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NEW FRONTIERS IN CONFLICT MANAGEMENT AND PEACE ECONOMICS: WITH A FOCUS ON HUMAN SECURITY

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FOREWORD

For the last three or four decades, we have seen a lot of publications and scholarly activities around the world in the area of Conflict Management, Peace Economics, and Peace Science.

There are a number of book series on these subjects. Also, there are many professional organizations arranged international meetings and other activities in these areas. Some of the organizations are: Peace Science Society (International) and Economics of Peace and Security, etc. The journal of Peace Science Society which I briefly edited many years ago -Conflict Management and Peace Science- is a leading publication in the field. Extensive data about Conflicts, War and Peace are available in many datasets such as COW War Data, and other publications by such organizations like International Red Cross, and Catholic University at Leuven, Belgium. Another source of data is SIPRI, which publishes for many years extensive data on military expenditure, security, and arms transfers.

Although we have considerable amount of activities in the area of peace economics, conflict management and peace Science, it is a relatively new social science discipline. This is a multi-disciplinary Social Science integrating the subject matter of Peace with Economics, Sociology, and Anthropology, Law, and Engineering, etc.

Based on available time series, cross section, and panel data, highly sophisticated analysis have been conducted using advanced techniques of Econometrics and Management Science, etc. There are also many case studies on conflicts such as between Israel and Palestine, other conflicts in the Middle East and South Asia have been published.

The primary sources of the theoretical basis of Peace Science have been developed by Walter Isard in his books like Conflict Analysis & Practical Conflict Management Procedures; Arms Races, Arms control, and Conflict analysis, and many other books authored by him. He has also developed a broad approach integrating Sociology, Anthropology, and Law, etc. in his book: Understanding Conflict and the Science of Peace. He also integrated the subject matter of Peace Science with Regional Science. There have been also numerous publications in the area of Arm Production and Nuclear proliferation. Different techniques of Game Theory have been applied to analyze the situation of competitive, and cooperative structure of decision making.

Our book series on Conflict Management Peace Economic and Development published by Emerald Publishing, UK addressed many of these topics in thirty volumes.

However, we need some new directions in the area of Peace Economics and Peace Science. Some of them are Big data, Artificial Intelligence, Data mining, Environmental Conflict and Global Warming, Conflict and Public Policy, Ethics and Corporate Social Responsibility, and Disaster Management such as Covid-19. The papers included in this volume are in that direction.

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INTRODUCTION

Partha Gangopadhyay and Madhumita Chatterji

The edited book seeks to improve our collective understanding of how to fight humanity's persistent and tragic problems with conflicts, climate shocks and ruptured peace in a globalised world. With the collapse of the former USSR in the early 1990s, Francis Fukuyama prophesised 'the end of history', driven by free-market liberal democracy, which was meant to deliver:

- massive increases in productive efficiency in the global economy;
- unprecedented improvement in the solidarity between nations; and
- unprecedented economic development and prosperity for all nations.

In the early 1990s, after the collapse of USSR, the process of economic globalisation was supposed to increase productive efficiency, and produce greater solidarity between nations and promote economic development of all economies. Francis Fukuyama spoke about 'the end of history' and argues that free-market liberal democracy will be the lasting and 'final form of human government' to propel our collective prosperity and peace. This prediction is resonant with the Kantian concept of *perpetual* peace.

Ironically, within a span of three decades from 'the end of history', history has started a new and terribly ominous reincarnation: war cries of the rich and the powerful against globalism have drowned our collective voice for human security and harmony. Some political leaders have vowed to create a *new world order*. Neo-protectionism has raised its ugly heads in the form of tariff wars between the United States and China. National sentiments of mercantilism have driven out the *cunning of reason* to foster global cooperation to fight myriads of challenges to human security. Now Fukuyama looks suitably anxious about the future of our globe and, like every responsible citizen of our globe, ponders about its future. Fukuyama is reported to have stated: 'Twenty-five years ago, I didn't have a sense or a theory about how democracies can go backward. And I think they clearly can'. (https://www.washingtonpost.com/news/worldviews/wp/2017/02/09/the-man-who-declared-the-end-of-history-fears-for-democracys-future/).

Contrary to Fukuyama's prophecies, however, three decades later, international tensions have not shown any downward trend. Since the creation of the World Trade Organisation, economic and financial crises have often revitalised state economic protections and nationalist sentiments of some political leaders want to return to a more political and mercantilist conception of economic policy. In Europe, it is widely held, Brexit has outright rejected globalisation as the

EU failed to protect its population from *predatory* globalisation (https://www.theguardian.com/business/2016/jun/26/brexit-is-the-rejection-of-globalisation). The years of Brexit drama and continuing uncertainty have created enormous cracks and deadly fault-lines across nations within the European Union (EU). It is imperative to highlight that there has been push back against globalisation, or the 'final form of human government', all across the globe.

Yet, we are at a critical juncture of human history as our civilisation has been under serious threats from anthropogenic factors. Human security is in peril. Roughly speaking, human security can be best understood using a negative term called human insecurity. Human insecurity is our existential threats from violent conflict and poverty, humanitarian crises and epidemic diseases. We also tend to pot injustice and inequality in the narrow space of human insecurity. Broadly speaking, hence, human security is all about security of individuals and their communities, global humanity and harmony. Human security can be summarised in the following triad:

- human security is about absence of fear for individuals;
- human security is about freedom from want for individuals; and
- human security is about freedom to live in dignity, peace and harmony.

Hence, human security is radically different from the traditional mandate of security studies that have clear foci on military force, territorial control and sovereignty in exercising state power.

This edited book diligently explores the uncharted land of human security by riveting on some of the most serious challenges that human security faces in various parts of our globe due to intra-state conflict and terrorism, inter-state wars, predatory globalisation, failed development, environmental problems and man-made and natural disasters. By bringing together a diversity of researchers, the book will offer a comprehensive treatment of human security. This book will provide an original contribution and a further impetus to crafting well-grounded academic and policy responses to human security, or global problems that so urgently call forth ingenious solutions. Some of the relevant topics covered in the book will focus upon:

- Climate shocks.
- Terrorism.
- Conflicts.
- Poverty.
- Inequality.
- Inefficient governance.

This book is about our collective resilience to fight some of the above challenges to human security. It will explore our collective efforts to create a pathway from economic and social chaos to Kantian peace during a violent phase of globalisation. This violent phase is often termed as *predatory* globalisation. In other words, the volume will seek to understand how to shear off the predatory nature of globalisation for ensuring human security.

We are standing at the crossroads of human history: we live in a globalised world and our contemporary problems are global in nature. A widely publicised research work, undertaken at Oxford University, highlights that more than 1.6 billion people are living in multidimensional poverty around the world today. To overcome our collective problems, we need global cooperation on a scale unprecedented in human history.

This volume will seek to address some of these urgent challenges to human security – as for examples, continuing and deadly conflicts, over-population, climate change, disappearing bio-diversity and lack of development and progress for 1.6 billion people of our globe –peace and development will play a key role.

Without peace and development – it will be improbable, if not impossible, to achieve the levels of cooperation, trust, inclusiveness and social equity needed to create and implement solutions to global challenges.

From the ongoing research on development, peace and security, we have learnt the hard lesson: if we look at the economic impact of violent conflict on a global scale, the pecuniary costs – ignoring social and psychological costs – at least US$ 14.3 trillion. In other words, 13.4% of global GDP is wasted every year due only to conflicts and violence. This is what George Washington came to term as 'the waste of war' in 1788 and the book will help researchers and policymakers across the globe how to mitigate the 'waste of war'.

An abiding theme of the volume will revolve around the question of managing conflicts and thereby achieving lasting peace. Wars and conflicts, in the opinion of European philosophers like Baron d'Holbach, are nothing but a 'remnant of savage customs'. Yet our time is still marred – more often than not – by such savage customs as some of our work highlighted during the last five decades.

As early as in 1788, George Washington argued that it was time for agriculture and commerce 'to supersede the waste of war and the rage of conquest'. Yet time and again, we see the following:

> the wild rage of war has been supplanted by the calculating and rational belief that a brief momentary madness of war can smother many future wars. This belief provides a rational foundation for wars as a war for peace, like war on terror, as the globe witness the wars in the Balkans and the gulf, followed by the global rage triggered by 9/11. (Gangopadhyay & Elkanj, 2017)

The above sentiment is nothing new as in 1790 the new French Revolutionary State enunciated the 'declaration of peace to the world', which claimed to have ended the savage wars in Europe forever. The declaration of peace after the French revolution pivots upon 'a single society, whose object is the peace and happiness of each and all of its members'. It took less than 2 years after the declaration of peace when Europe got dragged into a series of *bloody wars* that continued for 23 years. It ended with the final defeat of France in 1815.

In other words, the book will highlight, many violent conflicts have the lurking the hope of a perpetual peace at the end of 'this very final conflict', yet wars and conflicts smudge our human history with an unfailing regularity. Nation states would direct every possible political, social and economic resource towards the utter defeat of the enemy – *one last time*.

In one serious context on the frontier of research in human security, the jury is still out on whether development causes peace and security, or peace and security cause development. This book will touch upon a crucial theme of human security: development, peace and development are inter-dependent and we need a systemic understanding of development, peace and security. In this context, a key finding of the Institute for Economics and Peace is that 'more peaceful societies are also more prosperous'.

Human security is an important subject for our globe, in particular South Asia, as it calls forth interactions among various fields of social change, such as:

- development;
- conflict resolution;
- human rights; and
- humanitarian assistance.

In a globalised world, threats become trans-national very quickly, and hence inter-state cooperation is mandatory to crush problems threatening human security. Written by researchers who are experts in the field of human security and with case studies from different regions (EU, North America, South America, South Pacific, and various parts of South Asia, Central Asia and East Asia, Africa and the Middle East) presented throughout, this book will create and drive the new multidimensional conception of human security, and explore its strengths and weaknesses. The book will also explore various strategies to enhance human security.

REFERENCE

Gangopadhyay, P., & Elkanj, N. (2017). *Analytical Peace Economics: The Illusion of War and Peace.* London: Routledge.

CHAPTER 1

RETHINKING AUGUSTINE'S LAW: ARMAMENT COSTS AND EVOLVING MILITARY TECHNOLOGY

Jurgen Brauer, Keith Hartley and Stefan Markowski

ABSTRACT

Using long-run trend data for US tactical and bomber aircraft, Norman Augustine's Law 16 famously suggests continuously rising US armament unit costs. By the year 2054, the country's entire defence budget would be expended on a single aircraft, which an industry colleague dubbed as the Battlestar Galactica. However, while it is thought provoking, what does Law 16 in fact entail? It appears that the mechanics of Augustine's 'Law' has never been examined in detail. To help disentangle the matter and assess its relevance in the context of today's battlefield technology, which is increasingly focussed on the application of large numbers of small, cheap, expendable, electronically linked, yet highly autonomous systems, this chapter introduces the concept of an Augustine weapons system.

Keywords: Armament costing; defence budget; Augustine's Law; Augustine weapon system; military technology; autonomous system

INTRODUCTION

Recently, US naval forces were reported to have moved back into international waters far from the Chinese mainland due to the potential threat posed by Chinese new low-cost missiles designed to destroy/damage the very expensive

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US aircraft carriers and naval battle groups. Outer space-based assets, aerial and naval drones and unmanned land vehicles proliferate; and an on-going, low-intensity, cold war-type cyberwar is a constant feature among China, Russia, the United States, and other nations. This new wave of changes in warfighting and power projection technologies, increasingly incorporating the latest, frame-breaking rather than just frame-bending advancements in artificial intelligence (AI) and cyber developments, has been referred to as a yet another Revolution in Military Affairs (RMA). As human warfighters and their ever more capable but complex and costly to build and use fighting machines are soon to be replaced by autonomous, AI-enabled, and potentially cheaper military equipment, it has been argued that the current RMA has profound operational and strategic implications for force structure design and warfighting possibilities and, thus, for national defence policies and defence budgets (Hammes, 2015).

Given this knowledge-intensive and labour-saving nature of the new RMA, and its apparent potential for significant reductions in unit costs of military equipment, investments in future defence forces appear to be affected by two opposed pressures. First, there is the continuing trend for the unit costs of 'traditional', ever more complex and multi-tasked weapons systems to increase exponentially over time. In the US case, for example, these are the exponentially increasing costs of fleets of nuclear submarines and aircraft carrier-centred naval battle groups, multi-role stealth aircraft designed to deliver precision-focussed lethality anywhere in the world, and land vehicles offering manoeuvre and firepower capability with much enhanced ballistic protection for their human operators. With peacetime budget constraints, this tendency for the unit costs of weapons systems to grow exponentially over time has resulted in progressive reductions in volumes of procured equipment. This phenomenon has been labelled *Augustine's Law* (see below). Second, there is the expectation that the new technology capable of delivering much cheaper, unmanned, autonomous, and AI-enabled weapons systems will bring equipment volumes back to the battlefield so that Augustine's Law need no longer apply.

Our research question is therefore: will this RMA be different from its predecessors? Will the 'equipment bulk' return to the battlefield even though future warfighting is likely to be increasingly labour-saving? Or, are we likely to see the new, unmanned equipment subjected to the same pressures of the ever-growing complexity of weapons design and 'gold plating' so that new systems will soon be produced to be increasingly more autonomous, smarter, and versatile and the upward pressure on their unit costs of acquisition will resume?

The following section focusses on Augustine's Law, namely, the asserted ongoing substitution of the ever smaller numbers of the increasingly more complex and expensive weapons systems for larger volumes of less capable but more affordable military equipment. The next section briefly outlines the main features of the current RMA. It is followed by a section examining the mechanics of Augustine's Law 16. The chapter concludes by considering the Law's continuing relevance as the new RMA unfolds.

COST, TECHNOLOGY, AND CAPABILITY: AUGUSTINE'S LAW 16

Norman Augustine famously asserted that the long-run trend of rising unit costs of military capital equipment in real terms would eventually lead to smaller armed forces and economic disarmament (Law 16 in Augustine, 1997). Somewhat flippantly, but with serious intent, he predicted that the entire US defence budget would be consumed with the coming of a highly capable but lone aircraft, the *Battlestar Galactica,* to be shared among the air force, navy, and marines.[1] Not only the United States but many other nations are in fact reducing volumes of military equipment in use under budgetary pressures although they usually claim that the associated military capabilities are enhanced rather than reduced. The guiding idea of the *Battlestar Galactica* is (or should have been) that it is meant to be more capable in achieving its military objectives than previous fleets of specialised aircraft. Augustine explicitly acknowledges the contributory role of costly technology in enhancing system capability:

> The point is not … that new technology is inevitably more expensive than old technology; the opposite is often the case. But what happens is that … new technology opens vast new capability vistas which are then crammed into each new generation of a product' (1997, p. 105).

Ultimately, investments in military capability aim either to *enhance* the scope for *power projection,* or *enhance* the *effectiveness of defence* against the projected power, or both and military equipment is produced for that purpose. For a given military budget, the purpose of new military capability formation is to provide *more opportunities* for successful offensive and/or defensive military operations.[2]

Given budget constraints, it does appear to be true that military forces around the world are less numerous over time in that they require fewer but better trained people and smaller numbers of increasingly more capable, complex, and, thus, expensive-to-buy equipment. Augustine shows examples for US tactical and bomber aircraft over the period 1910–1985. Although using price deflators based on civilian rather than military products, our own Table 1 similarly shows rising real unit costs for a chronological selection of UK military aircraft over the period 1937–2003. Over this 67-year-long period, fighter aircraft (real) unit costs increased 236-fold, and bomber aircraft 18-fold. The generation-skipping aggregates conceal the magnitude of cost increases between successive aircraft generations. From the Spanish Civil War-era *Gladiator* (1937) to the World War II-era propeller-powered *Spitfire* (1940), the unit cost increase was 1.5. On to the first-generation jet-powered *Meteor* (1946), unit costs increased 2.4-fold, and between the *Meteor* and the *Hunter* (1955), unit costs increased 2.6-fold. The increase between the *Hunter* and the *Lightning* (1959) clocked in at 3.3, and that between *Lightning* and the *Typhoon* (2003) 7.9-fold. Similarly, for bomber aircraft, which saw especially steep rises between the 1943 propeller-powered *Mosquito* and the 1955 jet-powered *Valiant*. The aircraft listed in Table 1 represent different capabilities in terms of airframe technologies, propulsion, avionics, software systems, offensive and defensive weapon capabilities, reliability and maintainability standards, and so on. Figures reported in the Table are 'stylised' unit costs of items that

Table 1. UK Real Unit Costs.

UK Aircraft	Nominal Price (£000s) at First-Year Contract	Constant 2018 Price (£000s)	Real Cost Increase between Aircraft Types (Rounded)
Fighter aircraft			
Gladiator	3.1 (11/1937)	151.3	
Spitfire	5.1 (6/1940)	219.5	1.5
Meteor	13.9 (3/1946)	529.7	2.4
Hunter Mk1	53.5 (1/1955)	1,376.8	2.6
Lightning Mk1	199.0 (4/1959)	4,539.4	3.3
Typhoon	23,160.0 (6/2003)	35,737.9	7.9
Bomber aircraft			
Lancaster	18.4 (6/1943)	714.9	
Mosquito	9.1 (8/1943)	355.2	–0.5
Canberra	54.0 (6/1951)	1,660.2	4.7
Vulcan Mk1	365.0 (12/1954)	9,740.7	5.9
Victor Mk1	235.5 (5/1955)	6,172.7	–0.6
Valiant	385.0 (9/1955)	9,888.9	1.6
Vulcan Mk2	358.0 (1/1958)	8,080.3	–0.8
Tornado	2,753.1 (6/1979)	12,930.5	1.6

Source: DSTL (2010)

Notes: (i) Data are per-unit production costs UK military aircraft airframes only and include a profit allowance but excluding all other costs (e.g., engines, guns, radio, landing gear); (ii) data are for contract for the year shown in brackets. All aircraft had more contracts but only the initial contracts are shown; (iii) *Gladiator*, *Spitfire*, *Lancaster*, and *Mosquito* are World War II-era propeller aircraft. All others are post-1945 jet-powered aircraft; (iv) cost increases between types show cost increase from *Gladiator* to *Spitfire*, from *Spitfire* to *Meteor*, *Meteor* to *Hunter* and so on.

are not easily comparable and cannot be described even as different evolutionary phases of air-fighting technology. Still, the Table does convey Augustine's point that manned military aircraft have become vastly more expensive over time and, with binding budget constraints, technological advances, and quality enhancements tend to crowd-out equipment volumes.

Panels (a) and (b) in Figure 1 show Augustine's argument in terms of stylised (U-shaped) average cost curves, often used in economics textbooks, including the effect of ever-advancing military technology on average unit cost, defence budgets, and consequent reduction of units ordered. The solid line in Panel (a) is an idealised, planned average total cost (ATC planned) curve with an ATC minimising $Q^*=1{,}000$ at $ATC_{min}=1{,}000$, for a total cost (TC_1) of 1,000,000 (currency units are omitted). Hence, the cost-minimising production run would be $Q=1{,}000$. In practice, both for military and for budgetary reasons that quantity may not be achievable. Instead, in practice, with a budget of $TC_2=300{,}000$, planners are looking at a purchase of, say, $Q=200$, and $ATC=1{,}500$. In time, however, as (product-related) research, development, and testing get under way the projected unit cost creeps up to the dashed ATC (delayed) line which implies that producing $Q=200$ now incurs $ATC=2{,}000$ and $TC_3=400{,}000$ (note that the product is now also improved so we are not comparing like with like). In the usual bureaucratic and political manner, the production run now is cut back to $Q=150$, at $TC_4=300{,}000$, to trim costs back to the originally 'planned' outlay. While this is a stylised version of the mechanism of cost creep implied by Augustine's Law,

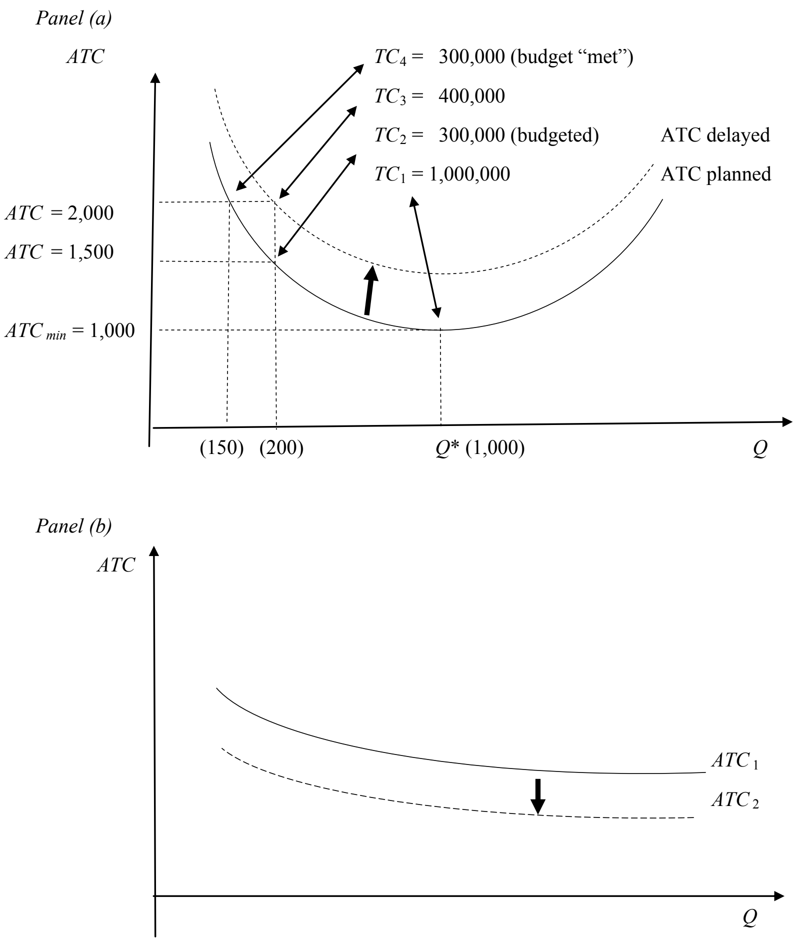

Fig. 1. Average Cost Curves for Military Weapons Systems, 'Old' versus 'New' Military Technology.

there appears to be a broad consensus of view among the academics, defence industry practitioners, and policymakers as to the fundamental correctness of Augustine general assertion: as unit costs increase, quantities purchased are cut back.

In contrast, Panel (b) of Figure 1 shows the stylised version of what is now asserted to be the potential impact of the current RMA on unit costs of weapons systems over time. Here, the solid ATC curve slopes downward; there is no upward-sloping portion of the curve as the marginal cost (MC) of adding additional units is essentially unchanged once the minimum efficient scale of production is reached and, thus, the ATC declines as more units are built and purchased. Moreover, as technology develops, the ATC is asserted to shift down to the dashed ATC as systems, at any desired quantity, become cheaper to make and purchase over time.

THE NEW RMA

Smart weapons systems, drones, and military robotics using AI technologies are increasingly prototyped and/or gradually introduced into service by many powers, particularly the US and its major NATO allies but also by China, Russia, Japan, and lesser powers such as Australia, South Korea, Taiwan, and Singapore. Many of these systems will be able to operate in communications-denied environments at machine speed under conditions that prohibit human oversight after launch (Hammes, 2015). Other advanced developments include powerful nano-explosives. In manufacturing, additive 3D printing technologies will be able to assemble complex weapons systems, such as drones, in remote locations to be used as loitering rounds of ammunition and/or mobile detonators of potentially explosive systems located in enemy areas as well as highly portable sea, air, and land platforms to support other military applications. All these developments will influence both how the military could fight and what it would fight with. Thus, some commentators argue that:

> A military made up of small numbers of large, expensive, heavily manned, and hard-to-replace systems will not survive on future battlefields, where swarms of intelligent machines will deliver violence at a greater volume and higher velocity than ever before. Success will require a different kind of military, one built around large numbers of small, inexpensive, expendable, and highly autonomous systems. (Brose, 2019, p. 124)

The future battlefield may involve the return of mass quantities of armaments as the new technology will allow more systems to move over wide geographical areas. The current round of the on-going RMA will generate vast quantities of data that quantum computers will soon be able to process at high speeds and make available to unmanned, autonomous, numerous, manoeuvrable, and fast but *low cost* fighting machines operating in air, sea, land, outer space, and cyber environments. Their lethality will also increase exponentially with the application of laser, high-powered microwaves, and other directed-energy technologies. The range and accuracy of these lethal systems will improve while their payloads get smaller, lighter, and more devastating. The anti-access-area-denial capabilities will also get cheaper to develop and field and more effective in application as large salvos of low-cost precision fire could be directed at an enemy's weapons systems.

Thus, it is asserted, the effective future military force will:

- require large swarms of intelligent equipment that will distribute sensing, movement, lethality, and communications away from inherently vulnerable nodes (fewer big, vulnerable targets, and single points of failure) and out to the edges of vast, dispersed networks (to maximise system redundancy); this will also allow the military to target many adversary capabilities over large geographical areas;
- use cheap and expendable systems, which will allow it to absorb large-scale loss of equipment in combat; and
- rely, where ethically and/or legally acceptable, on unmanned and autonomous equipment to reduce the human cost of combat operations (Brose, 2019).

Clearly, much of this technological scenario may turn out to be a science fiction, more so since the purpose of war is to win and attacking large numbers of 'soft' civilian targets may provide a far more effective means of winning wars than fielding large swarms of lethal systems designed to stop and/or overwhelm large swarms of similarly capable enemy equipment. In this respect the traditional 'kill chain' of warfighting is unlikely to change. Still, what the argument appears to entail is that emerging military technology has the potential to change the fixed cost-trap of major conventional weapons where R&D costs have become so high as to lead to Augustine-style predictions of one aircraft air force, one tank army, and a single ship navy.

There are at least four possible reasons for escaping this fixed cost-trap. First, without humans on board, weapon platforms do not need to protect their human operators and occupants, which should drastically reduce their costs (cf., unmanned outer space exploration). Second, smaller systems reduce fixed, platform-related costs. Third, much higher volumes imply lower average production costs reflecting scale and learning economies (e.g., large swarms of drones). Fourth, whereas 'traditional' aircraft, ships, and tanks have little to no platform commonality, modern military technology seems to have much commonality as the weapons systems are electronics-intensive and cyber-enabled, thus potentially benefiting from economies of (cross platform) agglomeration in addition to platform/product-specific scale economies.

AUGUSTINE WEAPONS SYSTEMS EXAMINED

Modern defence equipment is costly to develop and produce. For example, large aircraft carriers have unit acquisition costs of some UK£8 billion; a nuclear-powered hunter-killer submarine may cost almost £2 billion per copy; a strategic bomber may command a price tag of £3.7 billion apiece; and a modern fighter/strike aircraft can cost over £100 million per unit (Pugh, 2007). Various reasons have been given for such high and rising costs. These include arms purchased as 'tournament goods' with rival nations seeking technological superiority and military advantage through the development of ever more expensive new technology demonstrators; inefficient monopoly defence industries; ever shorter production runs well below the minimum efficient scale of production; and the technological and capacity changes between generations of equipment. As a causal factor, the UK data for the period 1945–1960 raise doubts about the monopoly defence industry argument since the UK aircraft industry was reasonably competitive over this period with monopoly only emerging after 1960. Also, except for the United States as the largely autarchic military superpower that deliberately restricted its potential import dependence as a strategically unacceptable vulnerability, most secondary powers retain the option to import and, thus, the monopoly defence industry argument is not very convincing.

As we are commenting on Augustine's Law and its applicability, we coin the concept of an *Augustine weapons system* or an *Augustine good* as a bundle of attributes that continues to get refined and enhanced over time, by mutual consent between the producer-seller and the military user, because much of its utility depends on *signalling* its potential effectiveness/lethality in a wide range of credible contingencies. Ultimately, the Empire has only one universal battleship (the ultimate 'wonder weapon') to police and threaten the entire galaxy with, which is a continuously evolving and ever more complex technology demonstrator until the day when it is used in anger and promptly destroyed by some trivial but ingenious means (as has often been demonstrated by small, poorly armed but inventive guerrilla forces discovering and taking advantage of inevitable vulnerabilities of their much larger and well equipped adversaries).[3] At present – given the US role as the sole global superpower, which aims to be able to project power against any adversary anywhere in the world – Augustine goods are mostly, but not exclusively, made for and commissioned by the US military.

The purpose of this section is to critically examine the real cost escalation syndrome that seems to apply to military procurement, including the question of why this syndrome appears to be more of a problem in military than civilian new capability formations. Again, the conventional argument is that (product-related) R&D costs become a trap for major conventional weapons systems as they are enhanced over time and their unit costs escalate to become so large that only very small quantities of equipment can be afforded by its military users. Two arguments need to be distinguished in this context. First, is there much evidence of the ever-increasing military R&D budgets crowding-out other military expenditure? If this is the case, why does it apply to weapons systems in particular rather than to all investments in complex and technologically evolving capital equipment regardless of whether they are military or civil? Second, one must distinguish between *technological change that applies to production processes*, which affects the unit cost of production as it determines the returns to scale and scope in production, and *product-related technological change* that determines what is actually made and why. In this chapter, we only examine the second argument.

Consider Figure 2, which shows the average unit cost of two weapons systems, *A* and *B*, in the long run. Initially, both *A* and *B* are well specified and some product-specific R&D has been incurred in the past. Initially, there is no further product-specific technological change, so the first challenge is to examine the economics of producing these products in different quantities and combinations. Product specifications are assumed invariant, but the two-weapon systems can be built separately or jointly in different quantities and are shown as points either on or between the two horizontal product axes *A* and *B*, for example, A_1, A_2, B_2 for strictly dedicated (single product) quantities of output or AB_2, when the quantities of both products are mixed (say, along the *A*/*B* ratio axis shown as a fixed output proportions ray from the origin, 0).

In the Figure, the long-run average unit cost (LRAUC) decreases as the *scale of production* increases (i.e., as either the production of *A*, or of *B*, or a specific constant mix of *A* and *B:* say, *A*/*B* are made). As we deal with the long run wherein all inputs are scalable, the only justification for the declining slope of the LRAUC surface as the scale of production increases (economies of scale) lies in the associated, up-front fixed cost of making *A* and *B* or any mix thereof. Contrary to common perception, with modern flexible and numerically controlled production