

Celebration of the 5th Centenary of Fernão de Magalhães's circumnavigation voyage

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Abstract: *In this article we intend to demonstrate the importance of the circumnavigation voyage for the advancement of science and technology in the 16th century, the research and innovation projects carried out within the scope of the 5th Centenary celebrations, project the “Magalhães feat in the future, as pillars of a new international agenda” and to compare the globalization produced at the time of the Discoveries with globalization as a modern phenomenon that emerged with the evolution of the new means of communication.*

Key-Words: *Circumnavigation of Fernão Magalhães, Celebration of the 5th centenary, Impacts of the voyage in science and technology, I&I Projects, Globalization of Society.*

I. Introduction

Recently, the 500th anniversary of Fernão Magalhães circumnavigation was celebrated, this trip marked humanity as it was the first to circle the world, something that at the time was considered impossible since no one had proven that both sides of the globe were connected. This trip contributed to scientific advances in such a way that a second trip was carried out and the

basis for globalization began, some of the scientific areas that progressed were Nautical, Astronomy, Geography, Cartography, Meteorology and Mathematics [8].

Currently, we can observe that globalization has evolved in such a way that the world is interconnected by other forms of communication, some of which we use daily, for example, social networks.

II. Contributions of the Portuguese Science

Before the trip was carried out, there was a boost in the technological areas of naval means such as the caravel and the means of orientation at sea such as the nautical astrolabe. Abraham Zacuto was a very important man for this impetus, because in addition to being named Astronomer Royal he was also involved in the improvement of the astrolabe and later being attributed to him the construction of the first metallic astrolabe. This gentleman even published his first astronomical book in Hebrew, which included Zacuto's tables. These tables showed the movements of the stars, making it possible to predict the time and astronomical coordinates. With the use of these

coordinates, it was possible to determine the position of the stars, their inclination, and other relevant data [1].

We were still able to observe the use of the magnetic compass mainly for the definition of maritime routes, verifying that despite the lack of detailed maps at the time, there were still uncertainties in latitude and longitude. Ending the period before the trip we can include that the Portuguese were one of the few countries that practiced the calculation between the angle of the compass needle and the geographic meridian, they also took the opportunity to document everything in manuscripts that would be important for future generations.

After the successful completion of the trip, those who carried it out decided to spread their discoveries with those responsible, in addition to influencing the cultivation of the globalization environment, they also developed the sciences whose trip was related to.

In the future there was a great advance in medicine, botany, astronomy, mathematics, physics, oceanography and nautical [2]. One of the main theories developed at this time was the heliocentrism theory [4] [9].

III. Globalization

Globalization is a term used to describe the act of establishing communication between two or more individuals over a long distance. The term globalization originated in the Age of Discovery and found its great impulse with the circumnavigation voyage of Fernão de Magalhães. Globalization is still identified as the act of interaction with either economic, social, cultural or political purpose.

The trip established the foundations of globalization as it demonstrated that it was possible to interconnect the world [11]. For some time now, globalization has shown itself to be an ally to the human being, since it is with the exercise of it that cooperation between various peoples is promoted, facing several difficult and crucial challenges, such as climate change, air pollution and overfishing, of the ocean.

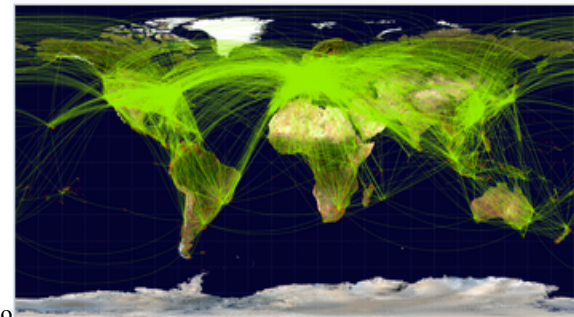
Two of the main factors in the interconnection between people and the continuous presence of the evolution of globalization are the internet and air/sea routes, as can be seen in both figures below.

Figure 1 – Map of the maritime internet cables network



Source:https://pt.wikipedia.org/wiki/Globaliza%C3%A7%C3%A3o#Teorias_da_Globaliza%C3%A7%C3%A3o

Figure2– Map of world commercial air routes



Source:https://pt.wikipedia.org/wiki/Globaliza%C3%A7%C3%A3o#Teorias_da_Globaliza%C3%A7%C3%A3o

IV. UNESCO Memory of the world application

In November 2021, Portugal, together with Spain, submitted an application to permanently remind the world of the way in which a group of sailors, scientists and experts came together to program this special trip. The application consists of 15 documents including 1 diary, 1 indirect report and 13 national archives from both countries. These 2 countries consider this trip to be of such importance that they submitted the candidacy in order to elevate the feat, as it was revolutionary for humanity and science [6].

V. Research and Innovation Projects

In 2020 Portugal prepared an investment of 2.3 million that were divided into 8 projects: i) application of artificial intelligence in wave forecast; ii) the development of geochemical sensors for monitoring the magma movement at depth; iii) a exploration of circumambulation expedition data Antarctic navigation to better understand the time; iv) monitoring and resource management fisheries along the Atlantic route; v) the investigation of snake toxins from the Amazon; vi) creation of marine nanotechnological anti-corrosive coatings; vii) pollination management and sustainable agriculture; viii) human genetics, history and culture in circumnavigation space [3].

VI. Globalization of Society

Fernão de Magalhães's voyage is a reference in the globalization process, bringing peoples, cultures, and knowledge closer together. In 1519, globalization wasn't so present as today because most interactions took place between people from nearby countries. In order to have interactions between people from distant countries, it was necessary to travel long distances, something that at that time was dangerous due to the lack of security and the easy spread of diseases.

It is currently possible to establish communication with anyone on the opposite side of the world through a click on a browser as we are connected by a large communications network, the Internet. This fifth centenary served to demonstrate the impact that this trip brought to the world, to the scientific and technological revolution, and to compare the globalization produced at the time of the Discoveries with globalization as a modern phenomenon that emerged with the evolution of new means of communication.

These new means of communication that appeared were telegraphy, telephone, television, radio, cell phone, computers. social networks (WhatsApp, Facebook, Intagran, ...) newspapers, magazines, cinema, etc. When comparing these media with those that existed at the time the trip took place, letters and messengers, we recognize that they did not exist the technology and

knowledge necessary to develop these means [5][10].

VII. Conclusion

Finally, we can say that with the commemoration of another centenary of this trip, the enormous progress that has brought and continues to bring to humanity and to the scientific community, in the various areas and its repercussions are still being felt as investments in research and innovation projects have not yet ended.

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