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Impact of Technology on Future Wars: Options for Bangladesh

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INTRODUCTION

1. There is intrinsic relation amongst technology, science and war. There were pre-scientific technologies in early societies and today's modern and complex technology cannot be understood without science. At the same time progress in science and technology has been inextricably linked to the needs of war.

2. Developments in technologies have brought revolutionary changes in societies as well as warfare. Different scholars have studied these changes in different sequential phases and stages. In World War I, warfare was mainly static and defensive, though tank and aircraft appeared in the battlefield. In World War II the world has experienced the impact of mechanized and mobile warfare, and also the most devastating effect of nuclear weapons. New innovations made their debut during the Gulf War along with new concepts of warfare.

3. At the end of 20th century the technology has reached a level, where it seems that our past experiences of war may be of little value. Developed world is now thinking of waging wars without bloodshed. At this moment of transition, it is difficult to imagine or determine the shape of the future wars.

4. The way the developed nations have invested on research and development to keep technology at their prime edge, Bangladesh as a developing country can not do that. Hence it is always at the receiving end of the pipeline, which is continuously transferring exhausted and rejected technologies from the developed world. Bangladesh also can not afford to allow this situation to continue forever. Whatever small may be an endeavor that should be undertaken to change the condition.

5. This paper would study the impact of technology on future wars limiting up to 21st century. It would highlight the relation between technology, science, and war, sequential development of technology and war, and likely impact of technology on future wars to keep the paper within limit. Few options for Bangladesh would also be suggested at the end of this paper.

TECHNOLOGY, SCIENCE, AND WAR-THE RELATIONSHIP

Relation between Technology and Science

6. Technology and science are the two sides of the same coin. Technology is the systematic study of techniques for making and doing things[1]. Science is the study of structure and behavior of the physical and the natural world and society especially through observation and experiment[2]. One can not advance without the other in this modern world. It is difficult to mention the exact date since when the technology begun. Science has contributed much to modern technologies, yet, all technologies are not based on science, nor is science necessary to all technologies. There were pre-scientific technologies in early societies and today's modern and complex technology cannot be understood without science. For example, one could make a sword with iron without knowing the metallurgical aspect of it. It is impossible to proceed similarly about nuclear, space, and information technologies. Technology makes thing happen and science explains why and how it happens.

Relation between Technology and War

7. War is the state of fighting between the states or groups within the states using military force[3]. Throughout the history, man invented technologies for war at the same time technology also pushed them towards war. Today it is difficult to come to a conclusion whether weapons have produced wars or it is war, which is responsible for development of weapon technologies. Probably both proceeded hand in hand, one driving the other and being driven by it. The necessity of survival and freedom by defeating the enemy was of utmost importance to human beings. To ensure that, they often resorted to indirect means and amongst them technological innovations always occupied a central position. During the war period development in technology occurred so fast that one hundred years of advancement was made in one year under the pressing needs of the war. In warfare technology was always a force multiplier and would remain to be so.

SEQUENTIAL DEVELOPMENT OF TECHNOLOGY AND WAR

Toffler's Three Ages

8. Alvin and Heidi Toffler considered that the human society has changed through three super cultural waves, which have also brought changes in warfare:

a. Agrarian Age (First Wave). The period between 10,000 BC to 1690 AD is identified as the Agrarian Age. During this period, the society was feudal. The cause of conflict was land and they were waged between the feudal lords. There were no professional armies but organised in seasonal basis and led by those landlords. Orders were verbal and pay was in kind instead of cash.

b. The Industrial Age (Second Wave). From the end of Agrarian Age up to the end of World War II is the Industrial Age or second wave. Nationalism was the major causes of wars and fought between nation states by professional armies led by mil academy trained leaders on written orders. This war form reached its apex with the development of nuclear weapons for mass destruction.

c. The Information Age (Third Wave). This age started from late sixties and continuing till today. In the information age, it is considered that the knowledge would be the central resources of productivity and destruction. It will aim mainly to destroy enemies command facilities, communication network, and data banks and prevent enemy's backup echelons from ever going into actions integrating the air, land, and sea operations. The world is yet to experience a total information age war. We have a partial view of information technology in the latest Gulf War.

Martin Van Creveld's Four Phases

9. In his book 'Technology and War' Martin Van Creveld expressed his view that the technological development has occurred through four different phases. In short, they are as follows:

a. The Age of Tools. The duration of age of tools continued from the earliest times up to 1500 AD. In this age, most technologies were based on the energy from the muscles of animals and men.

b. The Age of Machines. The age of machines started with renaissance and ended around 1830. Its unifying theme is that the technology made the machines deriving their energy from non-organic sources such as wind, water and of course gun powder.

c. The Age of System. The age of system started in 1830 and ended in 1945. Its theme was the rise and employment of technological systems in war, pioneered by the railway and the telegraph. The outstanding characteristic of the age was that technology itself became subject to organisation, which previously had been applied only to human being.

d. The Age of Automation. The age of automation focuses on the present age, which stared in 1945. In this age of automation, war machines are linked to each other in systems and also capable, within limits, of themselves detecting changes in their environment and of reacting to those changes (guided weapons, smart bomb, etc).

Development through Various Wars-Case Studies

10. World War I. During World War I, machine guns, tanks, submarines, and aircraft were first introduced. Due to the limited strategies and pattern of warfare, these mil technologies could not be utilised to their fullest extent.

11. World War II. During the inter war period, most of the war equipment was modernised. The technologies and systems that came up during World War II are worth mentioning, which brought changes in war strategies. Some of those are: main battle tank, beyond visual range combat, carrier warfare, guided missile, mechanised warfare, nuclear weapons, etc. Mobile and offensive posture was used in this war utilising full potentials of the new inventions. The use of nuclear weapon was so devastating that still humankind curses its effect.

12. Indo-China War. In the Indo-China war, a different picture can be seen. Both French and USA were superior in technologies and strength but ultimately they lost. Modern technology could not be utilised effectively against Giap's forces and Vietminh's. It proves that unimaginative use of technology can contribute negatively.

13. Gulf War. New invention made their debut during the Gulf War. Some of those are satellite technology, stealth technology, long range precision guided missile, smart bombs, etc. Information technologies as well as industrial age technologies were simultaneously used in that war. The allied forces followed new strategy of destroying the command, control, communication, and intelligence (C3I) and logistical systems before launching of land forces in this war.

LIKELY IMPACT OF TECHNOLOGY ON FUTURE WARS

Emerging Technologies

14. Necessity is the mother of invention, at the same time it is true that necessity knows no bounds. Technology also moving ahead as fast as possible and bringing new inventions. In the past, weapon systems, lasted for centuries together, today it last only for a decade. It is often seen that technologies are exhausted before they are properly introduced to the field.

15. The future world is going to be dominated by variety of emerging technologies affecting all spheres of national and international relations. Developed world has installed satellites in the orbit for better communication and also for accurate intelligence collection. Computer viruses, which can disable the whole system of a country, logic bomb, which can destroy the data bank, are all the inventions of this information age. Today higher commanders can observe the battlefield and even talk to the commanders in the forward echelons from his command post with the help of the modern satellite communication system[4]. Technology may even proceed further beyond our imagination. On the other hand, capability of conventional equipment, like artillery, tank, small arms etc are also being enhanced by accurate data through computer based equipment eradicating human error with the help of information technologies.

Likely Trends of Future Wars

16. The future wars can be of various forms. They may also blend two or more forms at a time. Some of them are described as follows:

a. Niche Wars. Special forces and special operations will occupy a major portion in any type of future conflict, be it nuclear war or low intensity conflict. As example, during Gulf War army attack helicopters went and destroyed Iraqi early warning radar sites and created a safe passage for thousands of aircraft to follow.

b. Space War. Space added a fourth dimension to warfare and influenced a general direction to the conflict. Satellites were utilised in the gulf war and will continue to be used in the future wars.

c. Robot War. 'Like Robocop' or "Terminator-2" the future war is likely to experience massive robotisation. The most important factor favouring robotisation may be the change in public attitude toward acceptable casualty level. The spread of chemical, Biological and nuclear arms in the world is also likely to promote robotisation by creating battlefields just too toxic for human soldiers.

d. War Without bloodshed. After fighting innumerable wars with uncountable casualties, massive destruction and devastation today's world leaders are fond of San Tzu's theory, 'To subdue the enemy without fighting'. Future wars are likely to be fought with non-lethal technologies, i.e. computer virus, logic bomb, deception through electronic warfare, etc, which will have the capability to anticipate, detect,

preclude or regret the use of lethal means thereby minimising the killing of people. Thus without firing a single shot a war may be own or can be stopped before it starts.

e. Unconventional War. Terrorism and guerrilla warfare have also become the leading form of warfare since World War II. Technology has been widely applied to covert operations and terrorism. The development of special light equipment, both lethal and non-lethal, for light infantry in the advanced countries will increase the available means for guerrilla operations.

Shape of Future Wars – The Debate

17. Military thinkers are in great dilemma to determine the shape of the future wars. There are two strong schools of thoughts about the shape of the future wars. They are as follows:

a. Tofflerian View. Tofflers believe that in future weapons based on information technology will be used against enemy systems based on information technology and there will be information wars. In those wars armies in the field will not be the targets, instead, communication systems, data bank, economic and financial systems heavily dependent on information technology will be the target of destruction.

b. Van Creveld's Assertion. According to Martin Van Creveld, technology is matter of head and war is matter of heart and an irrational one. Any amount of development in technology is not going to change the functions of war. In future, wars will be fought between groups where, conventional military forces with their heavy military technologies, would find them irrelevant. According to Van Creveld, the future wars have already arrived: Bosnia, Chechnia, Georgia, Somalia, Afganistan, etc are the examples of 21st century warfare.

18. After analysing the two extreme schools of thoughts and from the study of various wars it can be visualised and predicted that future wars may not follow either of the two. In future, wars will be fought in different sectors of the world following different methods (using weapons of information age as well as industrial age) or by blending both.

OPTIONS FOR BANGLADESH

Analysis of Present Situation

19. Economy of Bangladesh is based on the donor countries and agencies. It does not have any capability to produce or obtain new technology; rather it is in the receiving end. It has to depend on the developed countries for receiving old technologies at a lower price. In technology transfer she has failed to exploit the opportunities in training her technical hands as well as to produce spares locally, which would have taken her at least gradually towards self sufficiency. In Bangladesh, lowest priority and interest is shown in research and development, as it is a costly affair. She has failed to exploit the industrial revolution and are also about to lose the information revolution.

20. Bangladesh have machine tools factory, a tank repairing shop, and an ordnance factory, which are all heavy industries based on modern technologies. Their existing capabilities are not fully utilised. National resources like, Science Laboratories, Atomic Energy Commission and Computer Council has no linkages with defence related expertise. Nation wide computer education programme has not yet being started, which is an essential requirement of this age.

Few Options

21. For coping with the modern trends, Bangladesh may put more importance on its research and development activities immediately. Efforts should be made to make technology transfer more benefit for her. Whatever resources she has, maximum utilisation should be made with co-ordinated and integrated effort. Defence based industries and expertise should establish linkages with their counterparts in civilian sector, specially, installations controlled by Ministry of Science and Technology. Mass computer education programme should also be taken up to cope up with the imerging technologies of the next century.

22. As the future wars are likely to be with both hi-tech and low-tech equipment encompassing conventional and unconventional forms of war, so Bangladesh should be prepared for all these situations. The doctrine of armed forces should be modified so that it can immediately switch over from one to another. The officers and men should be trained accordingly to face the challenges of the 21st century.

CONCLUSION

23. Technology, science, and war have the intrinsic relationship between them. There were pre-scientific technologies in the early societies and today's modern and complex technology can not be understood without science. Man invented technology for war at the same time technology also pushed them towards war.

24. Alvin and Heidi Toffler identified the development of technology and warfare in three different waves or ages: agrarian age, industrial age, and information age. On the other hand Martin Van Creveld identified technological development through four different phases: age of tools, age of machines, age of systems, and age of automation. Development of technology and warfare can also be understood through case studies of various wars e.g. World War I, World War II, Indo China Wars, and Gulf War.

25. Technology is moving ahead as fast as possible and bringing new inventions. Technology has produced precision guided weapons, sophisticated stealth aircraft, satellite and cyber technologies, etc. Technology may even proceed further beyond our imagination. On the other hand capabilities of conventional weapon systems are also enhanced by computer based equipment eradicating human error.

26. The future wars can be of various forms. They may be utilized singly or blending of more then one forms. Niche wars are the covert operation with Special Forces before launching major operations. The space technology will be used for command, control, communication, and intelligence (C3I) purpose. The future war is likely to experience massive robotisation (uninhabited vehicles). Technology now allows the option of winning a war without firing a single shot.

27. Military thinkers now are in great dilemma to determine the shape of future wars. Tofflers believe that the technicians will fight in future wars with highly sophisticated weapons and computerized systems without destroying soldiers. On the other hand Martin Van Creveld believe that in future the function of war will not be change by the technology which is a matter of heart. After analyzing both the thoughts and various wars it can be visualized and predicted that future wars may be a blending of two thoughts.

28. Being an economically poor country, Bangladesh have failed to exploit the opportunity of industrial revolution and it is also going to miss the opportunity to exploit the technology of information age. Adequate measures should be taken so that it can cope up with the challenges of 21st century.

RECOMMENDATIONS

29. After detailed study on the subject following recommendations can be suggested:

a. Bangladesh should put adequate priority to its research and development activities immediately integrating defense and civilian experts' efforts for coping up with the technological developments.

b. Technology transfer to be carried out considering its benefit.

c. Mass computer education program to be taken to face the challenges of the next century.

d. Armed forces personnel should be trained based on modified doctrine to meet the future requirements.

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