fayette* frigates produced in Singapore under license), Sweden (*Västergötland* submarines), Italy (torpedoes and naval guns), Germany (diesel engines, Leopard2A4 battle tanks and corvettes produced in Singapore under

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<sup>17</sup> Business Monitor International Ltd., *Singapore Defence and Security Report*, Q2 2012, pp. 69-72

license) and the U.K. (missiles and diesel engines).<sup>18</sup> The substantial import of sophisticated military equipment and the offsets associated with the procurement contracts (aimed at an industrial participation of 25-30% of the procurement contract's total value) has also favoured Singapore's defence industrial base.<sup>19</sup>

While Singapore can boast of defence industry successes, the growing competitiveness in the global defence market is having an impact on its defence industry as nations such as the U.S.A. and more recently China, Russia and South Korea have become important exporters of weapons systems in the Asia-Pacific.<sup>20</sup> Accordingly, Singapore's indigenous defence industry has undertaken strategic moves to ensure its viability including that the industry has consolidated and diversified its production between commercial activities and developing core defence capabilities. ST Engineering has successfully leveraged dual-use technologies and the defence industry has managed to export and maintain international competitiveness with certain niche products such as multirole land systems and guided weapons and munitions (including 40mm ammunition and the CIS 40mm Automatic Grenade launcher). The defence sector has also internationalised the development and production of weapons systems through a combination of foreign acquisitions, alliances and joint ventures with 1<sup>st</sup> and 2<sup>nd</sup> tier arms producing firms (namely in the U.S., South Korea and China). ST Engineering now has over 100 subsidiaries in 23 countries. The establishment of regional trade agreements and international cooperation not only facilitates the

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<sup>18</sup> SIPRI Arms transfers of major conventional weapons database

[http://armstrade.sipri.org/armstrade/page/trade\\_register.php](http://armstrade.sipri.org/armstrade/page/trade_register.php) [accessed on 18/10/2012]

<sup>19</sup> Australian Department of Defence - Defence Export Unit, *Countries Offsets Database*, March 2010, online document, [www.defence.gov.au/deu/docs/Offsets\\_Database.xls](http://www.defence.gov.au/deu/docs/Offsets_Database.xls) [accessed on 12/11/2012]

<sup>20</sup> Business Monitor International Ltd., *Singapore Defence and Security Report*, Q2 2012, p. 72

access of Singaporean defence products into foreign markets, but also gives foreign firms the opportunity to participate in Singaporean defence procurement processes.<sup>21</sup>

Singapore's participation in the Five Power Defence Arrangements (FPDA) has provided it with collective security benefits (namely, a deterrent capability and military cooperation) and has improved its relations with Malaysia. A bilateral Defence Cooperation Agreement was also established with Indonesia in 2007 to discuss the possibility of military cooperation and to promote a shared approach to security problems, whilst still preserving state sovereignty. The agreement also allowed the use of Indonesian military training areas by Singaporean defence forces.

Singapore does not possess weapons of mass destruction and supports non-proliferation policies, having joined the Nuclear Non-Proliferation Treaty (NPT) in 1970, the Comprehensive Test Ban Treaty (CTBT) in 1999 and the Bangkok Treaty in 1995. Singapore does not participate in the Warsaw Arrangement, the Australian Group and the Missile Technology Control Regime, and has not provided any report to the UNRCA.

## **South Korea and the Cold War's vestiges**

Just over a century ago Korea was still a single nation, and had been a united kingdom throughout hundreds of years, isolated from foreigners. The Korean

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<sup>21</sup> Kuah and Loo, 2004, pp. 15-18

peninsula projects to the south from northern China into the Japan Sea, and is separated from China by the Yalu River in the north, with a short but important frontier with Russia in the far north-east. The country's geographical location between three contending powers (China, Japan and Russia) determined its fate during the 20th century. Following the First Sino-Japanese War (1894) and the Russo-Japanese War (1904-05), Japan occupied Korea in 1910, and that occupation continued until the end of the Second World War.

The Japanese attack on the U.S.A. (Hawaii) and against American, British, Dutch and French colonial interests in the Asia-Pacific in 1941-42 brought an eventual end to the 35-year Japanese occupation of Korea. At the end of the war, the Soviet Union attempted to expand as far as Manchuria and Korea in order to regain the territories that Russia had lost to Japan at the beginning of the century. With Japan defeated and China immersed in an internal conflict, the U.S.A. and the Soviet Union became the major players in Korea. On 15 August 1945, the two countries agreed to divide the country along latitude 38° N, a line to the north of Seoul, splitting Korea in two roughly equal halves. The subsequent establishment of the Korean People's Democratic Republic (DPRK) in the north as a Communist state with a well-equipped military that was strongly supported by the Soviet Union' this contrasted with the small, poorly trained and inadequately equipped army of the new Republic of Korea (ROK) in the south.<sup>22</sup>

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<sup>22</sup> Crump, 2007, p. 74-48

In 1950, a full-scale North Korean invasion of the south resulted in the deployment of an international force led by the U.S. in Korea.<sup>23</sup> Within three months, North Korean forces were driven back north of the 38<sup>th</sup> parallel. The involvement of China in the Korean War (in support of the DPRK) however acted as an additional barrier against the prospects of a short-term conflict. In 1953 an armistice was finally agreed, with the peace negotiations at Panmunjom having established a military demarcation line and a demilitarised zone (DMZ) but failing to end with a peace treaty signed by both countries. The subsequent tensions between the north and south have persisted ever since, creating one of the most tense stand-offs in international relations and one of the most highly militarised areas in the world (both countries ranked first and second in the number of military personnel per capita).

South Korea recognised that it had a nuclear weapon programme in the 1970s, although this was discontinued under U.S. pressure. The country has, however, developed significant nuclear expertise owing to the fact that 40 per cent of South Korea's energy is provided by 18 nuclear power reactors. Certain uranium-enriching experiments have been criticised as being a breach of the Non-Proliferation Treaty signed by South Korea in 1975.<sup>24</sup> Furthermore, South Korea declared to have had an active chemical weapons programme, which was stockpiled and is currently gradually being destroyed following South Korea's ratification of the Chemical Weapons Convention (CWC) in 1997. A decade later, South Korea also banned all biological weapons demonstrating its commitment

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<sup>23</sup> Fourteen countries participated in the UN joint forces: Australia, Belgium, Canada, Colombia, Thailand, Turkey, South Africa, and the U.K. formed with the U.S. the military force supporting the war in Korea, while Denmark, India, Italy Norway and Sweden provided medical units.

<sup>24</sup> Business Monitor International Ltd., *South Korea Defence and Security Report*, Q1-2013, pp. 54

against the proliferation of weapons of mass destruction promoted by international organisations.<sup>25</sup>

South Korea has experienced an impressive economic growth in the last four decades, having developed a high-tech industry and currently ranking among the world's 20 largest economies. The differences with its northern neighbour are considerable, as illustrated in the table below. South Korea's military and strategic planning has been mostly driven by the antagonist actions of North Korea; although its ongoing dispute with Japan over the ownership of Takeshima/Dokdo (situated in the sea between the two nations) also plays a part, albeit minor, in South Korea's security planning. North Korea possesses a large amount of conventional weapons and platforms, particularly artillery (estimated around 13,000 units), which may be seen as a clear threat to Seoul (located 50km south of the border). The DPRK also has an active nuclear weapons programme. Despite the recent suspension of uranium enrichment in exchange for food aid, the prospects of a definite renunciation of its nuclear weapons development are limited.<sup>26</sup> In view of North Korea's military developments, it is not surprising that South Korea has devoted significant resources to its defence forces and is committed to the maintenance of a domestic defence industrial base. In the last two decades South Korean military spending has consistently increased by 2.5-3 percent of GDP. In periods of increased tension, defence expenditure can be increased. For example, North Korea's decision to test Taepodong missiles in

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<sup>25</sup> Ibid

<sup>26</sup> Boik, W., *Understanding the North Korea Problem: Why it has become the "Land of Lousy Options"*, Strategic Studies Institute, U.S. Army War College, Carlisle, PA, Working Paper, July 2011, p.9

2006 was followed by a large increase in South Korea's military expenditures by 9.7%, reaching US\$26 billion.<sup>27</sup>

**Table 14: General world, regional and country data (South Korea and North Korea) comparison, 2011, (in brackets % share of World total)<sup>28</sup>**

	South Korea	North Korea	Asia Pacific	World
Area (000 sq Km)	99.7	120.5	22,536 (4.42%)	510,072
Population (million)	48.8 (0.69%)	24.5 (0.34%)	2,228(31.7%)	7,021
GDP (US\$ trillion) <sup>29</sup>	1.116 (1.59%)	0.028 (0.04%)	18.9(27%)	69.9
Imports (US\$ billions)	524.4 (2.91%)	3.53 (0.01%)	5,181(28.7%)	18,000
Exports (US\$ billions)	556.5 (3.13%)	2.56 (0.01%)	5,578(31.3%)	17,779
Oil consumption (million bbl/day) <sup>30</sup>	2.23 (2.53%)	0.015 (0.01%)	23.85 (27.1%)	88.0
Military expenditure (US\$ billions constant 2010) <sup>31</sup>	28.2 (1.73%)	5 (0.3%) <sup>32</sup>	273.7 (16.8%)	1625

<sup>27</sup> Business Monitor International Ltd., *South Korea Defence and Security Report*, Q4-2009, p. 27

<sup>28</sup> Information elaborated from data obtained at Camilleri, 2007; the CIA World Factbook at <https://www.cia.gov/library/publications/the-world-factbook/>; and SIPRI Military Expenditure Database, <http://www.sipri.org/databases/milex> [accessed on 12/10/2012]

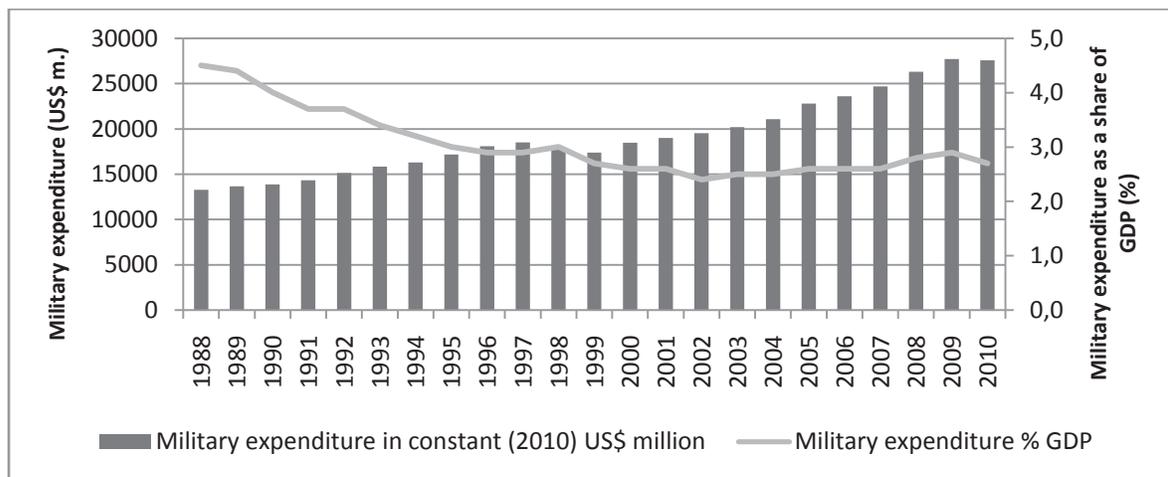
<sup>29</sup> Data differs among the U.N., the I.M.F., the World Bank and the CIA World Factbook

<sup>30</sup> U.S. Central Intelligence Agency - The World Factbook, *Country report: South Korea*, July 2012, online document, <https://www.cia.gov/library/publications/the-world-factbook/index.html> [accessed on 22/08/2012]

<sup>31</sup> SIPRI Military Expenditure Database, 2012, online document, <http://www.sipri.org/databases/milex> [accessed on 22/09/2012]

<sup>32</sup> North Korea military expenditure is not available, different sources' estimations varies from 18% to 27% of the GDP. Source Global Security.org, *North Korea estimated military expenditures*, online document, <http://www.globalsecurity.org/military/world/dprk/index.html> [accessed on 12/11/2012]

**Figure 13: South Korea's military expenditure in constant (2010) US\$ (million) versus share of GDP, 1988-2010<sup>33</sup>**



The recent tensions between North Korea and South Korea, including the sinking of the South Korean warship *Cheonan* in March 2010, and an attack of the island of *Yeonpyeong* several months later, spurred the development of South Korean military programmes with a specific focus on aerial surveillance and reaction, including high altitude spy drones and fighter jets, anti-artillery detection systems and precision-guided weapons able to counter the threat of North Korean artillery.

South Korea's defence industry has been able to be responsive owing to the capability developed as a result of strong U.S. support during the 1950s and 1960s. With American support, South Korea's arms industry was able to expand sufficiently to produce its own small arms and munitions, fighter aircraft and submarines. The combination of further economic growth and a government firmly committed to independently developing their own military core capabilities contributed to the building and sustaining of South Korea's domestic arms

<sup>33</sup> Information elaborated from data obtained at SIPRI Military Expenditure Database, online document, <http://www.sipri.org/databases/milex> [accessed on 22/12/2012]

industry. The financial crisis in Asia in the late 1990s severely affected some of South Korea's conglomerates (known as *chaebols*) which presented serious problems of over-capacity and mounting debts, however the subsequent process of rationalisation and transformation from a state-led economy towards a commercial and more competitive free-market model has produced a significant reduction in *chaebols* (half of the top 30 have been removed from the market).<sup>34</sup> The formation in 1999 of Korea Aerospace Industries (KAI) from the merger of three aircraft companies represents the most significant outcome of this Korean rationalisation process.<sup>35</sup> On the other hand, a restructure of the defence firms by merging without addressing the overcapacity problem has been reported as one of the major weaknesses of the South Korean defence industry's viability. For example, KAI was being operated at approximately 30 per cent of its full capacity.<sup>36</sup>

The South Korean defence industry currently encompasses a number of firms capable of developing and producing a variety of defence equipment, as shown in the table below. The aerospace sector in particular is developing a range of combat and support aircraft, helicopters, UAVs, and satellites; the land sector is indigenously manufacturing artillery systems, armoured vehicles and a range of rocket launchers and missiles; and the naval sector has accumulated remarkable experience producing submarines and electronic warfare systems. However, despite its significant development, the South Korean defence industrial base still

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<sup>34</sup> Business Monitor International Ltd., *South Korea Defence and Security Report*, Q2-2012, p. 69

<sup>35</sup> The merger of the following companies: Samsung Aerospace, Daewoo Heavy Industries Aerospace Division and Hyundai Space and Aircraft Company

<sup>36</sup> Bitzinger, 2003, pp. 50-51

relies on foreign expertise for certain high-technology products such as submarine technology and airborne warning and control systems (AWACS).<sup>37</sup>

**Table 15: South Korea's major defence industries<sup>38</sup>**

Company	Sectors	Products
Daewoo Shipbuilding & Marine Engineering – DSME (commercial offshore platforms and military vessels)	Shipbuilding, overhaul and offshore platforms	Submarines and 5,500 tonne destroyers
Doosan Heavy Industries & Constructions - DHI (commercial and military equipment)	Construction equipment, industrial vehicles, diesel engines, power supply equipment, machine tools and factory automation equipment	Armoured vehicles (K200 IFV), self-propelled short-range surface to air missiles (Chunma), a self-propelled anti-aircraft gun (BiHo), and torpedo tubes for the Navy. Civilian construction equipment, water generator and desalination plants and core equipment for nuclear plants.
Korean Aerospace Industries – KAI (military aerospace programmes)	Aircrafts and satellites	Fixed-wing aircrafts (Korean F-16, KT-1 basic trainer and T-50, a supersonic jet trainer developed in cooperation with Lockheed Martin). Helicopters (SB427), UAVs and satellites (KOMPSAT)
Samsung Thales	Missiles and electronics	Missiles, fire control systems, radar, telecommunication electronics, naval command and control and avionics (e.g. Search and Tracking system integrated in the Korean SAM systems)
Hanjin Heavy Industries	Shipbuilding and repair	Fast attack crafts (PKX)

<sup>37</sup> *South Korea Defence and Security Report*, Business Monitor International Ltd., Q1 2013, p. 55

<sup>38</sup> Information elaborated from data obtained at the *South Korea Defence and Security Report*, Business Monitor International Ltd., Q2 2012, pp. 83-87

Hyundai Heavy Industries	Maritime, armoured and mechanical components	
LG Innotek	Electronics, avionics, radar and communications	
Royal Thales Netherland	Maritime	
Samgong Industries	Protective clothing, equipment	
Samsung Techwin	Aerospace, armour and electronics	
Ssangyong Heavy Industries	Vehicles and naval engines	

A significant advantage for South Korea is that since the end of the Second World War, and even more so since the end of the Korean War, the U.S. has been committed to protecting South Korea. In the event of another war with North Korea, U.S. forces would assume control of South Korea's military operations, based on arrangements established before the Korean War. The U.S.A. not only continues to deploy forces in South Korea (approximately 28,500 U.S. troops in 2012), but has also supported its military development by both transferring technology (through license production) and facilitating military equipment procurements. Consequently, South Korea has become a consistent recipient of U.S. defence exports. South Korea has additionally manufactured a number of weapons systems under U.S. license in the last decade, including helicopters (UH-60L Blackhawk), combat aircraft (F16C, and F-15E Strike Eagle), self-propelled

guns (M-109A1 155mm), armoured vehicles (K1-A1 battle tank and amphibious vehicles) and also AWACS systems (Boeing 737).<sup>39</sup>

South Korean defence firms have also been involved in the licensed production of submarines from Germany, SAM (surface-to-air) missile systems from France, electronics systems (air search radar) from the Netherlands, and artillery locating radar from Sweden. Significantly, South Korea has also acquired armoured vehicles, helicopters, anti-tank missiles and light aircraft from Russia, although these arms transfers may have been a means of partially enabling Russia to pay off its financial debt to South Korea.<sup>40</sup>

Overall, the South Korean defence industrial base has been favoured by strong government support in military expenditure and the development of indigenous production. The South Korean defence sector has also benefited from its government offset policy, which has established an offset programme valued at 50% of the defence import contract's value. These compensations may be used on direct industrial participation programmes, including technology transfers, export and marketing support, and subcontracts or purchases from local suppliers; or on indirect industrial participation programmes such as investments in non-defence industries.<sup>41</sup> The offsets and cooperation with foreign firms also have a significant positive effect on exports. For example, the Korea Multirole Helicopter Programme established in 2004 for US\$12.5 billion with the intention of replacing

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<sup>39</sup> Business Monitor International Ltd., *South Korea Defence and Security Report*, Q2-2012, pp. 69-72

<sup>40</sup> SIPRI Arms transfers of major conventional weapons database  
[http://armstrade.sipri.org/armstrade/page/trade\\_register.php](http://armstrade.sipri.org/armstrade/page/trade_register.php) [accessed on 11/11/2012]

<sup>41</sup> Australian Department of Defence - Defence Export Unit, *Countries Offsets Database*, March 2010, online document, [www.defence.gov.au/deu/docs/Offsets\\_Database.xls](http://www.defence.gov.au/deu/docs/Offsets_Database.xls) [accessed on 12/11/2012]

all of South Korea's military helicopters had as the main partner Eurocopter. This enabled KAI and Eurocopter to also establish a joint venture (the *Surion* utility helicopter) planned to be exported primarily to Southeast Asia and South America. In addition, South Korea is currently developing three 7,000 tonne destroyers (named KDX-3) integrating the sophisticated American Aegis combat system (worth over US\$ 1.0 billion.), along with other significant projects.<sup>42</sup>

South Korea's defence industry is increasingly orientated towards exports. The recent establishment of the Defence Industry Development Council (DIDC) to guide the development of the defence manufacturing sector and to promote exports aims to transform the sector from a minor global player to one of the world's biggest defence exporters. The Defence Acquisition and Programme Administration (DAPA) revealed its intention to increase military exports fivefold from US\$2.4bn in 2011 to US\$10bn within the decade.<sup>43</sup> South Korean military products targeting specific niches (such as the XK2 tank, the XK-21/KNIFV amphibious infantry fighting vehicle, the K9/K10 self-propelled howitzer, the KT-1 trainer aircraft and the aforementioned T-50 Golden Eagle trainer and light fighter aircraft) are available at competitive prices in the global defence market. Some of the most important recipients of South Korean weapons systems are Indonesia which has ordered 16 KAI T-50 Golden Eagle aircraft (advanced trainer/light attack aircraft) and three submarines under license, and also Turkey which has ordered self-propelled guns and trainer aircrafts.<sup>44</sup>

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<sup>42</sup> South Korea Defence and Security Report, Business Monitor International, Q1-2013, pp. 60-62

<sup>43</sup> Business Monitor International Ltd., *South Korea Defence and Security Report*, Q1-2013, p. 67

<sup>44</sup> Business Monitor International Ltd., *South Korea Defence and Security Report*, Q1-2013, pp. 60-62

The viability and expansion of the South Korean defence industry are clearly favoured by the following factors: consistent government military expending (spurred by the nation's economic growth), which guarantees a domestic defence market; a diversified defence industrial sector strongly supported by commercial production, which may compensate for the economic drawbacks of defence production (such as overcapacity and poor economies of scale); successful leveraging of dual-use technologies, including 'world-class' South Korean firms employing cutting-edge technology to manufacture a wide range of products (from mobile phones to ships) that may be used in the military sector; development of an export-orientated strategy; and a significant internationalisation of defence development and production by foreign acquisitions, alliances and joint ventures. It is anticipated however, that the South Korean defence industry is yet to face some major challenges. In particular, the defence industry needs to improve the transparency and efficiency of its *chaebols* conglomerates (for which reform has not yet been completed), and address the problem of overcapacity and dependency on the domestic military spending. The high level of external debt may also generate certain instabilities and therefore more greatly expose defence firms' weaknesses.<sup>45</sup>

## **Indonesia, a rising tiger defence industry**

With more than 13,000 islands and over 200 million citizens, Indonesia is the most heavily populated and geographically extensive country in Southeast Asia. It is also extraordinarily diverse in ethnic, linguistic, and religious terms; however, 90

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<sup>45</sup> Bitzinger, 2003, p. 53; and Business Monitor International Ltd., *South Korea Defence and Security Report*, Q2-2012, p. 9

per cent of Indonesia's population is Islamic, making it in fact the world's largest Muslim country.

As with other Asia-Pacific nations, the Second World War had a great impact on Indonesia. The Japanese invasion of what was then the Netherlands East Indies in March 1942 put an end to three centuries of Dutch colonial rule. The development of Indonesian nationalism (led by Ahmed Sukarno under the Japanese occupation) resulted in an impossible restoration of the previous Dutch colonial government following the surrender of Japan in 1945. The Republic of Indonesia was recognised internationally in 1949 after four years of an armed and diplomatic struggle with the Dutch, facilitated by the vast stocks of arms left behind by Japanese forces.<sup>46</sup>

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<sup>46</sup> Crump, 2007, pp. 221-227

**Table 16: General world, regional and country data (Indonesia) comparison, 2011, (in brackets % share of World total)<sup>47</sup>**

	Indonesia	Asia Pacific	World
Area (000 sq Km)	1,904.5	22,536 (4.42%)	510,072
Population (million)	248.2 (3.53%)	2,228(31.7%)	7,021
GDP (US\$ trillion)	1.139 (1.62%)	18.9(27%)	69.9
Imports (US\$ billions)	172.1 (0.95%)	5,181(28.7%)	18,000
Exports (US\$ billions)	208.9 (1.17%)	5,578(31.3%)	17,779
Oil consumption (million bbl/day)	1.29 (1.46%)	23.85(27.1%)	88.0
Military expenditure (US\$ billions constant 2010)	5.22 (0.32%)	273.7(16.8%)	1625

Following its independence, Indonesia's tortuous path to democracy and integration revealed mounting tensions between the centralist foundation of the nation and the centrifugal forces of ethnic and religious differences. Indonesia became involved in various conflicts whilst under the authoritarian 'guided democracy' established by Sukarno, including internal political instabilities (namely between Communists and nationalists), an external dispute with the Netherlands over West Irian in the early 1960s, and diplomatic and armed clashes with the new Malaysian federation in Borneo in the mid-1960s (known as Confrontation). When General Suharto took over the Indonesian presidency in 1968, his main objectives were to bring order and prosperity to a country that was close to ruined by the former regime. Suharto's authoritarian 'New Order Administration' strengthened

<sup>47</sup> Information elaborated from data obtained at Camilleri, 2007; U.S. Central Intelligence Agency - The World Factbook, *Country reports*, July 2012, online document, *Indonesia*<https://www.cia.gov/library/publications/the-world-factbook/geos/id.html> [accessed on 22/12/2012], and *Malaysia*<https://www.cia.gov/library/publications/the-world-factbook/geos/my.html> [accessed on 22/12/2012]; and SIPRI Military Expenditure Database, <http://www.sipri.org/databases/milex> [accessed on 12/10/2012]

the Indonesian economy by favouring exports and import-substitution industries (which subsequently attracted Western investors). Despite the economic growth experienced by Indonesia during the 1970s and 1980s, internal unrest remained, mostly as a result of separatist movements in the provinces of Papua and Aceh, which was further exacerbated by the decision to occupy the ex-Portuguese colony East Timor in 1976. It was during the 1970s that the Indonesian defence industry underwent the initial stages of development, focusing its capabilities on low-scale production and the maintenance and repair of military equipment.<sup>48</sup>

Indonesia's leading role in the Nonaligned Movement (in which participating nations declared their neutrality in the Cold War) meant that the nation acquired significant status in the Third World throughout the 1980s and early 1990s.<sup>49</sup> At the end of the Cold War neutrality was no longer considered imperative as the rivalry between the two main superpowers had ended. This greatly undermined Indonesia's international relevance, which was further weakened by criticisms received from international organisations and NGOs regarding corruption, abuse of human rights and lack of political freedom.<sup>50</sup> Expansion of the Indonesian defence industry capabilities during this period occurred largely as a result of licensed production (mainly of aircraft, landing craft, patrol boats, and a variety of small arms and ammunition). During the 1990s, the increasing demands for democracy coincided with the rise of independence movements in Papua, Aceh and East Timor; meanwhile other ethnic and religious strife persisted throughout the country, particularly in Java, Ambon, and Kalimantan. The violent repression of

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<sup>48</sup> Crump, 2007, pp. 221-244

<sup>49</sup> Younce, W., *Indonesia: Issues, Historical Background and Bibliography*, Nova Science Publishers, New York, 2001, p. 74

<sup>50</sup> Davis, T. & Galligan, B., *Human Rights in Asia*, Edward Elgar Publishing, Cheltenham, 2011, pp. 39-44

independence movements in East Timor by the Indonesian Army (TNI) resulted in a U.S.-imposed arms embargo on Indonesia between 1992 and 2005.<sup>51</sup>

The financial crisis of the late 1990s severely affected Indonesia's fragile political and economic stability. The Indonesian defence industry was particularly hit by the crisis with many defence firms going bankrupt or having to initiate a process of restructuring. Further growth of the defence industry was only made possible as a result of continued state support and foreign loans. In 1998, Suharto resigned from the presidency, and Indonesia initiated a process to restore democracy, although ethnic and separatist movements persisted. Unfortunately, the situation in East Timor deteriorated in 1999 following a referendum on independence leading to an Australian-led military intervention under a U.N. Security Council Resolution.<sup>52</sup> Human rights violations by Indonesian forces and pro-Indonesian militias in East Timor in the lead-up to the intervention also led the European Union to impose an arms embargo between September 1999 and January 2000.<sup>53</sup>

The risk of political disintegration occurring in Indonesia has been a major concern for neighbouring states owing to political, social, economic and security consequences. Malaysia (closely linked to Indonesia in terms of language, religion, culture and proximity) would most certainly experience political turmoil as

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<sup>51</sup> Johnston, Tim, *US eases Indonesian arms ban*, BBC news, 26 May 2005, online article, <http://news.bbc.co.uk/2/hi/asia-pacific/4581733.stm> [accessed on 21/11/2012]

<sup>52</sup> Sterio, M., *The Right to Self-determination Under International Law*, Routledge Research in International Law, Routledge, New York, 2013, pp. 73-76; Lahneman, W., *Military Intervention: Cases in Context for the Twenty-First Century*, Rowman & Littlefield, Lanham, MD, 2004, pp. 155-156

<sup>53</sup> Council of the European Union, *Common Position 1999/624/CFSP and Common Position 2158/1999/CFSP in reaction to a series of violations of human rights and international humanitarian law in East Timor*, online document [http://www.sipri.org/databases/embargoes/eu\\_arms\\_embargoes/indonesia](http://www.sipri.org/databases/embargoes/eu_arms_embargoes/indonesia) [accessed 12/12/2012]

a result of the 'Balkanisation' of Indonesia and the arrival of scores of refugees (as occurred in 2001, when violence in East Timor, Papua, Aceh, Maluku, Sulawesi and Kalimantan generated over 1.3 million displaced people within Indonesia and an average daily entry of 3,000 illegal refugees in Malaysia). Australia would also be adversely affected by masses of displaced people and asylum-seekers. Indonesia's instability would favour terrorism and piracy with a severe impact on the security of regional sea lanes and a subsequent deterioration in the regional and global economy. Fortunately, the recent transition to a multiparty democracy and significant economic reforms has strengthened Indonesian's stability. The political settlement achieved with Aceh's separatists in 2005 has also contributed to an increased international awareness of Indonesia's progress. The risk of disintegration has declined in recent years and Indonesia now has one of the fastest growing economies in the Asia-Pacific.<sup>54</sup>

Although territorial disputes over land and maritime borders with Singapore, East Timor, Vietnam and especially with Malaysia remain largely unsolved, the chances of an inter-state conflict in this area seem remote. Indonesia is seen as a cornerstone in ASEAN, being firmly committed to regional co-operation on trade and security issues (such as anti-piracy and natural disaster response capabilities). However, Malaysia's efforts to establish regional defence collaboration among ASEAN nations has had little effect, suggesting there is still a certain degree of distrust amongst some participating states, which may include Indonesia. The major threats currently faced by Indonesia are internal separatism

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<sup>54</sup> Huxley, T., *Disintegrating Indonesia? Implications for Regional Security*, The International Institute for Strategic Studies, Adelphi Paper 349, 2002, pp. 71-91

in some provinces and terrorism, as demonstrated by the attacks on Bali and Jakarta in 2002 and 2005, respectively.<sup>55</sup>

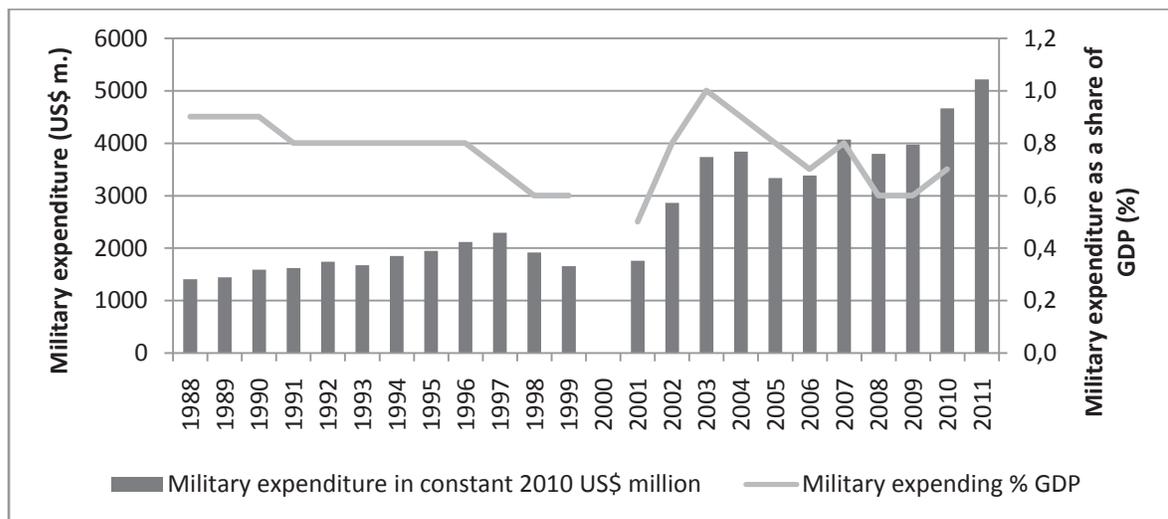
The need for national unity and cohesion has given the Indonesian National Armed Forces a critical role in the formation of the state. Its military equipment, however, is based on a mixture of ageing Western and Soviet/Russian technologies and componentry, and some of it is estimated to have anywhere between 25 and 40 years of service. Only a third of the equipment is reportedly operational to a satisfactory level. Indonesia has recently adopted Malaysia's approach of revitalising the defence sector with a focus on self-reliance and a gradual modernisation of its military plants. In the last decade, Indonesian defence industry's capabilities and self-sufficiency aspirations have been limited to relatively low-technology programmes owing to a chronic lack of funds to support R&D; although this trend has possibly reached a turning point as a result of the nation's recent economic growth. The defence industrial base has experienced a second boost since 2008 owing to government efforts to revitalise the sector by increasing defence spending, promoting indigenous production, and introducing an offset policy (to strengthen the transfer of technology and subsequently favour the domestic industrial development).<sup>56</sup>

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<sup>55</sup> Business Monitor International Ltd., *Indonesia Defence and Security Report*, Q4-2009, pp. 6-11

<sup>56</sup> Taylor, C., *Military Balance in Southeast Asia*, Research Paper 11/79, House of Commons Library, 14 December 2011, pp. 28-37

**Figure 14: Indonesia's military expenditure in constant (2010) US\$ (million) versus share of GDP, 1988-2011<sup>57</sup>**



The increase in defence expenditures in the last two years in particular has made Indonesia's defence budget the second largest in Southeast Asia (behind Singapore, and closely followed by Thailand). Although this ascending trend is significant, with defence expenditure planned to reach 1.5 percent of GDP by 2014, it is still far from the ASEAN average of 2 percent of GDP for 2010, particularly when the size, geography and population is taken into account. Nonetheless, the current economic growth has enabled the Indonesian government to repay the export credit loans used on past military procurements (such as from Russia) and may permit the negotiation of further loans to undertake an ambitious military modernisation programme within the next decade.<sup>58</sup>

The Indonesian government is also committed to strengthening its indigenous defence industrial base, which is dominated by four major state-owned companies:

<sup>57</sup> Information elaborated from data obtained at SIPRI Military Expenditure Database, online document, <http://www.sipri.org/databases/milex> [accessed on 29/11/2012]. The gap represents non-available data

<sup>58</sup> Taylor, 2011, p. 31

PT-PAL on shipbuilding, PT-Dirgantara on aerospace, PT-Pindad on land systems, and PT-Dahana on explosives and propellants. PT-Pindad was founded as an artillery factory in 1808 by Dutch authorities and is currently manufacturing a range of small arms, mortars, howitzers and ammunition, as well as armoured vehicles such as the recently developed Anoa 6x6 armoured personal carrier. Most of PT-Pindad's small arms have been produced under license from foreign companies including Belgium's FN-Herstal and Italy's Beretta. PT-Pindad has also participated in various joint ventures with foreign companies from Germany (e.g. Siemens) and Japan (e.g. Fanuc).<sup>59</sup>

Indonesia's aerospace sector has been dominated by the state-owned PT Dirgantara Indonesia (IAe), which has produced under license a series of commercial and military aircraft, including the CN-235 which is a joint venture with the Spanish CASA (currently EADS) along with helicopters in a joint venture with the German MBB, the French Aerospatiale, and Eurocopter. The firm also produces components for both the F-16 and the commercial aircraft from Airbus and Boeing. This production under license has, however, limited the indigenous design and production capability to development of less sophisticated aircraft such as unmanned aerial vehicles. Further expertise in fighter development is likely to be obtained as a result of the recent collaboration with South Korea's KAI whereby Indonesia will be acquiring 16 South Korean T50 advanced jet trainers in exchange for four of the Indonesian-manufactured CN-235 transports.<sup>60</sup>

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<sup>59</sup> Business Monitor International Ltd., *Indonesia Defence and Security Report*, Q4-2011, p. 74; and PT-Pindad official website, <http://www.pindad.com/> [accessed on 02/10/2012]

<sup>60</sup> Business Monitor International Ltd., *Indonesia Defence and Security Report*, Q4-2011, p. 72; and Q2-2012, p. 74; and Taylor, 2011, p. 37

Indonesia's location and geography (formed by numerous islands) should probably give greater relevance to the role of the shipbuilding sector, however PT-Pal's indigenous capabilities have experienced only limited development (small patrol vessels and fast attack crafts) and therefore the Indonesians continue to focus on the production of foreign designed seaborne platforms under license. Indigenous expertise may improve as a result of a recent contract to build a submarine identical to those recently acquired from South Korea and to design four anti-submarines corvettes with the Dutch group *DamenSchelde* Naval Shipbuilding.<sup>61</sup>

**Table 17: Indonesia's major defence industries<sup>62</sup>**

Company	Sectors	Products
Dirgantara Indonesia	Aerospace	E.g. CN-235 transport aircrafts and variants, BO-105, Puma and Super Puma helicopters and commercial aircraft components from Airbus and Boeing.
PAL	Shipbuilding	Military fast patrols boats and 1,300 – 1,500 corvettes and also commercial vessels up to 50,000 tonnes. Submarines under license
PT Pindad	Weapons and Ammunition	Small arms (assault rifles, pistols and revolvers) and ammunition (from 9 to 12,7mm) and other equipment. Commercial products related with the heavy industry
Dahana	Explosives and propellants	

<sup>61</sup> Business Monitor International Ltd., *Indonesia Defence and Security Report*, Q4-2011, p. 74; and Taylor, 2011, pp. 33-34

<sup>62</sup> Information elaborated from data obtained at Business Monitor International Ltd., *South Korea Defence and Security Report*, Q4 2011, pp. 72-77

The increase in defence spending has also spurred arms imports from a diverse number of international suppliers located principally in France, Russia, the U.S.A., South Korea and the Netherlands (although Indonesia has also acquired military equipment and components from Brazil, Canada, U.K., Ukraine, and Germany). Production under license has been carried out without any offset policy in place since the 1960s, which has undoubtedly contributed to the poor transfer of technology to Indonesia and associated opportunity costs. The absence of local specialist subcontractors has also had a negative effect on competitiveness by reducing the possibility of expanding arms production to foreign markets.<sup>63</sup> As previously noted, an offset policy has the ability to improve the local defence industry providing it is applied to a broader defence industrial strategy. The Defence Industry Law recently passed by the Indonesian government has established a strategy which outlines certain requirements to ensure efficiency and increased cohesiveness with domestic defence systems, to guarantee transfers of technology, and to promote self-sufficiency.<sup>64</sup> The law reinforces the government's commitment to prioritise acquisitions from local sources and opens the possibility of partial privatisation of state-owned defence firms. Finally, it establishes an "offset-like" industrial collaboration in all defence imports.<sup>65</sup>

The increase in defence expenditures (which seem to spike every four or five years) may facilitate further military imports and support the development of the

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<sup>63</sup> Matthews, R. et al., *Indonesia's new Offset policy: Time for broader defence industrial strategy*, S. Rajaratnam School of International Studies, Singapore, RSIS Commentaries, August 2011, pp. 1-3

<sup>64</sup> Daslani, P. and Sihite, E., *Indonesia Arms itself with Defence Law*, The Jakarta Globe, 3 October 2012, online article, <http://www.thejakartaglobe.com/home/indonesia-arms-itself-with-defense-law/547892> [accessed on 30/12/2012]

<sup>65</sup> Grevatt, J., *Indonesia passes law for defence industry self-reliance*, IHS Jane's, 5 October 2012, online article, <http://www.janes.com/products/janes/defence-security-report.aspx?id=1065972104> [accessed on 30/12/2012]

defence industry as a whole through associated offsets and co-production arrangements. The Indonesian defence industry, which is at present highly dependent on the domestic market, faces various challenges such as the assimilation of the technology transferred through offsets and the achievement of cost-efficient production through economies of scale. The implementation of a broader civil-military industrial strategy is perhaps the greatest obstacle for developing a feasible indigenous defence industry. The increasing cooperation among ASEAN nations may open doors for the export of Indonesian defence products to foreign markets in the Asia-Pacific region, such as the recent export of CN-235 transport aircraft to Malaysia and Brunei.<sup>66</sup>

Indonesia is currently promoting regional security through its active role in international organisations such as ASEAN and through bilateral agreements such as the Lombok Treaty (2006) with Australia. In addition, it has recently signed defence collaboration and alliance agreements with several nations including the U.S.A., China, Russia, Serbia, Turkey, Saudi Arabia, France, South Korea, India, Vietnam and Brunei.<sup>67</sup> Indonesia is also supporting the international initiatives against the proliferation of WMDs, and while the state does not have nuclear weapons it signed both the Non-Proliferation Treaty in 1970 and the Comprehensive Test Ban Treaty in 1996. Indonesia also signed the Biological and Toxin Weapons Convention in 1972.<sup>68</sup>

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<sup>66</sup> Taylor, 2011, p. 37; Matthews, 2011, p. 2

<sup>67</sup> Taylor, 2011, p. 36

<sup>68</sup> Business Monitor International Ltd., *Indonesia Defence and Security Report*, Q4-2009, pp. 33-34

## China, the rising dragon

China's defence industry capabilities have greatly improved in the last decade as a result of the impressive expansion of its economy. This economic transformation contrasts with its situation over a century ago. By 1911, Imperial China had collapsed, immersing the country in a prolonged period of internal instability that lasted five decades. Despite the establishment of the Republic of China in 1912, the country remained politically fragmented among nationalists, Communists and various warlords. In addition, the consequences of the First World War permitted Japan (which had joined the Allies) to exercise an indirect control over the Chinese province of Manchuria during the 1920s; this external threat became more acute when Manchuria was eventually occupied by the Japanese in 1932. The Second Sino-Japanese War (1936-1945) urged the formation of a rather tenuous alliance between nationalists and Communists (intent on confronting a common threat) but failed to solve their political differences. The aftermath of the latter war left China in a state of total devastation, with 20 million civilians dead and a drained economy; the internal conflict between nationalists and Communists continued despite the nation's desperate situation. By 1949, Mao Zedong's communists had seized control of mainland China and established the People's Republic of China (PRC), forcing the nationalist government to retreat offshore to Taiwan.<sup>69</sup>

During the subsequent decades, the PRC carried out major economic, social and cultural reforms; however it faced many difficulties trying to cope with an enormous Chinese population and two opposing political and economic ideologies

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<sup>69</sup> Crump, 2007, pp. 4-15

(Communism and capitalism). During the 1950s the PRC's industrial, banking and commercial nationalisation programmes (based on Soviet models) proved to be ineffective; and its attempt to maximise industrial and agricultural output through the Great Leap Plan had disastrous consequences, with the loss of 20 million people from starvation and disease.<sup>70</sup> The economic reforms during the following decade (which intended to relax the state control and revitalise the industrial and rural areas) appeared to be effective, although caused the rising of ideological frictions against what was perceived as the establishment of capitalism.

By the 1970's the PRC initiated a new plan that was intended to transform China into a growing world power by the end of the century. After Mao's death in 1976, Deng Xiaoping led the country until 1997 combining centralist Communism and capitalist policies, fighting corruption and establishing improved relations with the U.S.A. (which further exacerbated existing Chinese tensions with the Soviet Union). The U.S. acknowledgement that Taiwan formed part of China led to rapid international recognition of the PRC in the early 1970s. The creation of special economic zones attracted foreign investment from multinational corporations which contributed significantly to an economic growth that still continues today. The PRC currently has the fastest-growing economy in the world and is also the world's largest exporter. Despite its poor record on human rights, environmental deterioration, large population and economic challenges, the PRC's international role is expected to grow in the foreseeable future.

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<sup>70</sup> LaFleur quantified the death of over 20 million people (mainly as a result of famine) during the Great Leap Forward plan led by Mao, which combined collectivisation, poorly conceived agricultural practices, diversion of resources to industrial development and unrealistic harvest estimations to a large scale famine in the late 1950s and early 1960s, Really, B., *Disaster and Human History: Case studies in nature, society and catastrophe*, McFarland, Jefferson, NC, 2009, p. 282; and LaFleur, R., *China*, ABC-CLIO, Santa Barbara, CA, 2010, p. 62

**Table 18: General world, regional and country data (China, U.S. and Japan) comparison, 2011, (in brackets % share of World total)<sup>71</sup>**

	<b>China</b>	<b>U.S.</b>	<b>Japan</b>	<b>Asia Pacific</b>	<b>World</b>
Area (000 sq Km)	9,597 (1.88%)	9,631 (1.88%)	377 (0.07%)	22,536 (4.42%)	510,07 2
Population (million)	1,343 (19.12%)	313 (4.45%)	127 (1.8%)	2,228 (31.73%)	7,021
GDP (US\$ trillion) <sup>72</sup>	7.3 (10.44%)	15.1 (21.60%)	5.86 (8.3%)	18.9 (27%)	69.9
Imports (US\$ billions)	1,743 (9.68%)	2,314 (12.85%)	794 (4.41%)	5,181 (28.78%)	18,000
Exports (US\$ billions)	1,898 (10.68%)	1,511 (8.49%)	800 (4.49%)	5,578 (31.37%)	17,779
Oil consumption (million bbl/day)	9.4 (10.68%)	18.8 (21.36%)	4.45 (5.05%)	23.85 (27.10%)	88.0
Mil. expenditure (const. 2010 US\$ b.)	129.2 (7.9%) <sup>73</sup>	689.6 (42.43%)	54.5 (3.35%)	273.7 (16.84%)	1625

China is involved in a number of ongoing territorial and maritime disputes. This includes, the South China Sea, with Brunei, Malaysia, the Philippines, Taiwan and Vietnam over the sovereignty of the Spratly Islands; with Taiwan and Vietnam over

<sup>71</sup> Information elaborated from data obtained at Camilleri, 2007; U.S. Central Intelligence Agency - The World Factbook, *Country reports*, July 2012, online document, *China*<https://www.cia.gov/library/publications/the-world-factbook/geos/ch.html> [accessed on 14/09/2012], *the U.S.*, <https://www.cia.gov/library/publications/the-world-factbook/geos/us.html> [accessed on 15/09/2012]; and *Japan*<https://www.cia.gov/library/publications/the-world-factbook/geos/ja.html> [accessed on 15/09/2012]; and SIPRI Military Expenditure Database, <http://www.sipri.org/databases/milex> [accessed on 12/10/2012]

<sup>72</sup> Data differs among the U.N., the I.M.F., the World Bank and the CIA World Factbook

<sup>73</sup> Estimated by SIPRI

the Paracel Islands; and with Taiwan and the Philippines over the Scarborough Shoal. In the East China Sea, it has disputes with Japan over the Diaoyutai/Senkaku Islands. Finally, it also disputes sections of the borders with India and Bhutan. China also continues to deal with security issues relating to internal disruptions in Tibet and refugees entering China from North Korea and the western border of Myanmar.<sup>74</sup>

Although the PRC's relations with the Soviet Union deteriorated significantly during the late 1960s (mostly as a result of ideological differences), with the end of the Cold War these have since improved to form a strategic partnership mostly centred on energy, economic growth and military cooperation.<sup>75</sup> Relations with Japan, however, still remain poor as a result of the aforementioned territorial and maritime disputes in the East China Sea, exacerbating nationalist reactions in both countries.<sup>76</sup>

The modernisation of the PRC's military capabilities has been influenced by the status of Taiwan as its security is supported by the United States. Various attempts conducted by the PRC to force unification (twice in the 1950s and once in the 1990s) were contested by U.S. military intervention. In particular, during the Taiwan Strait Crisis (1995-96) the U.S. sent in two naval battle groups as part of the largest naval movement in the Asia-Pacific region since the Vietnam War.<sup>77</sup> Sino-U.S. relations have continued to fluctuate in the last decade owing to U.S.

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<sup>74</sup> Business Monitor International Ltd., *China Defence and Security Report*, Q2-2012, pp. 60-61

<sup>75</sup> Luthi, L., *The Sino-Soviet Split: Cold War in the Communist World*, Princeton University Press, Princeton, NJ, 2010, p. 345; Bellacqua, J., *The Future of China-Russia Relations*, University Press of Kentucky, Lexington, KY, 2010, pp. 1-10

<sup>76</sup> Business Monitor International Ltd., *China Defence and Security Report*, Q1-2013, pp. 43-45

<sup>77</sup> Zhao, S., *Across the Taiwan Strait: Mainland China, Taiwan, and 1995-1996 Crisis*, Routledge, London, 1999, p. 127-128

investments in advanced weapons projects and increased naval presence in the Asia-Pacific region in response to the PRC's military build-up. The Sino-U.S. rivalry over security issues however contrasts with the intense commercial trade that exists between both countries with China account for approximately 75 per cent of the total of U.S. imports.<sup>78</sup>

Modernisation of the PRC's military capabilities has also been based on China's ambition for global power, political and cultural issues, and the need to secure commercial sea lanes and energy supplies. Accordingly, China is currently implementing a strategy known as *Active Defence* which aims to conduct high-intensity regional military operations (including anti-access and area denial) facilitated by the nation's sizeable conventional armed forces and strategic nuclear strike capability.<sup>79</sup> Additionally, China's global interests have spurred its military programmes to enhance power projection capabilities such as the development of aircraft carriers.<sup>80</sup> China is presently capable of producing a wide variety of defence systems such as military aircraft, naval destroyers, frigates and submarines (nuclear and conventional), main battle tanks, armoured vehicles, artillery pieces, and different types of air-to-air, surface-to-air and surface-to-surface missiles.<sup>81</sup>

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<sup>78</sup> Business Monitor International Ltd., *China Defence and Security Report*, Q1-2013, pp. 43

<sup>79</sup> See Collins, 2002, p. 86; U.S. Office of the Secretary of Defence, *Military and Security Developments Involving the People's Republic of China*, Annual Report to Congress, 2012, pp. 2-3, online document, [www.defense.gov/pubs/pdfs/2012\\_CMPR\\_Final.pdf](http://www.defense.gov/pubs/pdfs/2012_CMPR_Final.pdf)[accessed on 21/02/2013]

<sup>80</sup> Miller, F., *PLA lessons learnt from recent Pacific Command operations and contingencies*, in *Chinese Lessons from other people's war*, Strategic Studies Institute, U.S. Army War College, November 2011, p. 214, online document, [www.strategicstudiesinstitute.army.mil/pdf/files/PUB1090.pdf](http://www.strategicstudiesinstitute.army.mil/pdf/files/PUB1090.pdf)[accessed on 21/02/2013]

<sup>81</sup> Business Monitor International Ltd., *China Defence and Security Report*, Q1-2013, pp. 65

China's aim to achieve a self-sufficient defence industry is not recent. In the 1960s, the Soviet Union abruptly cut off military supplies to the PRC increasing the latter nation's need to rely more greatly on its indigenous defence production. Since the mid-1970s, the Chinese Defence Industry has been able to produce their own weapons systems, although production has been based on variants or upgrades of Soviet designs. The Chinese defence production was therefore for a long time considered obsolete by Western standards. Furthermore, the reforms undertaken in the 1980s to develop China's commercial production had little effect on the defence industry which at the time was suffering from redundancies, inefficiencies and corruption in its procurement systems. The possibility of acquiring Western military technology experienced a severe setback when the U.S.A. and the European Union established an embargo on arms sales (currently still in force) following the Tiananmen Square crackdown in 1989.<sup>82</sup>

China turned to the Russian market which, in the early 1990s following the end of the Cold War and the collapse of defence acquisition within the former Soviet bloc, was eager to maintain its defence industry through foreign sales. Russia was soon supplying over 90 per cent of Chinese arms imports (totalling \$26 billion by 2006), including a variety of weapons systems such as combat and transport aircraft, submarines, destroyers, anti-ship missiles, and an aircraft carrier. According to SIPRI data between 1998 and 2005, China accounted for almost 40 percent of all the major conventional arms exported by the Russian defence industry (although

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<sup>82</sup> Evron, Y., *China's Military Build-up in the Early Twenty-first Century: From Arms Procurement to War-fighting Capability*, S. Rajaratnam School of International Studies, Singapore, RSIS Working Paper, 10 December 2010, pp. 17-22; According to SIPRI, the European Union's arms embargo has been interpreted differently among European states such as the U.K. and France, which have taken different approaches in their dealings with China.  
[http://www.sipri.org/databases/embargoes/eu\\_arms\\_embargoes/china](http://www.sipri.org/databases/embargoes/eu_arms_embargoes/china) [accessed on 11/02/2013]

this did not include Russia's most advanced weapons systems). However, this trend has changed in recent years as the PRC's defence industry has been able to produce indigenous sophisticated weapons systems comparable to those of the late Soviet and early Russian periods. Undoubtedly, fear of the Chinese applying reverse engineering to produce indigenous versions of Russian designs still prevents Russia from exporting its most advanced weapons systems to China.<sup>83</sup>

China is a present nuclear power. The Chinese nuclear military programme detonated its first nuclear device in 1964 which was followed by the production of thermonuclear weapons and the testing of neutron bombs. It is believed that China's nuclear arsenal currently includes between 300 and 400 warheads deployed on a variety of strategic and non-strategic weapons. The former group of weapons include CSS-4 intercontinental ballistic missiles (ICBMs), CSS-2, CSS-3 and CSS-4 intermediate-range ballistic missiles (including 12 submarine-launched ballistic missiles), Q-5 bomber aircraft, and H-6 strategic bombers. In addition, certain long-range artillery, air-defence missiles and short-range missiles are also believed to be capable of deploying nuclear warheads.<sup>84</sup>

Despite China's collaboration in the development of Pakistan's nuclear programme and its supply of nuclear reactors to Algeria, Iran, Saudi Arabia and Syria in the 1990s, China has recently become more supportive of a non-proliferation policy. China ratified the Nuclear Non-Proliferation Treaty in 1992 and signed a bilateral agreement with the U.S.A. in 2004 to prevent further proliferation of nuclear

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<sup>83</sup> SIPRI Arms Transfers Database, <http://www.sipri.org/databases/armstransfers> [accessed on 19/11/2012]

<sup>84</sup> The number of nuclear warheads is uncertain as a result of Chinese nuclear program secrecy. Business Monitor International Ltd., *China Defence and Security Report*, Q1-2013, pp. 62-63

weapons including with greater international safeguards and export controls. China has also promoted its policy to “not be the first to use nuclear weapons” and made clear its intentions to respect and to not threaten with the use of nuclear weapons state-parties in the nuclear weapon-free zones of South America, the South Pacific and Africa.<sup>85</sup>

Demonstrating further commitment to the non-use of WMDs, China also signed and ratified the Chemical Weapons Convention and has declared China its intention to decommission stocks of chemical weapons, permit international inspections of chemical-related industrial facilities (approximately one third of the total declared by all states parties of the convention), and to complete the disposal of chemical weapons abandoned in China by Japan at the end of the Second World War.<sup>86</sup> On the other hand, like the other members of the Five Powers (the five permanent members of the U.N. Security Council) China has not yet signed the Ottawa Treaty (the Anti-Personnel Mine Convention), and has effectively blocked (together with Pakistan and Russia) an initiative to restrict the use of anti-vehicle mines. Furthermore, China is not a party of the Convention on Cluster Munitions owing to its “national defence needs”. Nevertheless, China has demonstrated willingness to consider a *modification of weapons* policy and as a party of the Convention on Certain Conventional Weapons supports its Amended

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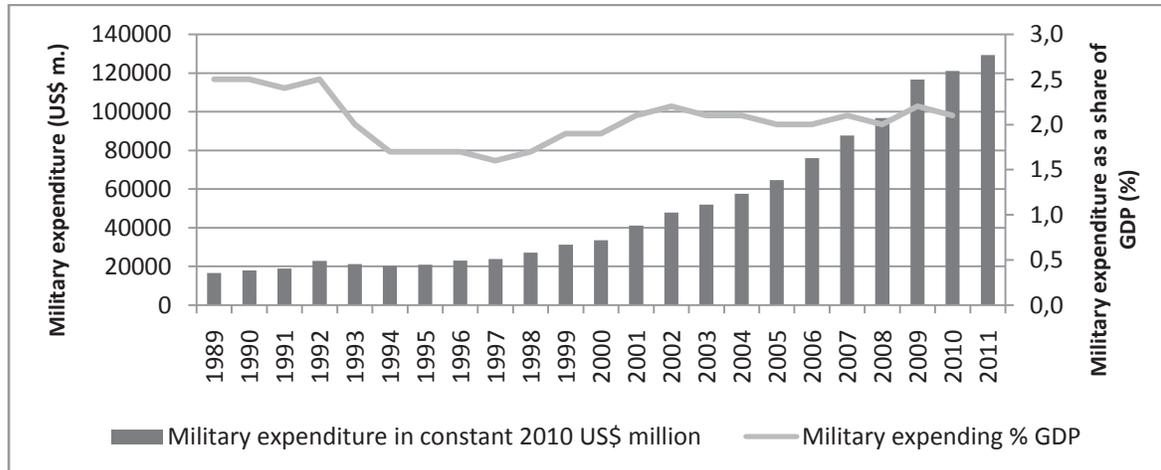
<sup>85</sup> Business Monitor International, *China Defence & Security Report*, Q1 2013, pp. 62-64

<sup>86</sup> OPCW, *Report on the Implementation of the Chemical Weapons Convention in China*, Second Review Conference, 7-18 April 2008, online document, [www.opcw.org/index.php?elD=dam\\_frontend\\_push&docID=1876](http://www.opcw.org/index.php?elD=dam_frontend_push&docID=1876) [accessed 21/01/2013]

Protocol II on landmines, which considers the use of anti-personnel mines as legitimate when they implement self-destruct and self-deactivation mechanisms.<sup>87</sup>

As noted previously, the growth of expenditures on defence procurement (an approximate increase of 153% between 1997 and 2003) spurred the production of the PRC's defence industry in terms of both quality and quantity. This development has been supported by a consistent increase in the Chinese military budget which has been estimated to be doubling between 2010 and 2016 (from US\$117 billion to US\$226 billion).<sup>88</sup> The lack of reliable and comparable data makes it difficult to accurately assess China's military expenditures (and therefore determine China's military priorities and procurement plans).<sup>89</sup>

**Figure 15: Chinese military expenditure in constant (2010) US\$ (million) versus share of GDP, 1989-2011<sup>90</sup>**



<sup>87</sup> Hoffman, W., *Arms Control and Proliferation Profile: China*, The Arms Control Association, August 2012, online document, <http://www.armscontrol.org/factsheets/chinaprofile> [accessed 07/12/2012]

<sup>88</sup> Business Monitor International Ltd., *China Defence and Security Report*, Q4 2012, p. 92' The U.S. Department of Defence estimated that China's total military-related spending for 2011 was between \$120 billion and \$180 billion at US\$ (2011) prices and exchange, U.S. Office of the Secretary of Defence, *Military and Security Developments Involving the People's Republic of China*, Annual Report to Congress, 2012, p. 6

<sup>89</sup> Bitzinger, R., 'Just the Facts, Ma'am: The Challenge of Analysing and Assessing Chinese Military Expenditure', *The China Quarterly*, March 2003, Issue 173, pp. 164-175

<sup>90</sup> Information elaborated from data obtained at SIPRI Military Expenditure Database, online document, <http://www.sipri.org/databases/milex> [accessed on 30/11/2012]

The allocation of additional defence funding was complemented with a new set of reforms initiated in the late 1990s to achieve a more efficient defence sector. The restructuring process aimed to improve the defence-procurement system and introduce incentives and competition among defence corporations. In 1999 ten huge corporations were established with two corporations competing in each of the various defence sectors (nuclear energy, astronautics, ordnance, aeronautics and shipbuilding). The Aviation Industry Corporation of China (AVIC I and II) in the aerospace sector, China State Shipbuilding Corporation in the naval sector, and China Aerospace Science and Technology Corporation in the missiles sector, are only a small representation of the numerous companies that form part of the Chinese defence industry illustrated in Table 19 below.

The PRC also established a defence strategy based on the lessons learnt from the Soviets' defence industry during the Cold War, involving selective modernisation by focusing on certain military technology capabilities, civil-military integration, and acquisition of advanced foreign weapons systems, materials and technologies to improve its indigenous design and manufacturing capability.<sup>91</sup>

China's defence industry currently employs approximately 2.5 to 3 million people in 11 corporations (with at least two of them competing in each of the following sectors: nuclear, aerospace, shipbuilding, ordnance and electronics). These corporations integrate approximately 1,000 military enterprises including factories

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<sup>91</sup> Medeiros, E., Cliff, R., Crane, K. & Mulvenon, J., *New Direction for China's Defence Industry*, RAND Corporation, Santa Monica, CA, 2005, pp. 24-25

and marketing organisations and over 200 research institutes.<sup>92</sup> Although the production by these corporations covers a wide range of weapons and other systems, China's major modernisation efforts are mostly directed at those sectors that contribute more strongly to its power projection capabilities and active defence strategy such as missiles, ships, military aviation, and information technology/defence electronics. Progress within these sectors seems to have been uneven and greatly influenced by their respective integration with a commercial economic counterpart. Shipbuilding and defence electronics have also benefited from China's success in commercial ship production and information technologies respectively; however, aviation and ordinance have experienced limited spin-off benefits from their related civilian production.<sup>93</sup>

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<sup>92</sup> Business Monitor International Ltd., *China Defence and Security Report*, Q1-2013, pp. 66-67

<sup>93</sup> U.S. Office of the Secretary of Defence, *Military and Security Developments Involving the People's Republic of China*, Annual Report to Congress, 2011, p. 42

**Table 19: China's major defence industries and corporations<sup>94</sup>**

Company (Location)	Sectors	Products
Aviation Industry Corporation of China	Aerospace	
Chengdu Aircraft Co. (Chengdu, Sichuan) Harbin Aircraft Manufacturing Corp. (Harbin, Heilongjiang) Hongdu Aviation Industry Group (Nanchang, Jiangxi) China Nanchang Aircraft Manufacturing Shaanxi Aircraft Co. (Chenggu, Shaanxi)  Shenyang Aircraft Corp. (Shenyang, Liaoning) Changhe Aircraft Industries Co. Ltd. (Jingdezhen, Jiangxi) China National Guizhou Aviation Industry (Guiyang Guizhou) Xian Aircraft Co. (Xi'an, Shaanxi)		Light fighters (J-10) Helicopters (Z-9), light transports Attack fighters (Q-5), fighter trainers (L-15) Missiles Medium transport aircrafts (Y-8) Heavy fighters  Helicopters (Z-8, Z-10, Z-11, EC-120 B) Fighter trainers (FTC-2000, LCF-16) Bombers (H-6, JH-7), medium transports (Y-7)
China State Shipbuilding Corp	Shipbuilding	
Guangzhou Shipyard International (Guangdong) Xijiang Shipyard (Guangxi) Huangpu Shipyard (Guangdong)  - Hudong – Zhonghua Shipyards (Shanghai)  - Jiangnan – Qiuxin Shipyards (Shanghai)		Replenishment vessels  Fast attack crafts 054-class frigate; fast attack craft 054-class frigate; Jiangwei&Jianghu frigate upgrades, etc Luyang I & II destroyers
China Shipbuilding Industry Corp	Shipbuilding/research	
- Bohai Shipyard - Huludao Shipyard (Liaoning)  Dalian Shipyard (Liaoning)  Dalian New Shipyard - Wuchang Shipyard (Wuhan/Hubei)		Nuclear submarines 093 094 classes Luhai and Luda destroyers upgrades; amphibious landing vessels  Conventional submarines
China North Industries Group China South Industries Group	Ordnance Vehicles	
China Aerospace Science and Industry Corp	Aerospace/missiles	
China Changfeng Mechanics & Electronics Technology Academy	Missile R&D	
China Haiying Electro-Mechanical	Cruise missiles	

<sup>94</sup> Information elaborated from data obtained at Business Monitor International Ltd., *China Defence and Security Report*, Q4 2011, pp. 72-77; and Medeiros *et al.*, 2005, pp. 64, 65, 124, 158 and 173

Tecnology Academy China Jiangnan Space Industry Company Sanjiang Space Group	Aerospace/missiles Missile R&D/space systems	
Hunnan Space Agency	Aerospace electromechanics	
China Aerospace Science and Technology Corp China Great Wall Industry Corp	Aerospace/missiles	
China Academy of Launch Vehicle Technology China Academy of Rocket Motor Technology	Aerospace import/export Space vehicle/ballistic missile R&D Rocket Motors	
China Academy of Space Technology China Aerospace Propellant Technology Academy	Satellites Launch vehicle engine/guidance system R&D	
Sichuan Space Industry Corp	Missile/launch vehicle systems	
China National Nuclear Corp China Nuclear Engineering-Construction Group	Nuclear Industry Nuclear Industry	

China is also the worlds' major producer of rare earth materials which are essential for the development of critical military-based technologies such as precision guided missiles, and have numerous other applications in the fields of lasers, magnets, communications, hydrogen energy storage and superconducting materials.<sup>95</sup> China's missile industry is actually considered to be one of its most developed defence sectors. Its production mostly involves sophisticated ballistic, cruise, air-to-air, and surface-to-air missiles. The industry is still lacking certain technologies for the production of intercontinental ballistic missiles, medium- and long-range air-to-air and surface-to-air missiles, and precision ground-attack missiles. At this time, China must rely on defence exporting countries such as Russia or Israel for the acquisition of such technologies; however, these countries

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<sup>95</sup> Hurst, C., 'China's Ace in the Hole: Rare Earth Elements', *Joint Force Quarterly*, 2010 4th Quarter, Issue 59,, pp. 121-126

continue to demonstrate great reluctance towards the transfer of their latest technologies.<sup>96</sup>

China's missile producers encounter similar obstacles to those met by other sectors: the state-ownership of missile firms and their bureaucratic organisation, their geographic dispersion, and production redundancies. These factors result in a lack of market-based incentives for innovation and efficiency, and also difficulties to achieve economies of scale. The missile sector nevertheless receives a consistent provision of financial resources enabling new developments such as the modification of missile systems as well as precision bombs. Modernisation of the sector is also facilitated by its institutional capabilities (including closer integration between research institutes and production enterprises), a certain level of competition (albeit limited) among Chinese producers, and the exposure to global markets for commercial aerospace-related products and services (such as the satellite launch and the manned space programme). Its more recent developments include an anti-ship ballistic missile capable of targeting aircraft carriers, a land-attack cruise missile for naval service, and an anti-satellite system.<sup>97</sup>

China's shipbuilding industry has greatly expanded in the last decades becoming one of the world's top shipbuilders. Economic and trade expansion have permitted Chinese shipyards to gradually improve their capabilities and capacities through access to foreign technologies, equipment, capital and knowledge. China's

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<sup>96</sup> Medeiros, E., *et al.*, 2005, pp. 107-108

<sup>97</sup> Medeiros *et al.*, 2005, p. 51-107; Business Monitor International Ltd., *China Defence and Security Report*, Q1-2013, p. 9, and pp. 59-61; Minnick, W., *China Challenges West for Arms Trade: New, Better Products on Display at Zhuhai Show*, DefenceNews, online article, 19 November 2012, <http://www.defensenews.com/article/20121119/DEFREG03/311190001/China-Challenges-West-Arms-Trade> [accessed on 12/01/2013]

shipyards are currently producing a wide variety of sophisticated naval platforms, which have also benefited other military projects such as submarines, surface combatants, naval aviation, and lift assets.<sup>98</sup> Compared with previous generations, current naval production exhibits significant advances such as faster built and more efficient vessels with improved battle readiness and incorporating advanced weapons and electronic systems.<sup>99</sup> China's aircraft carrier programme began by refurbishing an ex-Soviet *Kuznetsov* Hull-2 carrier (purchased from the Ukraine in 1998) which has recently successfully tested the first landing of an indigenous multipurpose aircraft closely modelled on Russia's SU-33 and obtained from the Ukraine in 2004. The accumulated knowledge is likely to facilitate the development of indigenous aircraft carriers in the Chinese shipyards in the near future.<sup>100</sup>

The shipbuilding industry also has been indigenously manufacturing the Yuan-class submarine since 2004; however, the industry still relies on certain foreign technologies for the production of engines, air-defence systems, anti-submarine warfare (ASW) weapons, and advanced electronics. This is also the case with the Luhai-class destroyers that use gas turbines imported from the Ukraine and diesel engines imported from Germany.<sup>101</sup>

The PRC's aviation industry is capable of indigenously producing a wide variety of military and commercial aircraft, components and civilian products for domestic

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<sup>98</sup> U.S. Office of the Secretary of Defence, *Military and Security Developments Involving the People's Republic of China*, Annual Report to Congress, 2011, p. 43

<sup>99</sup> Medeiros *et al.*, 2005, p. 153

<sup>100</sup> Page, J., *China Aircraft Carrier passes landmark*, Wall Street Journal, 25 November 2012, <http://online.wsj.com/article/SB10001424127887324469304578140832227759230.html>, [accessed on 14/01/2013]

<sup>101</sup> Chang, A., *Indigenous Weapons Development in China's Military modernisation*, U.S.-China Economic and Security Review Commission Staff Research Report, April 2012, pp. 8-13

and international markets (such as washing machines, motorbikes and automobiles). Although much of its aviation military production is considered obsolete by Western standards, its newest developments include highly sophisticated aircraft such as a fifth generation stealth fighter (J-20), unmanned aerial vehicles (UAVs), and AWACS aircraft (KJ-200 and KJ2000). The aviation industry's production has evolved from direct copies of Soviet models to the upgrade of existing designs and indigenous manufacture of modern aircraft. Despite these improvements, the sector still lacks certain technologies, requiring the importation of engines, avionics, high-precision and sophisticated machinery tools, and other componentry. For example, engines for high-performance combat aircraft such as the JF-17, FC-1 and J-20 are being supplied by Russia and Ukraine. In addition to military aircraft, at least 15 Chinese aviation manufacturers have also produced components for Boeing, Airbus, McDonnell Douglas, Bombardier, French Aerospace, Dassault, and Italian Aerospace, providing experience of modern manufacture that can be applied to military as well as civilian aircraft. The same Chinese companies also produce a broad range of civilian products such as washing machines. This policy of dual military-civilian manufacture certainly permits an increase in revenues, but it may also divert valuable resources necessary to improve military production in this key period for the Chinese defence industry. Overall, China's aviation industry has gradually improved its capabilities and this trend is expected to continue in the foreseeable future as China plans to make further investments in the industry, in particular in the domestic engine R&D and production. Nevertheless, China must first deal with a few challenging issues such as the rationalisation of its workforce and the leverage of dual-use technologies in order to improve its production. Commercial

aviation production may achieve economies of scale that may then facilitate the use of certain components for military aircraft and collaboration with foreign companies may provide additional opportunities to develop the required technical expertise. The technological gap that exists at present between China and the most advanced nations is bridgeable although it may take some years to complete.<sup>102</sup>

The Chinese military production for ground forces has also improved considerably in the last decade. This sector is currently capable of manufacturing more sophisticated land weapon systems whilst still maintaining the existing production of older models. China North Industries Corporation for example has developed a modern main battle tank (model Type-99, in service since 2001, although its propulsion is based on a German diesel engine), armoured personnel carriers, a wide range of artillery pieces, anti-tank guns and mortars, and also a variety of small arms such as pistols, assault rifles, sub-machine guns and sniper rifles.<sup>103</sup> As with the other defence sectors, China must import certain weapons systems and components to cover technological gaps and develop its indigenous production capability. Since 2001 China has imported over 900 engines from Russia, Ukraine and Germany.

The current embargo on arms sales by the U.S. and the European Union compels its defence industry to focus on the acquisition of dual-use technologies; however, it is still possible to procure or to commence manufacture of Western equipment

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<sup>102</sup> Medeiros *et al.*, 2005, pp. 158-167

<sup>103</sup> U.S. Office of the Secretary of Defence, *Military and Security Developments Involving the People's Republic of China*, Annual Report to Congress, 2011, p. 43

that may be used militarily. The most recent Chinese military production under license includes civilian helicopters (AS-365, SA-321 and AS-350) as well as air/sea-search radars, diesel engines and guns from France; diesel engines for submarines, from Germany; anti-air gun and fire control radar from Switzerland; turbofans from the U.K.; landing craft from Ukraine; and a wide variety of weapons systems from Russia, such as fighter aircraft (SU-27), anti-ship missiles, anti-tank missiles, air search radars, helicopters, and surface search radar (for Type054 Frigates). Despite the technological deficiencies, China's progress in the development of its defence sectors in the last decade has been remarkable. In fact, it is estimated that China will achieve a completely autonomous defence industry within the next 10 to 20 years.<sup>104</sup>

China's defence exports have increased in recent years as a result of its now significant defence production. Its major customers are in developing nations across Africa, South America and Asia, with customers including Bangladesh, Pakistan, Myanmar, Egypt, Sri Lanka, Thailand and Iran. China's most popular exports are the Hongdu K-8 trainer combat aircraft, the Y-12, Y-7 and Y-8 transport aircraft, the F-7 fighter, different models of armoured personal carriers (namely the ZFB-05, the WZ-523 and WZ-551), a variety of missiles, helicopters, and air-search radars. In addition, naval exports have recently increased as a result of the purchase of off-shore patrol vessels by Nigeria, fast attack craft by

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<sup>104</sup> Business Monitor International Ltd., *China Defence & Security Report*, Q1 2013, pp. 65-73; SIPRI Arms transfers of major conventional weapons database [http://armstrade.sipri.org/armstrade/page/trade\\_register.php](http://armstrade.sipri.org/armstrade/page/trade_register.php) [accessed on 08/01/2013]

Pakistan, and two Jianghu II-class frigates by Myanmar (qualified by China as surplus).<sup>105</sup>

Some nations also manufacture Chinese weapons systems under license, namely Pakistan, Egypt, Myanmar, Thailand and Iran. Pakistan, in particular, has the most significant Chinese production under license including the K-8 trainer combat aircraft, portable surface-to-air missiles, anti-tank missiles, battle tanks, four frigates, six submarines, and the assembly and production of some components of the JF-17 fighter aircraft.<sup>106</sup>

The presence of multinational defence companies in China is limited (owing to the current U.S. and E.U. arms embargo in force) although there are some joint ventures, such as between Thales and China Spacesat, and between Eurocopter and the Chinese General Aviation Maintenance and Engineering Co. The latter joint venture is based on two cooperation programmes: the EC 120B Colibri (a single engine light helicopter) and the EC 175 (a civil multipurpose helicopter).<sup>107</sup> The framework provided by the Shanghai Cooperation Organisation formed in 2001 between China, Russia, Kazakhstan, Tajikistan and Uzbekistan offers additional opportunities to enhance Chinese defence industry cooperation.<sup>108</sup> China's indigenous industry is not only capable of covering most requirements of the People Liberation Army but already is also able to participate in the highly

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<sup>105</sup> SIPRI Arms transfers of major conventional weapons database  
[http://armstrade.sipri.org/armstrade/page/trade\\_register.php](http://armstrade.sipri.org/armstrade/page/trade_register.php) [accessed on 08/01/2013]

<sup>106</sup> Ibid.

<sup>107</sup> Eurocopter China was created in 2007 as a subsidiary headquartered in Shanghai with a liaison office in Shenzhen. Official website, <http://www.eurocopter-china.com/en/inchina.php> [accessed on 12/02/2013]

<sup>108</sup> Business Monitor International Ltd., *China Defence & Security Report*, Q1 2013, pp. 39-40

competitive global arms market. China has become the fifth largest arms exporter in the world.<sup>109</sup>

The ascent of China as a world power and the progress of its defence industry are influencing the existing geopolitical order led by the United States. Despite being immersed in a severe economical crisis, the U.S. is compelled to invest significant resources in its defence industry to maintain military superiority. In particular, the operational requirements of a potential conflict in the Pacific and the rapid modernisation of the Chinese Navy are forcing the U.S. to strengthen its defence programmes related to naval and force projection capabilities. Accordingly, the U.S. Navy has undertaken a series of actions 'to support engagement, presence and deterrence' in the Pacific, such as providing at least six carriers and 60% of its submarines. It is also improving its ability to counter Chinese maritime anti-access capabilities through the acquisition of highly capable ships (e.g. Ford class aircraft carriers, Virginia class attack submarines, and Arleigh Burke class Aegis destroyers), aircrafts (e.g. F-35C, E2-D Hawkeye early warning and Command and Control aircraft or the P-8A Multi-mission Maritime Aircraft), and weapons systems and technologies associated with air and missile defence.<sup>110</sup>

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<sup>109</sup> Bitzinger, R., *China's Re-emergence as an Arms Dealer*, S. Rajaratnam School of International Studies, Singapore, RSIS Commentaries, 2 June 2009, pp. 1-3

<sup>110</sup> O'Rourke, R., *China Naval Modernisation: Implications for U.S. Naval Capabilities – Background and Issues for Congress*, Congressional Research Service Report for Congress, Washington D.C., 21 March 2013, pp. 53-59, [http://china.usc.edu/App\\_Images//crs-2013-china-naval-modernization-RL33153.pdf](http://china.usc.edu/App_Images//crs-2013-china-naval-modernization-RL33153.pdf) [accessed on 26/03/2013]

## Comparative analysis

The four nations examined all have a strong desire to protect their national sovereignty, give priority both to their national security and to the modernisation of their military capabilities, aspire to develop self-sufficient arms industries, provide consistent support to their defence industrial bases, maintain state ownership of their most significant defence firms, have growing economies which promotes their defence expenditures, and give greater priority to national security issues over collective security, transparency and other confidence-building measures. However, there are also a number of differences including the nature of their major security threats (with South Korea facing a constant threat of interstate war with North Korea, China facing the security challenges of an ascending great power and the need to protect its interests at a global level, Indonesia with a latent risk of internal disintegration, and Singapore being vulnerable to external threats owing to its location, size and lack of natural resources). Although all four nations have experienced increases in military expending (supported by their economic growth), Indonesia continues to assign significantly less funds to its defence industry (in terms of percentage of GDP) than South Korea, China and Singapore.

The four countries face problems of overcapacity and poor economies of scale, and in order to maintain their defence industrial bases and military capabilities they must also import from foreign suppliers and produce military products under license. Only China has experienced a decline in its arms imports in recent years, indicating greater proximity to achieving autarky in its defence sector. Singapore, South Korea, and to a greater degree, Indonesia, still allocate significant defence

spending to foreign military acquisitions. The four nations do also place greater emphasis on foreign sales and exportation of their defence products as this would facilitate the maintenance of their defence industrial base; however, they all face the same highly competitive international arms market where a large number of firms from the first and second tiers of the ladder of production compete to sell their products and only the development of niche technologies appear to have greater prospects for generating success.

Most South Korean defence firms have greatly diversified their production into the commercial sector, which may compensate for the aforementioned problems of overcapacity and poor economies of scale (and subsequent lack of competitiveness). The Chinese defence firms have similarly, although less significantly, achieved certain diversification of their production. Conversely, Indonesian arms producer firms remain highly dependent on the state's procurement programmes.

South Korea and Singapore have had unlimited access to modern weapons systems technologies and to the global arms market; China, on the other hand, has been under an arms embargo placed by the U.S.A. and the E.U. since 1989, and Indonesia was under a U.S. arms embargo between 1999 and 2005. In consequence, China relied on dual-use technologies and reverse engineering techniques applied to Russian weapons systems in order to then develop its defence sector, while Indonesia has been unable to develop its defence industrial base until recent years.

China and Indonesia both place greater priority on their national and security interests rather than on collective security. Singapore also gives considerable importance to its national security although has found it necessary to obtain additional deterrent capability through the Five Power Defence Arrangement and bilateral agreements. Meanwhile, South Korea's security is strongly supported by the U.S. South Korea is perhaps the most committed to arms control policies, forming part of the Wassenaar Arrangement and other international agreements on arms and technology transfers; but like China, Singapore and Indonesia, lacks transparency when it comes to reporting to the UNRCA.

Despite having different motives, resources and security environments, all four nations have embraced a security strategy based on developing a self-sufficient defence industry rather than focusing on collective security strategies. This is becoming a major reason for arms proliferation within the region. The increasing demand for modern weapons systems and their widespread availability provided by the current global arms market are magnifying the effects of the security dilemma.

## CONCLUSION

This study of defence industry and the Asia-Pacific region has demonstrated that states with a defence industry face two major dilemmas: the security dilemma, and the mercantilist versus liberalist dilemma in arms production. Both dilemmas are based on the same opposing concepts: national control versus international cooperation. The security dilemma grows through national interest and often fear and suspicion, although it is diluted when there is security cooperation (as with the use of arms control measures). Similarly, the arms production dilemma increases as a result of the economic sustainability of a sophisticated industry, which may be ameliorated through industrial cooperation. The mercantilist approach, in which the state exercises a large amount of control over the defence industry, may lead to extensive investments in the defence industry, lack of competitiveness, and an eventual decrease in the nation's security; whereas the application of liberal principles, in which there is minimum intervention by the state in the defence sector, may result in more competitive military equipment production and therefore greater security, although may also create certain vulnerability as there is greater dependency on foreign suppliers.

The controversial issues that have developed between national control of the defence sector and international cooperation also exist in other area such as

international relations (national sovereignty versus globalisation), economics (protectionism versus free markets), and security (autarkic arms production versus collective security). Timing is crucial in the development and transformation of a defence industrial base. A self-sufficient arms industry requires decades to acquire the capability to produce sophisticated weapons systems. There are only a few nations in the world that have these industrial capacities, and these are mainly first tier nations of the ladder of arms production (of the case studies, only China may emerge as a first tier nation) whilst the rest depend on the importation of weapons systems and military supplies from these nations.

The study has demonstrated the presence of a hierarchical structure within the global defence industry, where production and innovation are dominated by a few nations (namely the first tier arms producing nations). Second tier nations lack sufficient resources to sustain a highly sophisticated arms industry in all sectors (land, aerospace and shipbuilding) so they must specialise in niche productions, engage in joint ventures, and orientate their firms towards exportation to compensate for the high cost of maintaining the less profitable defence manufacturing sector. First tier nations have a dominant role in the transfer of technologies critical for the production of modern military equipment in the second tier. The recipient nations greatly depend on their support and are therefore exposed to possible bans or cut-offs on arms transfers, which would hinder their progress up, or maintenance of their current position on the ladder of arms production.

The globalisation of arms production facilitates the transfer of technologies, but does not undermine the dominance of first tier arms-producing nations which is exercised through their large transnational corporations. The latter corporations also strengthen the collaboration of the numerous geographically dispersed subcontractors and suppliers within the global defence industry. The enormous complexity involved in indigenous production of military hardware and componentry and the acquisition of an adequate supply of onshore raw materials (required by the modern defence sector) clearly implies the need for global cooperation in the development of modern weapons systems (particularly amongst second tier arms-producing nations). The increasing competitiveness within the global arms market also favours international cooperation as this may help to further reduce development costs and sustain nations' defence industrial bases. This would appear to support the enhancement of international security cooperation which may, in the longer term, also promote a NATO-style defence cooperation organisation in the Asia-Pacific that has until now been resisted among most of the APEC and ASEAN countries.

Despite there being numerous reasons to favour the collective security approach, some key nations in the Asia-Pacific region are continuing to embrace and to promote strategies to achieve self-sufficient defence industries. The global arms trade has maintained a constant growth in the last decade, particularly in relation to the importation of weapons systems to the Asia-Pacific region, which now accounts for almost half of the world's total arms imports. China, Japan, North Korea, South Korea, Indonesia and Singapore are the most committed Asia-Pacific nations towards developing autarkic arms industries; although China, and

to a lesser degree South Korea and Japan, are perhaps the only nations within the group that have the capacity to actually achieve this ambitious goal. All other Asia-Pacific nations require the transfer of technologies and support from first tier nations in order to maintain their current position on the ladder of arms production or to progress up the ladder of arms production, which demands cooperation with selected major powers.

The arms control policies of Asia-Pacific nations reflect their lack of commitment to security cooperation strategies. Most nations within this region favour non-proliferation initiatives but are reluctant to compromise their national security through the implementation of transparency, and confidence and security building measures. In a more globalised world, common security problems are best addressed through cooperative security. It is perhaps this development that will need greatest attention in the following years to promote further stability.

The global arms industry is contributing enormously to the development and modernisation of Asia-Pacific defence industries. This fact certainly reflects the significant geopolitical changes that are taking place in the region. As Kennedy noted in *The rise and fall of the Great Powers* (1989), it is the assimilation of the rising powers within an already established international order that has generated the major conflicts over the last four centuries. Accordingly, the peaceful assimilation of China as a great power is likely to be the greatest challenge for the 21<sup>st</sup> century geopolitical agenda. Mounting tension is already being manifested through the visible effects of the security dilemma, in particular the increase in

arms proliferation in the region and the lack of a solid collective security framework.

The Asia-Pacific is now reaching a critical crossroad for the future stability of the region and hence, the world. It seems that a cycle of armament rivalries to counterbalance the rise of China has already begun. First-tier, and to a lesser degree second-tier, arms producing nations have the responsibility of using defence strategies that are based on cooperation rather than confrontation which is a huge and complex task, and if not adhered to could lead the world through far worse warfare and suffering than that experienced in the last century. Such an event would demonstrate that we are still immersed in the *Great Illusion* described by Sir Norman Angell over a century ago and that humanity has not yet learnt from the mistakes that caused two world wars.

# BIBLIOGRAPHY

## BOOKS

Abbot, G. and Johnson, S. *The Changing Defence Industrial Base*, Strategic Forum - Institute for National Strategic Studies, National Defence University Press, Washington D.C., 1996

Alistair, E. & Haglund, D., *Canadian Defence Industry in the New Global Environment*, McGill-Queen's Press, Montreal, 1995

Angell, N., *The Great Illusion: A study of the relations of military power in nations to their economic and social advantage*, William Heinemann, London, 1911

Axelrod, R., *The Complexity of Cooperation: Agent-Based Models of Competition and Collaboration*, Princeton University Press, Princeton, NJ, 1997

Bellacqua, J., *The Future of China-Russia Relations*, University Press of Kentucky, Lexington, KY, 2010

Betts, R., *Military Readiness: Concepts, Choices, Consequences*, Brookings Institution Press, Washington D.C., 1995

Bitzinger, R., *Towards a Brave New Arms Industry?*, International Institute for Strategic Studies, Adelphi Paper 356, Oxford University Press, Oxford, 2003

Bitzinger, R., *The Globalization of the Arms Industry: The Next Proliferation Challenge*, International Security, MIT Press, Cambridge, M.A., 1994

Bitzinger, R., *The Modern Defence Industry: Political, Economic and Technological Issues*, ABC-CLIO, Santa Barbara, CA, 2009

Blacker, C. & Duffy, G. (Ed.), *International Arms Control: Issues and Agreements*, Second Edition, Stanford University Press, Palo Alto, CA, 1984

Booth, K. & Wheeler, N., *Security Dilemma: Fear, Cooperation, and Trust in World Politics*, Palgrave Macmillan, London, 2007

Brooks, S., *Producing Security: Multinational Corporations, Globalization, and the Changing Calculus of Conflict*, Princeton University Press, Princeton, NJ, 2005

Brown, C. & Ainley, K., *Understanding International Relations*, Palgrave MacMillan, London, 2009

Capie, D., *Under the Gun: The Small Arms Challenge in the Pacific*, Victoria University Press, Wellington, 2003

Carter, A., *Success and Failure in Arms Control Negotiations*, Stockholm International Peace Research Institute, Oxford University Press, Oxford, 1989

- Christensen, T., in Ikenberry, J., *International Relations Theory and the Asia-Pacific*, Columbia University Press, New York, 2003
- Collins, J., *Military Strategy: Principles, Practices, and Historical Perspectives*, Brassey's Inc., Dulles, VA, 2002
- Camilleri, J., *Asia-Pacific Geopolitics: Hegemony versus Human Security*, Edward Elgar Publishing, Cheltenham, 2007
- Chevrier, M., *Arms Control Policy: A Guide to the Issues*, ABC-CLIO, Santa Barbara, CA, 2012
- Croft, S., *Strategies of Arms Control: A History and Typology*, Manchester University Press, Manchester, 1996
- Crump, T., *Asia-Pacific: A History of Empire and Conflict*, Hambledon Continuum, London, 2007
- Davis, T. & Galligan, B., *Human Rights in Asia*, Edward Elgar Publishing, Cheltenham, 2011
- Den Dekker, G., *The Law of Arms Control: International Supervision and Enforcement*, Martinus Nijhoff Publishers, Boston, 2001
- Devetak, R., Burke, A. & George, J., *An introduction to International Relations*, Cambridge University Press, Cambridge, 2011
- Dombrowsky, P., Gholz, E. & Ross, A. et al., *Military Transformation and the Defence Industry After Next*, Newport Paper 18, Naval War College Press, Newport, RI, 1993
- Drifte, R., *Japan's Growing Arms Industry*, Programme for Strategic and International Security Studies, The Graduate Institute, Geneva, 1985
- Fosberg, R., *The Arms Production Dilemma: Contraction and Restraint in the World Combat Aircraft Industry*, MIT Press, Cambridge, MA, 1994
- Freedman, L., *Arms Control: Management or Reform*, Royal Institute of International Affairs, Routledge, London, 1986
- Gleditsch, N. & Njølstad, O., *Arms races: technological and political dynamics*, International Peace Research Institute, Oslo, 1990
- Gropman, A., *Mobilising U.S. Industry in World War II*, Institute for National Strategic Studies - U.S. National Defence University, Washington D.C., 1996
- Haftel, Y., *Regional Economics Institutions and Conflict Mitigation: Design, Implementation and the Promise of Peace*, University of Michigan Press, Ann Arbor, MI, 2012
- Hasik, J., *Arms and Innovation: Entrepreneurship and Alliances in the Twenty-First Century Defence Industry*, University of Chicago Press, Chicago, 2008

- Hartley, K., & Hooper, N., *The Economics of Defence, Disarmament, and Peace: An Annotated Bibliography*, Edward Elgar Pub., Cheltenham, 1990
- Hartley, K. & Sandler, T., *The Economics of Defence Spending: an International Survey*, Routledge, London, 1990
- Hartley, K., & Sandler, T., *The Economics of Defence*, Cambridge University Press, Cambridge, 1995
- Hartley, K. & Sandler, *Handbook of Defence Economics Volume 2*, Elsevier, Amsterdam, 2007
- Hartley, K., *The Economics of Defence Policy: A New Perspective*, Routledge, London, 2012
- Hitch, C. & McKean, R., *The Economics of Defence in the Nuclear Age*, Harvard University Press, Cambridge, MA, 1967
- Hoyt, T., *Military Industry and Regional Defence Policy: India, Iraq and Israel*, Routledge, London, 2007
- Ikenberry, J., Mastanduno, M., et al., *International Relations Theory and the Asia-Pacific*, Columbia University Press, New York, 2003
- Inbar, E. & Zilberfarb, B., *The Politics and Economics of the Global Defence Industries*, Routledge, London, 1998
- Kapstein, E., *The political economy of national security: a global perspective*, University of South Carolina Press, Columbia, 1992
- Kemp, G., *The Control of the Middle East Arms Race*, Carnegie Endowment for International Peace, Washington D.C., 1991
- Kennedy, P., *The Rise and Fall of the Great Powers: economic change and military conflict from 1500 to 2000*, Unwin Hyman, London, 1988
- Kiss, J., *The Defence Industry in East-Central Europe: Restructuring and Conversion*, SIPRI Monographs Publications, Oxford University Press, Oxford, 1997
- Krause, K. *Arms and the State: Patterns of Military Production and Trade*, Cambridge University Press, Cambridge, 1992
- LaFleur, R., *China*, ABC-CLIO, Santa Barbara, CA, 2010
- Lahneman, W., *Military Intervention: Cases in Context for the Twenty-First Century*, Rowman & Littlefield, Lanham, MD, 2004
- Larsen, J., *Arms Control: Cooperative Security in Changing Environment*, Lynne Rienner Pub., Boulder, CO, 2002

- Larsen, J. & Smith, J., *Historical Dictionary of Arms Control and Disarmament*, Scarecrow Press, Lanham, MD, 2005
- Levi, M. & O'Hanlon, M., *The Future of Arms Control*, Brookings Institution Press, Washington D.C., 2005
- Luthi, L., *The Sino-Soviet Split: Cold War in the Communist World*, Princeton University Press, Princeton, NJ, 2010
- Martin, S., *The Economics of Offsets: Defence Procurement and Countertrade*, Hardwood, Amsterdam, 1996
- Markusen, A. & Costigan, S., *Arming the future: a defense industry for the 21st century*, Council on Foreign Relations Press, Washington D.C., 1999
- Medeiros, E., Cliff, R., & Crane, K., *A new direction for China's Defence Industry*, Rand Corporation, Santa Monica, CA, 2005
- Naylor, R., *Patriots and Profiteers: Economic Warfare, Embargo Busting, and State-Sponsored Crime*, McGill-Queen's Press, Montreal, 2008
- O'Hanlon, M., *Defence Strategy in the Post-Saddam Era*, Brookings Institution Press, Washington D.C., 2005
- O'Hanlon, M., *The Science of War: Defence Budgeting, Military Technology, Logistics, and Combat Outcomes*, Princeton University Press, Princeton, NJ, 2009
- Overy, R., *War in the Pacific*, Allen & Unwin, Crows Nests, N.S.W., 2010
- Oye, K. (Ed.), *Cooperation under Anarchy*, Princeton University Press, Princeton, NJ, 1986
- Patman, R., *Globalization, Civil Conflict and the National Security*, State Contemporary Security Studies, Taylor & Francis, London, 2006
- Ritzer, G., *Globalization: The Essentials*, Wiley-Blackwell, Chichester, 2011
- Really, B., *Disaster and Human History: Case studies in nature, society and catastrophe*, McFarland & Co., Jefferson, NC, 2009
- Reiser, S., *The Israeli Arms Industry: Foreign Policy, Arms Transfers, and Military Doctrine of a Small State*, Holmes & Meier, New York, 1989
- Rotfeld, A., *Arms Control and Disarmament: A New Conceptual Approach*, United Nations, Department for Disarmament Affairs, New York, 2000
- Schelling, T. & Halperin, M., *Strategy and Arms Control*, Pergamon-Brassey's, Washington D.C., 1985
- Shekhar, R. & Singh, N., *Asian Strategic and Military Perspective*, Lancer Publishers, New Delhi, 2005

- Simon, S., *ASEAN and its security offspring: facing new challenges*, Strategic Studies Institute, U.S. Army War College, Carlisle Barracks, PA, 2007
- Singh, D. P. (Ed.), *Southeast Asian Affairs 2009*, Institute of Southeast Asian Studies, Singapore, 2009
- Singh, D. & Thambipillai, P. (Ed.), *Southeast Asian Affairs 2012*, Institute of Southeast Asian Studies, Singapore, 2012
- Sterio, M., *The Right to Self-determination Under International Law*, Routledge Research in International Law, Routledge, New York, 2013
- Stone, J., *Military Strategy: The Politics and Techniques of War*, Continuum International Publishing Group, London, 2011
- Tan, S. & Acharya, A., *Asia-Pacific Security Cooperation: National Interests and Regional Order*, M.E. Sharpe, Armonk, NY, 2004
- Thee, M., *Military Technology, Military Strategy and the Arms Race*, International Peace Research Institute, Croom Helm, London, 1986
- Till, G. et al., *Globalisation and Defence in the Asia-Pacific*, Contemporary Security Studies, Routledge, London, 2009
- Toft, M., *The fog of Peace and War Planning: Military and Strategic Planning under Uncertainty*, Cass Series—Strategy and History, Taylor & Francis, London, 2006
- Tow, W., *Asia-Pacific Strategic Relations: Seeking Convergent Security*, Cambridge University Press, Melbourne, 2001
- Vicziany, M., *Controlling Arms and Terror in the Asia Pacific: After Bali and Baghdad*, Edward Elgar Publishing, Cheltenham, 2007
- Williams, P., Goldstein, D. and Shafritz, J., *Classic Readings of International Relations*, Harcourt Brace College Publishers, Fort Worth, TX, 1999
- Williams, R., Williams, R. Jr., and Viotti, P., *Arms Control: History, Theory, and Policy*, ABC-CLIO, Santa Barbara, CA, 2012
- Wulf, H., *Developing Countries*, in Ball, N. & Leitenberg, M., *The Structure of the Defence Industry*, Croom Helm, London, 1983
- Younce, W., *Indonesia: Issues, Historical Background and Bibliography*, Nova Science Publishers, New York, 2001
- Zhao, S., *Across the Taiwan Strait: Mainland China, Taiwan, and 1995-1996 Crisis*, Routledge, London, 1999

## ARTICLES

- Bitzinger, R. A., 'The Globalization of the Arms Industry: The Next Proliferation Challenge', *International Security*, Autumn, 1994, Vol. 19, Issue 2, pp. 170-198
- Bitzinger, R., 'Just the Facts, Ma'am: The Challenge of Analysing and Assessing Chinese Military Expenditure', *The China Quarterly*, March 2003, Issue 173, pp. 164-175
- Derouen, K., Bercovitch, J. And Wei, J., 'Duration of Peace and Civil Wars in Southeast Asia and the Pacific', *Civil Wars*, June 2009, Vol. 11 Issue 2, pp. 103-120
- Gidathubli, R. G., 'Russia's Military Industrial Complex: Struggle for Revival', *Economic and Political Weekly*, June 8-14, 2002, Vol. 37, Issue 23, pp. 2215-2218
- Hartley, K., 'The Economics of the UK Defence Industrial Strategy', *Security Challenges*, June 2007, Volume 3 Number 2, pp. 19-30
- Hartung, W., 'The Boom at the Arms Bazaar', *Bulleting of the Atomic Scientists*, October 1991, Vol. 47 Issue 8, pp. 14-20
- Hurst, C., 'China's Ace in the Hole: Rare Earth Elements', *Joint Force Quarterly*, 2010 4th Quarter, Issue 59, pp. 121-126
- Murray, W., 'Innovation: Past and Future', *Joint Force Quarterly*, Spring 2003, Issue 34, pp. 23-32
- Nackman, M., 'A critical examination of offsets in international defence procurement: policy options for the United States', *Public Contract Law Journal*, Winter 2011, Vol. 40 Issue 2, pp. 511-529
- Neuman, S., 'Power, Influence, and Hierarchy: Defence Industries in a Unipolar World', *Defence and Peace Economics*, February 2010, Vol. 21 Issue 1, pp. 105-134
- Skön, E. & Wulf, H., 'The Internationalization of the Arms Industry', *The Annals of the American Academy of Political and Social Science*, September 1994, Vol. 535, pp. 43-57

## REPORTS AND WORKING PAPERS

- Alagappa, M., '*A Changing Asia-Pacific: Prospects for war, peace, cooperation and order*', Centre for Strategic Studies, Victoria University of Wellington, New Zealand, Discussion Paper 09/11, 2011
- Bitzinger, R., *China's Re-emergence as an Arms Dealer*, S. Rajaratnam School of International Studies, Singapore, RSIS Commentaries, 2 June 2009
- Bitzinger, R., *Japan's defence industry on the brink*, S. Rajaratnam School of International Studies, Singapore, RSIS Commentaries, 56/2010, May 2010

Boik, W., *Understanding the North Korea Problem: Why it has become the “Land of Lousy Options”*, Strategic Studies Institute, U.S. Army War College, Carlisle, PA, Working Paper, July 2011

Brauer, J., *The Arms Industry in Developing Nations: History and Post-Cold War assessment*, Paper presented at the conference on Military Expenditures in Developing and Emerging Nations, Middlesex University – U.K., 1998

Business Monitor International Ltd., *Australia Defence and Security Report*, Q2-2012

Business Monitor International Ltd., *China Defence and Security Report*, Q2-2012, Q4-2012, and Q1-2013

Business Monitor International Ltd., *Indonesia Defence and Security Report*, Q4-2009, Q4-2011, and Q1-2013

Business Monitor International Ltd., *Japan Defence and Security Report*, Q2-2012, Q1-2013

Business Monitor International Ltd., *North Korea Defence and Security Report*, Q1-2013

Business Monitor International Ltd., *Singapore Defence and Security Report*, Q2-2012

Business Monitor International Ltd., *South Korea Defence and Security Report*, Q4-2009, Q2-2012, and Q1-2013

Business Monitor International Ltd., *Taiwan Defence and Security Report*, Q1-2013

Business Monitor International Ltd., *Vietnam Defence and Security Report*, Q4-2012

Chang, A., *Indigenous Weapons Development in China’s Military modernisation*, U.S.-China Economic and Security Review Commission Staff Research Report, Washington D.C., April 2012

Evron, Y., *China’s Military Build-up in the early Twenty-First Century: from arms procurement to war-fighting capability*, S. Rajaratnam School of International Studies, Singapore, RSIS Working Paper, December 2010

Huisken, R., *Asia-Pacific Security: Taking charge, collectively*, Strategic and Defence Studies Centre, Australian National University, Canberra, Working Paper 368, 2002

Huxley, T., *Disintegrating Indonesia? Implications for Regional Security*, The International Institute for Strategic Studies, Adelphi Paper 349, 2002

Jane’s International Defence Review, IDR Volume 39, Jane’s Information Group, 2006

Kuah, A. & Loo, B., *Examining the defence industrialization - economic growth relationship: the case of Singapore*, S. Rajaratnam School of International Studies, Singapore, RSIS Working Papers, 2004

Mack, A., *Arms Proliferation in the Asia-Pacific: Causes and Prospects for Control*, Department of International Relations, Research School of Pacific Studies, Australian National University, Canberra, Working Paper 1992/10, 1992

Matthews, R. et al., *Indonesia's new Offset policy: Time for broader defence industrial strategy*, S. Rajaratnam School of International Studies, Singapore, RSIS Commentaries, August 2011

Raska, M., *From Copier to Innovator? China's Ballistic Missile Modernisation*, S. Rajaratnam School of International Studies, Singapore, RSIS Commentaries, 21 February 2011

Ross, A. et al., *Military Transformation and the Defence Industry After Next*, U.S. Naval War College Press, Newport, RI, Newport Paper 18, 1993

Taylor, C., *Military Balance in Southeast Asia*, House of Commons Library, London, Research Paper 11/79, 14 December 2011

Till, G., *Asia's Naval expansion: An arms race in the making?*, International Institute for Strategic Studies, Adelphi Paper 432-433, 2012

Weichong, O., *Singapore's Total Defence: Shaping the Pillars*, S. Rajaratnam School of International Studies, Singapore, RSIS Commentaries, February 2011

## ONLINE DOCUMENTS

ABC News, *Weapons Seized from Australian-owned ship*, 31 August 2009, online article, <http://www.abc.net.au/news/2009-08-30/weapons-seized-from-australian-owned-ship/1410356> [accessed 21/12/2012]

Ahern, D., et al, *F-35 Joint Strike Fighter Concurrency Quick Look Review*, U.S. DoD, November 2011, online document, <http://s3.documentcloud.org/documents/274217/dod-quick-look-ahern-report.pdf> [accessed 28/12/2012]

Alpers, P., Muggah, R. and Twyford, C., *Trouble in Paradise: Small Arms in the Pacific*, Report Small Arms Survey, Graduate Institute of International and Development Studies, Geneva, 2004, online document, <http://www.smallarmssurvey.org/fileadmin/docs/A-Yearbook/2004/en/Small-Arms-Survey-2004-Chapter-09-EN.pdf> [accessed on 14/01/2013]

APEC Official Website, online document, <http://www.apec.org/About-Us/About-APEC.aspx> [accessed on 07/12/2012]

ASEAN Official website, online document, <http://www.asean.org/asean/about-asean/overview> [accessed on 7/12/2012]

Australian Department of Defence - Defence Export Unit, *Countries Offsets Database*, March 2010, online document, [www.defence.gov.au/deu/docs/Offsets\\_Database.xls](http://www.defence.gov.au/deu/docs/Offsets_Database.xls) [accessed on 12/11/2012]

BBC News Asia, *Regional media: Anger on North Korea Test*, 13 February 2013, online article, <http://www.bbc.co.uk/news/world-asia-21438129> [accessed on 14/02/2013]

Bekkers, F., *et al.*, *Development of a European Defence Technological and Industrial Base*, TNO Report for the European Commission, 2009, online document [http://ec.europa.eu/enterprise/sectors/defence/files/edem\\_final\\_report\\_en.pdf](http://ec.europa.eu/enterprise/sectors/defence/files/edem_final_report_en.pdf) [accessed on 21/08/2012]

Bitzinger, R., *Can the Defence Industry Still Innovate?*, S. Rajaratnam School of International Studies, RSIS Commentaries, 8 May 2012, online document, <http://www.rsis.edu.sg/publications/Perspective/RSIS0802012.pdf> [accessed on 24/09/2012]

Capaccio, T., *Lockheed F-35 faces 'significant' software delays, GAO says*, Bloomberg, 15 March 2011, online document, <http://www.bloomberg.com/news/2011-03-15/lockheed-f-35-jet-faces-significant-software-delays-gao-says.html> [accessed on 28/12/2012]

Council of the European Union, *Common Position 1999/624/CFSP and Common Position 2158/1999/CFSP in reaction to a series of violations of human rights and international humanitarian law in East Timor*, online document [http://www.sipri.org/databases/embargoes/eu\\_arms\\_embargoes/indonesia](http://www.sipri.org/databases/embargoes/eu_arms_embargoes/indonesia) [accessed 12/12/2012]

Daslani, P. and Sihite, E., *Indonesia Arms itself with Defence Law*, The Jakarta Globe, 3 October 2012, online article, <http://www.thejakartaglobe.com/home/indonesia-arms-itself-with-defense-law/547892> [accessed on 30/12/2012]

Dhanapala, J. (Under-Secretary-General for Disarmament Affairs of the United Nations), *The NPT Regime: External and internal challenges*, Seventh Carnegie International Non Proliferation Conference, U.S. (Washington D.C.), January 1999, [www.un.org/disarmament/HomePage/HR/docs/1999/1999Jan11\\_Washington.pdf](http://www.un.org/disarmament/HomePage/HR/docs/1999/1999Jan11_Washington.pdf) [accessed on 12/01/2013]

Eurocopter-China Official website, <http://www.eurocopter-china.com/en/inchina.php> [accessed on 12/02/2013]

Eurostat - European Commission, *European statistics*, online document, <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/> [accessed on 22/09/2012]

Global Security, *North Korea estimated military expenditures*, online document, <http://www.globalsecurity.org/military/world/dprk/index.html> [accessed on 12/11/2012]

Grevatt, J., Indonesia passes law for defence industry self-reliance, IHS Jane's, 5 October 2012, online article, <http://www.janes.com/products/janes/defence-security-report.aspx?id=1065972104> [accessed on 30/12/2012]

Hoffman, W., *Arms Control and Proliferation Profile: China*, The Arms Control Association, August 2012, online document, <http://www.armscontrol.org/factsheets/chinaprofile> [accessed 07/12/2012]

Holtom, P., Bromley, M., Wezeman, P. and Wezeman, S., *Trends in International Arms Transfers 2011*, SIPRI Fact Sheet, 2011, online document, <http://www.sipri.org/research/armaments/transfers/measuring/recent-trends-in-arms-transfers> [accessed on 25/08/2012]

Johnston, Tim, *U.S. eases Indonesian arms ban*, BBC news, 26 May 2005, online article, <http://news.bbc.co.uk/2/hi/asia-pacific/4581733.stm> [accessed on 21/11/2012]

Kim, J., *North Korea rocket launch raises nuclear stakes*, Reuters, 12 December 2012, online article, <http://www.reuters.com/article/2012/12/12/us-korea-north-rocket-idUSBRE8BB02K20121212> [accessed 09/01/2013]

Koh, H., *U.S. Position on the CCW negotiations on Cluster Munitions protocol*, U.S. Department of State, Special Briefing, 16 November 2011, online document, <http://www.state.gov/s/l/releases/remarks/177280.htm>, [accessed 13/01/2013]

Leigh, D. & Evans, R., *The Lockheed scandal*, The Guardian, 8 June 2007, online article, <http://www.guardian.co.uk/world/2007/jun/08/bae35> [accessed on 10/11/2012]

Army Technology.com, *RG31 MK5 Mine-Protected Vehicle, South Africa*, online document, <http://www.army-technology.com/projects/rg31mk5mineprotected/> [accessed 10/02/2013]

Miller, F., *PLA lessons learnt from recent Pacific Command operations and contingencies*, in *Chinese Lessons from other people's war*, Strategic Studies Institute, U.S. Army War College, November 2011, p. 214, online document, [www.strategicstudiesinstitute.army.mil/pdf/files/PUB1090.pdf](http://www.strategicstudiesinstitute.army.mil/pdf/files/PUB1090.pdf) [accessed on 21/02/2013]

Minnick, W., *Are U.S. Defence Experts Getting China Wrong?*, DefenceNews, 1 December 2012, online document, <http://www.defensenews.com/article/20121201/DEFREG03/312010002/Are-U-S-Defense-Experts-Getting-China-Wrong-> [accessed on 09/01/2013]

Minnick, W., *China Challenges West for Arms Trade: New, Better Products on Display at Zhuhai Show*, DefenceNews, 19 November 2012, online article, <http://www.defensenews.com/article/20121119/DEFREG03/311190001/China-Challenges-West-Arms-Trade> [accessed on 12/01/2013]

Nuclear Suppliers Group Official Web Page  
<http://www.nuclearsuppliersgroup.org/Leng/default.htm> [accessed on 13/01/2013]

O'Rourke, R., *China Naval Modernisation: Implications for U.S. Naval Capabilities – Background and Issues for Congress*, Congressional Research Service Report for Congress, Washington D.C., 21 March 2013, pp. 53-59, <http://china.usc.edu/App/Images/crs-2013-china-naval-modernization-RL33153.pdf> [accessed on 26/03/2013]

Organisation for the Prohibition of Chemical Weapons, online document, <http://www.opcw.org/our-work/demilitarisation> [accessed on 21/-2/2013]

Organisation for the Prohibition of Chemical Weapons, *Report on the Implementation of the Chemical Weapons Convention in China*, Second Review Conference, 7-18 April 2008, online document, [www.opcw.org/index.php?eID=dam\\_frontend\\_push&docID=1876](http://www.opcw.org/index.php?eID=dam_frontend_push&docID=1876) [accessed 21/01/2013]

Page, J., *China Aircraft Carrier passes landmark*, Wall Street Journal, 25 November 2012, <http://online.wsj.com/article/SB10001424127887324469304578140832227759230.html>, [accessed on 14/01/2013]

NATO, *AAP-20 - Phase Armaments Programming Systems (PAPS)*, February 2010, online document, [http://www.msb.gov.tr/birimler/tekhiz/doc/ac327/AAP-20\(2\)Ec1.pdf](http://www.msb.gov.tr/birimler/tekhiz/doc/ac327/AAP-20(2)Ec1.pdf) [accessed on 21/08/2012]

Postan, M., *British War Production*, Her Majesty's Stationery Office, 1952, online document, <http://www.ibiblio.org/hyperwar/UN/UK/UK-Civil-WarProduction/index.html#contents> [accessed on 09/06/2012]

PT-Pindad official website, online document, <http://www.pindad.com/> [accessed on 02/10/2012]

Singapore Department of Statistics, *Singapore's Annual GDP at Current Market Prices*, February 2013, online document, <http://www.singstat.gov.sg/stats/themes/economy/hist/gdp2.html> [accessed on 12/02/2013]

Stockholm International Peace Research Institute (SIPRI), *Arms Transfers Database*, online document, <http://www.sipri.org/databases/armstransfers> [accessed on 22/08/2012]

Stockholm International Peace Research Institute (SIPRI), *Arms Embargo Database*, online document, <http://www.sipri.org/databases/embargoes> [accessed on 21/12/2012]

Stockholm International Peace Research Institute (SIPRI), *Concentration ratios of the Top 100 arms-producers companies*, online document, [http://www.sipri.org/research/armaments/production/researchissues/concentration\\_aprod/ratios](http://www.sipri.org/research/armaments/production/researchissues/concentration_aprod/ratios) [Accessed 10/08/2012]

Stockholm International Peace Research Institute (SIPRI), *World Military spending levels out after 13 years of increases*, SIPRI Media Press Releases, 17 April 2012, online document, <http://www.sipri.org/media/pressreleases/17-april-2012-world->

[military-spending-levels-out-after-13-years-of-increases-says-sipri](#) [accessed 15/11/2012]

Stockholm International Peace Research Institute (SIPRI), *Military Expenditure Database*, online document, <http://www.sipri.org/databases/milex> [accessed on 02/08/2012]

Stockholm International Peace Research Institute (SIPRI), *Top 100 Arms-Producing Firms by country*, online document, <http://www.sipri.org/research/armaments/production/Top100> [accessed on 10/09/2012]

Stockholm International Peace Research Institute (SIPRI), *Yearbook on Armaments, Disarmament and International Security*, 2000, online document, <http://www.sipri.org/yearbook/2000> [accessed on 03/08/2012]; *Yearbook 2009*, online document, <http://www.sipri.org/yearbook/2009> [accessed on 03/08/2012]

Small Arms Survey, *Weapons and markets*, Graduate Institute of International and Development Studies, Geneva, <http://www.smallarmssurvey.org/weapons-and-markets.html>, [accessed on 13/01/2013]

Small Arms Survey, *Small arms definition*, Graduate Institute of International and Development Studies, Geneva, online document, <http://www.smallarmssurvey.org/weapons-and-markets/definitions.html> [accessed on 13/01/2013]

Solomon, J., et al., *North Korea's Illegal Weapons Pipeline Flows on*, The Wall Street Journal, 29 November 2012, online article, <http://online.wsj.com/article/SB10001424127887323830404578144981537771060.html> [accessed on 6/01/2013]

Suksai, C., Narag, R., and Menglang, K., *Participatory Research on Armed Violence and Human Insecurity in Southeast Asia*, Report Small Arms Survey, Graduate Institute of International and Development Studies, Geneva, 2003, <http://www.smallarmssurvey.org/fileadmin/docs/E-Co-Publications/SAS-NI-2003-whose-security-counts.pdf> [accessed on 14/01/2013]

The Australian Group Official Web Page  
<http://www.australiagroup.net/en/index.html> [accessed on 14/01/2013]

The Economist, *Kaputt*, 13 October 2012, online article, <http://www.economist.com/node/21564569?zid=293&ah=e50f636873b42369614615ba3c16df4a> [accessed on 17/12/2012]

The Economist, *The last manned fighter: will the F-35 survive?*, 14 July 2011, online article, <http://www.economist.com/node/18958487> [accessed 9 February 2012]

The Guardian, *Watchdog finds 'shocking' £6 billion military overspend*, 16 November 2011, online article, [www.guardian.co.uk/uk/2011/nov/16](http://www.guardian.co.uk/uk/2011/nov/16) [accessed 21 February 2012]

The Hague Code of Conduct against Ballistic Missile Proliferation, online documents, <http://www.hcoc.at/index.php>, <http://www.bmeia.gv.at/en/foreign-ministry/foreign-policy/disarmament/weapons-of-mass-destruction/hcoc.html> and <http://www.armscontrol.org/documents/icoc> [accessed on 13/01/2013]

The International Institute for Strategic Studies, *BAE-EADS: facing up to a smaller defence market*, September 2012, online article, <http://www.iiss.org/publications/strategic-comments/past-issues/volume-18-2012/september/bae-eads-facing-up-to-a-smaller-defence-market/> [accessed on 7/12/2012]

The Wassenaar Official Web Page, online document, <http://www.wassenaar.org/introduction/index.html> [accessed on 13/01/2013]

Thomas, D. & Lalor, D., *BAE to buy Australia's Tenix*, Reuters online article, 18 January 2008, <http://uk.reuters.com/article/2008/01/18/uk-tenix-bae-idUKSYU00377220080118> [accessed on 12/01/2013]

Thucydides, R., *History of the Peloponnesian War. Book 1*, online document, [http://en.wikisource.org/wiki/History\\_of\\_the\\_Peloponnesian\\_War/Book\\_1](http://en.wikisource.org/wiki/History_of_the_Peloponnesian_War/Book_1) [Accessed 26/07/2012]

United Nations Publications, *Treaty Handbook*, Treaty Section of the U.N. Office of Legal Affairs, 2012, online document, [http://treaties.un.org/Pages/Publications.aspx?pathpub=Publication/TH/Page1\\_en.xml](http://treaties.un.org/Pages/Publications.aspx?pathpub=Publication/TH/Page1_en.xml) [accessed 10/12/2012]

U.K. Ministry of Defence, *Defence Industry Strategy*, 2005, online document, <http://www.official-documents.gov.uk/document/cm66/6697/6697.pdf> [accessed on 12/07/20012]

U.K. Ministry of Defence, *Statistics 2011*, online document, <http://www.dasa.mod.uk/modintranet/UKDS/UKDS2011/Contents.php> [accessed on 6/10/2012]

United Nations Conference on Trade and Development (UNCTAD), *World Investment Report, Global Investment trend*, online report, <http://www.unctad-docs.org/files/UNCTAD-WIR2012-Chapter-I-en.pdf> [Accessed 3/09/2012]; and *Training Manual on Statistics for FDI and the Operations of TNCs*, Volume I, online document, [http://archive.unctad.org/en/docs/diaeia20091\\_en.pdf](http://archive.unctad.org/en/docs/diaeia20091_en.pdf) [Accessed 3/09/2012]

United Nations General Assembly, *Resolution adopted by the General Assembly on the Report of the United Nations Conference on the Arms Trade Treaty*, New York, 2-27 July 2012, online document, [http://www.un.org/ga/search/view\\_doc.asp?symbol=A/RES/67/234&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/67/234&Lang=E) [accessed on 15/12/2013]; *Draft of the Arms Trade Treaty*, online document, [http://www.un.org/ga/search/view\\_doc.asp?symbol=A/CONF.217/CRP.1&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/CONF.217/CRP.1&Lang=E) [accessed on 15/02/2013]; and *Compilation of views on the elements of an arms trade Treaty*, online document,

[http://www.un.org/ga/search/view\\_doc.asp?symbol=A/CONF.217/2&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/CONF.217/2&Lang=E)  
[accessed on 16/01/2013]

United Nations Office at Geneva, *Documentation on Biological Weapons Convention*, online document,  
<http://www.unog.ch/80256EE600585943/%28httpPages%29/04FBBDD6315AC720C1257180004B1B2F?OpenDocument> [accessed on 17/12/2012]

United Nations Office for Disarmament Affairs, *Convention on Certain Conventional Weapons*, online document,  
<http://disarmament.un.org/treaties/t/ccwc> [accessed 12/01/2013]

United Nations Office for Disarmament Affairs, *Convention on Cluster Munitions*, online document, [http://disarmament.un.org/treaties/t/cluster\\_munitions](http://disarmament.un.org/treaties/t/cluster_munitions) [accessed 12/01/2013]

United Nations Office for Disarmament Affairs, *Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines*, online document, [http://disarmament.un.org/treaties/t/mine\\_ban](http://disarmament.un.org/treaties/t/mine_ban) [accessed on 12/01/2013]

United Nations Office for Disarmament Affairs, *The Comprehensive Nuclear Test Ban Treaty*, online document, <http://disarmament.un.org/treaties/t/ctbt> [accessed 15/12/2012]

United Nations Office for Disarmament Affairs, *Treaty of Bangkok*, online document, <http://disarmament.un.org/treaties/t/bangkok/text>  
[accessed 14/12/2012]

United Nations Register of Conventional Arms, online document, <http://www.un-register.org/HeavyWeapons/Index.aspx> [accessed on 12/01/2013]

United Nations, *Security Council Resolution 1718*, online document,  
<http://www.un.org/News/Press/docs/2006/sc8853.doc.htm> [accessed on 12/10/2012]

United Nations Treaty Collection, *Definitions*, online document,  
[http://treaties.un.org/Pages/Overview.aspx?path=overview/definition/page1\\_en.xml#conventions](http://treaties.un.org/Pages/Overview.aspx?path=overview/definition/page1_en.xml#conventions)

United Nations Treaty Collection, *Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction*, online document,  
[http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg\\_no=XXVI-5&chapter=26&lang=en](http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVI-5&chapter=26&lang=en) [accessed on 12/01/2013]

United Nations Treaty Collection, *Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects*, online document,  
[http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg\\_no=XXVI-2&chapter=26&lang=en#EndDec](http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVI-2&chapter=26&lang=en#EndDec) [accessed 12/01/2013]

U.S. Central Intelligence Agency - The World Factbook, *Countries reports*, February 2013, online document, <https://www.cia.gov/library/publications/the-world-factbook/index.html> [accessed on 12/02/2013]

US Department of Commerce, *Offsets in Defence Trade*, 2008, online document, [http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/final\\_offsets\\_eleven\\_report.pdf](http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/final_offsets_eleven_report.pdf) [accessed on 1/09/2012]

U.S. Office of the Secretary of Defence, *Military and Security Developments Involving the People's Republic of China*, Annual Report to Congress, 2012, online document, [www.defense.gov/pubs/pdfs/2012\\_CMPR\\_Final.pdf](http://www.defense.gov/pubs/pdfs/2012_CMPR_Final.pdf) [accessed on 21/02/2013]

U.S. Office of the Undersecretary of Defence (COMPTROLLER), *U.S. Overview of Fiscal Year 2013 Budget Request*, February 2012, online document, [http://comptroller.defense.gov/defbudget/fy2013/FY2013\\_Budget\\_Request\\_Overview\\_Book.pdf](http://comptroller.defense.gov/defbudget/fy2013/FY2013_Budget_Request_Overview_Book.pdf) [accessed on 30/01/2013]

Watts, B., *The U.S. Defence Industrial Base: Past, Present and Future*, Centre for Strategic and Budgetary Assessments, 2008, online document [http://www.csbaonline.org/4Publications/PubLibrary/R.20081015.The\\_US\\_Defense\\_In/R.20081015.The\\_US\\_Defense\\_In.pdf](http://www.csbaonline.org/4Publications/PubLibrary/R.20081015.The_US_Defense_In/R.20081015.The_US_Defense_In.pdf) [accessed on 23/08/2012]