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Abstracts & speaker information

Quantifying the Roman Transport Networks: Understanding the costs of Roman commerce using innovative GIS-based applications for archaeology

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Speaker information

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Trade and Transport in the Roman Empire; Classical Archaeology; Ancient Economy

Several methodological approaches are used to these days that also suggest how Roman transport works. This work provides a view of the use of infrastructures and the simulations of the movement as indispensable to know the benefits and shortcomings of the transport system created in Roman times. A thorough analysis of each distribution models set (both temporary and costs) provides valuable information for understanding the mechanisms of the Roman economy and society. It is therefore obvious that the combination of all of the approaches (archaeological material, ancient sources, network simulation...) should allow obtaining a more accurate perspective of the Roman economy, especially in matters of the movement of goods.

As will be seen during the presentation of this project, the knowledge of infrastructure is essential to obtain a more accurate knowledge of good's transportation. This project has taken into account while analyzing the whole infrastructure of roads which existed in Roman times, whether through land environment, river or sea. The main geographical focus of this project is the NE of Hispania. It was necessary expend a significant part of this project to the gathering, documentation, analysis and digitization of Roman communications with high precision. For this reason, maps and aerial photos (1:5000 scale) have been documented and digitalized using them as the base which has allowed a precise adaptation to the territory. With the aim of using these methodology in a much broader geographic frame, the entire Iberian Peninsula, Italy and Britain were analyzed with less detailed transport networks discovering a series of very interesting patterns.

With this digital network, a set of constant values has been used to calculate the costs and time needed for transport. In fact, this project has broadly coincided with theories about the transport already undertaken by Yeo (1946) and followed by other researchers as Finley (1973) or Duncan Jones (1973) updating its data due to new contributions that have been documented over the years. The ancient sources, the archaeology and current experimenting had allowed us to approach with much reliability to the knowledge of the ancient transport. The use of the transportation network studied previously as a basis and the costs and movement speed established for each form of transport allows making different calculations about the business dynamics in this region.

Therefore, it has been possible to observe how the construction of a complex communication network, especially based on the creation of land routes, meant an important element for the integration of new territories to the Rome's Provincial model.

This model offers a simulation of possible costs and time needed to transport certain goods from a particular spot of this territory to another (and even the entire network). Without losing perspective on the data type that this project can deliver, this model mainly shows how the optimal movement of goods ought to operate at a cost and transport time level. These results plus the connections that are among the archaeological and historical data indicate how the commercial distribution partly followed similar criteria to a market system. The main criterion for this concept comes from the market system named 'minimax', developed by Zipf (1949) and applied to economic costs. Translated to the level of this archaeological project, this means that the amount of archaeological material should be higher where transport costs were lower, while it should also be greater in those closest areas (in terms of cost, time or distance) to the production places. The combination of these results on the transport costs along with the results on the time travel allows the complementary visualization of the communications structure.

We have also analyzed the transport network rating the Centrality Degree (concept of Network Analysis) of each urban settlement in this territory. The assessment of each node of the network depends on its location within the network and the number of routes that relate to them. The use of these premises as a system for reflection on communications becomes widespread thanks to the British geographers of the 70's as Dicks (1972). With some necessary methodological changes, we have been able to categorize with absolute values the accessibility rate of the different Catalonian Roman towns. This assessment has been the tool to evaluate the levels of mobility which the infrastructures allowed to each of the Roman cities of this region.

To demonstrate the usefulness of the simulation model created in this study, the Catalonian results has been linked with three case studies. The distribution of Dressel 20 amphorae have been analysed first from the documentation of its label and a sample of their presence in this territory. Secondly, we have analysed the data of coins located in different urban areas from different geographical contexts. Finally, the possible distribution of intangible goods such as wheat has been analysed compared to the archaeobotanical and archaeological record from different sites.

Finally, the ability to see graphically and numeral those costs values which until now they could only be guessed, can open new perspectives and justifications to the speeches made on the work done until today. In fact, the comparison between these results and the analysis of archaeological and historical interpretations should not invalidate the final information but in many cases they should complement each other, clarifying and offering more elements for a global vision.

References

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