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Book Reviews

Sending Your Government a Message. E-mail Communication Between Citizens and Government

C. Richard Neu, Robert H. Anderson and Tora K. Bikson

Santa Monica, CA, RAND Science and Technology, 1999, xxx + 200 pp., ISBN 0 8330 2754 9

This is a sequel to an earlier RAND report: *Universal Access to E-mail Feasibility and Societal Implications* (1995) in which the major policy conclusions and recommendations were:

- it is critical that electronic mail be a basic service in a National Information Infrastructure;
- it is important to reduce the increasing gaps in access to basic electronic information services, specifically, access to electronic mail services;
- there are no fundamental technical barriers to providing universal access to electronic mail services.

The new volume takes up the question: 'What are the opportunities for and the obstacles to increased use of the Internet and electronic mail to facilitate communication between government agencies and their citizen clients?' (p. iii). This interaction is viewed as expansion of citizen–government personal electronic communication—not simply downloading, e.g. tax forms, but 'involving personal information, iterated communications between an individual and a government agency, and the use of a personal electronic mailbox for the individual' (pp. iii–iv). The results of an informal survey of current state uses of such communication, supplemented by two substantial case studies of potential use, are included and electronic access trends in the US are updated from the 1995 report.

A distinction is drawn between form based (messages relying for their formulation on pre-structured response fields) and free form (open ended and not formally pre-structured) messages. The majority of examples of complex messages in government–citizen interactions were form based. At the time of the survey (the summer of 1997), the general findings were:

- almost all states post forms for downloading, especially for tax purposes;
- no states were offering citizens the opportunity to make on-line applications for social welfare benefits;
- the main barriers to increased use were security, costs, and socially constructed barriers such as technophobia and (dis)trust;
- there is 'no one size fits all' solution to the disparate communications needed between government and citizens.

The two case studies were:

Health Care Financing Administration and the Medicare Program,

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California's Employment Development Department and its Unemployment Insurance Program

The security issues indicate that certificate authorities will have to meet the following criteria (p. xx):

- highly reliable identification of agencies and users;
- local presence (to provide periodic in-person interactions to verify identity of a person seeking a certificate);
- extensive customer service (to handle service requirements, such as answering questions and restoring or replacing compromised certificates).

Trends data were 'not encouraging … many gaps in the availability of a computer at home were major in both [1993 and 1997] and had *widened* in the four-year interval' (p. xxi). Despite there being 'a number of operational concerns', the report argues that there is a strong case for the immediate development of e-mail capability for handling significant volumes of personalized communication: it can be cheaper than postal or telephone communications; it allows improved service; and 'Citizens will eventually insist on communication with government agencies by e-mail' (p. xxiii).

The report asks 'Why are millions of dollars' worth of interactive transactions taking place daily on the Internet, yet important (legal, monetary, etc.) on-line transactions between government and citizen are not?' (p. xiii). The report is useful but it does not deal adequately with limitations detectable in the current state of affairs.

- Nearly half the US population does not have access. This has implications for the costs of providing 100% access, and, in the interim, for the costs of operating dual systems, if the proposed use 'for all' (p. xxv) is to be honored.
- Homogeneous goods account for the bulk of trade on the Internet. The reason is that for other goods, it is more difficult and more costly to define a search pattern.[1] There are technology optimists who look forward to the early development of more sophisticated software agents than are currently available that will enable the more complex types of goods, services and interactions to be dealt with—presumably by endowing the software agent with the entire mind set of the citizen.
- The real costs have not been measured. There is growing tension between legal relations and fundamental economic determinants. Additional costs may well be involved if the time factor proves to be more important than plans allow. Citizens may well wish and feel entitled to time to reflect. In the financial sector there have been interesting legal cases that turned on whether a 'clear understanding' had been effectively communicated. All in all there seems to be plenty of scope for legal tussles.

Reference

1. N. Vulkan, 'Economic implications of agent technology and E-commerce', *Economic Journal*, 109, 1999, pp. F67–F90.

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World Development Report 1998/99: Knowledge for Development

The World Bank

Oxford, Oxford University Press, 1999, viii + 252 pp., US$50.00, £35.00, ISBN 0 19 521119 7 hbk or US$35.00, ISBN 0 19 521118 9 pbk

This report, the 21st World Development Report, should be read by anyone interested in the role of information and knowledge in economic development. Written under the general direction of Joseph Stiglitz and Lyn Squire, it provides a much needed 'knowledge perspective' on development, and puts forward the somewhat idealistic vision of the World Bank as a 'knowledge bank'. It contains much that is correct, but often forgotten, about economic development.

In general terms, the report examines the role of knowledge in advancing economic and social well-being. Economies are built on a foundation of information, learning and adaptation. If anything, the report makes the reader aware of the opportunities and risks of the 'information revolution' and 'knowledge age'. 'Knowledge for all' seems a distant utopia, and irrespective of how much effort is expended, knowledge problems will persist.

The report considers two broad types of knowledge: (a) knowledge about technology, or technical knowledge, i.e. about farming, health, software engineering or accounting; and (b) knowledge about attributes, i.e. about the quality of products, the credibility of borrowers, or the diligence of workers. The unequal distribution of technical knowledge amongst and within societies is called 'knowledge gaps'. The difficulties resulting from incomplete knowledge of attributes are called 'information problems'. Both types of problems exist in developed and developing countries, but they are usually much worse in the latter, and they especially hurt the poor.

The report consists of an overview followed by three main parts, technical and bibliographical appendices, a short appendix on 'international statistics on knowledge', and the usual World Development Report data appendix of selected world development indicators. There are numerous boxes, tables and figures throughout. They often report case study results, or supplement the many case studies mentioned or discussed in the text.

Part One of the report focuses on 'narrowing knowledge gaps'. After discussing the features of knowledge and the general role of knowledge in development (chapter 1), chapters concentrate on acquiring, absorbing and communicating knowledge (chapters 2–4). It is recognised that inequalities between developed and developing countries in the capacity to create knowledge exceed even those in income and that developing countries trying to close the gap are pursuing a moving target. Developing countries seem to be trapped in a vicious cycle of low knowledge intensity, loss of traditional exports, and low growth.

The remedies put forward emphasise increased capacity to develop local knowledge (in order to be able to acquire and adapt international knowledge), all types of educational investments, and investment in information technologies to facilitate knowledge distribution. The discussion of international property rights (IRPs) seems balanced. Potential negative impacts of tighter IRPs on developing countries' growth are mentioned besides any potential positive impacts. Despite this, in general the report emphasises the benign role of imported knowledge. Possible negative impacts are less emphasised, e.g. obsolescence of existing knowledge and replacement of indigenous knowledge. The well-known prescription of privatisation, competition and deregulation is put forward for the telecommunications market, supported by selective public action, in order to provide up-to-date and cost-effective telecom services accessible by the poor.

The report notes that in many countries these conditions are still far from being met, hindering the communication of knowledge.

Part Two develops in detail the major types of information problems encountered in developing countries. They can be broadly divided into those arising from difficulties of verifying the quality of goods and services, and those of enforcing performance. Without knowledge about attributes, markets cannot function properly. Institutions that help to recognise standards and enforce contracts help the establishment of markets. However, developing countries have fewer and weaker institutions than developed countries to ameliorate information problems. Therefore, institutional innovation has a major role to play in remedying the information problems. After documenting the widespread nature of information problems (chapter 5), the report focuses on three specific problem areas, i.e. processing of the economy's financial information, increasing knowledge of the environment, and information problems that particularly hurt the poor (chapters 6–8). It is recognised that both knowledge gaps and information problems must be addressed simultaneously, and examples are given of how this has been attempted. Moreover, it is acknowledged that during the course of development from a 'traditional' to a 'modern' society, information flows may deteriorate before they improve.

Part Three discusses policy options to address the problems. The report's authors see a role for international institutions in providing international public goods, acting as intermediaries in the transfer of knowledge, and 'managing' the rapidly growing wealth of knowledge about development, i.e. they should become 'knowledge banks'. However, the magnitude of knowledge gaps and universality of information failures also provide a strong rationale for public action. The World Bank sees a need for national strategies to narrow knowledge gaps, and discusses a number of steps governments should take in this regard.

Three key means to facilitate knowledge acquisition are open trading regimes, foreign investment, and technology licensing. Policies for absorbing knowledge focus on education. Policies for communicating knowledge have to overcome the still very common situation that only the privileged few have access to even basic communications technology. The proposed remedy is privatisation of the telecommunications sector. To address information problems, the basic message from the World Bank is that governments have to improve information flows and make sure markets function as well as possible. A great deal can be accomplished by passing and credibly enforcing appropriate laws and standards. The general policy dilemma is summarised as follows (p. 156):

> Recent development thinking has been based on the assumption that markets work well enough to ensure development and alleviate poverty. Our growing understanding of information constraints suggests that markets alone are often inadequate; societies also require policies and institutions to facilitate the acquisition, adaptation, and dissemination of knowledge, and to mitigate information failures, especially as they affect the poor. This view implies an expanded mandate for public action. Yet government, like markets, are hampered by information failures.

Somewhat idealistically (some might say naively), the report also points out the need for trust between government agencies and the poor whom the policies are supposed to help.

The appendix on international knowledge statistics is very short and testifies to the current rudimentary state of such statistics. There are only two tables, i.e. one reporting tertiary enrolments by field of study, the other providing indices of the legal infrastructure (creditor's rights, shareholder's rights, the degree of enforcement). It can be argued that neither of them reveal much about knowledge creation, absorption, and diffusion. It would have made sense to include the usual World Development Indicators on

'communication, information, and science and technology' (11 in all). However, they are listed in the general data appendix. This gives the impression of a very token effort in regard to 'knowledge' statistics.

The challenges to achieve the World Bank's vision seem formidable. A major problem is the lack of appropriate quantitative and qualitative measures of knowledge gaps and information problems. The report points out that governments and citizens in developing countries cannot wait for these issues to be solved. However, it can be argued that, given the poor 'knowledge base' from which to judge the success or failure of policies, many of the proposed policy prescriptions are only weakly based on a knowledge perspective to development, and are more a continuation of existing consensus development policies dressed up as knowledge and information policies. For example, whether international trade has increased international knowledge gaps, or is likely to do so in future (which is a possibility mentioned in the report), is not clear. The report seems to assume a 'level-playing field' for all countries in the world economy which does not exist. There is little mention of developing countries facing barriers to entry in developed countries, especially in sectors in which they are currently competitive. Also, there is little discussion of temporary protection. New growth theory tells us that it is no longer possible to draw conclusions, *a priori*, about the benefits and costs of free trade.[1] Despite this, free trade policies are advocated with great certainty. Another problem is to find the right mix of international and local knowledge. There is a danger that the World Bank's knowledge is presumed superior to local knowledge, but the Bank might get it wrong. If past policies of conditionality were inappropriate, we cannot be certain that the knowledge bank concept will get it right either.[2]

On the whole, however, it is difficult to disagree with much in the report. It provides a fairly comprehensive picture of the workings (and failings) of the knowledge and information based economy, but something fundamental seems missing, and that is a discussion of the political dimensions of the problems and policies advocated to remedy them. Maybe it is too much to expect the World Bank to develop into a true knowledge bank. Maybe it has to be superseded, or at least supplemented, by new international institutions for a world knowledge economy.

There seems to be a need for drastic international action and willingness on the part of developed countries to reduce the huge international imbalances in the creation and acquisition of knowledge. Should there be free provision of some types of knowledge to developing countries? Can we envisage a world which is not based on a few countries at the top of the 'knowledge development ladder', with a few others seriously trying to catch-up, but with the majority of poorer countries having no chance of doing so? Can we really envisage a world without knowledge gaps, i.e. a world where knowledge is shared more or less equally between and within countries? What would have to happen to realise such a vision?

The 22nd World Development Report has by now been published.[3] The new 'Comprehensive Development Framework' put forward seems very much to relegate 'information and knowledge' to being one of many background factors, instead of being at the centre of development. The discussion of globalisation, localisation, and institutional factors, the reports central themes, doesn't mention knowledge flows, and information and knowledge seem again to be reduced to IT. No chapter headings or sub-headings mention the words information or knowledge. Of the many boxes, figures and tables contained in the report, none has 'knowledge' in its title. Given this state of affairs, and the premature departure of Stiglitz from the World Bank, one must have serious doubts about how committed the Work Bank is to putting 'knowledge' at the

centre of its efforts. One is tempted to ask: what comes after the knowledge perspective on development? Business as usual?

Notes and References

1. See, for example, Philippe Aghion and Peter Howitt, *Endogenous Growth Theory*, MIT Press, Cambridge, MA, 1998, chapter 11. Also see my review in *Prometheus*, 17, 2, 1999, pp. 225–8.
2. The changing rationales for an institution like the World Bank are discussed by Christopher Gilbert, Andrew Powell and David Vines, 'Positioning the World Bank', *Economic Journal*, 109, 459, November 1999, pp. F598–F633. They focus on the contrasting paradigms of the 'Conditionality Bank' versus the 'Knowledge Bank' and draw out the requirements and policy implications of each.
3. World Bank, *Entering the 21st Century: World Development Report 1999/2000*, Oxford University Press, New York, 2000.

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Universities and the Global Knowledge Economy: A Triple Helix of University–Industry–Government Relations

Henry Etzkowitz and Loet Leydesdorff (Eds)

London, Pinter, 1997, viii + 184 pp., £55.00, ISBN 1 85567 421 1

The university model that came into being in the late 19th century was closely associated with the social, economic and institutional structures of modernity. In principle, if not always in practice, the new university was intended to be a factory of knowledge. Through teaching and research it would produce knowledge and knowledgeable individuals, both of which would feed into the economy and society. The university had the ability to intervene in society and the economy only indirectly, in terms of the pedagogical ideal whereby individuals would come into the university, be changed, and go on to change the outside world. Apart from this arm's-length relationship, the university was conceived as a separate 'producer of ideas', largely disinterested and certainly uninvolved in the world beyond its walls, be they stone, redbrick, or as later, concrete and plate-glass. The relationship between the university and the rest of the world was intended to be in one direction, the university having some impact on society, but remaining largely unchanged by it.

The situation today is very different, the information economy and the network society having wrought significant changes in the form and content of knowledge production, dissemination and application. The authors of *Universities and the Global Knowledge Economy* examine the ways in which universities are developing in the post-modern era, in which they are far more involved than they were as active participants in the implementation of knowledge. The differentiation of function which characterised the classically Fordist model is being replaced by a more post-Fordist approach. Under post-Fordism, universities, like individuals, are asked to become flexible specialists, active agents in the information economy. They are both active shaping the post-Fordist economy and society, as well as being shaped by it.

The book consists of 14 chapters written from a variety of disciplinary perspectives, including sociology, management, and science and technology studies. It developed from a workshop meeting held in Amsterdam in 1996. It focuses on four main areas: the development of the 'knowledge-based regime'; technology transfer; the formation of the 'triple-helix'; and the general role of universities in information economies. It has an international scope, employing case studies from Europe, Asia, Australia and North and South America. The book compares innovation networks between countries, and has a valuable take on non-Western university systems, such as those of South East Asia and Latin America. Some of the case studies presented here show that the division between industry and academia is a far more culturally and place specific fact than many in the West appreciate.

In physics, a helix is a path rather than a structure, which seems to be the sense best fitting the authors' intentions when they describe the triple helix. The triple helix model describes the interaction between industry, university and government. It attempts to encapsulate the interweaved processes of internal change, mutual influence, and inter-organisational networking, as well as the effect of the triple helix on the economy and society. The authors investigate a variety of specific instances of the triple helix in operation. These include technological programs in the European Union; intellectual capital and the patenting of public sector research; biotechnology; digital media and the 'desktop model' of innovation; research–technology communities; the emergence of Artificial Intelligence; communication between industry, university, and government; the role of universities in enhancing the competitiveness of industry; the development of science policy; and finally, and perhaps most significantly, the appearance in post-Fordist economies of the 'entrepreneurial University' and 'democratic corporatism'.

A significant sea change in the function of the university has occurred over the past two decades: the exponential increase in the capitalisation of knowledge. As Henry Etzkowitz points out (p. 143), science—including social science—is less and less a disinterested consumer of resources and producer of knowledge. It is now very closely bound up with economic valuation, and has become an active agent of capital. This is not an entirely new nor post-modern development. The science of chemistry, for example, developed directly from industry during the late 19th century. German academic chemists especially were encouraged to apply their efforts practically. Nonetheless, it is increasingly the case that universities, rather than individual academics or companies, are becoming capitalisers of knowledge. They are encouraged to become 'regional innovators' and behave as corporate economic actors.

There are similar developments—though different patterns—in the disorganisation and reorganisation of university research in separate countries, such as China and Australia, as detailed in Turpin and Garret-Jones' chapter. These include in Australia the decline of the centralised laboratory, and in China the decline of the state-funded enterprise. In both cases there has been a farming out of knowledge production from traditional sectors. Important changes have occurred in the funding of academic research, its implementation, and the ways in which it relates to other social and economic spheres. In particular there is much greater collaboration between individuals and organisations in the private and public spheres.

The book focuses on research collaboration between industry and academe. Of course, there are similar developments in the teaching area, something many readers will be familiar with. University departments all sell their ability to gear their students for the labour market. The introduction of modular courses mirrors post-Fordism in emphasising flexibility and an absence of centrifugal intellectual structures. There has been what might be called the de-pedagogisation of education. Students are behaving more like

consumers, and educators like salespeople. The post-Fordisation of the university is not a one way learning process. Industry has adopted ideas produced in the academy, but as anyone who has worked in a British university recently will know, universities have been encouraged to become more business like. This hasn't been a happy process, as a lot of academics are learning to live with the sort of pressures and demands that the rest of society is familiar with.

This leads me to a criticism. The authors mostly assume that the new social contract is a positive development, and the book largely limits itself to a technocratic perspective, considering how the triple helix can be best implemented. There is little consideration of the politics of the global knowledge economy, what might be called the political economy of knowledge. What knowledge gets produced, and for whom, are important questions, although to be fair they are perhaps outside the scope of this sort of study. It is often assumed by its proponents that the information economy and the innovation focused university are levellers, both in society and within the education system itself, wiping out hierarchies of institutions. However these new developments disguise some old inequalities. Cultural, network and social capital are still deployed to ensure that the elite reproduces itself, though perhaps with far less certainty than in past generations. There is still a strong association between old universities and new industry—for instance in the 'Cambridge phenomenon'.

This book gives the reader a comprehensive overview of collaboration between universities, industry and government and the contribution of this collaboration to the development of new technologies and industries. It contains many interesting and engaging case studies of collaboration and innovation. Although undoubtedly a worthwhile contribution to the field, it is a little narrow in its theoretical focus, being highly technocratic and perhaps lacking a critical edge when considering the division of benefits that come from the operation of the 'triple helix'.

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Business @ The Speed of Thought: Using a Digital Nervous System

Bill Gates (with Collins Hemingway)

Ringwood, Australia, Penguin, 1999, xxii + 451 pp., AU$39.95, ISBN 0 670 88664 5

Forecasting electronic, commercial, social and cultural globalism, in 1962 Marshall McLuhan wrote:

> Instead of tending towards a vast Alexandrian library the world has become a computer, an electronic brain, exactly as in an infantile piece of science fiction. And as our senses have gone outside us, Big Brother goes inside. So, unless aware of this dynamic, we shall at once move into a phase of panic terrors, exactly befitting a small world of tribal drums, total interdependence, and super-imposed co-existence.[1]

The Alexandrian library was a material and intellectual focal point for (what was to be later known as) Western and Middle Eastern education and culture. Founded in the

third century BC, the Alexandrian library was the most famous library of Hellenic classical antiquity. It established a canon of Greek poets, standard referencing for Greek literature, systems of punctuation and accentuation, and the division of works into 'books'. The library flourished until the third century AD, when it was destroyed by the Christians.

The computer is now the focal point for all sorts of fantasies which simultaneously encompass education, culture, entertainment, business, communication, civility, war, and just about anything else. Invented in the mid- and rapidly developed in the late-twentieth century, the computer is the most famous technological invention of modernity. It has made the inventory, movement and manipulation of data rapid and global. It has been so efficient in processing data that it has been attributed with being the cause, means and solution to the so-called information revolution.

Put in a broad historical context and a modern tradition of critical commentary of the mass media, Bill Gates' appraisal of the information revolution we are experiencing, with digital technology at our fingertips and the power that comes with increased knowledge, is not innovative. He writes that our new portable digital technologies will keep us constantly in touch with each other and with other systems. This is not new, as all kinds of information systems, from the oral traditions of Homeric education through to the libraries of the Middle Ages and modern telecommunications, have kept us constantly in touch.

The whole book, *Business @ The Speed of Thought*, hinges on the single idea that our new digital infrastructure is 'like the human nervous system' (p. xvii). Gates insists that he is 'not talking about anything metaphysical or about some weird cyborg episode out of *Star Trek*' (p. xvii). However, he does not explain his own anthropomorphisation of a computer system, and so, by repeating a mantra of a few common sense phrases, Gates naturalizes the perceived corporate need for a digital central nervous system. It is one that reacts to stimuli in the marketplace and automatically transmits information to the right place at the right time.

The metaphor of a digital nervous system is one that is worth analysing. While corporate-speak claims to be dealing with the 'real' (material, objective, quantifiable, measurable, and therefore apparently controllable) it actually speaks in the metaphorical. On inspection, Gates' metaphoric images (italicised below) are, mundane, mixed and say very little. For example, the Introduction concludes with

> Going digital will put you *on the leading edge* of a *shock wave of change* that will *shatter* the old way of doing business. A *digital nervous system* will let you do business *at the speed of thought*—the *key to success* in the twenty-first century (p. xxii).

Then the first section of the book is titled 'Information Flow is Your Lifeblood'. There are chapter headings like 'When Reflex is a Matter of Life and Death' and the whole book is replete with expressions like 'To think, act, react, and adapt' (p. 15), 'An organization's nervous system has parallels with our human nervous system' (p. 23), and 'there's the conscious directing of your company's muscles' (p. 24). These expressions are reminiscent of pseudo Darwinian expressions like 'there's the quick and the dead', 'it's a dog eat dog world', and 'flexing corporate muscle'. The sort of corporate-speak which integrates these kinds of expressions relies on misunderstood Darwinism and Lamarkianism. Such an aggressive zero-sum apprehension of the business world of computer media is not only unimaginative, but it is also dangerous, to business and civil life.

Gates writes that 'companies need … the ability to run smoothly and efficiently, to respond quickly to emergencies and opportunities, to quickly get valuable information to the people in the company who need it, the ability to quickly make decisions' (p. xvii).

The whole thing is about speed, strong reflex actions, and an aggressive ability to make important corporate decisions based on cold, hard facts and figures. However, it is only by *not* reacting according to impulse that one can avoid instinctual pressures of prejudice, jealousy, greed, envy and hatred. Such speedy reactions do not establish conditions necessary for good decision making.

Fast, profit-oriented decision making has no time for questions of ethical social issues like privacy and exploitation. Anything in *Business @ The Speed of Thought* related to social or political issues is glossed over with statements like: 'the Web lifestyle isn't about changing human nature or the fundamentals of how people live. Instead the Web lifestyle gives more people a chance to pursue their interests in a better way' which is soon followed, unproblematically, with: 'The Web produces a true consumer-centric world' (p. 131).

Business @ The Speed of Thought exemplifies the interconnectedness of commercial, cultural, territorial and political exploitation. However, it does so in a non-self-reflexive manner. Not only is Gates excited about the apparently unbounded potential for profit to be made through being networked, he is also excited about past and future military applications (where 'speed is of the essence') of computers. There is a whole chapter, called 'Reflex: A Matter of Life and Death', on the display of aggressive American military capability in the Gulf War of 1991. Gates accepts warfare as a fact of life which is as inevitable as business. He writes that 'The military shares with business a need for organization, supplies, logistics, and tactics'. Gates describes how the Pentagon has fused civilian and military use of technology by 'investing in civilian technologies critical to military applications; manufacturing commercial and military items on the same low-cost production lines; and inserting commercial components into military systems' (p. 385); and Gates repeatedly asserts that the same lessons apply equally to business and military technology, as though they are both neutral applications of the best, fastest, smartest and most powerful technology. Such assertions also imply that the application of this technology has no civilisational consequences, except to reassert American superiority, and that the application of this technology has no civilisational consequences, except to reassert the superiority of the mighty.

'Reflex: A Matter of Life and Death' is also a (crude, naïve and inaccurate) reference to Darwinism. Darwin's theory of evolution[2] was not about technological invention and/or application. His theory was a synthesis of naturalism, gradualism and long-scale geological time. Darwin claimed that major changes in organic species were the result of minute, individual changes over very long, if indefinite, geological time. To attempt to map Darwinist notions of evolution and survival onto a crude material way of seeing time as money is to not only seriously misinterpret one of the most significant paradigm shifts in science and religion, but it also reinforces the sort of dangerous thinking that fuels war. Gates' perspective of the Gulf War is comfortable with the destruction of civilisational 'others', Arabs, who are perceived as being less evolved. Reference is also made to the Vietnam war, purely as another lesson in the application of technology. Even Bosnia gets mentioned in relation to Falcon View, a PC-based mission planning system, which was used by NATO forces to immediately locate and blow up a bridge. Gates writes about all this in a highly celebratory tempo and mood. The whole book revels in the vast superiority of Microsoft power.

Contrary to it's own claims, Gates' book is not a description of 'the evolution of a modern organisation's nervous system' (p. 59). It is merely a claim that a Microsoft system *is* an electronic nervous system which responds to threats and changes quickly, efficiently and correctly, thus surviving its slower, less evolved competitors. It is a naive and superficial application of Darwinian notions of evolution. However, it is not alone.

In *Fortune* magazine, Michael Schrage[3] claims that managers of large, successful, competitive organisations will not turn to well-known economists or marketers but, rather, to Charles Darwin. He writes that post-industrial managers will have to either embrace Darwinism or become 'obsolete or extinct'. He says that ' "Darwinian management" will become less a metaphor than a practical methodology'. With no explanation of what 'Darwinian management' is about, one is left to assume that it taps into what Bill Gates refers to as the

> digital nervous system ... (which) ... is the corporate, digital equivalent of the human nervous system, providing a well-integrated flow of information to the right part of the organisation at the right time. A digital nervous system consists of the digital processes that enable a company to perceive and react to its environment, to sense competitor challenges and customer needs, and to organise timely responses (p. xviii).

This techno-determinism (success is attributed to technology) mirrors bio-determinism (everything is determined by genes). However, even the most mainstream scientists agree that it is a combination of genes and culture, or genes and behaviour, that determine what goes on, and they also agree that the connection between genes and culture and behaviour is very complex and never fully accounted for. If, indeed, ' "D-commerce" will be what shapes e-commerce' (Schrage) then e-commerce will be perceived in crude misinterpretations of Darwin's (and Lamark's) valuable insights into evolution and natural selection.

In 1859 Darwin published the *Origin of the Species* where he argued that all organisms, including humans, are the product of a long and slow process of evolution through natural selection. Because more organisms are born than can survive and reproduce, there is a 'struggle' and the 'fittest' are 'selected' for survival. It is also important to note that Darwin claimed that adaptation and survival were due to individual traits which were inherited and passed on through reproduction. So when Darwin refers to the survival of tribes, he refers to natural groupings made up of individuals.

Any reference to tribes cannot easily be metamorphosed into entrepreneurial organisations, as Schrage does. Schrage extends tribes to include organisational groups, neglecting the fundamental social details of either groupings, and this is just what Gates does when he interprets any social groups as being the same as business groupings.

Schrage (and Gates) uses pre-determined (by behaviourist socio-biologists) taxonomies made up of things like personality types, optimal sizes of effective human tribes, or sibling positions in order to work out how best to exploit a given global demographic. It provides a crude model. Such social biology is a very fertile ground for justifying capitalist (as well as civil and political) exploitation.

Michale Ruse (a socio-biologist himself) says that socio-biologists view human thought and behaviour as shaped by natural selection. Then he asks: 'Is the presumption that selection is still operating and (more crucially) that humans, particularly those living in industrialized societies, always think and do that which is of immediate adaptive change?' (p. 167), to which he replies, saying that in an age of AIDS and Chernobyl, he doubts that anyone would seriously argue for so tight a connection between behaviour and adaptive advantage. We know that natural selection was important in the development of human life, but natural selection has nothing to do with electronic commerce.

Darwin's theory of evolution serves as a basis for thinking about organic origins, not how to turn a corporate organisation into a victor. Evolution, whether it is Lamarkian or Darwinian, is species specific and it promotes diversity. Homo sapiens is a species.

Even though Bill Gates implies that a corporate organisation is very much like a species, it is not. An organisation is not an ontological entity. At best, it could be seen as an epistemological entity, in that it is an entity which is a collective of individuals who create themselves as an entity. However, in this case, such a class could not be seen to constitute a discreet species.

Business @ The Speed of Thought is simply a crude advertisement for Microsoft. It addresses the world at large through a business paradigm, which is made up of victorious, aggressive, corporate warriors, and the survival of this corporatised world depends entirely on successful business deals which, in turn, depend on 'smart' technology.

Notes and References

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2. Information on Charles Darwin and the scientific debates around evolution and natural selection are from Michael Ruse, *The Darwinian Paradigm*, Routledge, London, 1989.
3. Michale Schrage, 'Will evolving corporate strategy be Dar-Win-Win-Ian?', *Fortune*, 21 June 1999, p. 103.

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Systems of Innovation: Technologies, Institutions and Organisations
Charles Edquist (Ed.)
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This book is part of a series on science, technology and the international political economy edited by John de la Mothe, and presents the results from the work of the international System of Innovation Research Network established by the editor Charles Edquist back in 1994. It contains contributions by 24 scholars from 10 different countries (eight European countries plus USA and Israel), including amongst others well-known experts such as Luc Soete, Bengt-Åke Lundvall, Pier Paolo Saviotti and Morris Teubal. Its essentially theoretical nature will be of interest to readers mainly with academic orientation, particularly researchers in the field of innovation and science and technology policy.

The book is a serious attempt to bring together two promising methodological approaches in innovation studies, which attracted a vast number of publications of the 1990s, namely systems of innovation and evolutionary concepts in innovation. The title (which refers only to one of these approaches) reflects the authors' view that any system of innovation (at a national, regional or local level) inherently contains evolutionary elements and cannot be analysed outside its historical background and evolutionary changes. However, if your expectations are to find more about developments in the area of systems sciences and potential links to innovation theory, this book is not for you as it does not go further than providing a systems definition for systems of innovation. Its main strength is in summarising recent developments in the two methodological fields and consequently clarifying and further developing some of the basic concepts, such as

what are institutions and organisations. It also concentrates on providing insights on the dynamics of change, i.e. how systems of innovation develop.

The 17 individual contributions are organised in three parts which all start with introductions and an overview of the issues. I also found very useful the 35 page overall introduction and overview of the issues skilfully presented by Charles Edquist. Part One of the book discusses the concept of systems of innovation; Part Two presents the evolutionary perspective; and Part Three deals with transformations within the systems of innovation. From the three aspects in the subtitle, namely technologies, institutions and organisations, the focus is not so much on the role of technologies but on institutions and organisations.

The definition for innovation, adopted by the team of authors, is stated by Edquist as 'new creations of economic significance' (p. 1). To me, this is a mainstream traditional economic approach, which as a rule fails to represent the multi-faceted nature of innovation and its importance in society. One of the missing aspects is that innovations are means to achieve particular goals and they do not necessarily have to be purely economic. For example, if you are concerned about the status of the natural environment (and related to it green consumerism and green innovations), this does not appear to be an important factor within the systems of innovation debate. One possible explanation could be that the authors did not engage in examining the reasons behind systems' learning and changing, but they rather concentrated on describing the mechanisms for such learning and change to occur.

The various sections of the book offer hours of thought-provoking reading even for those who are familiar with the main concepts in systems of innovation and evolutionary theories. The network of authors has set up the ambitious task to provide more clarity and definition in what they consider conceptual frameworks (rather than formal theories) in studying innovation. They are quite successful in doing this although some readers could possibly find most of the contributions in the first half of the book too theoretical and lacking particular empirical examples. Nevertheless, the consistency of the methodological approach across such a numerous number of chapters is very impressive and makes the publication as a whole a fine example of a scholarly work and networking. Another important feature is that all chapters can be read as stand-alone independent pieces of research as they offer distinctive angles in addressing the methodological problems and providing some findings.

It is impossible in this review to give the attention all individual sections of the book deserve. Instead, I have decided to comment on a small number of contributions from each part in order to give some of the flavour of this publication. In doing so, there has not been any intention to underestimate the remaining unmentioned papers. The whole book is worth having and reading. It also can be used as a sound methodological basis for further research in the area of innovation.

In the introduction to Part One, Johnson draws attention to the use of systems of innovation at the local, regional, national, continental and even global level as complimentary approaches rather than being substitutes or in competition. He then highlights the main concepts embedded in this theoretical framework, namely that interactive learning is a crucial factor behind innovation and diffusion of innovations and that learning and innovation are only to some extent deliberately organised activities. Personally, I found extremely valuable the discussion to follow by Edquist and Johnson on the role of institutions in learning and innovation. They make a clear distinction between institutions (in terms of patterns of behaviour, common habits, routines, established practices and rules) and organisations (which are formal structures consciously created with an explicit purpose). This helps in understanding their functions in the

innovation process as well as the way they change (e.g. institutions can develop spontaneously while organisations are specifically designed). Smith's contribution on the significance of economic infrastructure is also very useful as it offers a good taxonomy between physical (e.g. roads, harbours, telecommunication networks) and knowledge (universities, R&D labs, databases) infrastructure, the latter becoming the focus of his investigation. His approach is to define the technical characteristics, which transform institutions and organisations into infrastructure; they are large scale, indivisibility, multiple users and generic functions.

Saviotti's chapter, which is the first in Part Two, examines the contribution evolutionary theories have made to the understanding and study of innovation systems. He justifies the existence and explains the main features of national systems of innovation on the basis of evolutionary theory. The main implication relates to diversity and variety, which affect economic development and international competitiveness. He puts a special emphasis on growing (e.g. development of new sectors and new technologies) and limiting (e.g. standardisation, economies of scale) diversity to come to the conclusion that 'at the moment we cannot make any prediction about the "right" amount of diversity' (p. 189) in a society. The diversity concept is also central in the chapter by McKelvey, the emphasis of which is on the generation and intrafirm preselection of technological opportunities. Cohendet and Llerena stress the importance of policies and policy tools in order to exploit (or valorise) diversity. I thoroughly enjoyed reading the chapter by Carlsson and Jacobsson on creating diversity, which contains good empirical evidence and comparisons between Sweden and the USA in the cases of electronics and genetic engineering.

The chapter by Meyer-Krahmer is a very good example of the main focus of Part Three. It discusses the fundamental source of change and transformation within technologies and institutions, that is the process of knowledge building itself. Trans- and inter-disciplinarity are stressed as being of growing importance as separation of technologies becomes more difficult and fluid. This chapter also contains empirical evidence and implications for science and technology policy. The contributions by Radosevic on the transition economies and by Caracostas and Soete on the European Union are examples of the theoretical framework applied to analyse the transformation processes in the two main regions of Europe. Radosevic provides a very convincing argument that the problems of erosion of the closed socialist economies, transformation and creation of techno-economic networks are central to the long-term recovery and potential growth of that part of the world. Caracostas and Soete take a historical perspective in analysing the establishment and development of European institutions and the potentially emerging European system of innovation. It is a very good conclusion for this part of the book. Nevertheless, I was left with a sense of incompleteness with the lack of overall conclusion. This criticism, however, does not diminish the quality of the work presented in the publication and leaves room for reflexion and further investigation.

There have already been new studies within the theoretical framework adopted and developed by the book, which was originally published in 1997. Nevertheless, this publication withstands the test of time and is still a very valuable methodological source. If you are working in the field of innovation theory and the book has escaped your attention until now, my recommendation is to make it part of your professional library. It is also a good idea to keep an eye on any other already published or coming publications from the same series.

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Contingency, Complexity and the Theory of the Firm: Essays in Honour of Brian J. Loasby, Volume II. 1999

Sheila C. Dow and Peter E. Earl (Eds)

Cheltenham, UK, Edward Elgar, 1999, 352 pp, £65.00, US$100.00, ISBN 1 84064 187 8 9 (hbk)

This second volume honouring Brian Loasby continues the themes of the first, delving more intensely into the hard core of the Loasby deposit. It is distinguished from the first volume by its blue cover and cream paper, in contrast to the green and white of the first. This is a kinder combination for the eye, but the contents do not encourage relaxation.

The theme explored in the first volume is the nature of knowledge in a world of incomplete information that emerges, with error, over time. The second volume examines the necessity for a theory of the firm under these conditions, and whether such a theory is possible.

Mark Casson is always ingenious in applying optimisation principles. In their chapter, Casson and Nigel Wadeson show how information costs lead to alternative protocols for production, claiming an advance on Simon's bounded rationality and Nelson and Winter's application of it to the routine.[1] They also show it improving upon Williamson's use of opportunism to explain organisational forms, but put their framework up against G.B. Richardson's experience at Oxford U.P. He suggests many other causes of vertical integration. These include the advantages of specialisation as against general capabilities, as in the paper-making plant once owned by OUP, but Richardson gives us an example of a failed re-organisation, which could be seen as one of cutting information channels which were of great importance to the business of publishing, a Cassonian story.

The following three chapters worry at similar themes. Nicolai Foss seeks to show how Loasby's analysis of incomplete contracts not merely differs from the orthodox picture of the property rights theorists and the TCE authors, whose concern is with incentive and opportunism, but that Loasby includes their concerns as a part of the broader analysis. Foss points out that the property rights view, while holding the esteem of neoclassical purists, is based on the most arbitrary *ad hoc* assumptions. It is Loasby who showed how to include ignorance in general in the theory of organisation. The firm is a flexible structure of capabilities that allows production to proceed despite whatever form of ignorance is to the fore. There is no single form of the firm, not even in a single market for a simple output, evidence that ignorance yields a number of reasonable, definitely not hyper-rational, responses. Incomplete contracts, for Loasby, are essential to prevent the various forms of radical ignorance faced in all human endeavour from putting an end to that endeavour.

Neil Kay's paper asks first how to define the firm and map its boundaries, and then what might be the reason for transactions to take place within a firm or between firms. He believes that we can recognise a firm when we see it. It is a set of activities under a single ultimate controlling power. I'm not so sure, when looking at so many structures which might or might not be under one control. Like Foss, Kay sees the essence of hierarchy in uncertainty, as a means of undertaking long run planning to defy ignorance. This rationale, he points out, was arrived at by Loasby in 1967, in a paper in a journal not much read by economists, the *Journal of Management Studies*.

The following chapter by Martin Fransman provides an application of the ideas of both Foss' and Kay's chapters. He shows how the Loasbian theory of the firm, that organisation is a means of creating new knowledge, or inventing futures, is illustrated by the computer industry. Why have some large firms survived, why have some national industries dominated, how have these firms dealt with ignorance and prospered? In doing so, he also provides good evidence for the Loasbian, and more generally the capabilities or resources view, that firms do specific things because they know about them. This is something the orthodox incentive/opportunism theories know nothing about.

The following two chapters, by Felicia Fai and John Cantwell, and by Keith Pavitt, both continue this theme, looking at aspects of knowledge production and the firm. The first of these chapters examines the relation between size and diversification of technical capabilities, finding it positive; the second goes back to Smith for insights into knowledge and the division of labour. Both see the firm as the locus of knowledge organisation.

The second half of the volume is devoted to methodological questions. John Finch discusses the early post-Marshallian thought of Andrews, Penrose and Richardson, with a nod toward Loasby, a latter day exponent. He makes the case for their being representatives of a community of scholars with a common interest in Marshall, almost canonical in stature, and in the concept of industry. This last may well have been disputed by Penrose, who professed not to know what might have been meant by 'industry'.[2] But as Finch points out, Penrose was seeking an explanation of the insides of the firm, its significance for the outside left to others. It must be said that the concept of industry will always remain problematical, as much as that of the firm, and for the same sort of reasons, inherent vagueness. Industry studies, the research method characteristic of these writers, and, argues Finch, post-Marshallians in general, may need to use some version of the inductive qualitative theorising advocated by Glaser and Strauss.[3] But the list of drawbacks to this method suggests that industry case studies may always be a preliminary to more rigorous empirical work now emerging with numerical methods rather than the old fashioned analytical method of neoclassical theory.

Kenneth Cleaver's discussion of bounded rationality in economic thought demonstrates the ability of neoclassical theory to absorb concepts that might seem toxic to itself. Herbert Simon's concept has succeeded brilliantly in all the social sciences, bar economics, and whatever currency it holds amongst orthodox economists is a currency debased by the means used to make it acceptably anodyne, as in Williamson's transactions costs theory and many game theorists. Even the *Journal of Economic Behaviour and Organisation*, founded to encourage research which would have to take the bounds on rationality seriously, is now just another outlet for formalised analytical methods. It has been colonised by the game theorists and the New Institutionalists, displaying their superior ability to propagate created by the hegemony of the neoclassical program amongst the community of 'sound' referees. Not even the *Journal of Evolutionary Economics* is immune from the hegemonic properties of this community. I would put forward the hypothesis that it is the analytical method which has restricted the progress of the behaviourally based rationality concepts. The disciplines in which Simon's work is highly regarded are not so slavish users of analysis, a fact that is treated by economists as evidence of their weakness. Formal alternatives to analysis include numerical methods. Frank Hahn is one pillar of the establishment who thinks, with some sadness, that the future belongs to numerical methods.[4] In this future, the neoclassical program loses its

advantage and may shrink back to being a mere school of thought, as it was even as late as the 1950s.

Stephen Dunn's chapter illustrates the gains to be made from exploring the intersections of intellectual communities' interests. In this case it is the post-Keynesian interest in uncertainty intersecting with the New Institutionalists' interest in rationality. He shows how limited the Simon concept is, a theme taken up again in a later chapter by Torr. Bounded rationality accepts the ergodicity of the economic world and looks at the implications of agents being unable to comprehend or calculate in that world. In such a world the long run is a world of perfect competition and no need for organisation. Uncertainty characterises a nonergodic world, genuine choice exists, and organisation has a role in the longest of runs. It is fascinating that this world of radical uncertainty, an Austrian world, is one which draws forth the very institutions whose significance is denied by hardcore Austrians of libertarian tendency, but seen as central by 'Austrian Marshallians' such as Loasby and Richardson.

Maurizio Caserta examines whether Loasby's theory of the growth of knowledge is consistent with Bayesian or only with more open theories of subjective probability. His starting point is the inconsistency of the requirement of a list of possible states of nature with Loasby's theory of the growth of knowledge, his connecting principles and 'individual as scientist' concepts. He attempts to link these with de Finetti's theory of subjective probability, a theory not unlike that of Shackle, but which tries to express the personal judgement of likelihood in terms of probability numbers. These numbers are, however, entirely personal and contained within an individual brain. Internal consistency is all that is required. This implies his theorem of compound probabilities, on the modification of belief in the light of new information. Caserta asserts that this procedure is consistent with Loasby's theory, that coherence is combined with imagination. Furthermore, he asserts that a form of Bayes' Rule can be used. The question remains, is it useful to express a state of uncertainty in terms of subjective probability when the list of possibilities is completed by the individual imagination, and that list is updated arbitrarily whenever the individual chances upon a further piece of information, or flash of intuition? He avers it is a way of organising one's thoughts. Well, so good for individuals who like to think that way, but not for those who don't. But can Loasby benefit by putting his theory into the straitjacket of subjective probability? Caserta's reasons are two: the first is that knowledge is fundamentally an individual matter. This can be challenged by the capabilities view of knowledge in which a group activity is the institution within which knowledge resides. Nelson and Winter, and much of the literature of evolutionary economics, would be unhappy to restrict knowledge to what can be contained within a human head. The second is that a general framework is a good thing. A consistent framework for understanding uncertainty is provided by subjective probability theory. Evaluation of knowledge can then be carried forward with consistency tests available. Neither of these reasons seems compelling to me. The first is wrong; the second ignores the importance of non-logical processes in human decision making. Only if a normative standard of logical consistency is imposed can the second reason begin to have any force. Perhaps the last nail I would wish to drive is Caserta's ignorance of Shackle. Even if Shackle's ideas are to be set aside, it is necessary in this context to deal with them, given the importance Shackle's ideas have for Loasby.

In a similar vein, the chapter by Giuseppe Fontana and Bill Gerrard attempts to reconcile Loasby's views of uncertainty with those of Keynes as expressed in his *Treatise on Probability* (and in the *General Theory*). They argue to Keynes's two-dimensional view of uncertain situations, probability and weight of evidence, or degree of credence. Unfortunately, the exposition is not convincing. The second dimension is not clearly defined.

One can have a subjective probability of an event, and hold that belief with a greater or lesser confidence. Is this any different from the orthodox statistical notion of confidence intervals? No matter how I manipulate my understanding of the authors' exposition, I cannot see that they have provided any content to the dimension Keynes called weight of argument. They go on to argue that Loasby's growth of knowledge theory can be interpreted using Keynes's weight of argument concept. This does not seem credible to me. New knowledge changes conjectures, changes subjective probabilities if you like (though I'm sure I don't), but it doesn't seem to be captured by Keynes' weight of argument notion (p. 243). If you decide to change your theory of the world due to new knowledge (Popper, Kelly, Loasby all might agree), this can be alternatively theorised using subjective probabilities without the complication of the so-called second dimension. I see no reason to weigh Loasby down with concepts which do not enlighten, but merely seem to obfuscate. It is not that Keynes was wrong, just that his concepts do not seem to be particularly helpful if one is happy with the growth of knowledge perspective Loasby champions.

Christopher Torr delves into the nature of incommensurability, particularly with regard to the Classical/Keynesian divide on the analysis of the labour market. His investigations suggest that more care is needed than is given by most economists, to make sure argument and analysis is kept to a logically supportable pathway. The problem of involuntary unemployment, he shows, is not one over which so much analytical blood has to be spilled, if the degree and kind of commensurability is properly understood. The Classical understanding of unemployment might allow that out of equilibrium labour markets will clear as opportunities for labour vendors to sell their labour are exploited at market clearing prices. The Keynesian understanding is that not enough work is available, and until demand picks up, the workers whose services are not wanted will just have to wait. But this chapter doesn't seem to add too much to our understanding of the unemployment problem, that excess supplies of unskilled labour persist, that demand and entrepreneurial activity have little impact on unemployment as measured by official statistics, over the current decade or more.

Richard Day's short chapter re-visits the decline of economics as a practical discipline in the world of affairs, contrasting the Neoclassical equilibrium theory that gains academic approbation with the Classical out-of-equilibrium theories that are needed to understand this world beyond the grove. He suggests that the regard for the State as a social institution is more problematic for Neoclassical than for Classical theorists. The market and the State co-evolve, but the Neoclassical equilibrium theories take the opportunity of equilibrium to forget that the State is crucial to establishing the market. His simple exposition of the nature of dynamical systems, with their propensity to jump, or slip, from one to another zone of attraction, each with its attendant possibility of equilibrium, demonstrates why the Neoclassical view can only be a part of the explanation of economic performance. He also suggests that a healthy discipline would include both streams. The Neoclassical stream can examine and describe potential equilibria, while the Classical can do the same for the pathways of dynamical change through which the economy, micro and macro, evolves. This chapter is a short and elegant demonstration that no thinking Neoclassical economist should be able to ignore. The only question remains: are there any Neoclassical economists interested in thinking about these issues?

The penultimate contribution (the position reserved for the 'star turn' in the music halls a century ago) was assigned to Jason Potts, whose chapter is indeed a 'start turn'. Potts presents us with a general theoretical framework into which can be fitted any of the heterodox contributions which might like to be associated with the work of Brian Loasby.

Potts' graph theory tells us that a system in which there are too many or too few connections between the elements will not work. The underconnected system will just sit doing nothing, or doing what it has always done, and precious little of it at that. Would an isolated traditional society of few members be an example? The overconnected system, he gives as a example a Walrasian economy, will be chaotic. There is a range of connectedness within which there is order, and a further range of complexity. While he draws on Stuart Kauffman's *Origins of Order*,[5] Potts goes further in speculating about the theoretical possibilities for using this framework to model what he calls *hetero œconomicus*, the agent who is quite well connected, but not fully (or chaotically) connected. This fully connected being he calls *homo œconomicus*. The orderly and complexly connected system is that in which all the various phenomena of bounded rationality are observed. These are systems in which efficient operation depend on 'grit in the system'.[6] Richardson's information restraints on investment, the capabilities requirements of Penrose,[7] and so on. This chapter sums up much of what has come before, though in a very condensed and austere manner. The suggestion that a general theoretical treatment may emerge, fit for a treatise, and then a textbook, looks more likely having read Potts.

Brian Loasby's concluding reflections are remarkably optimistic. His uncertainties allow that something good will turn up for economics, as long as enough room is left for change in unexpected direction changes. Clearly Loasby's thinking follows Loasby's theory of knowledge. The papers delivered at his conference, and presented in the two volumes, do give heart to those of his opinion.

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Globalization, Economic Growth and Innovation Dynamics

Paul Welfens, John Addison, David Audretsch, Thomas Gries and Hariolf Grupp

Berlin, Heidelberg, Springer-Verlag, 1999, x + 198 pp., US$64.35, ISBN 3 540 65858 0

This book contributes to the literature dealing with the role of innovation and technology in national economies although its contribution is modest in terms of new insights or

original research in the field. Its content is based on a project for the European Parliament. Accordingly, the book proposes strategies for government action based on existing knowledge of innovation, technology and global economic forces, rather than a new perspective on the relationship between innovation, economic growth and government policy.

The book draws on both neo-classical economic theory and new growth theory to develop a set of proposals for government policy within the European Community. Its focus is mainly Europe although its arguments are grounded within the context of international trade and the forces of globalisation. Indeed, a central argument of this monograph is that the reality of globalisation has highlighted deficiencies in our theoretical understanding of innovation and economic growth. While 'traditional neo-classical growth theory does not correspond with the stylized features of the global growth process' (p. 159), new growth theories 'fail to explain the development of middle and low income countries' (p. 160) especially with respect to their capacity to imitate rather than innovate.

Globalization, Economic Growth and Innovation Dynamics is a book that favours government facilitation of markets rather than direct government participation in the market. The authors appear to favour a mix of policy initiatives that reinforce market forces but accommodate government intervention in providing some of the infrastructure required in national systems of innovation. Thus, policy recommendations focus on increasing levels of expenditure on research and development, improving standards of education and strengthening patent protection. Even in the area of venture capital, the authors favour stimulation of the financial markets rather than direct government financing of new technology-based enterprises.

This approach to government action appears to be grounded in the theoretical approach developed by the authors. The neo-classical, new growth theory constructions used by the authors place considerable emphasis on the importance of international trade, the contribution of foreign investment to growth and the considerable influence of multinational companies in international economics. Thus, there is an assumption of the primacy of markets in both the analysis and implications for government.

Some of the early analysis of this presents an alarming depiction of the power and influence of multinational companies in national economies. These arguments imply that governments are very limited in their capacity to manage national economies and are confined to adopting policy instruments that might attract foreign capital or the investment of multinational companies. Here, it is easy to extend the arguments of the authors to conclude that government policy should mostly be concerned with profit maximisation of global capital or multinational companies.

Indeed, this book is an economics approach to economic growth that consistently ignores some of the considerable political implications of the perspectives being advanced. Indeed, the authors identify five ways that democracy limits the capacity of innovation in economic policy to develop. These factors include the need to achieve majorities in parliament, the instability of coalitions, the influence of rent-seeking vested interest groups and a political constitution that is inherently conservative (p. 147). Thus, politics is constructed as an impediment to sensible policy.

This type of approach to innovation and economic growth ignores important recent developments in areas such as strategic management and technology strategy that refine these social processes as opportunities rather than threats. It is at the level of these interactions that *Globalization, Economic Growth and Innovation Dynamics* is weakest. It is only in the area of networks and diffusion of technology that the monograph presents some recognition of a wider variety of social forces impacting on innovation. For example,

government regulatory regimes are often a response to these social forces and may provide opportunities for innovation. Environmental regulation or industry standards are cases of these forces.

Similarly, the policy instruments explored by the authors conceive governments as providers of services to attract or support private companies. This approach is consistent with the market approach to innovation proposed in the book. However, the role of government and its agencies as participants in the economy remains mostly untested. Governments represent around 50% of the GDP in many European economies. They are both sources and providers of innovation. The role of governments as contributors to economic growth implies that there is a much wider range of policy initiatives available to governments than proposed in this book.

Despite these omissions, *Globalization, Economic Growth and Innovation Dynamics* is an intelligent book that presents a strong and convincing argument based on credible evidence. It assumes some knowledge of the field and some understanding of the language. The book doesn't present new material but rather uses existing knowledge to develop a case for limited government action in support of innovation.

The content of the book was for policy-makers, so its accessibility to the public is limited. Indeed, there are frequent editorial mistakes throughout this book, presumably in its conversion from German or in changing a government report to a book. The book also lacks completion with respect to drawing together of themes, coherence and the logical development of content and chapters. Its form as a report to parliament is still evident.

However, the audience for this book is more likely to focus on its well-supported arguments and extensive use of both theory and data to derive policy conclusions. It is a book that should be read by students, researchers and policy-makers engaged in areas of innovation and economic growth. The primary strength of *Globalization, Economic Growth and Innovation Dynamics* is its achievement in bringing together the most recent data and theoretical argument in this field to inform the policy debate.

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Creating a Clearway on the New Silk Road: International Business and Policy Trends in Internet Commerce

Matthew Hyndes, Mike Adams, Ann Duffy and Daniel Bray

Canberra, Department of Foreign Affairs and Trade, 1999, xxvi + 202 pp., AU$30.00, ISBN 0 642 37404 X

Within such a short period of its emergence, no other recent technology has led to so many 'cliches' like the internet. The internet has resulted in reducing distances, collapsing time, accelerating growth, facilitating access to new markets and exposure to new competitors. While internet commerce could be the 'new silk road', the route towards the road is not smooth. The level of internet diffusion and e-commerce adoption in any country is determined by the social, economic, technological and democratic infrastructure prevalent there. Despite the strong pull factors embedded in commercial

networking facilitated by the World Wide Web (WWW), no government can afford to ignore its role as a catalyst in the diffusion of electronic commerce. The Australian government has always been aware of the potential of the internet, as is evident from its earlier studies on internet technologies and uptake of electronic commerce in Australia. It is in this context that Tim Fisher, then Deputy Prime Minister and Minister for Trade, commissioned the latest report *Creating a Clearway on the New Silk Road*. This new report and the previous reports *Putting Australia on the New Silk Road* and *Driving Forces on the New Silk Road*, both commissioned by the Department of Foreign Affairs and Trade exemplify government initiatives in educating Australia on the importance of electronic commerce as an inevitable commercial tool. Creating a clearway for internet commerce gains momentum when it is projected that global e-commerce transactions in the first couple of years of the new millennium would at least equal the size of the Australian economy.

This book, written by Matthew Hyndes, Mike Adams, Ann Duffy and Daniel Bray, is the result of considerable research input by academics and professional research organizations. Intended as a basic book on the role of internet commerce in international trade, *Creating a Clearway on the New Silk Road* is a curtain raiser to the complex web of internet trade. This well-designed user-friendly monograph, aimed at the general public, traders and policy makers, goes beyond the role of introducing internet commerce.

Five distinctive chapters on the growth of internet commerce worldwide and the avenues that the seamless medium offers, are supplemented by eight annexes, each on different aspects of internet trade and the role of business and government in building up an environment conducive to global internet commerce.

Chapter 1 is a brief introduction justifying the objectives of the report. In Chapter 2, 'Revolutionising effects', the growth of the internet so far, and projections for the early years of the millennium are described. Estimates of internet commerce are treated with caution. An introduction to the four waves of internet development follows. The spatial setting of the various waves of internet diffusion is neatly illustrated within a historical context.

Chapter 3, 'Making business work better' is about the role of the internet in business. The concepts of how the internet helps to achieve business objectives, how the cost of communication and transaction could be reduced on the net and how transport and distribution logistics efficiency could be increased, are well explained. The effects of convergence on digital services, the impact of the internet on publishing, broadcasting, manufacturing and retailing and finance are well summarized in this chapter. The technological limitations for convergence are also briefly dealt with.

In Chapter 4, 'Electronic commerce and world trade', the positive impact of the internet on intra- and inter-organizational efficiency in the exchange of services and movement of goods, trade facilitation and retailing to a global market are explored in the context of international internet trade. At the same time, a realistic caution on the potential new generation of trade barriers to online trade across borders has been highlighted. These range from contradictions in legality among countries, political aspects of webcasting, regulations on internet advertisements and impact of existing trade barriers on electronic trading.

As the title of Chapter 5 implies, 'Glimpsing the online world in 2002', it is a projection of internet proliferation, and the likely impact of internet commerce on world trade in the next 2–3 years. Sectoral impact of online technologies and the resultant emerging international trade opportunities are also assessed in this chapter.

At a time when it is unfashionable to acknowledge the role of government, this report highlights the role governments have played in the past, and the role they would have to play as model users of internet technologies in the future. The report emphasizes the

belief that the Australian government has a continuing role to ensure that Australia is as well equipped as possible to survive and thrive in the information age. Being unbiased in the historical documentation of the various phases of internet growth, including its commercialization, this book is well exemplified with government initiatives towards internet and internet commerce. For instance, Annex 5 of the book documents the government policies, initiatives and online services of the economies on the first and second waves of internet development (Australia, France, Germany, Hong Kong, Singapore, Sweden, the UK and the USA). Annex 6 describes the initiatives of those countries on the third wave of internet development (China, Egypt, Fiji, Indonesia, Malaysia, Philippines, Poland, Russia, Saudi Arabia, Sri Lanka, Thailand and Tonga). Those countries on the fourth wave of Internet development (like Burma, Vietnam, Laos, the Solomon Islands and Zimbabwe) have been hindered not only by social and infrastructural constraints, but also by the 'official apathy or attempts to limit or ban the Internet' (Annex 7).

In the overview of the book, it is stated that *Creating a Clearway on the New Silk Road*, and the companion report *Driving Forces on the New Silk Road* are set in the Australian context. While this is true of the *Driving Forces on the New Silk Road*, which specifically puts internet commerce in the Australian context, *Creating a Clearway on the New Silk Road* is more about the internet commerce environment worldwide. The report is based on the premise that the worldwide spread of the internet is a function of economic development. However, the political settings or the social development aspects of the countries could facilitate or hinder adoption and diffusion of internet technologies. The report is also silent on the interregional disparities prevailing in the countries considered.

This book has an excellent glossary of technical terms, which the readers would find as useful as the report itself. However, since internet technologies are changing rapidly, this edition of the book may not be as relevant in a couple of years as it is now, except from a historical perspective. Hence it would be appropriate if the report, along with the previous reports, were revised once in every 2–3 years until Australia makes its presence felt in a big way on the new silk road of internet commerce. Meanwhile, the Department of Foreign Affairs and Trade, which commissioned these reports, could update and make addenda in the online version of the reports available at http://www.dfat.gov.au/nsr/

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Technology and Public Participation

Brian Martin (Ed.)

Wollongong, NSW, Australia, Science and Technology Studies, University of Wollongong, 1999, 263 pp., AU$30.00, ISBN 0 86418 559 6

This set of 10 articles draws on writings both wide and deep about technology and society, and about areas that may not seem to be related to technology, such as psychology, public relations, and the jury process. The authors discuss the benefits public participation could bring and the forms it might take for particular technologies. Along

the way, the reader develops an appreciation of the intricacy of the factors, and how these come down to the personal level. A few samples illustrate the scope.

The fundamental area of food technology highlights the difficulty of meaningful participation in this area, since the general trend is for the consumer to be steadily removed from the source of production. Andy Monk shows that this abstraction of food and the processes that produce it, make it increasingly difficult to understand or assess the pros and cons of food technology. Even at a local level, commercial interests can cloud producers' judgment about environmental and other issues. Monk outlines effective forms of resistance, which require the development of a cultural ethic that values sustainability.

Any parent will be aware of the power of toys as potential traineeships in consumerism. Wendy Varney's article argues that overly structured toys might also decrease a child's ability to play creatively and to participate effectively in shaping their surrounds. She explains that toys are part of a wider technological set of activities that reinforce passive consumption and acceptance of the commercial culture and its accompanying assumptions. Thus, each technology also socialises.

The very ordinariness of the telephone leads us to overlook it as a participatory mechanism, but Lyn Carson describes its importance in conveying personal and emotional information, as well as arranging factual affairs. She found that change of opinion is dependent on the existence of a relationship, that is, the development of trust. Her experience on a government council led her to understand how voice to voice communications can offer equal time and equal input at a local level.

Janis Birkeland's article on community participation in urban planning is perhaps more theoretical than some of the others, and yet offers commonsense propositions. For example: mainstream planning disregards the need for a sense of well-being from community, contact with nature and a healthy, safe environment. Full and meaningful participation is not easy to attain. Her description of a feminist/biocentric approach would also fit comfortably in a deliberative or non-linear model. Whatever the label, this chapter shows how urban planning is influenced by pictures in our heads of internalised power structures, values and ideologies.

A few key assumptions unite the book: that social and technical issues cannot be neatly boxed and dealt with separately; that those affected by a technology should be able to influence it; and that issues of technology and participation should be continuously aired, as part of a wider democratic process. Without offering a cut and dry opinion about technology in general, this book provides some sensible discussions about public participation in a range of technological settings. Along the way, the combined impact of the contributions is to enlarge the readers perspective on the role of the public in technological decision making. Often through personal accounts, the articles relate theoretical approaches to the complex issues of participation in relation to particular technologies.

Some of the concepts which underpin the authors' contributions are the idea of a risk society, the expert–lay divide, the tragedy of the commons and the idea of social, as well as environmental sustainability. These notions, and the debates that form around them, are embedded in many technological decisions. These ideas bubble through the chapters of the book, encouraging readers to examine their own views and values. For example, the risk society is related to the idea that we cannot fully know the consequences of many decisions. In today's world, where actions and results often have a complex relationship, it is hard enough just to predict the possible outcomes of a decision. The risk of getting it wrong, such as through genetically modified food, reverberates throughout society.

As with a hazardous waste incinerator, the example Sharon Beder elaborates on, the

risks cannot be limited to a particular group. When public relations firms become key sources of information, the public is placed in double jeopardy.

This is where the expert–lay divide comes in. The dominant rhetoric is that we can trust the experts to protect us from undue risk. Several of the writers reveal the non-neutral position of experts, including psychiatric experts and possibly even family members, in the case of compulsory psychiatric treatment. As Martin points out in the introduction, jet pilots may not be the best people to discuss alternative forms of travel. In extreme form, over-reliance on experts can lead to a tragedy of the commons situation, where a common resource is degraded until it is not available to anyone, including the experts. This may be the case with global climate change, which is surely a rich area for a similar exploration of public decision making on a complex issue that involves all the technologies of energy.

One of the consistent features of books that Brian Martin is associated with is their accessibility at several levels. This book fits comfortably in many hands. To varying degrees, the articles have a non-academic writing style, suitable for the average citizen without a scientific or academic background. It could be used as a textbook to encourage interdisciplinary thinking in a range of fields, while the inclusion of footnotes extends its usefulness for those who study such issues professionally.

For activists involved with technology and social change, *Technology and Public Participation* can provide additional perspectives on the wider political and economic context in which such matters are decided; and those who design or implement technology, or interact with its legal or administrative ramifications (a large target audience indeed!) would find value in the underlying arguments and concepts which thread through the articles. Martin notes that of the huge literature on democracy and participation, only a small amount has been written about participation in technological decisions. The wide range of topics covered amply illustrate just how wide a net technology casts over our lives, yet most of us feel unable to understand much less and how to contribute to its design, implementation or evaluation.

Several other aspects are noteworthy. The text is available for free on the Internet, although the reviewer confesses to reading it in book form. If it is possible to encourage participation in a text, this one shows the way. Each chapter was offered to colleagues for comment before publication, and outside readers with an interest in the area were also invited to provide written comments. The authors then had the opportunity to reply to these. This creates a coda of dialogue for each chapter, which gently leads the reader to continue musing about the views presented. Thus, without much ado, the book is an example of a technology intentionally fostering participation. The compact set of articles is framed by the editor's clear introduction and conclusion.

Globalisation is a low frequency tone underlying many of the articles: Australian specifics refer to wider pressures. Thus, it was surprising that information technology, as an overarching 'metatechnology', was only included in two articles: as a brief mention of teledemocracy versus deliberative democracy, and in Miriam Soloman's discussion of the way laptop computers shape the communications of non-government organisations. With the immediacy of first hand experience, she describes how the north–south divide is repeated in international meetings. Rather than using the opportunity to build relationships, computer owners often communicate with an unseen 'other', leaving those without such accoutrements to talk among themselves. Undoubtedly, participation in the wider design of information technology warrants further consideration, as this infrastructure increasingly underpins all other technologies. Decisions are being made now on behalf of those who do not know they will become dependent on it.

Sharon Beder's contribution on the intense involvement of multi-national public

relations firms in many areas of technical decision making also relates to globalisation. These paid advocates encourage acceptance of the status quo, and play down the political aspect of technical decisions. Resistance to technology, the handmaiden of globalisation, is commonly dismissed as a 'neo-Luddite' response.

Technology and Public Participation is a salient reminder of the necessary nexus between theory and practice, from authors committed to social change. Increasingly, local issues are entwined in systemic processes, and these articles show that technology and participation are always part of wider structures. The choices presented to the public, if presented at all, often reflect underlying conflicts between sets of values and unacknowledged interests. The editor and authors argue cogently that this pervasiveness and complexity makes public participation in all aspects of technology more important than ever. The book is also published on the Internet: http://www.uow.edu.au/arts/sts/TPP/.

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The Complexity Challenge: Technological Innovation for the 21st Century

Robert W. Rycroft and Don E. Kash

London, Pinter, 1999, xiii + 302pp., £45.00 (hbk), £15.99 (pbk), ISBN 1 88567 608 7 (hbk), ISBN 1 85567 611 7 (pbk)

Few would argue that technological innovation is a critical key to national prosperity. *The Complexity Challenge* investigates the issues and processes which enable the development of complex technologies. These products are important avenues for generating high-value-added goods, thereby assisting in reducing national trade deficits.

Most would assume that the normal processes of research, investment and training would lead to this high value outcome. The authors, however, argue that technologies must be viewed as simple and complex. Complex technologies are defined as those which cannot be understood in detail by a single expert, or communicated to others through time and space. Initial investigations of world exports, using this simple categorisation, highlighted the weak performance of the US in producing complex products. They were found to rely more heavily on simple outputs which can be readily replicated and copied. There are two fundamental questions addressed in this work: why do some countries, such as Japan, do so well in producing complex technological innovations, while countries like the US falter in this area? And secondly, what can be done to lift performance in this area?

The authors explore the issue from two perspectives. First, they seek to outline how the technologies may be defined, and what features are to be found in a complex product. Second, they provide examples using case studies to show how innovative complex technologies are developed.

The exploration of technological innovation spans a number of theoretical issues. The authors note the contradiction between the linear perception of change which permeates Western society, and the synergistic amalgamation of concepts which is reflected in many innovations. Ideas are not necessarily developed from one initial foundation. Rather, they may comprise an eclectic array drawn from several different

products previously seen as discreet and mutually exclusive. The authors note that this ability to innovate through synthesis has required some significant changes in the way we view industrial decision making.

In previous years, the quest toward mass production has required the eradication of creativity and innovation. The organisational structures developed to support these streamlined product goals were mechanistic, hierarchical, rigid and inflexible, providing little opportunity for independent thought or synergy. In contrast, the authors explore the alternative work environment, 'lean' manufacturing, which is more frequently developing. They view these organic, flexible environments as strong frameworks which allow synthetic practices to burgeon. Interestingly, their view of the two organisational structures reflect the Asian, versus the traditional Western, work environments.

While the organisational structure is seen to underpin the development of synthetic opportunities, a further requirement is identified as networks. These enable the drawing of information from a vast array of channels: users, the market, services, production, research and development, designers and related asset suppliers. These, and others, all provide feedback and learning which contribute to further innovation. The authors emphasise the critical nature of this communication network, and argue that it is a prerequisite to complex technological innovation.

To support their argument, they review six case studies of complex innovation. Four categories of technology are included: mechanical, electronic, electronic–mechanical and electronic–optical–mechanical. Each product clearly reflects the criteria of complexity; that is, the product required input from a number of experts, none of whom could produce the product singly. Prior to reviewing the findings of the research, the authors provide a short summary of the innovation process for each company. A comprehensive time line depicting the innovative process provides a highly informative picture of the stages of development, and the phases of change which occurred. The time line features five key elements: the dates of milestone innovations; the product version which was produced; the technical capabilities of the product; the innovation network which contributed to the product development; and public policies which impinged on the changes. The tables and the accompanying commentaries clearly illustrate the authors' previous claims of the need for networking, synergy and synthetic production.

Having provided a thumb sketch of the six products, the authors then review some of the key features which are reflected in the work practices and environments. They highlight three key factors evident in the cases: self-organisation; network learning; and path dependence.

Self-organisation operates at two levels: organisational and network. At an organisational level, the authors argue that public policy is actively working against innovation in US enterprises. While many organisations are attempting to create flatter hierarchies, self-managed teams, multi-skilled workers, diffusive communication, and high worker autonomy, the actual economic imperatives resist such changes. They contrast these difficulties with the processes which are readily implemented in cultures where lean manufacturing has existed for some years. There is a clear message that economic drivers may hinder innovation.

Self-organisation through networks is seen as an alternative innovative channel for developers who are limited through organisational constraints. The authors claim that 'innovative networks respond to and create change by developing and modifying their mix of core capabilities and complementary assets' (p. 112). A number of criteria are shown to exist for those who successfully innovate through self-organised networks. First, the authors note the need for core competencies which provide a commercialised market edge. These competencies link to trade secrets, copyrighted products, patents and

trademarks which reflect the core technological know-how of the network participants. The ability to develop complementary synergies between the various contributors is a second element for success. This can be achieved through a number of channels, such as competitive manufacturing, distribution, service, complementary technologies, and other means of sharing resources and know-how. Thirdly, the capacity to learn from experience, so that capabilities and assets are (re)created and enhanced is a fundamental component of these environments. The key role of network self-organisation is to create an adaptable and incremental force which can develop the routines and technologies using the most efficient learning mechanisms possible. The authors describe a number of strategies which can contribute to this network knowledge growth, highlighting the strategic nature of much of this process. Structure, co-ordination and routine are all explored and identified as critical components of effective self-management of innovation networks.

The criticality of network learning is also examined from the stance of how one acquires knowledge. Six sources of learning are examined: learning through doing; learning through usage; learning from advances in research and industry; learning from spillovers; learning by interaction; and learning from formalised research and inquiry. A related issue which is well explored, is the need to unlearn whilst also relearning. The reliance on past understandings, it is argued, can become a limitation, rather than a strength when technological innovation is the goal. Many advancements occur because people think 'outside the square'. Such thinking needs to be encouraged and nurtured where innovation is targeted.

The authors also address the path dependence nature of innovation. The case studies provide a trajectory diagram, depicting the developmental phases of each new innovation in the six products. Some factors which clearly impinge on the successful integration of innovation relate to cultural evolution, learning, technological compatibility, standards setting and industry strategy. These contributing forces are briefly reviewed, and linked to the case material.

The final section of the work provides a comprehensive summary of the process of innovation, and the stages through which an innovation may pass. The authors identify three different innovation patterns in terms of their network characteristics, technologies and trajectories. The three patterns are labelled normal, transition and transformation. The factor which most differentiates the three patterns is the degree of continuity evident in the change process. Normal innovations are characterised by smooth developments, while transitional developments are caused by significant alterations to design and performance. Transformational processes are the least predictable, and the most chaotic of the three. These occur when the new design is fundamentally different from any before. The development has often required the creation of new core capabilities, new complementary assets and wide ranging learning.

The authors conclude with two powerful chapters exploring the implications for organisations. They argue that organisations must recognise the fact that networks are the innovation drivers for complex technologies. The recognition of this fact raises the question as to how one can manage the growth and role of such networks. The authors briefly outline some basic techniques for mapping change patterns and developing strategic management of the network.

Perhaps the most important concluding chapter is the review of public policy and its impact on technological innovation. Three key areas are identified: networking resources to allow communication across interested parties; providing opportunities for learning, development of potential capabilities, assets and path dependencies; and ensuring public standards and policies work for, not against, innovation. Although this final chapter is

very much focused on the US political environment, the issues are as pertinent to any Western nation seeking to foster technological creativity and growth.

This work is impressive in its research depth and development of a cogent argument for the management of technological innovation. It provides the reader with a sound grounding in the paths followed by key innovators, and draws out realistic and credible conclusions from the analyses. The practical perspectives on organisational management of innovation is one of the more complete analyses of innovation barriers erected in workplaces. However, the most valuable element of this work is its very complete and careful analysis of the innovation network and the means by which such groups may be used to advantage.

This work is highly recommended to those who are attempting to work at the cutting edge of complex technological innovation. Many of the described strategies could enable a more effective management of the contributions and the learning gained from those synergies. Those who manage innovative enterprises would also find the cases and their implications to be both informative and constructive. Perhaps the most fundamental message operating throughout this work is that we must allow creative growth and value those who think in this manner. In particular, we should aim to provide more support and fewer barriers as they seek to become lateral or transformational innovators.

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Stopping the Juggernaut: Public Interest Versus the Multilateral Agreement on Investment

James Goodman and Patricia Ranald (Eds)

Sydney, Pluto Press, 1999, xiii + 255 pp., AU$24.95, ISBN 1 86403 071 2

Passionate protests against the World Trade Organisation (WTO) and its corporate agenda last November in Seattle demonstrated that the drive for liberalisation of trade and elimination of all barriers to foreign investment will be key issues for the start of the millennium. *Stopping the Juggernaut,* an appraisal of the Multilateral Agreement on Investment (MAI) and the campaign which stopped it, is therefore a timely publication, launched on the very day of the Seattle flashpoint.

The MAI was an agreement being secretly drafted by the OECD which sought to elevate multinational corporations (MNCs) to virtual 'sovereignty' status and, in so doing, curtail the ability of nation states to set their own agendas. Already many nations find that their economies are very much out of their hands, with foreign capital so integrated into domestic economies and so mobile and with other socially devastating agreements overseen by the WTO already 'kicking in'. But the MAI would have exacerbated the situation substantially. In many instances, it would effectively have given MNCs at least as much power as nation states, and arguably more. Of course, many MNCs already have much more economic power than many nation-states but the MAI was to extend that into virtually every arena of political as well as economic life.

Designed to increase the mobility of all forms of investment and financial transactions and to prevent government regulation which MNCs could interpret as 'discriminatory',

the MAI would have granted the corporation actual rights. It also included measures for enforcement of the treaty's clauses through tribunals which had at least the potential for being kangaroo courts. The WTO lustily envisaged the treaty as a 'constitution for a single global economy'.

It all sounded great for MNCs, but how would citizens fare? In most cases, very poorly. Implementation of the MAI would have had far-reaching implications for social welfare, the arts, research, non-profit organisations, indigenous people, many women, small farmers, 'Third World' countries and the poor in general. For instance, it would have jeopardised governments' ability to maintain some control over matters such as local investment, technology transfer, training and export requirements. The domestic telecommunications equipment industry in Australia would be most unlikely to have got off the ground if the MAI had been in force at the time of its development.

The draft limited many aspects of industry policy, regional development and government procurement policy. Governments could not require corporations to have joint ventures with local investors nor insist on minimum levels of local ownership, training of local people or local development. The cultural industries of small countries or countries with main languages other than English would suffer drastically and their national and local cultures would be severely threatened, with subsidies for home-grown television and regulations setting standards and minimums for local content all running against the grain of the MAI. Anti-discrimination, affirmative action and indigenous rights laws could all be under question marks.

It was a frightening business and it is not over yet, as the book points out, for the WTO has shown every indication that it still wants the terms of the MAI instigated, albeit under a different name and in a different venue, 'by hook or by crook'.

Stopping the Juggernaut has two parts. The first part covers three main areas, seeking firstly to put the MAI in its global context, secondly to explain what the MAI would have meant for Australia, and thirdly to explore the success of the anti-MAI campaign.

Part two is a collection of 17 submissions made to the Joint Standing Committee on Treaties set up by the Australian government. This is only a sample of the 900 submissions the issue attracted from all over Australia and from a wide sweep of groups and individuals, demonstrating the range of concerns and depth of feeling against the MAI, to which 95% of the submissions were opposed. But the sample spread is a good one, covering particularly the areas of economic and cultural concerns; human rights and minority group issues; and other issues of social justice, particularly environmental justice and the inequity between rich and poor nations. This is useful for those wishing to look at a particular perspective or special area of concern.

The conclusion presents some proposals for new forms of regulation, not only to counter the campaign for deregulation but to take up the challenge mooted decades ago but swept away in the euphoria of neo-liberalism. Campaigners are agreeing that yes, there needs to be a treaty but of quite a different kind, with the questions not being about the quantity of investment so much as its quality: 'Does it benefit local peoples? Does it exploit or develop? Does it undermine labour or indigenous rights, women's rights or human rights? Are its environmental impacts acceptable?' (p. 221). Paradoxically, in greedily grabbing for an astronomically ambitious amount of extra power, the MNCs may have restimulated a movement for quite different and infinitely more democratic demands.

Several boxes sprinkled through the book highlight some of the side issues of the push towards trade liberalisation, a push that, at least in its MAI phase, was characterised by clandestine and behind-the-scenes lobbying. What the MAI lobbyists strove for became entangled in their process of achieving it and in the behaviour of their supporters, such

as the Australian Treasury, as shown in one of these side-issue boxes entitled 'Like blood for a stone'. It reveals the remarkable story of how the Australian Conservation Foundation (ACF) attempted to acquire documents from the Treasury under Freedom of Information legislation. For its boldness, the ACF met a wall of secrecy, stalling, red tape and blustering interspersed by long periods of silence. This is a useful insight into how the campaign for the treaty mirrored the philosophical contents of that treaty, once more suggesting a link between means and ends. Both the treaty and the process towards it embodied an arrogance and disregard for public opinion. Another box reproducing verbatim a conversation between some parliamentarians demonstrates similar disregard.

The campaign of anti-MAI activists, on the other hand, was diverse, democratic and had a real basis in the grassroots. It too was global but in an entirely different way, with activists using the net to spoil the covert operations of the OECD. When negotiations for an MAI were first leaked, the entire draft was immediately placed on the web by an American-based NGO, which then alerted other NGOs to the draft treaty's presence. Small groups and individuals threw themselves into the campaign with a sense of innovation and commitment which the MNCs, for all their resources, could not match.

An exhaustive list of references both demonstrates the knowledge of the authors in this field and provides a very useful starting point for those wishing to further research this urgent topic. It covers a wide range of critiques of the corporate agenda and also many documents from the OECD, which provide damnation for the organisation from its own mouth.

One of the book's key benefits is its ability to look at the issue from both a macro and micro perspective. An enlightening chapter by Frank Stilwell deals with the bigger picture, as he argues that there are several contradictions in the globalisation process, most notably greater inequality versus the need for rising consumption; a diminished role for the state versus the need for social stability; and environmental degradation versus dependence on the biosphere. He urges that globalisation be interpreted in a way which allows contestation, such as was the case in the anti-MAI campaign. 'Seeing globalisation as a contestable process directs attention to political processes and choices' (p. 11).

But the book never loses sight of how the treaty—or any equivalent treaty—would impact on people in their everyday lives. The authors demonstrate an impressive blend of a scholarly grasp of globalisation and sensitivities towards the real problems as they unfold for the most disadvantaged—sensitivities which are, unfortunately, all too lacking in the hallowed halls of the WTO's Geneva headquarters.

As the authors note, the struggle against the tide of global neo-liberalism continues. Their book makes a worthwhile contribution to that struggle.

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