
Science and Technology Studies in Greece

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Human beings become builders by building.
(Aristotle, 'Nicomachean Ethics')

Abstract

We argue that Science Technology Studies do not exist in Greece and we correlate this fact with the low importance paid by the state and society to science and technology, especially to the creation of science based artefacts. Data on R&D policies are given. We propose a narrative account of the history and philosophy of science in Greece, where a serious development has taken place since the 1980s. We conclude that STS can provide new tools for problems the Greek people face, but for this to happen civil society must be stronger and Manichean practices in public life be reduced.

Science and Technology Studies (STS) do not exist in Greece and this paper is a comment on that deficiency. Steven Shapin's well-known dictum concerning the scientific revolution provides a framework to describe activities relevant to STS, to think about the causes that contribute to its non-existence, and to discuss problems upon which STS could focus.

We must note, however, that the History and Philosophy of Science (HPS) is developing in Greece; some argue that it is flourishing. Greek historians produce studies that thirty years ago one could not have foreseen regarding both the current methodological assumptions and the total volume of scholarly production. Additionally, university research has continued to accumulate since the late 1970s. The national press emphasises issues concerning science policy and advances the popularisation of science. From another perspective, Athens lacked the 'science wars' that permeated the US in 1996, although those American debates did create some ripples in Greek academic circles. One can read this paper as supporting the idea that science studies flourish where science practice flourishes. Furthermore, science studies are not 'against science' as some detractors contend.

B. Latour's generalised notion of symmetry from his 'Second Turn' influences our concept of STS, especially when he states that science and society must be explained in the same terms.¹ This principle, we believe, applies fully when considering the social environments in which science is a substantial component within the whole communal life.

In this paper, we will exploit the idea that the factors that hinder the development of STS in Greece correlate with the relatively low importance directed towards science and technology (S&T) by the state and society, especially concerning the creation of scientifically based artefacts.

HPS and STS in Greece

We can define STS as mimicking the conceptual curricula of relevant academic programs. In other words, STS is a field that parallels studies of science and technology in which a series of analytic tools from the traditional disciplines are exploited—such as history, philosophy, political theory, anthropology, and social theory—but where no one holds a dominant position in the discourse. Within the climate of the historicist turn of the 1960s, it was clear that the privileged discussants then were history and philosophy, and that the research dealt with philosophical or historical problems as they related to S&T. The absence of this reductionist project is the specific element of the new methodological conceptions. M. Biagioli writes that there is no need for defining 'science studies' 'since the scientists did the job very well,' and 'science' is a thoroughly described and respected enterprise that provides a unity in its object but a diversity in its methods, questions, and associated institutions.²

Scholars accept that one can trace the source of STS to the science policies connected with the practices at Los Alamos, which led to the first atomic bomb. The critical radicalism of the 1960s adds a humanitarian component to the S&T enterprise. However, neither of these documented factors applies to the Greek case. The animated Greek radicalism of the 1960s–1970s never dealt consistently with science and technology as a social phenomenon.

The developments in HPS after Kuhn's *Structure of Scientific Revolutions* led to a more socially cognisant treatment of the phenomenon of science thereby providing a philosophical cause for STS. Furthermore, the interplay between the sociology of science and STS consumes a significant portion of the relevant literature since the early 1990s.

Within this section, we wish to examine the basis of HPS development in Greece.

During the past 20 years—and not without birth-pains—Greece developed a successful HPS program that encountered an environment traditionally dominated by Marxist criticism. The roots for the latter extended back to the political crises in the 1940s, the main figures during which were: N. Kitstikis, a resistance figure who served as Rector of the National Technical University of Athens (NTUA) during the German occupation; D. Batsis, a communist executed in the early 1950s who wrote an influential and well-documented book that argued for state-controlled technology as the basis of socialist development; and the philosopher E. Bitsakis, who actively continues to produce research. The same period saw the production of important works by non-Marxist authors, such as G. Pezopoulos, K. Doxiades, and K. Varvaresos, who wrote about the planning and development of technology. Significantly, the more politically conservative philosophers dealt with topics such as ancient philosophy, political philosophy, and the history of culture; in other words, they avoided science. Although the impact of their predecessors is clear, we still find it difficult to trace the impact of the scholars from the mid-war and early post-war period, such as the influence of the historian of science M. Stephanides and the philosopher K. Logothetis, who dealt with 17th century science. We do not refer, however, in this paper to ethnic Greeks working abroad, such as the internationally renowned figures K. Kastoriadis, N. Poulantzas, and G. Vlastos.

HPS was initiated in the early 1980s by a group of young scholars: A. Baltas, K. Gavroglu, A. Koutoungos, and the late P. Nicolacopoulos at NTUA and the University of Athens, and the late Y. Goudaroulis from the University of Thessaloniki. Other scholars moved into the field later, most of them possessing a background in technology or the sciences. Many of these scholars were educated in America and the United

Kingdom, some in Paris, some in Moscow, and some in Greece. During the same period, Y. Karras of the National Research Foundation developed with his students a fundamental project for the study of Greek science within a broader Balkan context during 16th to 19th century.

NTUA initiated an HPS postgraduate program in 1992, and some years later the University of Athens created an HPS Department, which additionally provided a new home for studies in philosophy in general. Both a professional society and a specialised journal, *Neusis*, were launched during this period, and series of international conferences were held.

Background works were done during the 1990s. NTUA reconstructed their early 19th century library collection, while colleagues at the University of Athens electronically reproduced the vast collection of Greek scientific books published during the 16th to 19th century. NTUA created a bibliography of nearly 5000 scientific and technological books published in Greek between 1830 and 1940, and formed a foundation of nearly 2000 Greek scientific manuscripts principally originating from European libraries. The EU, along with private donors, funded these projects.

Historians at the University of Athens created a museum, and restored and preserved their archive, since its founding in 1837, while at the National Research Foundation colleagues worked on the collection of scientific instruments existing in Greece from the 19th century. During this same period, several new technological museums opened: one in Ermoupolis on the island of Syros, one in Thessaloniki, the Air Force Museum, and another containing a collection of scientific instruments at the University of Athens.

We wish to describe the state of Greek studies on HPS on topics relating to Greece. We notice that the HPS research that parallels those topics of international interest is successful in Greece. Our research meets international standards of excellence, and it appears that a new generation of Greek philosophers, for the first time in our history, is emerging from graduate programs in Greek universities.

Studies in Byzantine science and technology are underdeveloped internationally and Greeks fare little better since we are in the formative stage in regard to this area of study ourselves. There are, however,

important studies for the period between the 17th and the early 19th century when Greek was the *lingua franca* of the Balkans. It is important to note that modern scientific and political ideas were transferred into the region, which contributed to the consolidation of national consciousness. To what extent these science-oriented ideas were assimilated by broader strata of the population is not clear.

On the other hand, scholars accept that the then newly-established University of Athens possessed underdeveloped science departments during the 19th century when the Department of Philology and the Faculties of Law and Medicine dominated the university. Hence, the disciplines that controlled the university were those that proved significant for the creation of the new state and for the national identity. We should remark that the new science professorate was created by sending young graduates to France and Germany in order to complete their education and get familiar with research practices.

HPS is currently making good progress in Greece, but STS is not taught at the undergraduate level and the few topics taught at the postgraduate level fall under the umbrella of the history of science, since most philosophers are not happy with the empirical treatment of normative issues. At the influential NTUA, probably the leading research institution in the country,³ teaching humanities to undergraduates is not considered an integral part of the curriculum—that which is provided smacks of an amateurish version of a generalist education. We continue to follow the central European tradition, to which our university has been linked since the late 19th century, ignoring alternate tendencies that approach the serious teaching of humanities for engineers, especially for their elite.

R&D data

We provide some data on R&D policies in Greece, which, although partial, allow us to develop to our central argument. A diploma thesis that dealt with R&D indicators in Greece during 1993–1999 shows that the total R&D expenditure held nearly constant (0.5% of GNP) while

the EU average for the same period ran at 1.92%.⁴ Within this amount, EU sources for Greece were 25% of the total expenditure, while they contributed 6.5% in Spain and 2% in Germany. Hence, EU money is the essential source for the development of new research projects, while the sources from the Greek government principally support fixed overheads (salaries, etc.). An important factor also concerns the low expenditure by the private sector—22% of the total, which is similar to the situation in Portugal—while the private sector in most EU countries contributes approximately 50%. The combination of these data proves that the private sector in Greece spends—with respect to the GNP—only one-tenth of the EU mean private expenditure on R&D.

R. Kratsa, a Greek deputy in the European Parliament, provides more data.⁵ Participation in continuing education in Greece is 1.1% within the age group of 25–64 year-olds, while the EU mean is 8.4% participation. The newly registered patent factor is 0.5, the lowest in the EU, while Finland, which is ranked highest, has a factor of 80.

The personal experiences and impressions from two scholars active in Athens regarding new technologies can give us a glimpse on the current climate, since official publications are rare (in any case, the goal of this paper is not to give a complete picture of R&D policies). D. Yova, Professor of Applied Biophysics at NTUA, believes that biotechnological procedures are only applied sparingly, and that there is no production of any kind of hardware within her field, though the production of software meets international standards. She also notes that there is a dearth of cultural dialogue on medical technology and its application in public hospitals, nor could she remember any spin-off companies in the discipline.

Dr. D. Xenikos, an official at Greek Telecom (OTE), gives a slightly different picture about information technologies in Greece. Mobile telephone use meets the EU average, but Internet users are at the rate of 10%–11% where the EU average is 28%. There are obvious financial considerations for Internet utilisation, following the general dichotomy of the information rich and poor, but these considerations do not explain its limited use in commerce (10.2%) or in tourism (7.4%).⁶ However, it would be interesting to investigate the factors for the differing use of mobile telephones and the Internet according to the Merton–Weber thesis,

which analyses the values required for scientific work. Xenikos notes the existence of some successful spin-off companies, and also stresses that the Greek information technology industry generally works as a subcontractor for foreign companies making no real hardware innovations. Furthermore, he reminds us about the very important human potential in the information sector in Greece, which produced important contributions to design planning and software.

Why STS?

For Greece, the most accessible period (and probably the most important) for STS are the most recent years. As an aside, we must state that studies referring to periods after 1833, following the establishment of the Greek State, do consider technological issues and that Greece continued to maintain contact with the latest technological developments during the entire 20th century.

Ch. Agriantoni, who produced fundamental works on the history of Greek industrialisation, writes that Greeks lack the necessary patience for encouraging industrial progress. This conclusion must function as operative, not final or definitive. F. Kafatos, the Director of the European Laboratory of Molecular Biology at Heidelberg and an influential figure within the development of contemporary Greek biology, does not avoid asking himself whether Greek society possesses the maturity to create an enduring tradition in the scientific fields.⁷ STS should think about these types of questions.

The historian G. Dertilis generalises his studies by declaring that the master narrative of Modern Greek history (19th–20th century) is the nationalistic idea, until 1922 taking the form of irredentism, after the civil war (1946–1949) taking the form of correct thinking, and after the fall of the military dictatorship in 1974 taking the complicated form of collective insecurities.⁸ He concludes by stating that Greeks preserve a deep but poor relationship with their history, and as a friend reminds me, we Greeks have not reconciled with our recent past, with the painful 20th century experiences: the national catastrophe, two world wars, a

civil war, and two military dictatorships. The existence of strong master narratives and the preservation of good versus evil dichotomy schemes in historical studies make the introduction of new conceptual tools of study difficult, although the younger generation of historians are struggling hard to overcome these obstacles.

We have started to study our S&T past using STS practices. Our main problem is the study of the social, economic, and political connotations for our S&T present. We could study, for example, topics ranging from large construction projects to the health system, from production problems associated with high technology to armament procurements to agriculture, the use of air conditioning, PCs, and the consumption junction in general, and remedy these deficiencies.

STS practices are based on a notion of multiple narratives, which presuppose a developed civil dialogue, which in the Greek case does not exist. This component is missing from our puzzle. The study of science in the making, which is a crucial focus of STS, brings difficulties to the traditional, easily accommodated notion of science as part of a great metaphysical system related to the few and foreign. Such problems show the importance of the question, *why STS?*

G. Dertilis in his review of Greek economic history concludes this country presents a type of development different from the Western canon—not better or worse, simply different.⁹ One can agree with him at the pragmatic and the moral level; but also can add that S&T in Greece are linked to a mentality closely related to this western canon.

The colleagues at Graz showed us through their practices that STS may take the form of systematic work by focusing on real problems in small or larger communities. We thank them for this.

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Notes

- ¹ B. Latour (1992), 'One More Turn After the Social Turn', in E. McMullin (Ed.), *The Social Dimension of Science*, Notre Dame Press.
- ² M. Biagioli (Ed.) (1999), *Science Studies Reader*, London: Routledge: IX.
- ³ A recent NTUA official publication, *The Absorption of NTUA Graduates to the Work Market*, states that this institution comes fourth among all EU institutions with respect to participation in S&T projects financed by the EU. Furthermore, when considering ethnic affiliations within American academia, it is well known that Greek scholars comprise one of the largest groupings.
- ⁴ A. Dikaiakos (2001), Diploma Thesis, *Evaluation of R&D Indicators in Greece 1993-97*, Dept. of Mechanical Engineering, NTUA: 84-87, 113.
- ⁵ *To Vima*, 25 November 2001.
- ⁶ *H. Kathimerini*, 16 December 2001.
- ⁷ Op. cit.
- ⁸ G. Dertilis (1988), 'The Historiography of the New Hellenism Today', *Syghrona Themata*: 86.
- ⁹ G. Dertilis (1999), 'Afterword', *Oiconomikos Tabydromos*, 23 December 1999: 97.