Work in Progress: Automobility in Portugal. The construction of the sociotechnical system, 1920-1950

M. Luísa Sousa[*]

The object of enquiry

Initially, in most countries the introduction of the automobile led to a series of campaigns oriented to the adaptation of streets and roads to the new vehicle, but in a second stage to the consideration of creating infrastructures especially designed for this kind of vehicles, notably by rethinking urban and rural organization in order to make them suitable to this new means of transport. In Europe, the turning point of these two stages occurred in the 1920s.[1] The present investigation begins precisely at this point, although references to the former period will be made whenever necessary. In the developed countries, the decades between the 1920s and the 1950s were a transition period between the two first automobile eras, to which correspond different consumption models, according to David Gartman's definition: the *Bourdieulian* era, characterized by the use of the automobile by the elite, in particular for the purposes of ostentation and leisure; the era of mass consumption and the use of the automobile through the Fordist automobile system, during which some contradictions emerged, notably regarding investment in the superficial aesthetic differentiation of the models released each year.[2] In the decades under analysis, Portugal was living the first era, presenting low levels of motorization. Simultaneously, as the importance of the elitist culture of private automobile use prolonged, the period between the 1920s and the 1950s also witnessed the development of commercial road

[*] Inter-university Centre for the History of Sciences and Technology (CIUHCT), New University of Lisbon. E-mail:luisacoelhosousa@yahoo.fr. PhD student under the supervision of Professor Maria Paula Diogo at the Faculty of Sciences and Technology of the New University of Lisbon, Portugal (CIUHCT, DCSA, FCT/UNL) and of Professor Catherine Bertho-Lavenir at Paris 3 – Sorbonne Nouvelle University (ED 267), with a scholarship from the Portuguese Foundation for Science and Technology (*Fundação para a Ciência e Tecnologia*).

[1] Marc Desportes, *Paysages en mouvement: transports et perception de l'espace (XVIIIe-XXe siècles)*, (Paris: Gallimard, 2005), p. 201.

[2] David Gartman, 'Three Ages of the Automobile: The Cultural Logics of the Car,' *Theory, Culture & Society*, 2004, 21, 4-5: 169-195.

transport and the institutionalization of the automobility system: on the one hand, state services were created for regulation of road traffic specific to the automobile nationwide; on the other, independent administrative structures were created to manage roads nationwide and their adaptation to automobile circulation, the first being the General Administration of Roads and Tourism (*Administração Geral de Estradas e Turismo*), in 1920. The criterion to define the period covered by this investigation was the attempt at capturing the institutionalization of this system. This study begins in the 1920s, when motorized road transport became significant, notably by comparison with railway transport, and autonomous state agencies and services were created for road administration with the purpose of either adapting the existing roads to the new means of transport or building new ones. In the early 1950s, the upper temporal limit of this work, the institutionalization of the system was stabilized and a new stage began, not only due to higher levels of motorization, but also due to the North American influence on European road mobility, which was also felt in Portugal.

My purpose is reflecting on how Portugal, originally a country with no car manufacturing[3] and technologically peripheral, appropriated[4] the use of the automobile and built up a sociotechnical system whose study can be carried out from the establishment of use regulations and the construction of infra-structures through the actions of users, engineers, legislators, automobile clubs, road services and administration. In the period under consideration, despite the low rates of motorization, the sociotechnical system institutionalized and stabilized, by monitoring the definition of international standards and creating structures which influenced the development of this system during the second half of the twentieth century. It is worth asking for whom and how was this sociotechnical system constructed. Since this period was marked by both an elitist culture of use by individual drivers and the growth of commercial road transport, how would have been the negotiations regarding the legislative effort towards the regulation of traffic

[3] Some attempts were made at manufacturing automobiles in Portugal, notably in the first decade of the twentieth century, similarly to various European brands almost handcrafted, some of them managing to develop. See José Barros Rodrigues, 'A Implantação do Automóvel em Portugal (1895-1910)' (Tese de doutoramento, Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa, 2013), 167-180. Only in the 1960s, however, an assembly car industry was established in Portugal. See José Barros Rodrigues and M. Luísa Sousa, 'The Myth of the Portuguese Automobile: Dreams, Projects and Causes of Failure,' in *Fifth Annual Conference on the History of Transport, Traffic and Mobility (T2M)* (Helmond, The Netherlands: 2007), 49, 50; M. Luísa Sousa and Maria Paula Diogo, 'Giving with one hand and taking away with the other: the automobile assembly industry in Portugal (1960-1988),' *Revista de Historia Industrial*, 2012, 48, 1: 155-181.

[4] Kostas Gavroglu, Manolis Patiniotis, Faidra Papanelopoulou, Ana Simões, Ana Carneiro, Maria Paula Diogo, José Ramón Bertomeu Sánchez, Antonio García Belmar, and Agustí Nieto-Galan, 'Science and technology in the European Periphery: some historiographical reflections,' *History of Science*, 2008, 46, 152: 153–175; Thomas J. Misa and Johan Schot, 'Introduction. Inventing Europe: Technology and the Hidden Integration of Europe,' *History & Technology*, 2005, 21, 1: 1-19.

and the creation of state agencies to this end, as well as the definition of a road policy? To what extent was the system built up in this period encouraged an elitist culture of use of the private car, both in terms of traffic regulation and the negotiations of new roles for their users, as well as the priority given to construction and repair of roads? How did the dictatorship known as New State (Estado Novo) dealt with the construction of this sociotechnical system, a symbol of modernity, and the management of the interests of the various actors involved and of specific practices? Finally, how were technical knowledge and the establishment of standards appropriated and applied in the construction of this system, and which actors were involved in this process?

To answer these questions this study problematizes the automotive system at the stage of its institutionalization in Portugal (1920-1950) by focusing on two of its aspects: traffic regulation and the adaptation of the road network to the new motor vehicles. The aim is to contribute in this way to a Portuguese historiography by approaching a topic rarely addressed, especially in the period under consideration,[5] by using a problematic and a methodology based on the history of technology, which bring to light little discussed actors and material realities that are fundamental to this story. In addition, by going beyond the critical reading of the printed sources produced during the New State - such as the reports emanating from the Independent Roads Board (JAE - *Junta Autónoma de Estradas*) or the commemorative publications of the Ministry of Public Works, and exploring the archives and coeval publications, notably the JAE archival material kept in *Estradas de Portugal, S.A.* , as well as the collection of the archive of the Automobile Club of Portugal (ACP- *Automóvel Club de Portugal*) - this work aims at presenting different interpretations. In particular, a narrative distinct from that of road construction during the New State, presented as a success story, implicit even in those who criticize the work of façade of the regime.[6] Instead, the aim is to unveil the tensions manifested in the course of road planning and construction in order to build up a more nuanced narrative.

[5] See M. Luísa Sousa, 'History of Transport and Mobility in Portugal: a non-field,' in *Mobility in History. Reviews and Reflections (T2M Yearbook 2012)*, eds. Peter D. Norton, et al. (Neuchâtel: Editions Alphil – Presses Universitaires Suisses, 2011), 133-143; Álvaro Ferreira da Silva and Lara Tavares, 'Transport history in Portugal: A bibliographical overview,' in *COST 340 - Towards a European Intermodal Transport Network: Lessons From History. A Critical Bibliography*, eds. Michèle Merger and Marie-Noëlle Polino (Paris: AHICF, 2004), 126-136.

[6] João Fagundes, 'Obras Públicas - a grande fachada do «Estado Novo»,' in *História de Portugal - dos tempos pré-históricos aos nossos dias. Estado Novo: o ditador e a ditadura*, ed., João Medina (Alfragide: Ediclube, 1998), 365-385. Along the lines of other studies focusing on the roads during the New State, the present study also uses printed sources from that period. Despite Fagundes's critical analysis of the regime's discourse in relation to public works, he nevertheless remains close to it, by using data from these sources which present an incomplete and often imprecise depiction of reality.

As far as European historiography is concerned, this project aims at contributing to the European history of transport and mobility and the history of technology, by focusing on a less known case little mentioned in the European narratives of these disciplines. The recent studies, which make comparative syntheses about the evolution of the automotive system, tend to focus on the most developed European countries such as the UK, France, Switzerland, the Netherlands and Belgium.[7] Unlike these studies, this project focuses on a European technological periphery with the potential of enriching these narratives and contributes to a better understanding of the history of automobile mobility in the countries of southern Europe.[8]

Methodology: strategies to approach the sociotechnical system of automobility

From the perspective of the social sciences, automobility is a fruitful research field, in which anthropological, psychological, sociological and historical approaches converge. The history of technology seeks to integrate elements of these disciplines within a vision of the automobile as a sociotechnical system. The aim is to understand the relationships between a complex infra-structure, which encompasses the technical object *per se*, the media through which it operates, and the agents who make it possible, as well as human behaviour seen from a group perspective. Concepts deriving from different theoretical fields are mobilised, notably those from *sociotechnical systems (STS)*, *social network analysis (SNA)* and *systems theory* (ST), and the notion of technical system from authors such as Bertrand Gille and Gilbert Simondon.[9] Around these theoretical instruments a variety of problems have been discussed, in particular technological determinism and social determinism, the latter emanating from *social construction of technology* (SCOT), in both cases in their hard and soft versions. In the last decade, sociology, in turn, has problematized

[7] See, for example, Ruud Filarski and Gijs Mom, *Shaping Transport Policy. Two ages of struggle between public and private – a comparative perspective*, (Den Haag: Sdu Uitgevers, 2011). For the case of roads a there is book which also deals approximately with the same countries, see Gijs Mom and Laurent Tissot, eds., *Road history. Planning, Building and Use*, (Neuchâtel: Éditions Alphil, 2006).These studies also include the USA.

[8] For example, in works which are currently being developed on the history of automobility in Greece, one finds various similarities with the Portuguese case which are interesting to explore. See Sofia Alexia Papazafeiropoulou, Evangelia Chatzikonstantinou, and Christos Karampatsos, 'Tourist passages to antiquities and beaches: Road constructions and distractions in twentieth century Attica,' in *6th Plenary Conference of Tensions of Europe* (Paris: 2013).

[9] Bertrand Gille, *Histoire des techniques*, (Paris: Gallimard, 1978); Gilbert Simondon, *Du mode d'existence des objects techniques*, (Paris: Éds. Montaigne, 1958).

mobility as new form of capital and social inequality,[10] and reflected on the consequences of automobility.[11]

The automobility system includes driving norms, elements that constitute 'motorscapes';[12] travel guides and itineraries written for drivers; the vehicles; road signalling and marking;[13] the users; the engineers and the interest groups all gravitating around road construction and use, within a wider definition of the sociotechnical system associated with automobility. A more inclusive approach of the elements that populate the road territory is to a great extent inspired by the suggestion of the historian Catherine Bertho Lavenir, according to which the sociotechnical system encompasses roads, signals, road codes and other legislation, commercial networks of distribution, the relationship with other means of transport and mobility, cultures of use, road engineers, users, legislators, associations and automobile and tourism clubs, their publications, values and representations, among other elements; finally, the negotiations, formal and informal, of these elements between different groups.[14]

The concept of sociotechnical system is a key-element of the theory of *social construction of technology* (SCOT), which advocates that technology and society are co-constructed, by mutually shaping each other: 'Technologies become part of the fabric of society, part of its social structure and culture, transforming it in the process.' [15] From some of its conceptual subsets, like the *sociotechnical systems (STS)*, *social network analysis (SNA)* and *systems theory* (ST), SCOT automobility can be read, first at the level of personal relationships in the social sense of the term, and technologies as objects and knowledge systems; then at the level of the organization of

[10] Vincent Kaufmann, *Re-thinking Mobility: Contemporary Sociology*, (Hampshire: Ashgate Publishing Limited, 2002).

[11] See, for example, Steffen Böhm, Campbell Jones, Chris Land, and Matthew Paterson, eds., *Against Automobility*, (Oxford: Sociological Review Monographs, Blackwell Publishing, 2006). The chapters of this book were also published in *Sociological Review*. See also the special issue on 'Automobilities' in *Theory, Culture & Society*, October 2004, vol. 21, n. 4 and 5, from which various articles are cited here.

[12] M*otorscapes* encompass signaling, emergency telephones, barriers to prevent accidents, road furniture, and architectural elements in the road sides. Tim Edensor, 'Automobility and National Identity: Representation, Geography and Driving Practice,' *Theory, Culture & Society*, 2004, 21, 4-5: 101-120, on p. 108.

[13] Desportes, *Paysages en mouvement: transports et perception de l'espace (XVIIIe-XXe siècles)*, p. 51.

[14] Catherine Bertho Lavenir, *La Roue et le Stylo, Comme Nous Sommes Devenus Touristes*, (Paris: Editions Odile Jacob, 1999), pp. 159-163.

[15] The perspective of co-construction of Society and technology moves away and criticizes technological determinism according to which technology is dominant in shaping society, but also the social construction of technology which tends to the opposite direction, because it does not take into account the material limits of technology. Philip Brey, 'Theorizing Modernity and Technology,' in *Modernity and Technology*, eds. Thomas J. Misa, Philip Brey, and Andrew Feenberg (Cambridge (MA): The MIT Press, 2003), 33-71, p. 52.

interest groups and finally, by using ST in the sense of Talcott Parsons's action theory, the understanding of actions through their underlying principles, means and purposes. The concept of sociotechnical system also interacts with approaches of *large technological systems* (LTS) and *actor-network* theory;[16] although they do not exactly match the *Hughesian concept* of large technological systems, whose reference has not always a correspondence in the automobility system. For example, in the traffic systems the capacity factor or the load factor does not have a correspondence, because the maximum capacity of a road is not its optimal capacity (depending on the technical characteristics of the road there is an amount of cars circulating from which speed has to be limited). Another example is the decentralized character of road management and control, often distributed by different administrative levels such as central government offices, regional or municipal.[17]

From the actor-network theory the most inspirational concept having in mind this study is that of *script*.[18] In this context, script means a set of imagined functions for a particular artefact by their designers or engineers, which is materialized in its characteristics (inscriptions, or *in-inscriptions*). The work of the historian consists of an attempt at apprehend through the materialization of those characteristics and archival research what were these inscriptions; it is a work of description or of *de-scription*.[19] Specifically, the point is to study the technical and social inscriptions from the various actors in relation to the automobility system in the process of being constructed, by means of a twofold analysis of traffic regulation and the adaptation of the road network to the automobile. One of tools to be used is to follow these actors,[20] not only engineers

[16] On these two approaches see Thomas P. Hughes, 'The Evolution of Large Technological Systems,' in *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, eds. Wiebe E. Bijker, Thomas P. Hughes, and Trevor J. Pinch (Cambridge, Mass./ London: The MIT Press, 1994 [1987]; reprint, 5), 51-82; Michel Callon, 'Society in the Making: the Study of Technology as a Toll for Sociological Analysis,' in *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, eds. Wiebe E. Bijker, Thomas P. Hughes, and Trevor J. Pinch (Cambridge, Mass./ London: The MIT Press, 1994 [1987]; reprint, 5), 83-103.

[17] Reiner Grundmann, 'Car traffic at the crossroads: new technologies for cars, traffic systems, and their interlocking,' *Flux*, 1994: 19-32, on pp. 20, 21; Erik van der Vleuten, 'Understanding Network Societies: Two Decades of Large Technical System Studies,' in *Networking Europe: transnational infrastructures and the shaping of Europe, 1850-2000*, eds. Erik van der Vleuten and Arne Kaijser (Sagamore Beach: Science History Publications, 2006), 279-314, p. 282.This text by Erik van der Vleuten is a good essay on the various approaches and nuances of work carried out by using the concept of large technological systems.

[18] Madeleine Akrich and Bruno Latour, 'A Summary of a Convenient Vocabulary for the Semiotics of Human and Nonhuman Assemblies,' in *Shaping Technology/Building Society: studies in sociotechnical change*, eds. Wiebe E. Bijker and John Law, *Inside Technology* (Cambridge, Mass.: The MIT Press, 2000 [1992]), 259-264, pp. 259, 260.

[19] Ibid.

[20] Bruno Latour, *Science in Action: How to Follow Scientists and Engineers Through Society*, (Cambridge, MA: Harvard University Press, 1987).

or legislators, but also the users who negotiate with the former. The aim is to make the users visible in the history of technology and related disciplines such as sociology of technology or social studies of science and technology, which have gained a growing importance from the 1980s onwards, with approaches such as the social construction of technology, the actor-network theory, feminist studies, cultural and media studies (consumption and domestication of technology), and semiotics.[21]

The joint visibility of both users and technology producers leads to a more encompassing interpretation of the life-cycle of technologies.[22] Like David Nye – whose work on the electrification of the USA by emphasizing uses and users[23] is considered complementary to that of Thomas Hughes,[24] which focused on the production of electricity – argues: 'each technology is an extension of human lives: someone makes it, someone owns it, some oppose it, many use it, and all interpret it.' [25]

In the Portuguese case, the approach focusing on users leads to the question of the appropriation of technology, in which concepts such as "transfer", "transmission", "introduction", "resistance" and "adoption" are crucial for understanding the position of Portugal in the European scene as a technological periphery.[26] The concept of appropriation – collective and individual – is not only crucial, but also enriches the historiography of technology which traditionally selected the processes of innovation as preferential objects of enquiry.[27]

The negotiations and appropriation of technologies and of their uses, in particular when it comes to consumer goods such as the automobile, can be approached at the level of the

[21] For a review of the various approaches emphasizing the role of users and non-users see Nelly Oudshoorn and Trevor J. Pinch, 'Introduction: How Users and Non-Users Matter,' in *How Users Matter. The Co-Construction of Users and Technologies*, eds. Nelly Oudshoorn and Trevor Pinch (Cambridge, Massachusetts: The MIT Press, 2003), 1-25.

[22] Thomas J. Misa, 'The Compelling Tangle of Modernity and Technology,' in *Modernity and Technology*, eds. Thomas J. Misa, Philip Brey, and Andrew Feenberg (Cambridge (MA): The MIT Press, 2003), 1-30, p. 10.

[23] David E. Nye, *Electrifying America: Social Meanings of a New Technology, 1880-1940*, (Cambridge, London: The MIT Press, 1997 [1990]), p. xi.

[24] Johan Schot and Adri Albert De La Bruhèze, 'The Mediated Design of Products, Consumption and Consumers in the Twentieth Century,' in *How Users Matter. The Co-Construction of Users and Technologies*, eds. Nelly Oudshoorn and Trevor Pinch (Cambridge, Massachusetts: The MIT Press, 2003), 229-245, pp. 230, 239.

[25] Nye, *Electrifying America: Social Meanings of a New Technology, 1880-1940*, p. ix.

[26] Gavroglu, Patiniotis, Papanelopoulou, Simões, Carneiro, Diogo, Sánchez, Belmar, and Nieto-Galan, 'Science and technology in the European Periphery: some historiographical reflections.'; Misa and Schot, 'Introduction. Inventing Europe: Technology and the Hidden Integration of Europe.'

[27] For a critique on the emphasis given to the study of novelty and innovation in the history of technology see David Edgerton, 'Innovation, Technology, or History: What Is the Historiography of Technology About?,' *Technology and Culture*, 2010, 51, 2: 680-697.

user/consumer [28] or at an institutional level in which "consumers, mediators, and producers meet to negotiate, articulate, and align specific technical choices and user needs."[29] In other words, the analysis which is being developed focuses on the level micro and mezzo of social organization.[30] At the micro level individuals (users, engineers, politicians, and drivers) are followed up and the same at the mezzo level, that is, organizations or social mediators (ACP, JAE, road services, and the Guild of Car Transport Manufacturers).

The negotiations taking place at these two levels are the outcome of a process of co-construction: they both construct a form of technology, or in this case, the sociotechnical system evolves, and in turn, this system also constructs society, for example by establishing hierarchies of a kind of users in relation to another, or in the construction of new social relationships and new practices and representations.[31]

This process of co-construction leads to the naturalization of the sociotechnical system,[32] which takes place when the system is completely integrated in the social fabric, when street and road users act, either complying with it or not, according to the script prescribed by engineers and legislators: "It is only when the script set out by the designer [or the engineer] is acted out – whether in conformity with the intentions of the designer or not – that an integrated network of technical objects and (human and nonhuman) actors is stabilized."[33]

The present doctoral work aims at contributing to the study of the automobility system, in Portugal, between 1920 and 1950, seeking to achieve a critical analysis of mobility, which departing from its materiality leads to a better understanding of the agency of the various actors who build and use it.

---

[28] Ruth Schwartz Cowan, 'The Consumption Junction: A Proposal for Research Strategies in the Sociology of Technology,' in *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, eds. Wiebe E. Bijker, Thomas P. Hughes, and Trevor J. Pinch (Cambridge, Mass./ London: The MIT Press, 1994 [1987]; reprint, 5), 261-280.

[29] Schot and De La Bruhèze, 'The Mediated Design of Products, Consumption and Consumers in the Twentieth Century,' p. 234.

[30] Paul Edwards, 'Infrastructure and Modernity: Force, Time, and Social Organization in the History of Sociotechnical Systems,' in *Modernity and Technology*, eds. Thomas J. Misa, Philip Brey, and Andrew Feenberg (Cambridge (MA): The MIT Press, 2003), 185-226.The question of the scale of analysis and its repercussion on the way of writing the history of technology was raised before by Thomas J. Misa, 'How Machines Make History, and How Historians (And Others) Help Them to Do So,' *Science, Technology, & Human Values*, 1988, 13, 3/4: 308-331.

[31] Sean O'connell, *The Car and the British Society: Class, Gender and Motoring, 1896-1939*, (Manchester, New York: Manchester University Press, 2001), p. 112.

[32] Edwards, 'Infrastructure and Modernity: Force, Time, and Social Organization in the History of Sociotechnical Systems.'

[33] Akrich, 'The De-Scription of Technical Objects,' p. 222.

(This text was submitted in May 2013)