# Management of Large Archaeological Projects in a Competitive Environment: The French Case

*Pascal Depaepe, Isabelle Kerouanton, Gilles Prilaux, Marc Talon*

***Abstract:***
*In France, the development of preventive archaeology has provided a framework for systematic archaeological investigation prior to the building of large scale infrastructures such as motorways, rail tracks, airports, etc. Since 2002, preventive excavations have been put out to tender with the contractor being able to contract a company of his choice after the archaeological project has been vetted by the government. Here we will compare two large scale archaeology projects, one having been put out to tender, the other not.*

***Keywords:*** *Preventive archaeology, Large archaeological operations, Excavation costs, Geophysics prospection*

***Résúme***
*Le développement de l'archéologie préventive française a fourni un cadre à des recherches systématiques préalables aux grands travaux d'aménagement du territoire comme les autoroutes, les lignes ferroviaires, les aéroports, etc. Depuis 2002, les fouilles préventives sont mises en adjudication, l'aménageur pouvant contracter avec une entreprise de son choix après validation du projet archéologique par l'état. Nous comparons ici deux grands projets archéologiques, le premier soumis à la concurrence entre des opérateurs en archéologie préventive, le second non.*

## Introduction

The operations that we have chosen to present here are the Seine-Nord-Europe Canal (CSNE) and the High-speed rail link Sud-Europe-Atlantique (LGV-SEA ; Fig 1). The first is still ongoing, the second has recently finished.

We will be tackling aspects relating to the organisation and the cost of these projects. As the publication of the results is in progress and it is for the moment too early to provide an exhaustive overview of each operation.

## The LGV Sud Europe Atlantique

The LGV Sud Europe Atlantique (LGV SEA) project involves the building of a new rail track between Saint Avertin – to the south of Tours, in Indre-et-Loire and Ambarès-et-Lagrave – to the north of Bordeaux in Gironde (Kerouanton pending). This new track, characterised by its high-speed infrastructure, is 302 km long

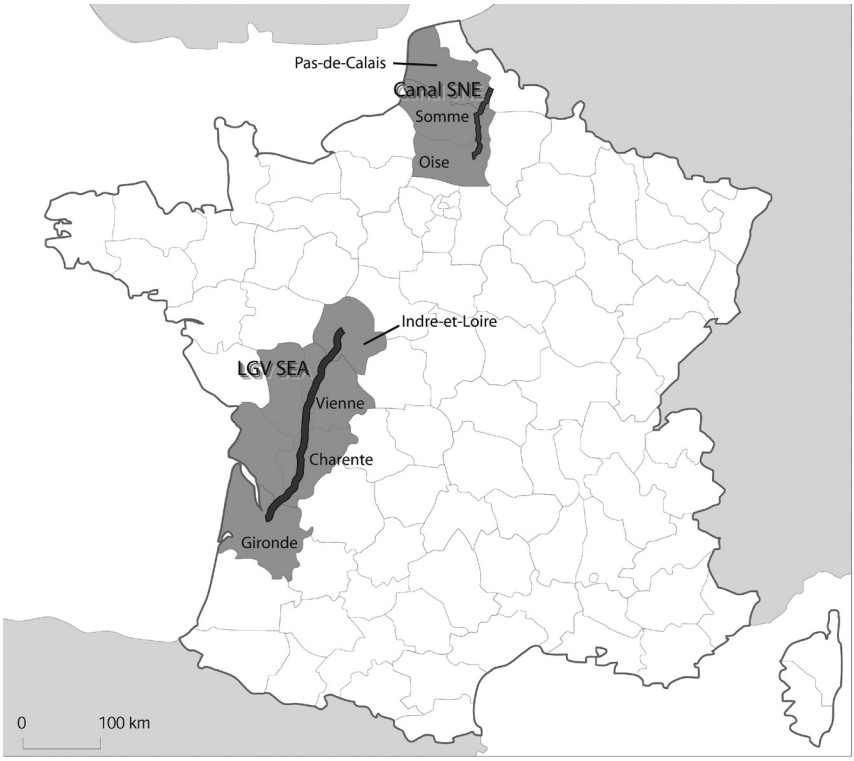



*Fig. 1. Locations of the LGV-SEA and CSNE operations.*

and has 40km of linking track that connects it to the existing network. It crosses the former regions of Centre (17.4 % of the track), Poitou-Charentes (72.2 % of the track) and Aquitaine (10.4 %), and the departments of Indre-et-Loire, Vienne, Deux-Sèvres, Charente, Charente-Maritime and Gironde. Its impact on the areas it crosses is significant as it has generated 70 million $m^3$ of spoil and 38 million $m^3$ of rubble over 4200 hectares.

It is the first high-speed rail track built within the framework of a public-private partnership using the system of concessions. This administrative structure with a tight operational timetable took a long time to put into place and was not without repercussion for the archaeological programme. It involves two correlative phases with overlapping timetables: the first pilot project (APS) proposed by Réseau Ferré de France[1] was subsequently refined into the detailed pilot project (APD) after the appointment of a concessionary. The impact of this final and more detailed project was to double or even triple in some sectors, the initial surface area of the project. Many additional zones were included corresponding to the temporary or permanent housing of material used in the construction of the new rail track as well as areas for work bases, retention basins, anti-noise sidings and other zones used for the construction or the installations (electrical stations, etc..) of the rail track. The archaeological prescriptions were firstly based on the first pilot project and were then completed after the presentation of the final pilot project by the appointed concessionary.

The administrative, operational and scientific management of the project encouraged INRAP, who carried out all of the evaluations, excepting a few hectares[2], and almost half of the excavations, to set up a management structure tied to the Interregional Grand-Sud-Ouest office. The input of such an organisation allows, other than providing a real scientific coherence in line with the specifications of the three regional authorities, to limit the logistical repercussions for the fieldwork teams. In the preparative stages, a technical assistant (or several assistants when the activity was at its peak) was responsible for not only organising the necessary mechanical and logistical means but also to prepare the fieldwork operation itself in order to facilitate the work of the archaeologists. This included ensuring and negotiating access to sites, mapping out access routes, following up on authorisations from landowners to intervene, etc. This preparation could not of course completely erase any unexpected incidents but could at least lessen their impact.

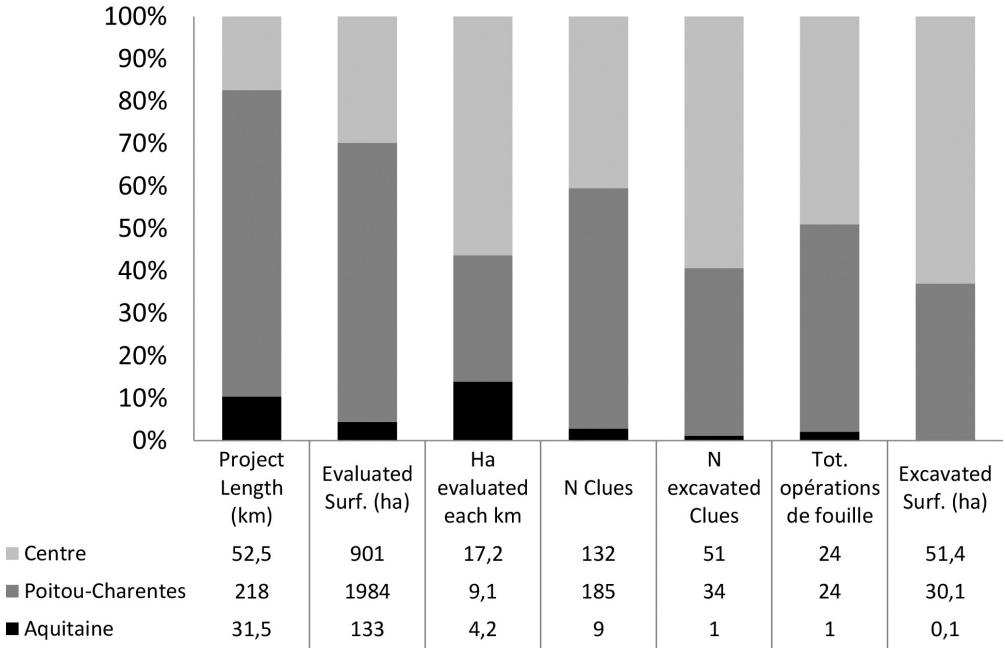
Crossing three regions the route of the LGV SEA was under the authority of three regional prefectures, three regional archaeology services and two interregional

1 SNCF réseau since January 2015.

2 In Indre-et-Loire, almost 85 ha were surveyed by the Departmental Archaeology Service (SADIL).

commissions for Archaeological research. The scientific guidelines for methods and means relating to fieldwork and appended to the governmental authorisations for the archaeological evaluations varied from region to region and needed to be included globally in the project. Guidelines for fieldwork could in some cases specify long trenches, while others specified 20m long staggered trenches. In the field and during the post-excavation phase, standard procedures were also put into place for the evaluations allowing amongst other things to transcribe the up to date data in a Geographic Information System.

The first evaluations, divided into 50 distinct operations (with a total surface area of 1914 hectares), began at the end of September 2009 using the first pilot project submitted by Réseau Ferré de France as a basis. 79 additional evaluations were carried out between August 2011 and June 2013 using the detailed project submitted by the appointed concessionary. This increased the evaluation area by 1105 hectares, corresponding to 57.8% of the areas that were surveyed. In total 3 020 hectares of the 4200 hectares of the surface area of the final project were surveyed between September 2009 and June 2013, corresponding to 10 hectares per linear kilometre (this average goes up in the Centre region to 17.2 hectares and decreases to 9.1 hectares in Poitou-Charentes and 4.2 hectares in Aquitaine – Fig. 2).




| | Project Length (km) | Evaluated Surf. (ha) | Ha evaluated each km | N Clues | N excavated Clues | Tot. opérations de fouille | Excavated Surf. (ha) |
|---|---|---|---|---|---|---|---|
| Centre | 52,5 | 901 | 17,2 | 132 | 51 | 24 | 51,4 |
| Poitou-Charentes | 218 | 1984 | 9,1 | 185 | 34 | 24 | 30,1 |
| Aquitaine | 31,5 | 133 | 4,2 | 9 | 1 | 1 | 0,1 |

*Fig. 2. LGV-SEA, regional differences in the execution of the archaeological operations.*

On the basis of these evaluations, 300 sites[3] or indicators of sites were identified, 49 excavations were undertaken after authorization by the government. The excavations have led to the study of 86 sites, 51 of which are located in the Centre region. The total area of the excavations that corresponds to about 82 hectares is divided up as following: 0.1% of the area is in Aquitaine (one excavation), 36.9% in Poitou-Charentes (24 excavations) and 62.9% in the Centre region (24 excavations). This underlines that the northern part of the route was the most impacted by archaeology, corresponding to 29.9% of the total area surveyed and 62.9% of the total excavated area, even though distance wise this part of the route only represents 17.4% of the total length of the track. In view of the important differences from on region to another, it remains quite difficult to overview the LGV as a whole. These differences are due to the very urbanised southern part of the route (Bordeaux and its agglomeration), certain sectors being less well preserved than others (plateau, valleys, chalk/silt/sand), the denser human occupation in the valleys (mainly in the Vienne, but also the Indre and Charente), but other extrinsic causes could also be alluded to.

Under private project management, the contracts for the excavations were put out to tender (each new authorisation generated a contract). INRAP won the most contracts (23). The Departmental Archaeology Service of Indre-et-Loire (SADIL) won one contract and the 25 other contracts were won by 8 private companies[4], either separately or by associations of companies (4 cases).

The contribution of public operators in this project has been important as on top of the evaluations almost half of the excavations were carried out by INRAP (and slightly more than half if you take into consideration the surface area) and the Departmental Archaeology Service of the Indre-et-Loire (SADIL). Competition between different companies was deemed beneficial to the contractor as it helped to reduce costs but probably also to reduce the timeframe of the intervention. The total cost of construction is announced at 7.8 billion euros, the cost of the archaeology can be estimated at 32 million euros, 0.41% of the global cost. In terms of schedule, the first excavation was undertaken at the end of 2010 and most of the operations were carried out within two years, from the summer of 2011 to the summer of 2013, mobilising several hundred archaeologists (and at the peak of the activity more than 200 at the same time). The evaluations and the excavations were carried out in three and a half years along the 300 km of the LGV route.

3 The term site here can be defined as »occupation type + chronology«. The same excavation that unearthed a Neolithic settlement and a medieval cemetery counts for two sites.

4 Archéosphère (3 contracts), Arkémine (1 contract + 4 in association), Archéoloire (3 in association), Eveha SAS (11 contracts), Hadès (3 contracts), Iker (1 contract), Oxford Archéologie (1 in association) and Paléotime (2 contracts + 1 in association). Two of these companies have gone bankrupt and a third is no longer authorised to excavate.

Even if the competition between different companies was beneficial for the contractor, it was probably less so in terms of the research aspects of the project. One geographical sector, in particular, seems to symptomatically illustrate a certain number of scientific shortcomings: here at the bottom and on the slopes of a small valley, several excavations of sites dating from the Neolithic to the Early Medieval period, and located only a few hundred metres from each other were, carried out by different companies. Archaeological sites are spread all over the valley and further, but between the different excavations, the question of a global approach to land occupation via chronological gaps (site displacement?) or functional differences (settlement/funerary contexts) could not be answered satisfactorily. If the independently managed fieldwork did not hamper the comprehension of the sites themselves, an overview of their immediate context was lacking. A comprehensive approach can only be attempted outside of this competitive environment once the site reports have been finished. So it is not possible to tackle the question of the occupation within the framework of the excavations when paradoxically the archaeological research that is carried out on linear routes is the most suited for this type of analysis. This widened focus can only be attempted outside of a competition framework once the reports have been given in and the contracts honoured.

The archaeological data collected from the excavations and the evaluations carried out on the LGV SEA is important and the papers and conferences provide a first if somewhat timid feedback to the scientific community. It remains to engage the scientific exploitation of these results that aims to go further than the excavation reports, incorporating the results of the evaluations and the documentation that has been made available by the research community. The multiplicity of the public and private contributors to this project makes this enterprise more complex but not impossible as shown by the first publication projects that bring together government services, public and private companies.

## The Seine-Nord Europe Canal Project

The Seine-Nord Europe Canal is the central segment of the high priority European Seine-Escaut project that involves the building of a fluvial link between France, Belgium and the Netherlands, opening up the fluvial basin of the Seine by joining it to 20000 km of European waterways. The future canal stretches over 107 km between Compiègne, where it connects to the Oise, and Aubencheul-au-Bac near to the town of Cambrai, where it connects to the Dunkerque-Escaut canal. The building of this high capacity canal, overseen by the Voies Navigables de France (VNF), will have a width of 54 m and a depth of 4.5 m. It includes six locks, a 1,3 km long canal bridge, 61 re-established road and rail links, four multimodal platforms, six transhipment

platforms, two pleasure boating installations and a reservoir of 14 million m3 of water. The project covers a 2 500 hectare area and will generate 57 million m3 of shifted rubble, digging down to a depth of up to 45 m necessitating the opening up of areas as wide as 180m in several sectors.

As early as 2004, archaeologists became aware of the importance of this project which largely surpasses other building projects in France. Using this dynamic and with the experience and the expertise of a local team used to work on large scale projects (Bayard, et al. 2011; Prilaux & Talon 2012a; 2012b; Buchez & Talon 2014), an archaeological programme was put into place as early as September 2008.

## The impact and the archaeological programme

The Seine-Nord Europe Canal affects large areas (three times the width of a motorway) and has a considerable impact on archaeological sites. In terms of their identification, the project has three main advantages: its linear route provides a transect of the region, the opening up of large areas to survey provides a global vision of sites and the depth of the digging gives access to Prehistoric sites buried in the loes several metres under the arable soil (Coutard, et al. 2015).

To expertise and then excavate the better preserved archaeological sites, INRAP created a local management of the project, based midway along the route at Croix-Moligneaux in the Somme between Ham and Péronne. The management team, that includes an operational and administrative staff of 10 and a technical platform that brings together different resources (topography, GIS, computer aided design, desktop publishing, palaeoenvironment, geomorphologic studies), is charged with coordinating the programme and the operational teams.

The archaeological programme consists of evaluation campaigns and excavations carried out under the authority of the Regional Archaeology Services (SRA) of Picardie and Nord-Pas-de-Calais, but also of publication and valorisation projects. Given the vast scale of the construction project (Fig. 3) and the means invested in assessing its archaeological potential and ensuring its survey, INRAP envisioned using the project to develop new methods but also as a communication tool towards the general public, local government and the scientific community.

The defining feature of the evaluation phase (Talon 2012) was to set up at its very beginning three specialised teams adapted to the type of survey to be carried out (shallow trenches, deep trenches and the survey of river valleys). Regional referents were involved to ensure the correct expertise or study of each site, to precisely identify its nature, its function and the dating of indicators and occupations and to inform the local scientific community of how work was progressing. Finally, some of the referents and the project managers actively participated in the training and the tutoring of the less experienced members of the team, providing a "nursery" of

*Fig. 3: Aerial view of an evaluation on CSNE Project (Campagne, Oise Dpt – @Altimage, Ph. Frutier).*

young project managers from a recruiting ground of more than a hundred archaeologists who were assigned to the project or who were permanently recruited by INRAP between 2009 and 2012.

## The evolution of the project and the field work

The initial project was launched as a public-private partnership and intervention times were very short. The fieldwork was due to finish in 2011 to give way to construction work with the objective of the canal opening in 2015. The workforce needed for the archaeological interventions was at the time estimated at 250 people which necessitated the creation of an independent management. In reality, the construction project was running behind schedule and the archaeological work (evaluations and excavations) of this first phase was drawn out over a longer period allowing a smaller workforce of a maximum of 120 people between 2009 and 2012.

Since the autumn of 2012, the project's reconfiguration ordered by the government led to the suspension of operations, the subsequent abandon of the most important public-private partnership in Europe (40% of the total cost) and the creation of a project company in May 2016 charged with the management of the construction. The cost of the project in real value in 2013 was 4.5 billion euros paid for by central and local government, the European Union and public finance. This new setup should enable the reprise of the archaeological programme from the autumn of 2016. It will focus on the survey of more than 1000 hectares and several excavations. Following an agreement with the local archaeological services of the Pas-de-Calais, the Oise and the town of Noyon, INRAP, the only provider of evaluation services, carried out trial trenches on 1800 hectares of the 2500 hectares of the initial project between September 2008 and December 2012. The evaluations have led to the discovery of 320 archaeological indicators, detailed in 48 site reports.

A geophysical survey was carried out on a section of the route over a 60 hectare area as a test to establish its pertinence for the detection of archaeological features. The results of the survey (using electrical and magnetic methods, Géocarta) were compared to the results from the conventional trial trenches that were implanted without the knowledge of the geophysical survey. Of the 13 sites that were identified, 12 were detected in the trial trenches, but only three were identified in the geophysical survey using both methods (Hulin, et al., 2014 and pending). This can be explained firstly by the discrete nature of the archaeological features and also by the nature of the soils.

Excavations started in March 2010 and focused only on the most scientifically interesting indicators and the best preserved sites. At present, of the 320 indicators, 98 were excavated, divided into 40 contracts by the VNF. INRAP and Oxford Archaeology, the only companies holding authorisations for all chronological periods, bid for contracts. They were each attributed three lots (Pas-de-Calais, Somme, Oise). INRAP won 39 contracts corresponding to 95 excavation sectors (121.5 hectares excavated for a cost of 26 million euros). Oxford Archaeology won only one contract for a 3 hectare excavation, having not bid on all of the contracts. In 2010, Oxford Archaeology failed to renew its national authorisation and from June 2011 INRAP was nominated sole operator within a framework agreement.

## Reports and publication programme

The priority of the archaeological programme was to free up the excavation areas as quickly as possible subsequent to the demands of the contractor and in accord with the authorising bodies. Site reports were to be finalised within the timeframe of 24 months after the end of the excavation. From 2012, the teams were mainly focused

on data analysis (post-excavation), on report writing and on the first publications. At present, of the 39 excavation reports that are due, 37 have been completed and have been examined by the Interregional Commission for Archaeological Research.

The efforts made in communication and valorisation have been and remain constant, one of the principal objectives being to inform the local population and schoolchildren of how sites are excavated and of the results of these excavations. Different media has been used to reach out to all types of public and an interactive atlas details the archaeological programme: http://multimedia.inrap.fr/atlas/canal-seine-nord-europe/archeo-canal-seine-nord-europe

The publication programme (Talon & Prilaux pending), was conceived from the start with the project managers and specialists and in consultation with representatives from the Regional Archaeology Services and the Scientific and Technical Direction of INRAP.

Chronological and regional syntheses and overviews on different themes as well a methodological and operational overview are all in the pipeline. Many of the excavated sites are diachronic and have not provided results that justify a monographic approach. In order to communicate the results of the archaeological programme within a short a timeframe as possible, archaeologists from INRAP have presented their results during the Regional Archaeology meetings or during more specialised workshops and conferences. Short papers are easily presented. By the end of 2015, 70 notes and longer papers have been referenced, mainly using means provided by INRAP in support of publication and research projects. However, the broader monographic and themed overviews need more important investment in terms of time and publishing. The books are still being written and will be published over several years according to the investment that will be made in scientific publication in the future.

## Discussion

Comparing the LGV-SEA and the CSNE brings to light certain resemblances and differences between the two projects. The archaeological evaluations enabled the identification of about the same number of sites for each project (LGV-SEA: 326; CSNE: 320), however, the surface areas are very different from one project to the other with a much higher density of occupation on the CSNE (Fig. 4). This difference stems from the methods put into place for each project and from the great width of the CSNE construction site, opening up larger areas for a better visibility of archaeological features. The types of sites that were excavated can also be considered a factor as medieval sites were the main focus of the LGV-SEA project, whilst Late Prehistoric sites

were mainly excavated on the CSNE (Fig. 5; but see Kerouanton 2014 for Bronze Age studies on LGV-SEA).

The number of excavated sites is also very similar from one operation to the other: LGV-SEA: 86; CSNE: 95. Consequently, the number of excavations in relation to the number of site indicators is also similar (Fig. 4). However, the number of excavations in relation to the total surveyed area is very different in the two cases: one excavation per 35 hectares surveyed on the LGV-SEA and one excavation per 19 hectares surveyed on the CSNE (50% less). This assessment can be linked to the number of indicators per hectare.

The total surface area excavated is 82 hectares for the LGV-SEA and 121.5 hectares for the CSNE. This difference is important as the average area of excavation is 9.500m$^2$ for the LGV-SEA and 13.000m$^2$ for the CSNE. This is probably because in average Late Prehistoric sites are more extensive than medieval sites. However, the cost of an excavation on the CSNE is lower (LGV-SEA: 370.000€; CSNE: 270.000€; Fig. 4). Therefore, the surface area excavated is not the sole determining factor of cost and the type of site to be excavated also needs to be taken into account. Even so, several Palaeolithic sites with high excavation costs were excavated on the CSNE and the relationship between site type and cost needs perhaps to be put into a larger perspective. The cost per hectare is inferior on the CSNE: 214.000€ compared to 390.000 for the LGV-SEA. In conclusion, opening excavations up to tender does not seem to guarantee lower excavation costs.

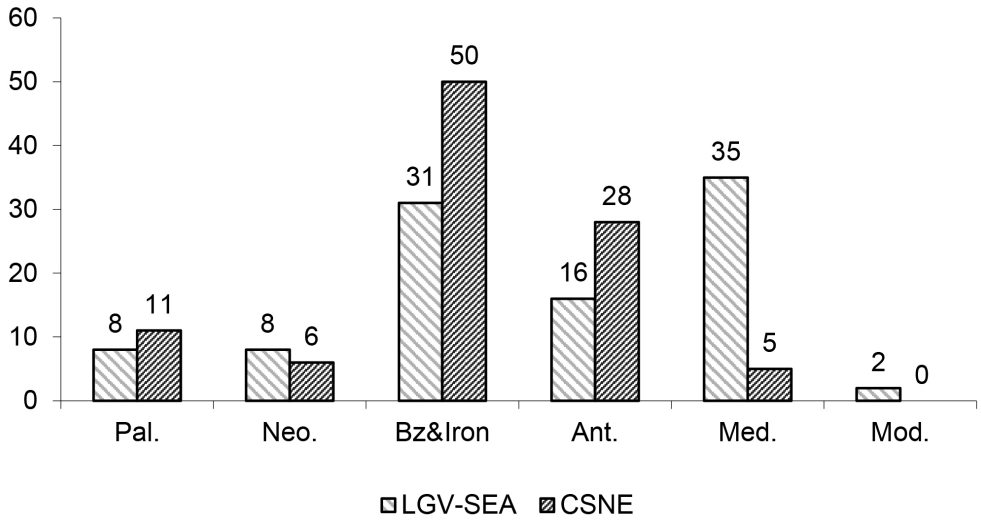



*Fig. 4. Some comparisons between LGV-SEA and CSNE.*

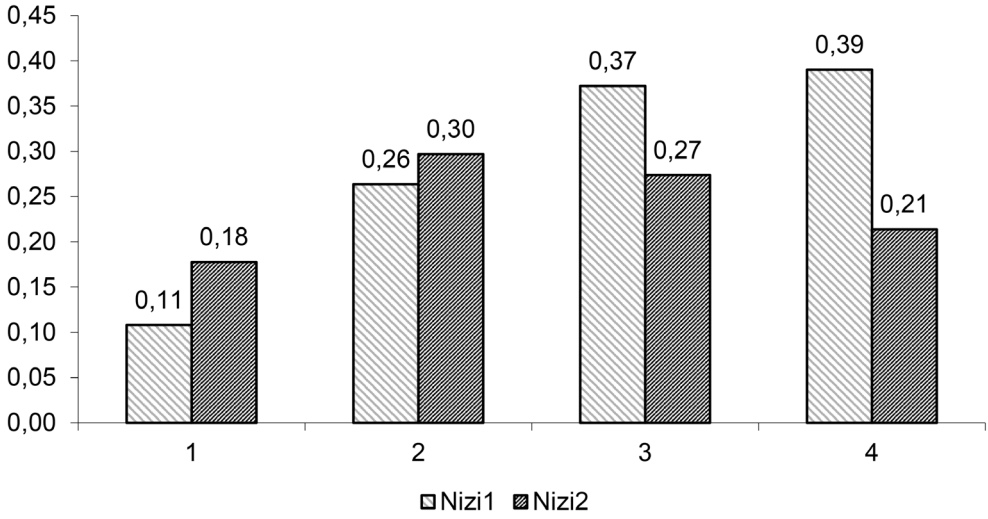



*Fig. 5. Number of excavations according to archaeological periods.*

It is important to tackle the question of the scientific exploitation of archaeological data. Due to the presence of several archaeological operators (in the case of LGV-SEA), it is difficult to engage collaborations with the objective of publishing the results (for financial and also for psychological reasons). Raising funds to publish research is a real problem in preventive archaeology (and certainly not only in preventive archaeology). It's also difficult for people from different companies or services to work together: it's true we're all archaeologists, but our employers don't necessarily have the same goals.

To conclude, it is perhaps important to focus on the future of archaeological data from fieldwork, as the mission of preventive archaeology is not only to protect cultural heritage but to also play a leading role on the scientific stage (third article of La Valetta Convention). This constitutes a major challenge for the future of preventive archaeology.

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