HPSC0094

Political Economy of Science

Course Syllabus

2021-22 session | Dr Tiago Mata | t.mata@ucl.ac.uk

Course Information

Science is integral to the production of value and wealth in contemporary capitalism. In this module we will explore this relationship drawing from literatures from economic history, political sociology and the economics of research. We will examine how transformations in the political economy such as the rise of the corporation, the building up of national government bureaucracies and the expansion of financial markets have transformed how science is administered and commodified.

Basic course information

Course website:	See moodle.
Moodle Web site:	https://moodle.ucl.ac.uk/course/view.php?id=7497
Assessment:	Two essays of 2000 words each
Timetable:	Recorded lectures, Thursday pm face to face meetings
Prerequisites:	None
Required texts:	Readings listed below
Course tutor(s):	Dr. Tiago Mata, Dr. Charlotte Sleigh
Contact:	t.mata@ucl.ac.uk; c.sleigh@ucl.ac.uk
Web:	http://www.ucl.ac.uk/sts/staff/mata
Office location:	Meetings with tutor to be arranged via Microsoft Bookings

Schedule

UCL Week	Topic	Date	Activity
20	Why STS needs political economy	13 Jan	-
21	Technology and the business cycle	20 Jan	Read Freeman and Louçã
22	Corporate research	27 Jan	Read Griffard
23	Military managers	3 Feb	Read Leslie
24	Growthmanship	10 Feb	Read Godin
25	Reading week		
26	Intellectual property	24 Feb	Read Mirowski
27	Entrepreneurial Universities	3 Mar	Read Slaughter and Mazzucato
28	Neoliberal regulation	10 Mar	Read Nik-Khah
29	Venture capitalism	17 Mar	Read Stross
30	Future of capitalism (and science)	24 Mar	Read Scott

Assessments

Summary

	Description	Deadline	Word limit	Deadline for Tutors to provide Feedback
1	Essay on perspective of industry	24 Feb, 5pm	2,000	As advised in class
2	Essay on perspective of public policy	25 Mar, 5 pm	2,000	As advised in class

Assignments

The module is assessed by two pieces of coursework submitted via the "Turnitin" function of the module's moodle page.

Both assignments are individually written essays on the intermingling of science and economy.

Assignment 1.

The perspective of industry.

In this essay you are asked to reflect upon the uses of science and technology in contemporary business.

Pick one of the three essay topics:

A. ***Describe our current technological age.***
   Further guidance: use the concepts of week 2, Schumpeterian waves and Kondratiev cycles, identity the key industries, key technologies and how those set the pace of contemporary finance and business activity, you can mention the role of the state but that is not as important as the description of the business world.

B. ***Argue the case that "research and development plays commercial and political roles in contemporary business."***
   Further guidance: think of an industry that epitomizes this type of relationship i.e. where research and science are used to draw in customers, or to support public relations campaigns, or to protect firms against regulatory oversight. Demonstrate how the R&D is aimed at these effects analyzing documents and media from those firms, or relying on critical examinations by journalists or advocacy groups. Examples may include: beverages, oil and gas industry, automobile industry…

C. ***Argue the case that "research and development has transformed the business model and orientation of industry."***
   Further guidance: think of an industry that epitomizes this kind of relationship, i.e. where research and science and technology transformed the business model and the practice of production (In particular labor relations). Research intensive industries may be good candidates. Examples include: chemical industry, electronics, aerospace… Make the case by reference to the industrial sector's history of institutional transformation and examine how much of that is due to technological change. Taking an historical, long view outlook might be a good strategy.

For all of these essay topics you are encouraged draw on module literature but also to go beyond it using resources from the media (in particular the business press, *Bloomberg Markets, Fortune, BusinessWeek, Economist, Wall Street Journal, Financial Times, The Economist*) and academic literature in business studies, innovation studies, and political economy. Occasionally you may find relevant literature issued from think tanks, industry organizations or firms, you should use that literature but with special caution.

The essay should not exceed 2000 words (+ or – 10%, without references).

Assignment 2.

The perspective of public policy.

In this essay you are asked to reflect on how elevating innovation as national goal is reshaping public policy.

Pick one of the three essay topics:

A. **Draw the landscape of contemporary government led research and development noting which national governments spend the most in science and technology and where that expenditure is directed.**
   Further guidance: You may wish to start this essay with a statistical examination of the data series of OECD, complemented by studies of national statistical institutes. However, outlining a ranking of nations by R&D expenditure would not be sufficient, you must also drill into what categories of expenditures these innovation public funds are targeting and interpret those findings. What patterns emerge that help to distinguish nations? You may focus on many nations and zoom in on a few, or start with only a handful.

B. **How has innovation policy change in the UK from 1980 until now?**
   Further guidance: You will find several academic articles and government white papers that tell a partial story. The essay is primarily an exercise in synthesis of these various sources and of judgment over which ones to bring to the fore and which ones to disregard. A coherent picture might be one that gives us an arc of incremental change, or one that highlights different epochs, or one that highlights the play of party politics in shaping the intensify and character of innovation policy.

C. **How has policy on higher education been shaped by the demands of innovation?**
   Further guidance: You are encouraged to think in the near term, maybe the last 10 years, and examine how funding for academic research and for higher education institutions has changed to respond to demands for innovation. You are encouraged to think critically and evaluate what is gained or lost by the innovation emphasis.

Each of these essays asks you to work with slightly different material (data on A, academic literature on B, policy documents on C). You may wish to pick the essay topic by considering the nature of the research work involved.

The essay should not exceed 2000 words (+ or – 10%, without references).

Aims & objectives

Aims:

The aim of this course is to introduce students to literatures on the political economy of science. Students should complete the course with a repertoire of concepts and modes of analysis that allow them to examine the ways in which science is marshaled for the creation of economic value. They should be able to demonstrate how many of the discourses underlying the governance of research are underpinned by economic models and idealizations.

Objectives:

By the end of this module students should be able to:

- Use key concepts from political economy;
- Analyze the intermingling of scientific research, economy and politics;
- Describe the evolution of the relationship between scientific research and corporate capitalism;
- Demonstrate effective researching and critical reading skills;
- Be able to conduct a critical analysis and report such analyses persuasively and coherently;
- Create relevant and critical bibliographies for research projects on the subject;
- Present their work effectively in oral and written formats.

Reading list

Below is a simple abstract detailing the subject of the week's meeting and a list of core readings, only the essential and recommended ones, students must read and answer guiding questions on the readings identified in the schedule on page 2, for ease of reference these items are * below. Further optional readings will be noted in the Moodle/Library Reading List for the module.

Session 1. Why STS needs political economy, 13 January
A dominant approach in science studies is to conceive the meanings and values of "science" as ultimately flexible, subject to continuous negotiation. According to this view, to claim that science is a source of wealth is an act of "boundary work," no more true than the support it gathers from its social allies. This module is setting a different course. In our first week we define "political economy" to be our aid in tracing the work of science in contemporary capitalism. That definition must acknowledge that science is a driver in the production of economic value, and that science is therefore rooted to practices of commercial and financial valuation.

Edgerton, D (2017) "The Political Economy of Science: Prospects and Retrospects" in *Handbook of Political Economy of Science*.
Edgerton, D. (2012) "Time, Money, and History" *Isis*, 103(2): 316-327.
Calvert, J (2004) 'The idea of 'basic research' in language and practice' *Minerva*, Vol.42, Issue 3, pp.251-268.

Session 2. Technology and the business cycle, 20 January

In the interwar period, the Austrian economist and statesman Joseph Schumpeter sketched a powerful explanation for the convulsive character of capitalism. He noted that the boom and bust of economic activity, also known as the business cycle, was bound to the birth and maturity of classes of technologies. Schumpeter was developing themes that can be traced back to Karl Marx. But Schumpeter put Marx on its head, he held that for science and technology to function as pacemakers of economic activity a crucial actor was needed, the entrepreneur. Schumpeter invented the entrepreneur as a visionary risk taker that was able to translate the insights of science into economic opportunity and "super profits."

* Freeman, Christopher and Louçã, Francisco (2001) *As Time Goes By: From Industrial Revolutions to the Information Revolution*. Oxford: Oxford University Press, 257-335.
MacKenzie, Donald (1984) "Marx and the Machine" *Technology and Culture*, Vol. 25, No. 3: 473-502.

Session 3. Corporate Research, 27 January
For a time the corporate labs of the early twentieth century were legend. In the USA and in Germany, large-scale investment in mechanical, electrical engineering and biochemistry were seen as the backbone of those nations' sudden rise to global hegemony and world war antagonism. After World War II the reputation of those labs diminished partly because national governments took on a greater role in funding and managing science. Before we look at more contemporary patterns we review what we know of the history of corporate research paying particular attention to how it set priorities and how it evaluated its own success.

Reich, Leonard S., (2002) *The Making of American Industrial Research : Science and Business at GE and Bell, 1876-1926*. Cambridge: Cambridge University Press, 2002. chapters 2, 5, 8, 10.
*Giffard, Hermione (2016) Making Jet Engines in World War II : Britain, Germany, and the United States. Chicago: University of Chicago Press, chapter

Session 4. Military managers, 3 February
In 1961 in his farewell speech as President of the United States, the former General, former President of Columbia University, Dwight Eisenhower, warned of collusion between the military and industry gaining unwarranted influence upon the American government. The relationship between science and war is an old one, and in Cold War America that relationship was institutionalized through industry. We examine how by promising relative autonomy and abundant resources military industry came to set the research priorities of many eminent American universities.

Ferrary, M., & Granovetter, M. (2009). The role of venture capital firms in Silicon Valley's complex innovation network. *Economy and Society*, 38(2), 326–359.
* Leslie, Stuart W. (1993) *The Cold War and American science: the military-industrial-academic complex at MIT and Stanford*. New York: Columbia University Press, chapters 1, 2, 3.

Session 5. Growthmanship, 10 February
In the wake of the mass destruction of the Second World War and facing the threat of socialist revolution, western polities reworked a new social contract. Their promise of expanding

welfare provision and moderate income distribution rested on assumptions of continued economic growth. The expansion of gross domestic product (a metric that came into existence postwar) through grains in productivity became the fundamental aim of policy. The key contributor to productivity growth, so explained the economists, was not labour, nor capital, it was technology. Thus the state took increasing responsibility in incentivizing innovation. We review what regime of technological management emerged from this post-1945 social settlement.

Collins, Robert M. (2000) *More : The Politics of Economic Growth in Postwar Ame*rica. Oxford University Press, chapter 1 and 2.

* Godin, Benoît, 'The Emergence of S&T Indicators: Why Did Governments Supplement Statistics with Indicators?', *Research Policy*, 32 (2003), 679–91.

Schmelzer, Matthias (2016), *The Hegemony of Growth: The OECD and the Making of the Economic Growth Paradigm*. Cambridge University Press, chapter 5.

Session 6. Intellectual property, 24 February

The Bayh-Dole Act of 1980 triggered a transformation in how University research was valued and imagined. With the Act research institutions funded by federal funds were no longer required to relinquish intellectual property to the government. Individual scientists and universities, sometimes competitively and litigiously, could now appropriate the economic gains from knowledge funded by the public purse. The new legislative framing, together with unrelated but coincidental changes to University management, and the financiarization of western economies, made intellectual property into a crucial arbiter in decisions to allocate funds and in the career ideals of scientists. The current intellectual property regime has fused together the quest for knowledge with the quest for personal fortune.

* Mirowski, Philip (2011) *Science Mart: Privatizing American Science.* Cambridge: Harvard University Press. chapter 4.

Parthasarathy, Shobita (2017) *Patent politics : life forms, markets, and the public interest in the United States and Europe*. Chicago: University of Chicago Press, chapter 5. "Human genes, Plants, and the distributive implications of Patents"

Stiglitz, Joseph (1999) "Knowledge as a Global Public Good" *Global Public Goods: International Cooperation in the 21st Century* (ed.) Inge Kaul, Isabelle Grunberg, and Marc Stern. Oxford: Oxford University Press.

Session 7. Entrepreneurial Universities, 3 March

The classic view of the entrepreneur was of a capitalist, an individual, who seized an opportunity. In the past half century entrepreneurship has become a more ample concept that marks out an attitude. Individuals of all classes and collectives and institutions such as universities, can be deemed entrepreneurial if they seize opportunities to expand their commercial activity and their profit margins. Under the icon of entrepreneurship, corporate ideas have permeated the University administrations and transformed the ways they have framed research and education. As a result, a managerial culture of audit and economic valuation has taken root.

Ginsberg, B. (2020) *The fall of the faculty : the rise of the all-administrative university and why it matters.* New York: Oxford University Press, chapter 6 "Research and Teaching at the All-Administrative University"

Hazelkorn, E. (2015) *Rankings and the reshaping of higher education ; The battle for world-class excellence.* Basingstoke: Palgrave Macmillan, chapter 1, "Globalization and the reputation race."

Kleinman, D. L., and S. P. Vallas (2001) ''Science, Capitalism, and the Rise of the ''Knowledge Worker'': The Changing Structure of Knowledge Production in the United States.'' *Theory and Society* 30:451-92.

*Mazzucato, Mariana (2011) *The Entrepreneurial State*. London: Demos, chapters 5 (find online at: http://oro.open.ac.uk/30159/1/Entrepreneurial_State_-_web.pdf)

Session 8. Neoliberal regulation, 10 March

Neoliberalism identities a movement of intellectuals that distinguished themselves from classic liberals by rejecting the belief that markets arise unaided from human nature. For these academics and policy-makers markets are superior information processors that must be designed and brought into being through state action. Because of their superior regulatory powers markets are welcomed into all spheres of social activity. In the medical and pharmaceutical sciences this intellectual program has been extraordinarily influential, and the global marketplace has come to replace, and undermine, national regulatory oversight. We examine how greater efficiency and profitability for pharmaceutical firms has been accompanied by perverse effects on the production of medical knowledge.

*Nik-Khah, Edward (2014) "Neoliberal pharmaceutical science and the Chicago School of Economics" *Social Studies of Science*, 44(4), 489-517.

Sismondo, Sergio (2009) "Ghosts in the Machine: Publication Planning in the Medical Sciences" *Social Studies of Science*, 39(2), 171-198.

Session 9. Venture capitalism, 17 March

The rise of finance is the defining feature of contemporary capitalism. In this meeting we look at two features of finance, and of London finance. Since the 1970s growth in institutional investors - mutual funds, pension funds, hedge funds and lately sovereign wealth funds - has meant an expanding clientele for exciting bets in "start-ups". Empowered by immense wealth and the demand of high returns venture capitalists have impelled to success the corporate giants of our age. We review how VCs changed our understanding of innovation and technological progress and how they have narrowed the expectation of how long it should take for a technology to come to profitable fruition.

Lerner, Josh; Pierrakis, Yannis; Collins, Liam and Bravo Biosca, Albert (2011) *Atlantic Drift: Venture capital performance in the UK and the US*. NESTA research report.

Powell, Walter W. and Kaisa Snellman (2004) "The Knowledge Economy" *Annual Review of Sociology* 30, 199-220.

* Stross, Randall (2000) *E-boys, The First Inside Account on Venture Capitalists Work.* Crown Business, chapters tbc.

Session 10. The future of capitalism (and science), 24 March

The final meeting is dedicated to looking ahead. We live in a time of endless challenges. To some the most important concern is an ailing global economy, still recovering from financial crises and a devastating pandemic, others look further into the future to a climate emergency of colossal consequences, still others look backward to decades of growing inequalities. To all of these commentators science and technological change appears as the solution, even those that seek to transform capitalism look to technology as an enabler of radical institutional renewal. We use the resources of this module to take stock of these visions of catastrophe and redemption.

Sundararajan, Arun. (2016) *The Sharing Economy: The End of Employment and the Rise of Crowd-Based Capitalism*. MIT Press, chapter 4.

Brett Scott. *Heretic's Guide to Global Finance*: *Hacking the Future of Money*. Pluto Press, chapter 6, "DIY Finance.

* Mazzucato, Mariana (2019) Governing Missions in the European Union. European Commission. (find online at: https://www.ucl.ac.uk/bartlett/public-purpose/sites/public-purpose/files/governing-missions-report.pdf)

Bowles, Samuel, and Wendy Carlin (2020) "Shrinking Capitalism." *AEA Papers and Proceedings*, 110: 372-77.

Useful links

Using Moodle: https://wiki.ucl.ac.uk/display/ELearningStudentSupport/Moodle

UCL Library electronic resources: http://www.ucl.ac.uk/library/eresources.shtml

UCL Academic Integrity: https://www.ucl.ac.uk/students/exams-and-assessments/academic-integrity

UCL Guide to References, Citations and Avoiding Plagiarism:
http://www.ucl.ac.uk/library/training/guides/webguides/refscitesplag