Université Paris I Panthéon Sorbonne

UFR 02 : Sciences économiques Master 2 : Économie et sciences humaines 2018-2019

Vers la machine à gouverner

Herbert Simon and the Impossibility of a Democratic Computer

Présenté et sountenu par : CARLOS ALBERTO RIVERA CARREÑO

Directeur de mémoire : JEAN-SÉBASTIEN LENFANT L'Université Paris 1 Panthéon Sorbonne n'entend donner aucune approbation, ni désapprobation aux opinions émises dans ce mémoire ; elle doivent être considérées comme propres à leur auteur.



This text is free: you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation, either version 3 of the License or any later version.

This text is distributed in the hope that it will be useful, but **without any warranty**; without even the implied warranty of **merchantability or fitness for a particular purpose**. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with this text. If not, see http://www.gnu.org/licenses/.

Copyright ©SYNCO 2018.

Per il professore Giorgio Israel.
Benché i nostri destini fossero uniti da quell'anno fatale del 1492,
ho mancato il nostro incontro.
Sono arrivato in ritardo, come la coscienza della nostra generazione.
I campi sanguinanti sono così prossimi,
ma nessuno vede niente.
Nell'era dell'informazione, diventiamo più ignoranti.
Questo è il prezzo del biglietto d'ingresso.
Grazie a Lei l'ho capito, maestro.

CONTENTS

RESEARCH 1
Research Proposal Motivation 3 Subject-matter 3 Bibliography 4
Research Plan 9
Thesis Plan 11 Skeleton 11 Draft Outline 11
Task list 13
Research 15



RESEARCH PROPOSAL

Main question.
Secondary questions.
Scope and interrelations.
Research hypotheses.
Methodology.
☐ Keywords.
$\hfill\Box$ Debates & controversies.
\square Axes d'interpretation.
Sources.
$\hfill\Box$ Update list of key texts.

 \square Update list of key authors.

MOTIVATION

Generally speaking, I am interested in questions of methodology in the social sciences. More specifically, I am interested in the role of metaphors in the construction of social theories, and the place that these have accorded to determinism. Thus, I would like to explore the parallels between the understandingsabout the essence of nature, society, the mind, and the universe-in economics and those in the other natural and social sciences. Without any ambition to elevate the regime of truth of economics, I am genuinely puzzled by its acceptance by the general public, as if economics was a type of discourse about a certain reality with portentous social consequences. But what is this social reality that is the object of economics? How and why have economists come to think about social reality in this way? With this master's thesis, I want to contribute a tiny bit towards a better comprehension of this impasse.

As we have discussed previously, I want to focus my master's thesis around Henry Simon; therefore, the question of how he fits into the picture I just painted requires an answer. For the record, I am neither sympathetic to Simon's vision of the social world nor to his project of a general *science of the artificial*. Rather, I decided to structure the

thesis around him because unlike many neoclassicals of his generation, Simon fully drank the cyborg Kool-Aid of the postwar systems sciences, and thus, he took to heart the manmachine analogy to its final consequences—to the point where he was one of the founders of the field of artificial intelligence. Given that today artificial intelligence presents itself as the next holy grail of science, I find it valuable to write about Simon also as an excuse to study more about computer science and its ontology.¹

SUBJECT-MATTER

I would like to write about the computer as a political technology, specially in its guise as the so-called *machine à gouverner*: the ultimate delegation of political authority and responsibility to machines—or more generally, to automatic decision mechanisms.² Therefore, in this thesis, I will trace the genealogy of Simon's ideas on the computer and computation to understand their influence on his views on social organization. By doing this, I wish to inquire about Simon's pessimism on the prospects of human rationality and his delegation of decision-making to "more capable" systems such as machines and organizations.

My opinion, so far, on Simon is that his idea of bounded rationality served as a kind of excuse to subordinate and reduce the individual to play a very minor role in social organizations and the conduct of human affairs in general. And, from what I have read, Simon's epistemic pessimism—which, by the way, is not too distant from Hayek's—has roots both on a kind of personal obsession of his with the relation between individual responsibility and

^{1.} As Mirowski shows in *Machine Dreams* (2002), the development of the computer and its entourage of systems sciences have had profound consequences for postwar neoclassical economics.

^{2.} The idea is certainly not Simon's. In fact, as far as I know, the term *machine à gouverner* comes from a 1948 article in the newspaper *Le Monde*, in which a Dominican friar, Père Dubarle, reviewed Norbert Wiener's book *Cybernetics*. In fact, in his latter book *The Human Use of Human Beings* (1950), Wiener explicitly cites and discusses Dubarle's idea.

4 Research

ethical choice,³ and on his fascination with the fledgling computer technologies and their prospects. Therefore, in this master's thesis, I would like to dedicate an important part to Simon's relation to the computer. This is necessary to account for the importance of the treatment of information in his theories of organization. In fact, I surmise that what really preoccupied Simon wasn't rationality per se, but information.

In the second part of the thesis, I would like to discuss the political implications of Simon's ideas on the computer and computation. Unfortunately, I cannot say more about this, since my reading hasn't taken me that far, but I will very likely base this section on Philip Mirowski's Machine Dreams and Paul Edwards's The Closed World. Moreover, in Simon's article Heuristic Problem Solving: The Next Advance in Operations Research, he discusses the relation between Charles Babbage and Adam Smith's ideas, which echoes a discussion in the second chapter of Machine Dreams on these same men. I surmise that there could be some insightful material therein to construct this section. Although, I would like to mention Babbage and Jevons at some point to compare their thinking to Simon's, it is unlikely that time will allow for this.

Main question

What is Herbert Simon's definition of the computer? How did this concept influence his ideas of *the human*? And, what are the consequences for the organization of labor of this vision of man and machine?

Secondary Questions

What was the relation between the natural and the artificial for Simon, and how does this relation relate to his late-life project of a Science of the Artificial?

How do Simon's ideas on automation relate to his political views?

Did Simon subscribe to the unity of science thesis?

BIBLIOGRAPHY

This is a thematic bibliography organized around keywords. To facilitate reading, the book titles are highlighted in blue.

The Brain

Casey, Gerard and Aidan Moran (1989). "The Computational Metaphor and Cognitive Psychology". In: *Irish Journal of Psychology* 10.2, pp. 143–161.

Crowther-Heyck, Hunter (1999). "George A. Miller, Language, and the Computer Metaphor of Mind". In: *History of Psychology* 2.1, pp. 37–64.

Marshall, John (1977). "Minds, Machines and Metaphors". In: *Social Studies of Science* 7.4, pp. 475–488.

Pickering, Andrew (2010). *The Cybernetic Brain*. Chicago: The University of Chicago Press, p. 537.

The Cold War

Heyck, Hunter (2012). "Producing Reason". In: Cold War Social Science: Knowledge Production, Liberal Democracy, and Human Nature. Ed. by Mark Solovey and Hamilton Cravens. New York: Palgrave Macmillan. Chap. 6, pp. 99–116.

- (2014). "The Organizational Revolution and the Human Sciences". In: *Isis* 105.1, pp. 1-31.

Jones-Imhotep, Edward (2012). "Maintaining Humans". In: Cold War Social Science: Knowledge Production, Liberal Democracy, and Human Nature. Ed. by Mark Solovey and Hamilton Cravens. New York: Palgrave Macmillan. Chap. 10, pp. 175–195.

Rohde, Joy et al. (2012). Cold War Social Science: Knowledge Production, Liberal Democracy, and Human Nature. Ed. by Mark Solovey and Hamilton Cravens. New York: Palgrave Macmillan.

Weidman, Nadine (2012). "An Anthropologist on TV: Ashley Montagu and the Biological Basis of Human Nature, 1945-1960". In: Cold War Social Science: Knowledge Production, Liberal Democracy, and Human Nature. Ed. by Mark Solovey and Hamilton Cravens. New York: Palgrave Macmillan. Chap. 12, pp. 215-232.

I am not aware that Simon was a particularly religious man, but these concerns are quite clearly influenced by christian morality and Simon's American-style liberal values.

The Computer

- Campbell-Kelly, Martin et al. (2014). Computer: A History of the Information Machine. Westview Press.
- Dasgupta, Subrata (2014). *It Began with Babbage: The Genesis of Computer Science*. Oxford University Press.
- Edwards, Paul (1997). The Closed World: Computers and the Politics of Discourse in Cold War America. Cambridge: MIT Press.
- Gigerenzer, Gerd and Daniel G. Goldstein (1996). "Mind as Computer: Birth of a Metaphor". In: *Creativity Research Journal* 9.2, pp. 131–144.
- Heyck, Hunter (2008a). "Defining the Computer: Herbert Simon and the Bureaucratic Mind—Part 1". In: *Annals of the History of Computing, IEEE* 30.2, pp. 42–51.
- (2008b). "Defining the Computer: Herbert Simon and the Bureaucratic Mind—Part 2".
 In: Annals of the History of Computing, IEEE 30.2, pp. 52-63.
- Lévy, Pierre (1992). *La machine univers: Création et culture informatique*. Points-Sciences. Seuil.
- Mackenzie, Donald (1995). "The Automation of Proof: A Historical and Sociological Exploration". In: *IEEE Annals of the History of Computing* 17.3, pp. 7–29.
- Mirowski, Philip (2002). *Machine Dreams: Economics Becomes a Cyborg Science*. Cambridge University Press.
- Newel, Allen and Herbert Simon (1976). "Computer Science as Empirical Inquiry: Symbols and Search". In: *Communications of the ACM* 19.3, pp. 113–126.

Metaphors

- Hodgson, Geoffrey et al. (1994). Natural Images in Economic Thought: "Markets Read in Tooth & Claw". Ed. by Philip Mirowski. Cambridge University Press.
- Mayr, Otto (1989). *Authority, Liberty and Automatic Machinery in Early Modern Europe.*Johns Hopkins University Press.
- Riskin, Jessica (2003). "The Defecating Duck, or, the Ambiguous Origins of Artificial Life". In: *Source: Critical Inquiry* 29.4, pp. 599–633.
- Schaffer, Simon (1994). "Babbage's Intelligence: Calculating Engines and the Factory System". In: *Critical Inquiry* 21.1, pp. 203–227.

- (1999a). "Enlightened Automata". In: The Sciences in Enlightened Europe. Ed. by Jan Golinski, William Clark, and Simon Schaffer. Chicago: University of Chicago Press. Chap. 5.
- Thompson, Edward (1967). "Time, Work-Discipline, and Industrial Capitalism". In: *Past & Present* 38, pp. 56–97.

Herbert Simon

- Ando, Albert (1979). "On the Contributions of Herbert A. Simon to Economics". In: *The Scandinavian Journal of Economics* 81.1, pp. 83–93.
- Cyert, Richard M. and Herbert Simon (1983). "The behavioral approach: With emphasis on economics". In: *Behavioral Science* 28.2, pp. 95–108.
- Druzdzel, Marek and Herbert Simon (2013). "Causality in Bayesian Belief Networks". In: Proceedings of the Ninth Conference on Uncertainty in Artificial Intelligence (UAI1993).
- Eisenstadt, Stuart and Herbert Simon (1997). "Logic and Thought". In: *Minds and Machines* 7.3, pp. 365–385.
- Heyck, Hunter (2005). *Herbert Simon: The Bounds of Reason in Modern America*. Baltimore: Johns Hopkins University Press.
- Iwasaki, Yumi and Herbert Simon (1993). "Retrospective on "Causality in Device Behavior"". In: *Artificial Intelligence* 59, pp. 141–146.
- (1994). "Causality and Model Abstraction". In: *Artificial Intelligence* 67, pp. 143–194.
- Kalagnanam, Jayant, Herbert Simon, and Yumi Iwasaki (1991). "The Mathematical Bases for Qualitative Reasoning". In: *IEEE* Expert-Intelligent Systems and their Applications 6.2, pp. 11–19.
- Klaes, Matthias and Esther-Mirjam Sent (2005). "A Conceptual History of the Emergence of Bounded Rationality". In: *History of Political Economy* 37.1, pp. 27–59.
- Millican, Peter and Andy Clark (1999). "Machine as Mind". In: *Machines and Thought.*The Legacy of Alan Turing. Ed. by Peter Millican and Andy Clark. Clarendon Press. Chap. 5.
- Minsky, Marvin et al. (1977). "History of Artificial Intelligence". In: *IJCAI'77 Proceedings* of the 5th International Joint Conference on Artificial Intelligence. Vol. 2, pp. 561–563.

6 Research

Sent, Esther-Mirjam (2001b). "Sent Simulating Simon Simulating Scientists". In: *Studies in History and Philosophy of Science Part A* 32.3, pp. 479–500.

- (2005a). "Simplifying Herbert Simon". In: *History of Political Economy* 37.2, pp. 227–232.
- Simon, Herbert (1956b). "Rational Choice and the Structure of the Environment". In: *Psychological Review* 63.2, pp. 129–138.
- (1959). "Theories of Decision-Making in Economics and Behavioral Science". In: *The* American Economic Review 49.3, pp. 253– 283.
- (1960a). "Management by Machine". In: *The Management Review* November, pp. 12–80.
- (1960b). "The Corporation: Will it Be Managed by Machines?" In: Management and Corporations, 1985: A Symposium Held on the Occasion of the Tenth Anniversary of the Graduate School of Industrial Administration, Carnegie Institute of Technology. Ed. by Melvin Anshen and George Leland Bach. McGraw-Hill, pp. 17–55.
- (1965). The Shape of Automation for Men and Management. New York: Harper & Row Publishers.
- (1967). "Programs as Factors of Production." In: *California Management Review* 10.2, pp. 15-22.
- (1973). "Organization Man: Rational or Self-Actualizing?" In: Public Administration Review 33.4, pp. 346-353.
- (1977a). Models of Discovery: and Other Topics in the Methods of Science. Vol. 54. Dordrecht: D. Reidel Publishing Company.
- (1977b). "What Computers Mean for Man and Society". In: *Science* 195.2.
- (1978). "Rational Decision-Making in Business Organizations". In: Nobel Memorial Lecture.
- (1980). "Cognitive Science: The Newest Science of the Artificial". In: Cognitive Science 3346, pp. 33-46.
- (1981). "Prometheus or Pandora: The Influence of Automation on Society". In: Computer 14.11, pp. 69-74.
- (1983a). "On the Behavioral and Rational Foundations of Economic Theory".
- (1983b). Reason in Human Affairs. Stanford: Stanford University Press.
- (1983c). "What is Industrial Democracy?" In: *Challenge* January-February, pp. 30–39.

- (1984). "Robots: Who Wants Them And Why?" In: *Carnegie-Mellon Magazine* Winter, pp. 12–19.
- (1985a). "Artificial Intelligence: Current Status and Future Potential". In: Charles H. Davis Lecture Series, The Naval War College. Washington, DC.: The Academy Press, pp. 11–23.
- (1985b). "Human Nature in Politics: The Dialogue of Psychology with Political Science". In: *The American Political Science Review* 79.2, pp. 293–304.
- (1986a). "Rationality in Psychology and Economics". In: The Journal of Business 59.4, pp. 209-224.
- (1986b). "Whether Software Engineering Needs to Be Artificially Intelligent". In: *IEEE Transactions on Software Engineering* 12.7, pp. 726-732.
- (1988a). Bibliography.
- (1988b). "Freedom and Discipline". In: *Religious Humanism* 22.1, pp. 2-6.
- (1990). "Invariants of Human Behavior". In: *Annual Review of Psychology* 41, pp. 1–19.
- (1991a). "Artificial Intelligence: Where Has It Been, and Where is it Going?" In: IEEE Transactions on Knowledge and Data Engineering 3.2, pp. 128–136.
- (1991b). "Bounded Rationality and Organizational Learning". In: Organization Science 2.1, pp. 125-134. arXiv: /ehis.ebscohost.com/[http:].
- (1991d). "Organizations and Markets". In:
 The Journal of Economic Perspectives 5.2,
 pp. 25-44.
- (1993). "Anecdotes: A Very Early Expert System". In: *IEEE Annals of the History of* Computing 15.3, pp. 64-68.
- (1995). "Artificial Intelligence: An Empirical Science". In: Artificial Intelligence 77, pp. 95-127.
- (1996a). "The Patterned Matter that is Mind". In: Mind matters: A tribute to Allen Newell. Carnegie Mellon Symposia on Cognition. Ed. by D. M. Steiner and T. M. Mitchell. Mahwah: Erlbaum Associates. Chap. 11, pp. 407–431.
- (1996b). The Sciences of the Artificial. 3rd ed.
 Cambridge: MIT Press.
- (1997). "The Future of Information Systems". In: Annals of Operations Research 71, pp. 3-14.
- (1998). "Information 101: It's Not What You Know, It's How You Know It". In: *The Jour-*

- nal for Quality & Participation 21.4, pp. 30-33.
- (1999). "The Many Shapes of Knowledge".
 In: Revue d'économie industrielle 88.2e trimèstre, pp. 23-39.
- (2000c). "Public Administration in Today's World of Organizations and Markets". In: Political Science & Politics 33.4, pp. 749-756.
- (2000d). "Review: Barriers and Bounds to Rationality". In: Structural Change and Economic Dynamics 11, pp. 243–253.
- (2001a). "¿Por qué la administración pública?" In: Revista de Economía Insitutional 4.Primer Semestre, pp. 119-122.
- (2001b). "Complex Systems: The Interplay of Organizations and Markets in Contemporary Society". In: Computational & Mathematical Organization Theory 7, pp. 79–85.
- (2001c). "Pro- and Anti-Lists of the Most Significant Contributions to Economic Literature of the Twentieth Century". In: The European Journal of the History of Economic Thought 8.3, pp. 309-310.
- (2002a). "Explaining the Ineffable: Al on the Topics of Intuition, Insight and Inspiration".
 In: Cognitive Psychology, pp. 939-948.
- (2002b). "Near Decomposability and the Speed of Evolution". In: *Industrial and Cor*porate Change 11.3, pp. 587–599.
- (2007). The Economic Effects of Automation.
- (n.d.). Herbert Simon's Last Public Lecture: Public Administration in Today's World of Organizations and Markets.
- Simon, Herbert and Albert Ando (1961). Aggregation of Variables in Dynamic Systems. Tech. rep. 2, pp. 111–138.
- Simon, Herbert and Stuart Eisenstadt (1998). "Human and Machine Interpretation of Expressions in Formal Systems". In: *Synthese* 116.3, pp. 439–461.
- Simon, Herbert, Marti Hearst, and Haym Hirsh (2000). "AI's greatest trends and controversies". In: *IEEE Intelligent Systems*.
- Simon, Herbert and Pat Langley (1995). "Applications of Machine Learning and Rule Induction". In: *Communications of the ACM* 38.11, pp. 55–64.
- Simon, Herbert and Allen Newell (1958). "Heuristic Problem Solving: The Next Advance in Operations Research". In: *Operations Research* 6.1, pp. 1–10.
- (n.d.). "Human Problem Solving: The State of the Theory in 1970". In: *American Psychologist* ().

- Simon, Herbert and Yulin Qin (1990). "Laboratory Replication of Scientific Discovery Processes". In: *Cognitive Science* 14, pp. 281–312.
- Simon, Herbert and Andrew Stedry (1970). "Psychology and Economics". In: *The Handbook of Social Psychology*. Ed. by Gardner Lindzey and Elliot Aronson. 2nd ed. Vol. 5. Addison-Wesley Publishing Company. Chap. 40, pp. 269–314. arXiv: 00368075.
- Simon, Herbert and Dieter Wallach (1999). "Editorial: Cognitive Modeling in Perspective". In: *Kognitionswissenschaft* 8, pp. 1–4.
- Tabachneck, Hermina J M and Herbert Simon (1994). "What you see is what you get—but do you get what you see?" In: *Conference companion on Human Factors in Computing Systems CHI '94*, pp. 293–294.
- Vera, Alonso and Herbert Simon (1994). "Reply to Touretzky and Pomerleau: Reconstructing Physical Symbol Systems". In: *Cognitive Science* 18, pp. 355–360.

The Social Sciences

- Backhouse, Roger, Philippe Fontaine, et al. (2010). *The History of the Social Sciences since 1945*. Ed. by Roger Backhouse and Philippe Fontaine. Cambridge University Press.
- Dupuy, Jean-Pierre (2005). *Aux origines des sciences cognitives*. Poches Sciences. La Découverte.
- Miller, James G. (1955). "Toward a General Theory for the Behavioral Sciences". In: *American Psychologist* 10.9, pp. 513–531.
- Porter, Theodore et al. (2003). The Cambridge History of Science: The Modern Social Sciences. Ed. by Theodore Porter and Dorothy Ross. Vol. 7. The Cambridge History of Science. Cambridge: Cambridge University Press.
- Ross, Dorothy (1991). *The Origins of American Social Science*. Cambridge: Cambridge University Press.

RESEARCH PLAN

Look up into the history of Herbert Simon's

THESIS PLAN

SKELETON

Section		Length
Introduction		20
Chapter 1		25
	Section 1	
	Section 2	
	Section 3	
Chapter 2		25
	Section 1	
	Section 2	
	Section 3	
Conclusion		5
Total		80

DRAFT OUTLINE

Introduction

Chapter 1

Section 1 Background on the cold war and the computer.

Section 2 Simon's place in the context just given. That is, historical information on Simon.

Section 3 Simon's history with the computer and artifical intelligence.

Chapter 2

Discuss Simon's article on economic democracy and his views of the organization of labor.

Section 1

Section 2

Section 3

Conclusion

TASK LIST

\Box Check	with	adviser.	
--------------	------	----------	--

- $\hfill\Box$ Check with selected readers.
- $\hfill\Box$ Update the Framework.

RESEARCH

Final Sifting.
\Box Update list of key texts.
$\hfill\Box$ Update list of key authors.
If necessary, update any component of the Framework.