ECONOMIC REPERCUSSIONS WITH THE TECHNOLOGICAL ADVANCEMENT IN LETHAL AUTONOMOUS WEAPONS SYSTEM (LAWS)

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ABSTRACT

Advancement in the field of technology has become ineluctably foreordained in every sphere. Over the years the conduct of war has transmuted dramatically only by the means of advancement and development in military technology. The year 1945 witnessed a dramatic invention that changed the entire perception of war. Since then there was no looking back. It won't take many years for the control of weapons to be taken away from the hands of humans. Lethal autonomous weapons system (LAWS) is one such ongoing significant development in the field of military technology. Approved by more than a dozen nations with no prevalence of laws in the international sphere, the countries haven't failed to continue with the development of LAWS. This advancement in military technology creates a divide between the higher income countries and the lower income countries leading to nothing but greater economic inequality. Arguendo, the nation with lack of resources will approve of developing the weapon, it will be merely because of the deterrence theory. Applying the principle of such advancement in the field of military technology will not only have an impact on the transformation of the warfare but also on the economic aspect of the nations developing the same. Economically, public expenditures in developing weapons are rarely transparent; hence, it abbreviates the overall transparency of any government. The question is if building weapons is incompatible with the principle of being a welfare state, why do governments such as those of India and Pakistan seem exuberant in developing weapons when the impact of the costs of developing the same- its maintenance, expansion and storage is unknown- also impairs the domestic ability to redress the rudimentary issues like poverty, unemployment, inequality and health? The intention of the paper is to analyze and examine that the road to such military technological advancement like the development of Lethal Autonomous Weapons System (a weapons system that once after activation, will not require further human

intervention to cull or engage targets) does not merely depend on scientific discoveries or the invention of new technologies but rather on the fact that it would bring 'international prestige' to the nations or political advantage by owning such a weapon. The paper also accentuates that with the development of such a technology and despite verbal dictum, international incentives will be partial towards the nations which will be building LAWS, particularly if a nation wishes to become one of the key players specially in the world's political and economic sphere. Lastly, such a development will amount to not just mere reduction in the world's economic capacity but also individual nation's capacity to bring economic development to its own population.

Keywords: Autonomous, Economics, Lethal, Technology, Weapons.

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1. INTRODUCTION

Autonomous Weapons, in simple words, refer to such a weapon system which does not require human intervention for operation. It just requires activation, after which all operations (selection and engagement of targets) are self regulating. One of the most imperative topics of discussion at the level of international fora during the past few years has been not only the exordium of LAWS but also its implementation. The advancement in military technology and the proliferation in the usage of dual-use technologies like Artificial intelligence, Machine Learning and Data Analytics has not only augmented the development of LAWS but also the deployment of the same worldwide, therefore in the near future, we will see a change – when the control of the weapons will be taken away from the hands of the humans. Advancement of such a technological and sophisticated defense system would ebb human involvement in warfare. Killer robots would come into action and they would be designed in a way that would facilitate them to take decisions by the use of a lethal force without any human in the decision-making loop. Furthermore with the deployment of the LAWS the world will witness a paradigm shift in the conduct of war.

The question is what is the justification to transfer the potential of taking decisions regarding life and death from the hands of humans to machines? Ethically, will the machines have the cognitive capability to identify and attack the targets? Without any such answer to the underlying questions, the search for prestige in the international community has begun and is given much more importance than the economic development in many emerging nations. Contradictorily, the developed nations want to develop LAWS to become a key player both economically and politically in the international community. The paper further analyzes the concept of the theory of deterrence, a key military strategy which will play a major role in the development of LAWS. The very idea of instilling fear of an attack amongst the prominent and the less prominent countries would even encourage the underdeveloped nations to put into use their scarce resources in the development of the LAWS, at the expense of a very high opportunity cost of other necessary developments. The paper focuses on why the nations who fail to cater the basic needs of their own people are even propagating and supporting to develop and deploy LAWS. Lastly, paper emphasizes that development of LAWS will create a huge reduction in the world's economic capacity.

2. MEANING OF LETHAL AUTONOMOUS WEAPONS SYSTEM (LAWS)

It has been more than seven decades that scientists have been researching on the nature of intelligence with the aim of developing artificial intelligence. Such use of artificial intelligence toward military application is considered to be inevitable. The progression of artificial intelligence in the military domain would contribute to the development of lethal autonomous weapons system (LAWS), the definition of which is yet not agreed upon by the nations worldwide [1]. However, the common parlance between all the definitions is that, that LAWS is considered to be such weapons which operates without any human intervention. Although, such weapons do not exist, technological advancement will ensure the development of such killer robots that can select, identify, attack and destroy targets independent of human intrusion in the near future [2].

3. RECENT DEVELOPMENTS IN THE LETHAL AUTONOMOUS WEAPONS SYSTEM (LAWS)

It won't take many years before the control of the weapons, as a method to be used in conducting war, is taken away from the hands of the humans. Albeit, the LAWS are not yet developed completely, still semi-autonomous weapons system have made its way to major parts of the Air Force of several countries. Some of the features like automated aiming, movement and enemy detection has already been developed and furthermore, has been adopted by several countries like United Kingdom, United States, Israel, China etc.

The demand for a unanimous decision on definition of LAWS has been a constant matter taken up in the international colloquy. Recent conferences have been held by the United Nations in the context of development of LAWS. Consequently, the conference witnessed support of over 30 countries in banning the development of the LAWS [3]. These 30 countries have called for complete prohibition on fully autonomous weapons. However, there are more than a dozen countries that are in favor of development of LAWS [4]. The question of discussion in the conference was whether the LAWS will at all be compatible with International Humanitarian Law, both legally and ethically.

However, what can be accentuated in the terms of the countries who favor for the development and deployment of LAWS is that such countries (Like United States, United Kingdom, France, Russia, Republic of Korea, Australia, Israel, and Turkey) are developed ones and majorly have adequate capacity and technological background to develop lethal weapons. The irony of the situation is that China being a developed nation and has a ranking of 6 in the perspective of Gross Domestic Product growth, and has both the resources and technological capacity yet it did not approve the development of LAWS merely on ethical grounds. Another country which did not favor the development of LAWS being on rank 7 [5] in the military spending when compared to the world is Jordan [considering that Jordan ranks 7 in the military spending it may be assumed that it has both the capacity of the resource and technological capacity]. Furthermore, it is also emphasized that as per the data and the facts available, majority of those countries which are against the development of LAWS do not have sufficient budget and are far behind in the technological capacity.

4. BARRIERS IN DEVELOPMENT DUE TO ADVANCEMENT IN MILITARY TECHNOLOGY

The technology has been evolving and there isn't an iota of doubt that it will not get evolved in the future. When the scientists are researching on LAWS throughout the world, sooner or later it will be developed and this would compromise on the development of the nations,

consequently, it would lead to the reduction in the world economic capacity. The reasons for such compromise on the development of the nations economically can be discussed as follows: *Firstly*, Lack of Developmental Discourse due to Deterrence Theory and *Secondly*, Compromise on the Nations Welfare by adopting the Non Value Oriented Policies and focusing on International Prestige.

4.1. Lack of Developmental Discourse due to Deterrence Theory

Metaphorically, when the nuclear weapons were established by the United States, it took nothing more than half the GDP of the nation's budget (which includes various nations including India and Pakistan) to develop the same and it happened merely because of deterrence. Deterrence is the action of discouraging an action or event by instilling fear of the consequences. [6] The consequence in the military development due to cold war was that the desideratum of the superpowers was to maintain the nuclear weapons as it would deter other countries from starting the attack.

A hefty amount of the military budget is spent on the development of such weapons which in this case would also include LAWS that would enhance the military of the country which in turn has a huge opportunity cost and could have been used in the other essential services including healthcare, education, poverty alleviation. Deterrence theory helps to answer this anomaly. When a nation instead of being concerned about its own welfare by increasing the amount spent on the level of development and eradicating poverty and criminality, the nation is spending the amount behind the enhancement and advancement of military technology, then it must be understood that the sole purpose is to improve its defense which will affright the other nations. An attack by the LAWS from a particular country cannot be controlled or stopped easily and thus would leave the attacked country in deep waters with little hope of rising back to the water level again provided that the country that is being attacked does not possess the same kinds of weapons. Thus deployment of such weapons by one particular country forms a chain and most other countries would eventually be in the process of developing them regardless of their economic strength or GDP. A bona-fide epitome of this chain reaction is what happened after the United States brought the nuclear warfare system into the world. Nuclear weapons were first developed by the United States during the Second World War when it attacked Hiroshima and Nagasaki by nuclear bombs leading to detrimental effects and a huge loss of humankind. The fear from this attack led most of the other countries to introduce nuclear weapons in their military as well and till date most of the countries in the world, whether developed or developing, have nuclear weapons in their armour stores. There's no iota of doubt that when LAWS are deployed, this will not be the case.

4.2. Compromise on the Nations Welfare by adopting the Non-Value Oriented Policies and Focusing on 'International Prestige'

Where one developed nation in the world is developing such advanced technology to deploy the weapons in military it will not be difficult to assume that the emerging nations will also look forward to develop the same in order to remain a key player in the international community. An example of the effect of international prestige argument can be discussed as follows. A nation like North Korea whose people are famished and do not have the basic literacy rate in this competitive global environment, the Government compelled its scarce resources to be used for the development of nuclear weapons in search of prestige in the international community. [7] It is these types of decisions taken by emerging nations that the national priorities are held with at the expense of the welfare of the public. When a question of non-value oriented policy arises, it will not differentiate between the development of either

nuclear weapons or LAWs. Thus it can be analyzed and interpreted that if a developed nation develops LAWs in a fully automated capacity, it will take no time for the emerging nations to take such non-value oriented policies which is not specifically for the welfare of the public instead it will only be for the 'prestige', 'recognition' and 'respect' in the International Community.

5. REPERCUSSIONS OF DEVELOPING LAWS ON ECONOMY

The research of LAWs exists only to the limitation of the controversial aspect in the field of ethical, legal, political and military implications. However, this section of the paper focuses on the implementation of economics as a reasoning to not develop or deploy LAWs because it would not be less than a third revolution after gunpowder and nuclear arms. Long gone are those days where the basis of a war, rather the Cold War, was the development and stock piling of nuclear weapons. Today, the tensions are quite alike, but the conduct of war has changed from nuclear weapons to automated killing machines, which can take lives based on software data. The pitfalls of such a cold like war is unforeseen, when one superpower equips its kitchen with automated knives, other nations are compelled to do the same, putting International Security at peril.

5.1. Assumptions

Some of the most significant macroeconomic objectives that a nation would face due to the development and deployment of lethal autonomous weapons include high opportunity cost, unemployment and the reduction in the economic capacity or the output loss. To further understand these concepts, the authors make the following assumptions:

1. The nations in future deploy killer robots instead of the armed forces (army, navy, air force) and the paramilitary forces.
2. The labor markets face a linear demand and supply curves of labor.
3. The goods market also face linear demand and supply curves.
4. Prices and wages are flexible.
5. Market forces act in such a way that we achieve temporary equilibrium.

5.2. Impact on Economy

The repercussions of the Development of dual use technologies like Lethal Autonomous Weapons System (LAWs) if at one point would have an advantage for the developing nations, it will not be as beneficial for the nations with lack of resources and lack of their capacity in all spheres in the International Community. Such repercussions can be discussed under the following heads of *structural unemployment*, *fall in national income and opportunity cost* for the nations. While the developed nations would have the beneficial advantage of recovering from such losses, it is a doubt whether the developing nations would have the same advantage and whether such nations would be able to pay equal attention to both the welfare and development of the nation.

5.2.1. Surge in Structural Unemployment

It is quite essential to understand that if the killer robots are produced in colossal amounts, large enough to take over the military of any country, the soldiers or the military officials will be uprooted from their very job and thus will endanger their unemployment. Unemployment, according to the Organization for Economic Co-operation and Development, is when persons above a specified age are not in paid employment or self-employment and are currently available for work during the reference period. Although we may not anticipate such development in the near future, it may not be that distant. Such a loss in job would result in structural unemployment [8]; equilibrium unemployment which arises due to changes in

patterns of demand and supply in the economy or due to transformation in technology. People made redundant in one part of economy cannot immediately take up jobs in other parts of the country. The following diagram explains the same:

Figure 1 Increase in Structural Unemployment

Nominal wage is plotted on the vertical axis and labor is plotted on the horizontal axis. At E^* level we see that the equilibrium level of labor and wage rate are L^* and W^* . The natural rate of unemployment, also known as equilibrium unemployment is $(b-E^*)$. The economy at the E^* level is stable in nature. However, as there would be a decrease in the demand of labor due to the surge in the deployment of killer robots, the natural rate of unemployment would increase and the demand curve for labor would shift leftwards. Also, as the economy will progressively become capital intensive and production process becomes automated, the supply of labor would also decrease, hence shifting the supply curve leftwards. The new temporary equilibrium is attained at E' with the new aggregate demand and aggregate supply of labor curves at AD_L' and AS_L' . The new level of labor employed will be $L^$ at a decreased wage rate $W^$. This type of unemployment due to change in technology is technological unemployment which is a type of structural unemployment. Due to this increase in the production of killer robots, more of the nation's funds would be utilized to buy raw materials for the same, or the maintenance and storage of the same. These killer robots, or lethal autonomous weapons do bring a sense (prestige) of security to the entire nation from anticipated attacks, however there will not be any productivity in terms of national output from the same. Also, there are various side effects of increased rates of unemployment which include the following:

1. Hysteresis: Higher rates of unemployment in the present cause the future rates of unemployment to be higher thus forming a never ending loop of increased unemployment.
2. Personal cost: cost of financing increases as there is loss of earnings, this may also result in low self esteem.
3. Loss in tax revenue: the government will lose out the tax revenue and it has to bear the cost of benefit provisions, healthcare, social services also increases.
4. Lower unemployment may result in people indulging more into criminal activities and vandalism.

5.2.2. Plunge in National Income

The past few decades have seen a pronounced change in the conduct of war, all over the world. Traditionally, wars were fought with arrows and spears and with the collective evolution in techniques and technology, man invented nuclear weapons which brought about a second revolution after gunpowder. We may bring in two concepts which explain the allocation of the military budget of the economy in this regard. The military personals are offered with pay and allowances in terms of wages or pensions respectively. These are either used in consuming goods or saving up which adds to the country's aggregate demand thus maintaining stability in the goods market. Since these disbursements are spread over a considerable period of time, it is categorized as a flow variable. However, the capital that is allocated in either procuring or building weapons is a stock variable [9], as the expenditure on these occurs at particular point of time. It must also be noted that the stock variables do not contribute in any way to increase the national output.

Now, if we consider the case of killer robots replacing the military, the stock variables will still be feasible since more and more money would be invested in producing or acquiring the weapons. However, the fact that is of greater concern is that the loss of jobs of military personnel would destabilize the economy's aggregate demand as the flow variables which consisted of wages and pensions contributing to the national output of an economy will cease to exist, leading to a shift of the aggregate demand curve leftwards. Again, the increasing amount of the budget which will now be spent on the procurement or development of military goods, which will reduce the amount of money available for any other sector by a greater amount due to the limited resources available, which will in turn result in the loss of supply, hence shifting the aggregate supply curve in the goods market leftwards. Hence, with the problem of unemployment, we will encounter an even bigger issue i.e. the fall in the national output [10] or the nominal GDP and the nations will also face a higher opportunity cost.

The fall in the national output can be explained from the following diagram:

Figure 2 Equilibrium in the goods market

Price is plotted on the vertical axis and national income or output is plotted on the horizontal axis. At E^* , the equilibrium price and quantity produced are P^* and Q^* . As the aggregate demand and the aggregate supply in the goods market decrease, the equilibrium shifts to E' and the new price and quantity are P' and Q' . We thus conclude that as the

unemployment in the economy increases, the aggregate demand falls which in turn forces the suppliers to reduce the supply leading to an overall loss in the national output. We must also understand that the loss in development of the nations due to an increased military budget and a compromise of welfare of the nation is a product of various factors like deterrence, prestige in international community, value oriented aspects which has been discussed in the later section of the article.

5.2.3. Opportunity Cost and Compromise on Development

The “Chain Reaction” which leads the developing and the underdeveloped nations to deploy autonomous weapons also gives rise to certain unforeseen problems. For such nations, the scarcity of resources and the use of scarce resources to develop weapons would have a very high ‘opportunity cost’. Opportunity cost is defined as the value of next best alternative which is forgone in order to consume the good in question. Instead of squandering the resources and money on the deployment of LAWS, the developing and the underdeveloped countries have other significant aspects which they need to consider. The money which would be used to procure or develop arms (in this case, killer robots) could have been easily used to drive down poverty, increase the standard of living, develop better health schemes for the people or could have been used to alleviate illiteracy. The difference might be that some countries have a higher opportunity cost in terms of poverty whereas some countries might have a higher opportunity cost in terms of health and education. Thus the coerced proclivity towards automation and introduction of dual use technologies in military might leave the developing countries in dire straits since the problems they already have in their economy just gets aggrandized due to lack of concentration towards the welfare of the state and the limited resources which include land, labor and capital to eradicate them. In a country like India which is still developing and where more than half of the population faces persisting poverty, the allocation of more than 2% of their GDP to armed forces (army, navy and air force) and paramilitary forces is not justifiable to a certain extent.

6. CONCLUSION

At a time when the globalized world is moving towards non-proliferation of nuclear weapons and nuclear disarmament, developing LAWS albeit seems to be a better option for the developed countries, however, we may say that deployment of LAWS in the military would affect the world gregariously, politically, culturally, economically and ethically. It won’t take a lot of time when the international community would be affected after most of the nations have developed LAWS and ergo, the world community will ineluctably take a step backwards in disarmament of LAWS.

In the 21st century, the world community focuses more on the international prestige, respect and recognition. This becomes one of the valid and important reasons wherein the emerging nations who do not have the capacity to develop military technology and lack resources per se additionally goes ahead with the contributions in the development of such technology at the expense of the welfare of its population. This reduces not only the development of the nation per se but also it contributes towards the lack of development in the world’s economic capacity. It should be considered that if a nation like United States has the military expenditure of 3.1%, at the same time without compromising on the welfare of the public it contributes 8% of the GDP towards the health of the public. However, if we consider the same for India, the military expenditure of which is more than 2%, compromising not only the health, poverty, education but also development in all aspects. Thereby, it can be said that the pace of growth for all the nations are different and varied. If developing such technologies would help the developed nations, concurrently, it would be a mere shattering factor for the emerging nations leading to not only their crisis in development but also in the reduction of

the world's economic capacity. These quandaries would arise in the short run only. Most of the developed nations would come out of these tough situations in the long run with the help of planned policies and the efforts of the government. However, it would be arduous for the emerging nations to rescue itself from such a situational crisis.

Banning of such development of LAWs is necessary not only because they possess totally unacceptable risks and jeopardize, but also because the current situation around the world does not give rise to stable and effective global political, legal and economical order, one where the nations tackle problems like terrorism, poverty, education, health and disease effectively facing an interdependent world.

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