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IMPACT OF TECHNOLOGY ON MODERN LIFE: A COLOSSUS IN DEFENCE AND SECURITY

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Abstract

Technology has always been the source of improved tools of warfare. In the contemporary age, systematic research in science has preconditioned and made feasible development of new technology and innovations for use by both military and civilians. This development has had effects both on the society and the nature of warfare. European nations used their superior technology to subjugate and colonize other nations aside from Waging wars among themselves. The present age (knowledge age) is unearthing an unprecedented revolution in technologies. These technologies have not only touched myriad activities in the civil field but have as well initiated a revolution in military affairs. In this paper, an attempt will be made to examine the impact of technology on modern life of which warfare is an integral part. Historical, descriptive and qualitative approaches were adopted as mode of analysis.

Key words – Technology, warfare, revolution, contemporary, military.

Introduction

Warfare over the centuries, has progressed from primitive wars between tribal societies to warfare between societies based on agrarian economy and further, to warfare between industrialized societies. Mankind has progressed successively from fighting with bows and arrows to rifles, guns tanks, aircraft and missiles. Scientific and technological advances though slow and gradual in 18th and 19th centuries, were dramatic in the 20th century. The development of iron clad ships in the 1860's , the machine gun in the 1890s, the manned aircraft and the tank in the 1920's, the aircraft carrier and radar in the 1930's – 1940 's and nuclear weapons in the 1940's – 1950's are some of the important signposts in the evolution of military technologies. Each of these developments had revolutionary effects on the conduct of warfare. Alvin and Heidi Toffler postulated that "the way we make war reflects the way we make wealth. "2 Technology has always been exploited to make wealth as well as to make war. The industrial revolution launched the second wave of historical change in the form and nature of warfare. Mass production was accompanied by raising of mass armies loyal to modern nation sates and mass production of weapons. Technology was put to use to make new tools of war. Wars in turn accelerated industrialization. The principle of standardization was applied to military training, organization and doctrine as well. Written orders replaced oral orders giving rise to the development of General staffs. Mechanization in warfare with new kinds of fire power vastly enlarged the scale of military operations. The aim of war was destruction of the enemy's main forces on the battlefield. The concepts of total war and destruction were seen in world wars I and II and they carried on to the cold war.

The advent of nuclear weapons in the 1940s – 1950's added the ultimate in destructive power. War scenarios between the North Atlantic Treaty organization (NATO) and Warsaw Pact forces envisaged the ultimate war of attrition. Thus, mass destruction came to play the same central role in doctrine as mass production did in economies. The evolution of all these concepts was a direct outcome of the impact of technology on modern life and warfare.

Positive Impact of Technology

Warfare: In the area of warfare, meaningful /impact has been made with the advent of military technology. The invention of gun, body armour, the development in ship building, steam engine, war canoes in the midst 19th century, brought about meaningful progress in the history of warfare. Furthermore, in the area of industrial revolution, major advances were made in military technology. These advances it should be noted were preconditioned by development in Applied Science. This development led to the emergence of weapons of unlimited destruction in the second half of the 20th century such as found in the area of:

Rocket Propelled grenade (PRG) – Coming to prominence shortly after World War II, the RPG is a shoulder – fired anti-tank weapons, firing rockets equipped with an explosive warhead. While the accuracy will not remain intact within a few hundred feet of firing, it is easily portable while still maintaining the same explosive force as a stick of dynamite upon impact (Speak, 2012). The RPG is largely popular in asymmetrical guerilla warfare spanning many countries, from Ireland to Chechnya. It is still a weapon of choice for many combatants in the 231st century. While industrialized countries such as the United Stated continues to wage war with cutting edge 21st century technology, the RPG remains highly useful for small contingencies of opposition forces, Ease of access coupled with simplicity of usage makes this weapon a preferred item to have in ones weapons cache on the battlefield.

Improved Explosive Devices (ILEDs) – The terminology of this weapon first used the 1970's when British forces were dealing with the Irish Republic Army insurgency , and their use of fertilizer and semtex to create improvised yet highly effective surprise traps for their foes. The use of ILED's in modern warfare shows the truly discriminate nature of battle-field technology in the 21st century. These devices can and do harm not only to military personnel, but to innocent civilians who make the fatal flaw of walking or driving over such devices.

Man-Protable Air – defense systems (MANPDs) - Development of the original surface –to-air missiles (SAMs) began in the 1940's Rapid advancement began though roughly two decades later in the 1960's. Modern usage of such technology can be seen with devices known as 'stingers', which are infrared -homing SAMs, developed by the United States.

Stringers were used combat in the early 1980's during the Cold War combat operations between the Soviet Union and Afghanistan. With the ability to hit an aircraft from nearly 16,000 feet, this weapon once again introduced a level of long-distance warfare where the enemy was simply seen as a target to strike from a distance , rather than a human being that was being destroyed by the hands of another human being (Baglole).

Reconnaissance Satellite –With early development dating back to the 1950's, the United States and Russia initially began trying to garner this technology in their great' space race'. This technological competition was exemplified the quest for global hegemony. In modern warfare, this technology provides never before access to high resolution photographs (IMINT), communications eavesdropping (SIGINT), as well as the ability to detect the launch of any missiles. This technology is popularly referred to as "spy satellites."

The topic of civil rights and the usefulness of SIGNT remains issue of high contention around the globe, with ardent proponents citing the need to eavesdrop on others to prevent potential terrorist plots, as well as those who believe this is a flagrant violation of individual rights that has taken "the desire to protect" a step too far.

Unmanned Aerial Vehicles (Uavs) – Functioned by a controlled navigator often far away from the battle field, UAV's saw their official indoctrination to the United states military in the early 1970's. Highly useful in a hazardous territory, a UAV can be used by its controllers to many UAV's are simply used as an "eye in the sky", there are other uses as well used specifically for combat.

Armed Drones – Coming to prominence only within the past two decades are missile – laden UAV's with such ominous names as "Reaper" and "Predator" drones, used to target and kill enemy targets of high value. Largely used by the United States in modern warfare scenarios these armed drones can be used to attack targets that are deemed too dangerous or inhospitable for soldiers to enter, talking 21st century combat to a new level of anonymity in the battlefield.

Transition to New kind war

The Gulf war is widely accepted as a transitional point which contained elements of the past i.e industrial age warfare or second wave form of warfare which stressed on mass destruction (e.g fleets of US aircraft carpet-bombed Iraqis in their bunkers, in villages, and everything was destroyed) and elements of a new kind of war. This new war was fought with precision weapons with minimal collateral damage and with vastly improved means of real-time information, surveillance and target acquisition. It was realized that destruction of the enemy's means of warfare, when fully developed, would be knowledge based information age warfare characterized by manoeuvre rather than attrition. Toffler described this as the Third wave form of warfare. Others have described this as warfare of the post-industrial age of post-modern age.

The Gulf war demonstrated a number of high-tech weapon systems, surveillance and target acquisition and command and control systems, Historical, man has always attempted to extend the range and lethality of his weapons. In the post-modern age, technology breakthroughs are being achieved with increasing of warfare can be characterized into a number of dominant trends, namely, integration, concentration of maximum fire power in smaller units and increasing transparency in the battlefield.

Extension of Range

As the range of weapons extended and their lethality improved, individuals and units became more dispread. The introduction of rifling in the 19th century extended the range and accuracy of individual weapons and artillery guns. This development forced individuals to go to the ground and disperse. Increased lethality and dispersion had direct effects on organization, tactics, doctrine, equipment, force mix and methods of command and controls. These changes, in turn, had effects on training, soldiers and leaders. There has been trend of an ever expanding battlefield; the battlefield has been emptying. In 1815, a division occupied about 5 km; today it may take up the space of 40 by 40 km or even more. By 2015,s it may require an area of over 150 by 150 km.

The Gulf war saw a quantum increase in dispersion and improvements in the ability to deliver long-range lethal fires. In August 1998, precision strikes by Tomahawk cruise missiles against terrorist camps in Sudan and Afghanistan were a true demonstration of this trend. These were either launched from submarines or ship cruising in the Arabian sea. The ultimate in range are the inter-continental ballistic missiles which can target almost any place on the globe. In our context of the battlefield milieu 2015, we would be having Multiple Rocket Launcher Systems Like smirch and Pinaca, Dual Purpose Improved Conventional Munitions (DIPCM), and Agni and Prithvi missile systems all of which confirm the trend towards increased lethality and dispersion. Increased ranges and enlarged dispersion create the requirement to communicate over greater distances, to manoeuvee more quickly and to use fire power form various type of platforms. This trend will place a greater premium on the commander's ability to make decision quickly, the staff's requirement to synchronize movements of greatly dispersed units, the junior commanders

responsibility to make on-the-post decisions and emphasis on cohesion of the force and quality of the individual solider.

Volume of Fire

The first automatic gun with heavy volume of fire was invented by an American, Hiram Maxim in 1884. Using a mechanism powered by energy released by the previous detonation, the rate of fire was 600 bullets per minute. 3 Richard Gatling, inventor of the Gatling machine gun averred that two Gatling were presumably enough to replace an entire infantry regiment, thus, reducing overall costs. 4 The machine gun with its heavy volume of fire reaped havoc in World War I. World War II saw massed artillery fires being brought down on the enemy to pulverize the enemy's defence and to cause maximum destruction to the enemy's assets. The Battle of El Alame/ in North Africa witnessed moving barrages of artillery fire behind which Allied troops advanced and which caused devastating effects on German forces in defence. The trend of bringing down a very volume of fire with improved effectiveness continued after world war II. Heavier calibers of guns, increased rates of fire and improved effectiveness of munitions changed the nature of the battlefield. The development of technology to locate the enemy's guns and mortars was aimed to counter the effects of the adversary's heavy volume of artillery fire.

These trends gave rise to the use of entrenchments, and filed fortifications in the battlefield. A deadly zone of fire was created between two opposing forces which converted the nature of warfare into a long drawn out slogging match or almost static warfare which was also termed as trench warfare. Development of tanks and infantry combat vehicles provided mobility, protection, survivability and added fire power. They could move through a battlefield dominated by fire and turn the defences. Ther Germans exploited the characteristics of tanks fully in the initial stages of World War II when they carried out their Blitzrieg campaigns.

The increasingly heavy volumes of fire produced their own dynamics in the realms of logistics. By 1918, during the great German and Allied offensives on the western front, there were batteries which fired as many as rounds per day. In the same period, consumption of infantry ammunition by the German Army had risen to three million rounds a month. Transportation of such vast quantities of ammunition was a formidable task. In the present context, the problems of logistics get highlighted when we consider the operations of our own strike Corps. The reach ad operations capability of any force gets directly affected by its logistics wherewithal.

Earlier, the lack of accuracy of various weapon systems was sought to be compensated by heavy volume of fire but the development of guided weapons added a new dimension to the battlefield. The purpose of guided weapons was to economies on the size of forces by substituting accuracy for saturation, and also to provide a method for combating targets (such as supersonic aircraft) that were too fast and manoeuvrable. Induction of various.

Kinds of missiles, laser-aimed weapons, laser target designators that guide artillery rounds and s development of smart and "brilliant" munitions confirms the trend towards precision fire. Whereas 300 conventional artillery rounds were required to achieve the desire effect at the target end, the same effect could be achieved by 30 rounds of improved conventional munitions and two to three rounds of precision guided munitions (PGMs). Thus, an increased inventory of the PGMs would reduce tremendously the logistics developments in the field of volume and precision of fire would have a direct bearing on organisation, tactics, equipment , planning factors and balance between combat elements and support services.

System Integration

In communications technology, computers, information systems, surveillances, and target acquisition systems have given rise to improved means of command and control to a commander. Systems integration engenders force multiplication and gives a high level of precision to the overall force, not just to individual or massed fires. Modern integrative technology, however, started with the telegraph and railroad, two systems that, when joined, revolutionized the warfare.

The British introduced railways and telegraph in India, not entirely with altruistic motives. They could move troops quickly from one trouble sport to the other to maintain their empire. The railway revolutionized the mobilization and transportation of armies, but without the telegraph, a command system which could use these forces intelligently would not have been forthcoming. Thus, it became possible to coordinate mass military action. By the end of the 19th century, the schlieffen plan of Germany to catch France off-guard and win a dramatic victory pre-supported the most detailed and precise use of rail and telegraph. Introduction of radio and aviation expanded the scope of integrative technology. Effort have always been directed towards obtaining a perfect real-time information system on which to base decisions and give directions. However,, perfect command, control and information system is the fog of war and uncertainties will decision within the intent of the higher commander – that is, decentralization not centralization --- will remain vital in the future battlefield milieu.

During the Gulf war, the use of links between scout and attack helicopters, between joint surveillance and Target Attack Radar Systems (JSTARS) and weapons delivery platforms, between forward observers and indirect fire systems produced a quantum leap in systems integration. The future battlefield will depend largely on digital data and voice and video communication. Communication has always played a very dominant role. Table 1 gives the rate of data transfer during various wars. The effect of the first three trends --- lethality and dispersion, volume of fire and accuracy, and systems integration are increasingly being clubbed together in reinforcing a fourth: the trend towards the ability of smaller units to create effects.

Transport

The invention of the internal combustion engine including those require for road vehicles, aircrafts, ships and railway locomotives has registered consider positive impact in the area of transport. The advent of the motor-car for instance, has profound impact, providing a measure of fast and comfortable individual mobility never previously possible. The advent of rail provides alternative means of transportation. With rail, goods can be conveyed in extra-ordinarily large volumes form their areas of production to the commercial zones. Sea liners which are larger are faster and more comfortable comparable to s public transport system by road. The development of aircraft and of course aeroplane made possible inter-continental movement in a matter of hours.

Negative Impact of Technology

The industrial technology has undoubtedly polluted our eco-system. The smoke emitted to the air due to industrial activities has mounted a monumental pressure on the Ozone-layer. This situation has cause great concern to scientists. It should be noted that the excessive heat experienced today in the atmosphere or the unusually high temperature recorded these days is due to the pressure on Ozone layer as masterminded by industrial pollution. The industrial chemicals has so polluted the water that both the water and sea food are unsafe for consumption. The people of Ogoni in rivers State are faced with this situation because of the activities of Shell-BP and other Oil Companies in River State. The industrial chemicals have also rendered the land in Ogoni unproductive and infertile for farming. This situation has brought untold hardship to the people of Ogoni Land. It is this situation that laid a suitable premise for the Ken Sarowiwa, to fight for the restoration of human rights.

The magnitude of unemployment prevalent in the world today is because of the emergence of technology which provides capital intensive technique of production as a better alternative to labour intensive technique of production. Machines have come to displace manual labour in the work environment. The ultimate result of this development is pervasive unemployment. Industrialization also led to child abuse exemplified by child labour and women abuse industrial employment. For example, this is the type of situation that is prevalent in some mines and factories in South Africa.

Conclusion

Agreeably, the conduct of warfare is changing; it still has some constant determinants. The root causes of war are people be they political leaders, nation states or non-state actors. They will continue to be involved in wars or conflict for fear, revenge, hatred, greed or other human emotions. Technology has changed the traditional thought processes on military effectiveness. Increasingly, modern armed forces are endevouring to obtain superiority over their enemies by deploying qualitative advanced technologies. Developments in imaging, remote sensing, night vision, sensors, precision guided munitions, stealth technology and digital communication and computer networks have provided avenues for adoption of new war fighting technologies with attendant revolutionary impact on people's lives.

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