

THE DIGITAL SOCIETY INITIATIVE

INSTITUT D'ECONOMIE INDUSTRIELLE (IDEI)

INSTITUTE FOR ADVANCED STUDIES IN TOULOUSE (IAST)

TOULOUSE SCHOOL OF ECONOMICS (TSE)

14 MAY 2013

OBJECTIVES

Every day, multitudes of small decisions are made by entrepreneurs, large corporations, governments and individuals, making our world ever more interconnected. Another house is connected through fiber; a new standard is proposed; a startup proposes a new way of sharing souvenirs; a blogger tries to create a new online community. In the aggregate, our civilization is changing. We can communicate and cooperate at extremely low costs despite distance; our tools speak to each other and to us; the information of the world is at our fingertips. Sometimes, we feel that we are just another processor connected to a network of other processors, both physical and human. We need to learn how to have close working relationships with people we have never met in person; we (or at least some of us) look for love interests in a virtual world; our sense of privacy is eroded by the sharing of large amount of private information; universities explore entirely new ways of transmitting knowledge; and the reader will be able to add in many ways to this list.

For the last two decades, economists of the Institut d'Economie Industrielle (IDEI) and of the Toulouse School of Economics (TSE) have been at the forefront of the economic analysis of these phenomena. To take but one example, the notion of two-sided markets, which provides the fundamental theoretical tool for the analysis of platforms and electronic markets, was invented and developed in Toulouse. Both fundamental and applied research along these lines still flourishes and will continue for the foreseeable future.

However, more is needed.

First, changes in the fundamental texture of our civilization cannot be examined only through the lens of economics. A close relationship with other social sciences - law, psychology, sociology, and others - is needed. For instance, the costs of a loss of privacy cannot be analyzed without understanding better the psychological and sociological forces that make us want to hide certain aspects of our lives from others, and the policies that protect this privacy cannot be analyzed without close attention to legal details.

Secondly, these changes and their policy implications concern all citizens and not only politicians, regulators, business people and scholars. More can be done by scholars and researchers to provide opinion formers in the media as well as ordinary citizens with information and analysis to help them understand these changes.

It is in this context that, beginning in early 2013, the three world-class research institutes at the University de Toulouse-1 Capitole listed at the head of this document will launch the “Digital Society Initiative”. This is a program of policy-oriented research outreach and public education about current and future technological innovation in the field of digital technology. As discussed above, the IDEI and TSE already have an outstanding international reputation for frontier research on the economic aspects of these questions. The Institute for Advanced Studies in Toulouse (IAST) is a new interdisciplinary research institute, selected by an international jury as a “Laboratoire d’Excellence” in 2011 and funded by the French government. It will provide a home for a vibrant community of scholars who work in and at the intersection of anthropology, biology, history, law, philosophy, political science, psychology and sociology.

Through this initiative, we will collaborate with partners in the public and private sectors and in civil society, in a non-partisan spirit and without association with any of the private or public commitments of those partners. Our aim can be summarized as opening up the debate about the digital society from the expert to the citizen, while treating the technical and social science aspects of these questions with the rigor and seriousness they deserve.

ACTIVITIES

The Digital Society Initiative will involve five main types of activity:

1. Policy-oriented inter-disciplinary research. This will draw on fundamental research being done in Toulouse and throughout the world but will emphasize the big picture: what are the implications of digital developments for the evolution of our society? Examples of the topics on which such research will be conducted are set out in section 3 below.
2. Publication of the research both in peer-reviewed journals and in outlets oriented to a more general readership.
3. Publication of short, non-technical pamphlets setting out the questions for a general audience and providing some of the basic facts and analysis to enable an informed assessment to be made. There will be an emphasis on high visual standards and professional pedagogic presentation. We will investigate collaborations with a university or trade publisher to increase the visibility of such a series.
4. Conferences and lectures, open to the general public, not just in Toulouse but at a range of venues around the world.
5. Website and social media presence, including forums for discussion of issues raised under 3) and 4).

Membership of the Digital Society Initiative, which involves sharing of expertise as well as financial resources is open at three different levels:

- A. Charter members: mainly corporate sponsors and foundations.
- B. Civil society members: charities and NGOs, public sector bodies.
- C. Partners: organizations contributing expertise and sharing responsibility for some of the activities.

Memberships are available at much lower rates than our standard research partnerships,. They provide a unique opportunity to support our world-class research programs in these areas of importance to the world’ citizens. For more information about terms and benefits, please contact us at Jacques.Crémer@tse-fr.eu or Paul.Seabright@tse-fr.eu.

THE MAIN RESEARCH THEMES

The following paragraphs set out a range of questions that the Program will address, stressing the need for interdisciplinary thinking on each of them. The list is indicative, not exhaustive.

PRIVACY

Modern economic and social management requires both firms and governments to collect and analyze large amounts of data about individual citizens. Where is the balance to be drawn between these legitimate aims and the protection of privacy? The economic value of data collection is very large, although this value is often poorly understood even by the educated public. The cost of dissemination of this information is harder to quantify in great part because the very idea of a private sphere of life that deserves protection has evolved over time and across cultures and needs to be understood in a historical and cultural context. Policy analysis needs to integrate insights from psychology, history, and sociology in order to study this value; from economics in order to think through the incentives of the economic agents in charge of protecting this privacy; from law in order both to find the language to express this policy and to disentangle the rights of individuals and those of users of information.

DIGITAL SECURITY

Many modern systems of information management are vulnerable to software error or malicious hacking. What can be done to ensure that such systems are robust? Economists typically study the strategic interactions between cyber defenses and attackers as two person games. However, attacking computer systems is also a market activity in which thousands of individuals supply labor in response to demand from companies, criminal organizations and governments. As with any market, policymakers need to understand the dynamics that determine the supply of attacks and the demand for defense mechanisms. We will analyze this equilibrium using formal mathematical models from microeconomics, predator-prey models in biology, and epidemiology. The resulting insights will, in turn, help us to identify instances where modest policy interventions can yield large returns.

DIGITAL DISSEMINATION OF DANGEROUS INFORMATION

Access to advanced technologies is increasingly synonymous with access to information. This has made the Internet and other technologies for sharing data a powerful driver for human progress and economic development. At the same time, shared data also makes it easier for rogue states and terrorists to acquire Nuclear, Chemical, Biological, and Cyber weapons. Traditional policy responses focus on keeping these “dual use” technologies secret and creates difficult conflicts with Internet policy and open science. At the same time, we know that this conflict is often a false choice. Indeed, transparency played an essential role in exposing and/or destabilizing illicit programs in Nazi Germany (atomic weapons), the Soviet Union, Iraq, and South Africa (biological weapons) and the terrorist group Aum Shinrikyo (toxin weapons).

We will use insights from the new science of “synthetic biology” – which uses artificial DNA to “program” exotic organisms for tasks like making jet fuel and destroying cancers – to explore these ideas. Over the past ten years synthetic biologists have discussed numerous on-line strategies for improving security including (a) developing open source database collaborations to identify dangerous DNA sequences, (b) fostering new norms for reporting illicit activities, (c) creating

community panels to review experiments that could potentially lead to more powerful weapons technologies, and (d) building closer and more regular contacts between the community and “Do-It-Yourself” amateurs. We will use advanced social science methods to evaluate the feasibility and efficacy of these proposals along with detailed institutional recommendations for implementing them.

THE DIGITAL ENCODING OF CULTURAL HERITAGE

Many aspects of our common cultural heritage, including works of literature and the visual arts, can be digitally encoded. Who, and under what conditions, should have access to this digital encoding? Digital encoding can require large expenditures of economic resources, and free access might not be feasible. Important insights can be gained from applying economic tools such to answer this question as well as others such as the returns to such investments (how do closely citizens treat digital representations as substitutes for their analogue originals? what is the impact of access to digital representations on “downstream” creative activity?). Other disciplines are needed to illuminate why and how certain aspects of a society’s cultural heritage are treated as expressive of its collective values, and why access to them on privileged terms may be considered to form part of the rights of citizens in the society. Many citizens believe that the true worth of cultural items is not determined by how much individuals actually value them but is an ethical matter which require other ways of thinking about the issues.

MEDIA PLURALISM

Safeguarding pluralism in the news and information media is considered of fundamental importance in many societies, some of which have specific constitutional or legal safeguards in place (for instance with respect to mergers in the media industries). Does the spread of information technology make concerns about pluralism redundant, by reducing the costs of publishing and disseminating information? Or does it make them even more pertinent, by raising the barriers to gaining the attention of other citizens in the cacophony of information to which they are subject? (Similar issues may apply to linguistic pluralism in multilingual societies.) Understanding the changing nature of equilibria in the media and information industries as the costs of information creation and dissemination fall will require the tools of industrial economics. But other disciplines are needed to illuminate the value of media pluralism independently of its economic benefits; to investigate its contribution to the openness and quality of political debate; and to examine the fragility of its socio-political foundations (because political authorities, whose active or tacit acceptance is required for the implementation of measures to safeguard pluralism, may often be those most threatened by it).

DIGITAL HEALTH

Information technology will soon enable personalized medicine. Individuals will have access to treatments will be better adapted to their circumstances (including their genome), but also they will be able to use smartphone-like technology to produce self-diagnoses and self-treatments that substitute for services traditionally provided by doctors. What will be the appropriate role of face-to-face medicine given such developments? How can we ensure that the greatest benefits of such technologies are realized while not rendering medicine completely impersonal? Such technologies may be difficult to implement unless those in charge of making the decisions to do so perceive a clear benefit, and not just a threat to their current functions and economic rewards. There are also large scale economies in the production of such technologies, which with the likely presence of major

externalities, create an important role for public investment and regulation. However, relational and psychological factors, including placebo effects, have an influence on individual health that is both very large and very poorly understood. Indeed, doctors play an important social and symbolic role in the management of individuals' passage through the life-cycle, and technological changes have an impact on the power and influence doctors wield. This role makes it all the more important to use multi-disciplinary insights to illuminate the continuing place of face-to-face relations in the field of health.

ONLINE EDUCATION

Education uses two kinds of input, information and skilled labor, whose relative price has changed spectacularly in recent years, and on these grounds alone the underlying economic model of educational provision is in the process of radical change. Indeed, online education initiatives are already demonstrating their potential to replace many of the functions of traditional schools and universities. How much will physical proximity (of teachers to students and of students to each other) continue to matter in education, and if it does to any significant degree, how can educational institutions be designed to accord it its proper place?

Other disciplinary insights matter here as well: education trains citizens and not just workers; face-to-face education may inculcate certain values (of modes of argument and how to treat intellectual opponents, for instance) that online education may not; and ideas of education as a right rather than just as a consumption or an investment good may shape the terms on which education can be supplied (for example, if public education is constrained to be free of charge, it may be more feasible in some parts of the world to supply a free broadband connection and a free online enrolment than to provide free high-quality schools).

PERSONAL FINANCIAL SERVICES

Increasingly sophisticated software for the management of individuals' financial affairs is available, but many individuals find that software cannot replace personal advice. How important will the role of personal trust continue to be in the provision of financial services? Individuals' trust in financial systems is determined by many complex factors, and not just by beliefs about clearly economic returns. Liability for the failure of investments also provokes ethical and political arguments (about the relative deservingness of creditors and debtors, for example). At the same time not enough is known about the trade-offs between economic and non-economic aspects of the problem. For instance, the relative risk-return performance of algorithmic investment methods, as opposed to those that rely on the judgment of professional financial advisers, is still poorly understood. There may also be market-wide effects of the adoption of algorithmic investment methods (including potentially greater vulnerability to market crashes), which raise important issues about the extent to which subjective feelings of trust and confidence in elements of the financial system are compatible with a trustworthy financial system overall.

DIGITAL INFRASTRUCTURE FOR FIGHTING POVERTY

Mobile telephony and the internet have already shown great potential for delivering services to the poor, in Africa and in many of the world's poorest regions. How much will the full realization of this potential in the future depend on public investment and/or on regulation? Large amounts of investment in infrastructure are required, and the resources need to come from somewhere, so

standard techniques of cost benefit analysis will continue to be highly relevant. At the same time, some societies, or at least some of their members, are likely to view “digital exclusion” as not just an economic matter but also as an affront against certain political values. The choice between supplying infrastructure to poor regions, and encouraging the citizens of poor regions to move to places with better infrastructure, is a politically contested choice. Digital empowerment of the poor will affect the balance of political power between income groups, social classes, regions and ethnic groups. These considerations all mean that the political and legal aspects of digital infrastructure deserve thorough examination.

INTERGENERATIONAL CONFLICTS OVER DIGITAL INVESTMENT

In all societies, digital technology is mastered much better by those between the ages of 15 and 40 than by those between the ages of 40 and 65. However, this second group controls more economic resources and has more political power than the first. Given the large resources required to fund investment in digital technology and the importance of intelligent rules to govern its use, how can the necessary understanding between the generations be achieved and what kinds of conflict might arise? Many applications of information technology (such as the use of robots or more generally automated systems for care of the sick or housebound) have the greatest cost-saving potential in respect of care of the elderly, which would otherwise become one of the largest claims on society’s resources in the coming decades. Multi-disciplinary approaches to these questions will be particularly important, because there are well-documented behavioral biases in the decisions of young people about their own long-term future; because those investing resources in digital technology often have only a superficial understanding of the functioning of the technology, and have to take such matters on trust; and because care of the elderly involves issues of dignity and respect, and different digital technologies will have different impacts on the way in which the elderly can expect to be treated.

THE POLITICAL AND PHILOSOPHICAL ACCEPTABILITY OF INEQUALITY IN THE DIGITAL ECONOMY

A common theme running through many of the preceding topics is that changes in the technology of production will have an impact on the ownership of productive assets. While there is widespread enthusiasm (and has been for well over a century) about the potential of technology for enhancing both living standards and the quality of life, the rules determining asset ownership will affect the extent to which the benefits of such technology will be widely shared. In addition to the economic issues discussed above, there are important ethical and political aspects to the problem. Ethical and political intuitions about acceptable levels of inequality depend on ideas about the extent to which differences between individuals arise from hard work or luck. These ideas are subject to social and political argument and can vary significantly over time and between societies. The issues are also likely to become substantially more important over time: theoretically possible levels of inequality in the digital society are much greater than in most societies in the recent past (imagine if one individual held a patent on all of the processes required to make robots capable of caring for the elderly, or on a technology central to medical scanning for Alzheimers’ disease). This may test ethical and political intuitions in ways to which past experience provides little guidance.