A Short Historical Perspective on the Evolution of Logistics and its Implications for Globalization

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Abstract

This work reviews a few significant historical stages of economic globalization, and shows how the logistics of resources and production has influenced the development of the human society. Historically, logistics has played a fundamental role in the global development of human society by means of the five action vectors: military, economic, political, religious and cultural. In any historical stage but more significantly nowadays, a strong community, a strong state, or a strong alliance needs a clear framework for the operation of the logistics systems, and not lastly, adequate levers for the implementation of these systems. The globalization – logistics paradigm has always had significant effects on the order and ordering of society. An important factor, which has influenced the development of Logistics science, has been the development of technology, and consequently its use on the local, zonal and global levels. The development of society has and is based on the ability of the decision-making factor to predict or foresee the needs of society but also on the capacity to deliver the products, which would satisfy these needs. The systems, technologies and logistics management become more and more important in today's global world which is more and more interconnected and interdependent.

Key words: *development, economy, globalization, information, logistics, management, resources, technology, transport*

Introduction

The globalization of human society in the last century has favoured the development of the economic vector, which has led to an accelerated globalization of the economy. Economically speaking, globalization has

been supported by the removal of certain barriers to zonal and global trade, and has been favoured by the reduction of the costs of transportation, communication and coordination. An important factor which has influenced the globalization of the economy has been the gradual shift in the structure of the production process from one of centralization into unitary production centers to its separation into different production centers and in different countries, thus increasing the possibility of manufacturing the product using several components, which has meant an increase of the selling rate in different areas.

This type of production management has imposed a development on the commercial exchange flow, which has required a change of logistics strategies, and in its first phase, has especially influenced the strategy, manners and logistics of transportation.

In this globalization of economy, transportation plays a key-role in connecting the different import and respectively export markets, as well as in connecting the vertically disaggregated components of the production systems which can be spread all over the world. Lastly, we can say that transportation operations determine the efficiency of the movement of goods.

Technical progress in the last few centuries, as well as the development of management principles have improved the effectiveness of the movement of goods, rapidness of the deliveries, quality of the services, and have succeeded in making the operational costs, use of the facilities and energy resources more effective. However, transportation has continued and continues to have a crucial place in the logistical organization of the economy. As a consequence of these factors, the direct investments in logistics have rapidly increased, and lately the rate of increase in utility-oriented investments (electricity, gas, water) in logistics, communications and transportation has significantly increased.

Under the circumstances of the globalized economy of today's world, and in an interconnected and interdependent society, a strong and reliable economic system needs, in order to work, a clear logistics framework, and consequently needs the implementation of an adequate transportation system, together with the required techniques and technology which could effectively connect all the production procedures.

Further to the globalization of the economy, a scientific research system on economic relations and their evolution has developed, which has made research in the strategic resources management field become more and more important. Although the USA is the main support of the NATO economy for supporting the operations in Iraq and Afghanistan, a strategic

resources management[6] has not yet been achieved at the level of the countries participating in these actions.

We can say that, globally, as far as the logistics techniques are concerned, all the other nations try to approach and implement the global logistical techniques of the USA. Strategically, the military long-term advantage shall be reduced for NATO if the issue of unifying the resources management system isn't solved, by means of which the USA must itself learn how to manage its dependencies on resources, and at the same time be able to transmit and calibrate the strategies with the other members of the Alliance.

The best example of changing the security and collaboration paradigms within the alliances nowadays is the IT war. This new type of war has caused new instruments and procedures to emerge, by means of which such a war could be waged. All types of threats and IT conflicts such as the central network war or others of this type, led and coordinated by means of information technology, have generated searches for finding a new and more effective system, such as the integrated Command and Control system. The research, which has commenced in order to find a system of systems, has generated a new revolution in the military sciences. In its turn, this revolution has caused to change almost entirely the view and assessment of national security.

All the states of the world are trying to redefine security strategies, considering the fact that the globalization of today's world has generated a paradigm shift regarding the means and resources of a state or alliance; therefore, they can allow for the implementation of a new model for what we define as national security.[7]

We believe that the most important thing which must occur in the military system is that all these changes and ramifications must be understood by both those who analyze and elaborate the strategic plans, and the militaries on the battlefield. Moreover, these changes generate new pre-conflict and post-conflict attitudes, so that it is essential that they are understood by both the civil and military authorities. It can be said that, at the moment, the armed forces are confronted with the fifth dimension of the war, information, which determines the occurrence of a new plan in which the actions are taking place, i.e. the IT area, in addition to the terrestrial, maritime, aerial and spatial battles.

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[6] Major Christine M. Schverak, *The Globalization of Military Logistics*, 2010, http://www.almc.army.mil/alog/issues/May-June10/spectrum_globe_logisitics.html

[7] Hester, Jesse Stuart, *A technique for determining viable military logistics support alternatives* (PHD dissertation in 2009 at the School of Aerospace Engineering Georgia Institute of Technology)

In this new type of war, the IT war, one must consider the globalization phenomenon, a phenomenon which takes place and is developed by means of its five vectors, military, economic, political, religious and cultural, and consequently, no matter which national security strategies are developed or will be developed, one must simultaneously consider and take into account, in the decisions to be made, the military, economic, political, religious and cultural aspects of the community, state and geographical area in question.

Globalization, as a natural social phenomenon in development of human society, has always generated normal and exceptional forces in the different stages of humanity's development. Due to today's interconnected and interdependent globalized world, the normal forces but especially the exceptional forces have generated significant and often unpredicted effects all over the world when the paradigm changes induced by globalization have changed perceptions, and have influenced the attitudes towards a certain situation both related to people and businesses, and to countries. Individuals, communities, countries and alliances depend on each other, and are connected by in complex ways of information transmission and assimilation.

Thomas Friedman, an American economist, has described in his book, *The World is Flat,* ten factors which he considered as exceptional events, the so-called catalysts of globalization. In order to exemplify the significant effects of the paradigm changes due to the exceptional forces, we shall enumerate two of these significant moments which are more recent, namely the fall of the Berlin Wall, and the emergence, in 1995, of the Netscape network, which was the starting point of the internet network, and has made possible the fast and real-time IT access for the common individual.

We can say that the exceptional social event of the emergence, development and connection of the individual to the internet is the most complex and extended social phenomenon of globalization in the twentieth century, a phenomenon which has induced profound paradigm changes in the way of transmitting and assimilating knowledge both within the social communities, and at the global level.

Use of the Internet in everyday life has produced two major changes in society, one in terms of the globalization of social information produced by the enormous increase in the amount of information available to the common people and second, the explosion in demand for technological development of the cable networks and technology for internet use.

If at first analysis it looks like this information boom has been developed only by the economic vector of globalization, it should be noted that other active drivers of globalization, namely the military and the political ones, participated fully in the development of the Internet.

The theory of the five vectors of the development of globalization says that the social phenomena is using all five vectors simultaneously and that is how today this theory is confirmed by using the maximum efficiency of this type of channel of information, religious and cultural vector. It is common knowledge in any analysis that is done, this huge amount of information and data from any field, which is a handy source to everyone that has an internet connection, gives both the possibility of collection and dissemination of the communication strategies for any of the five vectors.

The development of human society in an accelerated rhythm based on the access to information it is beneficial in many ways, but it turned out that in the last two decades in terms of decision making and the establishment of group interests, or national community it has become more and more difficult. This moment of decision-making as it especially refers to both to the leaders of communities and alliances and the auxiliary device that they have at their disposal puts before them a variety of industries and requirements of companies.

Resource management and the delivery of products on time, which are not always goods, are the key success factors for organizations and the purpose of their work for decision-makers. The ability to predict and influence customer needs, the ability to predict and foresee the needs of beneficiaries are highly important features of organizational management and they are directly related to the ability to obtain the delivery of resources in the right place at the right time.

If we analyze the period of the 80s and early 90s, before the advent of the Internet, we remark that organizations and companies could more easily obtain advantages over competitors, requiring only implementation of a data management technology and fine-tuned production, a process which had as a result the computerization of production and an important breakthrough in technology over the competitor. Analyzing in comparison the struggle for supremacy in every field of industry, nowadays advantages cannot be created over the competition if some of the resources are not focused on research and uptake of new technologies. In today's globalized world, the benefits that any organization wishes to have over the other competitors, involve the latest technology, and at the same time, the implementation of a management of information to assure an innovative

breakthrough, and to provide technical information that is able to achieve an increase in efficiency and effectiveness in the activities of the organization.

The globalization of human society as a social phenomenon that occurred together with the evolution of human society and increases with it, was based since the beginning on a system of transmission of information. The key element in both human society and globalization is the logistic system through which both the transfer and implementation of the industry itself was achieved.

The global development of mankind in the last 5,000 years has highlighted the fact that logistics played a crucial role for globalizing forces. The most important moment from antiquity which was of fundamented importance to logistics, was the building of the pyramids[1] in ancient Egypt.

Thus it is noticed that the transition from one historical stage to another, the entering in the new social and economic era they are over time punctuated by brilliant logistics solutions. Another example that I have approached in this article as an arch over the time with the logistics of ancient Egypt, and which demonstrates the fundamental progress that is based on logistics, both in inventing the cargo shipping container and creating a global service of products, inventions that belong to the twentieth century. Both logistics for the transport of materials and of construction from ancient Egypt as well as the shipping container can now be considered as integral parts of globalization.

Logistics as an absolutely necessary component in the development of human society has been fully proven since ancient times and as an example is the period of 2700 BC which can be considered a turning point in the development of logistics, handling technologies for materials and last but not least the building systems that were used to build pyramids. Shaped stone blocks well thought and weighing tens of tonnes they were prepared on several sites, then transported and assembled on the site dedicated to the construction.

To build the Great Pyramid of Giza with a height of 146 m and whose weight is calculated at 6 million tonnes, ancient Egyptians needed transport equipment, that we can call sophisticated for that time, equipment that had to be able to move massive stone blocks that then had to be put in the established place for them in the construction. Analyzing it from the logistical point of view, these constructions of the ancient Egypt, we can not fully explain how it could achieve this level of precision, we have to consider the accomplishments of the people of those times were made with lifting technology, means of transport and the equipment so advanced as the age of 2700 BC allowed.

Another important aspect of globalization is the transformation and revolutionizing of shipping by Greek[1] ships. This revolution of the transport by ancient Greeks was based on the structure of Phoenician ships but due to increased transport capacity for military technology, troops and goods it lead Greek ships to develop the bases of a new type of intercontinental trade. Revolutionary inventions in shipbuilding technologies have created the foundation for rapid travel over seas, they have created the basis for the transport of materials and people and, they developed the base in the creation of a very good logistics system for supplying the mobile battlefields.

This logistics system that served the theaters of operations inevitably created an independent auxiliary system that served various military campaigns. Alexander the Great was the first great leader who was able to use these logistics capabilities in an efficient way and he undertook campaigns with his troops laying the basis of the greatest empire known, an empire that using the military vector and having the economic power of the other four vectors, political, religious and cultural, he had achieved the first globalization known thus uniting Europe with Africa, with the Middle East to the borders of the Far East. The development of the logistics in step with the development of human society shows that the globalization of the demand for resources it has influenced the networking systems within the company.

Significantly from this point of view is the period of 700 AD when a revolution of the logistics supplying systems was generated by the building Mezquita mosque. At that time it had to identify manufacturers for all 846 pillars of the construction in all the areas of the Islamic empire and then to think about logistics and transportation systems to bring them to Spain.

The construction that was built in Cordoba it was started during the reign of Umayyad Caliph of Cordoba in 756 and is considered today the largest mosque in Europe. The logistic revolution component that was generated by this project is the coordination production sites for the sustaining pillars, management of the shipping and land operations so that the 846 pillars of building to arrive in the right time from all parts of the Islamic empire.

Military and economic expansion increased the boundaries of the known world and the globalization phenomena has had evolutions in all kinds of logistic systems. Thus, around 1200 the Hanseatic[1] League was founded, a system of international cooperation in maritime transport and land transport, which generated one of the major international networks of intercontinental transport. The German city of Hamburg in 1188 became the

basis for the Hanseatic League, which allowed that starting from the North Sea to be able to make maritime transport and travel safer, more coordinated and thus could find a way to more effectively represent the interests of business and economics abroad.

At that time, management and transport logistics were so well developed that they allowed the transport of over 200,000 beef skins in a single transport and by a single cargo ship. Thus the trade made by the Hanseatic League extended from the North Sea to the North of Africa and by the Mediterranean Sea to all the Black Sea shores. Analyzing the situation from that period we can say that from the point of view of modern systems of trade, the cross-border trade of the Hanseatic League shared important similarities with the European Union of today.

Another significant moment in the development of logistics is the sixteenth century, a century in which European postal service increases progressively across the continent, and together with the expansion of English and Spanish empires, the first naval posting system develops. Following an agreement with Philip of Burgundy, Franz von Taxis organizes the first postal service with transit terms strictly defined in Europe. The letters were delivered in locations such as Paris, Ghent, Spain and the imperial court in Vienna promptly and, given the infrastructure and political fragmentation from those times generated by the multitude of small existing principalities the post yet reached its destination with little delay

The industrial revolution which has developed since the 1800s, led among other great achievements to the discovery of new means of transport by road and rail. These findings have importance for the expansion of logistics that had to cope with a new kind of management of new technologies and new means of transport, much faster, more efficient and more complex. Using the steam engine, the invention of vehicles, railways and ships and also the discovery of crude oil opened a new economic era that generated and made to develop new missions, tools and opportunities for logistics.

During World War I, the warring states from each camp separately, were put in a position to work together which required the military logistics systems specific to each army to interconnect and to find ways of communication and management. Real theaters of operations and the lengthening of the conflict have made the military logistics system from that period become a vital link that sustained the supply network of the troops with food, weapons, medicine and equipment.

Lessons learned by the armed forces involved in World War One showed that military logistics is a key factor in military alliances, in the

battles developed far away from principal military bases and in battles in other geographical areas.

Post conflict analyses have shown the need to redefine logistics management and with the beginning of preparations for the Second World War, which was predicted to be more complex and with a longer duration, each state, according to its organizational capabilities, has transferred the methods of military logistics business to the private sector. In this way, once with the beginning of the Second World War the warring states have transferred a large part from the military logistics concepts[2] to the world of private business definitively.

The invention in 1956 of the maritime containers for transport, an event at that time that was minor in appearance, generated by its use on a large scale, a structural revolution and modernization of world trade. Rapid interconnection of producers, consumers and ultimately the global markets, it has created a boom in the international flow of raw materials and goods. The American Malcom P. McLean managed by inventing the maritime container to influence and impose major changes in the terms and conditions of production in almost all industries in all parts of the globe. The indirect result of globalization in the chain logistics management of resources, manufacturing, marketplace, it was the change of the demands and of people's consumption habits.

The container for shipping and its applications for road and air transport further developed, demonstrates to us that its invention can be part of the category of important significant moments in the development of the globalization phenomena. After nearly 60 years from the launch of container shipping on the market, it continues to provide economic development and good business for ports and port cities, for states and for new commercial and industrial areas that are developing and they are thus participating in the commercial globalization and in the increase of markets. The direct result of economic globalization is that products from all over the world can be bought and sold to the people at reasonable prices.

Since the 70s the global economic development has generated the necessity of some changes in the logistics strategies of multinational companies. The new concept was developed and introduced in the market at Toyota Motor Company by Taiichi Ohno who sought to effectively interconnect logistics to other operational functions. The resultes of analysis and his research has led to the application of the logistics concept: Kanban or on-time (JIT or just-in-time). This concept focuses specifically on the interconnecting of the purchasing party directly with other links in the chain.

The accentuated globalization of the economy has led since the '90s to a faster transfer of technology and knowledge in almost all industries, which has made the reaction of markets to be faster and more oriented from the consumer to the manufacturer. Development continues together with the evolution of consumer society of the logistics management it has imposed in coordinating systems of the activities of companies of two new concepts who came to meet the demands of new social realities. These logistics concepts focus mainly on distribution and they stood at the base of both technologies on the producer's quick response to market stimuli response (QR or quik response) and technologies related to the efficient consumer response (ECR or efficient consumer response). These two concepts have had a major impact on logistics and made them to be applied in many companies which were able to control or impose on global markets by analyzing what can be sold on retail and what can be sold on wholesale, where and when to sell and, last but not least, to follow their stocks and the opportunity of refreshing them.

As a result of the use of these concepts and of related technologies to logistics, both production and distribution centers have shifted to more efficient organization of products and goods instead of dealing with their storage. New approach and refocus of logistics in company activities has enabled them to work their responses to market stimuli, that sometimes may be involved in the development of these markets and especially to establish a more efficient supply of goods.

In conclusion, we can say that nowadays we have to look with maximum attention to the entire logistics chain from the producer to the seller until the final buyer in today's globalized world, interconnected and interdependent. The concept of supply chain management has become an important component of logistics. Supply chain management is a complex concept that assembles all the necessary economic links and that, since the 80s has continually changed its meaning and importance so that organizational management systems gives it an important position.

Today, in the twenty-first century, the term is commonly used as a way to fully express the key processes of trade and economy as a whole concept that has direct and indirect logistics links to areas of semi-production to areas where the final products are assembled, and it ends with global areas in which the products are distributed or sold. Logistics management study shows that resources of the management systems and the management systems form an interactive concept that are based on vectors of the globalization phenomena creating a complex system involving

naturally and necessarily simultaneous monitoring of all targets of the universal chain of human society.

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