

REVIEW ARTICLE

On the failure of social theory

Social theory has failed intellectually, yet by most academic and popular standards it continues to attract all the trappings of success. Why should this be so?

To furnish an answer one must examine the nature of social theory itself, explore the character of its failure and seek an understanding of how, nevertheless, it continues to attract approval. In the latter respect a sociological account of the functions which social theory plays in both intellectual and practical life is required.

Rather than targeting social theory in the round we shall critically review aspects of Castells' volume *The Rise of the Network Society* (Volume 1 only). Castells' writings would be endorsed by most social scientists as an exemplar of what is usually termed social theory.

That *The Rise of the Network Society* is successful is beyond all doubt; first published in 1996 it has already been reprinted four times and attracted rave reviews from other social theorists. Cardoso (a political scientist) describes it as 'A masterpiece . . . (which) will have an enormous impact on (the) social sciences.' Giddens (a sociologist) opines that '. . . it is a very major work of social and economic theory' and finally, Touraine (another sociologist) writes: 'Castells' master book rediscovers the highest ambition of modern social science.' Furthermore, Castells appears to have attracted much attention outside academic circles. He was appointed to the European Commission's High level Expert Group on the Information Society and, was sought by the Russian political authorities to advise on similar matters.

The applause of other social theorists is not perhaps unexpected, it being one of the appurtenances of the calling that much mutual appreciation (and citation) takes place. There is after all a shared interest in the promotion of the genre. If, however, the whole enterprise is shaky, the extra-academic appreciation is more difficult to comprehend. Perhaps the European Commission and the Russian authorities were spellbound by the possibilities inherent to the following:

linear irreversible, measurable, predictable time is being shattered in the network society, in a movement of extraordinary historical significance. But we are not just witnessing a relativization of time according to social context or alternatively the return to time reversibility as if reality could become entirely captured in cyclical myths. The transformation is more profound; it is the mixing of tenses to create a forever universe, not self-expanding but self-maintaining, not cyclical but random, not recursive but incursive: timeless time using technology to escape the contexts of its existence, and to appropriate selectively any value each context could offer to the ever-present (on p. 464). I argue that this is happening now not only because capitalism strives to free itself from all constraints, since this has been the capitalist systems tendency all along without being able to fully materialise it. Neither is it sufficient to refer to the cultural and social revolts against clock time, since they have characterised the history of the last century without actually reversing its domination, indeed furthering its logic by including clock time distribution of life in the social contract. Capital's freedom from time and culture's escape from the clock are decisively facilitated by new information technologies and embedded in the structure of the network society. (p. 463)

We apologise for the length of this quotation but deem it important that the reader be as well informed as the Commission and Mr Yeltsin!

None of the chapters in Castells' book would easily find a place on the pages of a social science journal upholding appropriate refereeing standards. The quality of the writing and the often inept and selective (secondary) use of data would rule this out. We might ponder though, the motivations lying behind 'theoretical' writings of this sort. And let it be noted that the idiom is entirely characteristic of the genre, not just of Castells. Does clear precise prose prove inadequate to the theoretical purposes at hand? Or, rather, is it merely a matter of concealing the obvious or even banal in a florid vocabulary and style?

The precise nature of 'social theory' is difficult to pin down. The genre ranges from the micro to the macro (rarely providing an adequate understanding of the intricate two-way linkages which exist between the two and where, in fact, the central technical problems of theory construction reside). Castells, however, operates almost entirely at the macro end of things (at least in Volume 1) and apparently uses the terms social theory and sociological theory interchangeably. Castells' central purpose is to promote the adoption of networks as analytical units, which may straddle other more conventional units like states or regions in a rather untidy manner. It is, he urges, developments in information technology (IT) which, along with corporate restructuring have promoted networks to this preminent position. Thus, Castells writes

For the first time in history the basic unit of economic organisation is not a subject, be it individual . . . or collective . . . the unit is the network made up of a variety of subjects and organisations. . . . (p. 214)

The problem here, of course, is that all 'collectivities' (e.g. classes, corporations, groups and what not) may themselves, all be conceived as networks possessing relations of one sort or another, running between individuals (or sub-collectivities). There is, indeed, a strong analytical tradition within the social sciences (particularly sociology) which systematically adopts and explores the implications of this viewpoint, but of which Castells appears to be largely innocent. So what is the difference between the new IT tutored networks and the old variety which engenders a discontinuity in the socio-economic development of capitalism? It is difficult to find a definitive answer to this question in Castells' pages, but we encounter the following, which is described as the 'ethical foundation of the network enterprise' or the 'spirit of informationalism'

It (i.e. the spirit of informationalism) is a culture indeed, but a culture of the ephemeral, a culture of each strategic decision, a patchwork of experiences and interests, rather than a charter of rights and obligations. It is a *multifaceted, virtual culture*, as in the visual experiences created by computers in cyberspace by rearranging reality . . . Any attempt at crystallizing the position in the network as a cultural code in a particular time and space sentences the network to obsolescence, since it becomes too rigid for the variable geometry required by informationalism. (p. 214)

We have once again burdened the reader with a rather lengthy extract because it provides a good example of the intellectual style of much social theory. Surely if one is going to make radical theoretical claims for the distinctiveness of certain types of networks (whether induced by developments in information technology or not) then one should be held by the canons of good intellectual practice to careful and precise exposition. The tradition in social theory is, however, at odds with such practice and Castells provides no exception. It is clear from the above quotations, and we will repeatedly encounter the same problem as we progress, that intellectual precision is often surrendered. We will return to speculate why this should be the case, but for the moment we may observe that the distinctiveness of the new networks may be associated with how information technologies have reduced the durability of relations and stability in networks, emphasized fleeting coalitions of interest, changed the time perspective and spatial awareness of network participants and even introduced some ambiguity in their perceptions of reality and the image. These seem to be the sorts of claims which Castells is making. As such, of course, they are rather common-place and one wonders where Castells' own contribution lies for there is no attempt to address the complex modelling issue of how these various strands may interrelate. This is, surely, where genuine theory should start. But let us now turn to the specifics of his conjectures before returning to the spurious nature of his general approach to social theory.

Around about 1970 a revolution in IT occurred (with a distinct push from Silicon Valley). This is turning out to be a 'major event' comparable

in its impact with the industrial revolutions of the past. It is introducing *discontinuities* in the economic organization and performance of capitalism, in society at large and in our broader cultures – particularly in our conceptions of space and time. These discontinuities (or very rapid changes) are attributable to an increasing rate of feedback inherent in the new information technologies – the (positive) feedback running from experience in use to new innovations. The feedback is either getting faster (i.e. accelerating) or is faster than in previous periods (both statements are made). These developments are progressively inaugurating a new informational society which is described as the ‘Network Society’. Two causal questions arise. First, what set it all off (particularly in Silicon Valley but to a lesser extent elsewhere also)? Second, what are the *discontinuous* economic, social and cultural consequences?

In answer to the first question, Castells dismisses as ‘seeming unconvincing both ‘contradictions in capitalistic society and gaining military superiority over the Soviets’ (the latter merely ‘prepared American technology for the leap forward’). Rather, we are invited to entertain an ‘autonomous dynamic’ in the technology of discovery and diffusion, including ‘synergistic effects’ between various ‘key technologies’. So the causality is ‘technically induced’ rather than ‘socially determined’; none the less the course of the revolution is, ‘decisively shaped by historical context’.

As to the significance of Silicon Valley, Castells draws heavily upon a number of standard historical accounts. He poses the question, why Silicon Valley and not similar sites elsewhere (route 128 in Boston, Paris Sud or the M4 in Britain for example)? He believes that the answer lies with the twin facts that Silicon Valley, unlike other possible sites, is not based around an ‘old city’ and with American exceptionalism (‘the endless escapism from contradictions of built cities and constituted societies’). ‘It is not the newness of (the) institutional and cultural setting but its ability to generate synergy on the basis of knowledge and information’. Further, Silicon Valley provided a location where

by this interface between macro-research programs and large markets developed by the state, on the one hand, and decentralised innovation stimulated by a culture of technological creativity and role models of fast personal success, on the other hand, that new information technologies came to blossom. (p. 69)

Whatever the truth might be about this complex conjuncture, it does stretch one’s incredulity; how are we to interpret it as an example of ‘technological’ rather than ‘social’ determination? But one should not despair for we are quickly informed that the process is

largely underdetermined since the interaction of technology and society depends on stochastic relationships between an excessive number of quasi-independent variables.

However it came to be that Silicon Valley was selected, the site possesses the

characteristics of a 'technological paradigm' (a concept Castells adopts from others). One of these characteristics is called 'networking logic'; so

The morphology of the network seems to be well adapted to increasing complexity of interaction and to unpredictable patterns of development arising from the creative power of such interaction. (p. 70)

It is not clear what this means (though proffered as part of an extended definition) but I think Castells is implicitly drawing a distinction between hierarchically and nonhierarchically coordinated networks. Unfortunately, the technical literature on these matters (to which there is no reference) points to an entirely more complicated picture. Be that as it may, here we encounter another notable feature of social theory, namely, the promotion of formulations, which are systematically uninformed about any pertinent technically based social science.

One would expect the author of a book entitled *The Rise of the Network Society* to present a thesis on the nature of change in social networks. Instead we find abuse of network terminology contained in purely speculative comments on the changing character of social interaction and social organization. Given the lack of logical analysis underpinning any 'conclusions' (e.g. that culture is the result of increased productivity, asserted on p. 78), the intelligent reader can easily find arguments supporting their negation. The argumentation regarding imperfectness of capital markets, for instance, is on distinctly shaky grounds. Connectedness would be expected to drive towards more rather than less perfect markets. We are also told that electronically managed global capital markets lead to instability. But there is no reason why higher speed of communication should lead to more instability, indeed, one could argue that equilibrium should be reached faster.

Meretricious use of network analogies is pervasive in Castells' description of trends in the economy. We learn that 'a networked, deeply interdependent economy emerges' (p. 78). Let us assume that new IT facilitates connections. Does this imply that economies become more interdependent i.e. mutually dependent? In fact, the opposite should be the case. Easier access to information about suppliers, customers and competitors and the resulting increase in competitiveness should make each actor less, not more, dependent. The source of the fallacious conclusion is Castells' confusion of connectedness with dependence, a confusion which is all the more serious since one might expect a negative correlation between these two concepts in economic (and social) networks.

The chapter on employment betrays an alarming lack of familiarity with basic economic principles. Standard neoclassical production theory postulates declining marginal productivity of inputs. Yet the author is puzzled by the fact that productivity in agriculture increased as the labour force decreased (p. 267). Similarly, he is surprised to find that while 'vacation time seems to correlate positively with growth in labour productivity' not all countries have the same amount of vacation time. One is left with the

uncomfortable impression that an ignorance of the optimality result of equality between marginal revenue product and marginal expenditure is the source of this statement. The absence of a correlation between export/GDP ratios and development is presented as a paradox. Why?

Any reasonably sophisticated reader must be extremely irritated by the clumsy style as well as the content of Castells' book. A major problem is that on the rare occasions where we find some substance, it could be expressed clearly in a minute fraction of the space devoted to it. When definitions are provided they are utterly unhelpful not to say meaningless. On p. 101 the central concept of a 'global economy' is defined. Apparently, it works in real time (what would it be like if it didn't?) on a planetary scale (this is to distinguish it from a world economy!).

The most prominent consequence of the revolution in information technology is the creation (or perhaps only enhancement?) of the global economy which has arisen from an interaction between the 'rise in informationalism' (and, thus, the 'new' networks) and the 'process of capitalist restructuring'. The precise nature of the interaction is never made clear though the underlying story is a fairly standard interpretation of recent trends suffused with many unsubstantiated aspersions concerning the causal role of information technology. Any reasonable theory would, at this point, have specified much more precisely those mechanisms which bring together 'capitalist restructuring', the rise of networks (held together albeit fleetingly, by informationalism) and the impact of information technology on various markets. The reader is, however, left to pull these things together himself from scattered remarks littered over several hundred pages.

There has of course, recently been a rumbustious debate conducted by economists as to whether or not we are entering a 'new paradigm', led by productivity improvements caused by the introduction of information technology, permitting the coincidence of productivity growth with low inflation and high employment rates. Again, Castells' tangential engagement with this debate is largely uninformative. He uncritically embraces ideas which support his own view (roughly pro-new paradigm) rather than subjecting the many technical arguments to any significant scrutiny.

The global economic picture, which Castells promotes, is, largely uncontroversial (and, of course, not novel): it is based around three 'information rich' economic regions (North American, Europe and Asia Pacific) each associated with its respective hinterlands and the remainder – a rump of 'non-information rich regions'. In addition he distinguishes four (again, not controversial) 'positions' in the international division of labour which cut across both these regions and nation states, namely: high value added based upon information labour; high volume based upon low labour costs; production based upon material endowments and, finally, redundant producers. Not being regionally or nationally distributed these positions are organized in 'networks and flows using the technological infrastructure of the informational economy.' This is where networks are analytically

elevated to a sort of ontological preeminence (even though their variable geometry (a favourite though meaningless phrase) is constantly in flux). Furthermore, in the quest for discontinuity they comprise a 'distinctive form of production' significantly caused by changes in IT and 'preexisting cultural forms'. Neither of these claims is adequately substantiated.

The contemporary global economy which Castells examines, net of any reference to networks, but with a focus upon sprawling corporations is, give or take a few details, common currency. He takes us through familiar descriptions (though in a selective manner) of Japanese corporations, strategic alliances and so on. In their various ways these are ushering in the 'horizontal corporation . . . a strategically planned network of self-programmed, self-directed units based on decentralisation, participation and coordination' (p. 178). Make what you will of this, the chapter on the network enterprise is empirically speaking entirely derivative. Nothing wrong with this, but what do we gain theoretically by invoking some rather vague notion of networks? First, a definition of sorts

the network enterprise (is) that specific form of enterprise whose system of means is constituted by the intersection of segments of autonomous systems of goals. Thus, the components of the network are both autonomous and dependent vis-à-vis the network . . . (p. 187)

It is difficult to understand how a 'definition' as opaque as this can satisfy an author and what is more, it embodies an implication ('thus') which can only follow with the interjection of a whole skein of intervening propositions. Nevertheless, it is superficially clear where Castells is trying to take us. Many have observed that a lot of corporations (but not all) are increasingly forming alliances, contracting out and reducing their apparent dependence upon hierarchical in favour of more horizontal coordination. This we all know. The question is what is gained theoretically or empirically by invoking the language of networks. Castells continues as follows

The performance of a given network will then depend on two fundamental attributes to facilitate noise-free communication between its component parts; its connectedness, that is its structural ability is the extent to which there is sharing of interests between the networks goals and the goals of its components. (p. 187)

The degree of connectedness is of course an elementary network concept, which might have been put to some real theoretical use. But, unfortunately, traditional hierarchies and bureaucracies are also connected with a minimum number of relationships. So what might be special about 'horizontal networks' (which incidentally are unlikely to be 'noise-free' – (note the inept introduction of a rather technical sounding term here)? Well, there exist various technical literatures (sociological/economic) concerning the theory of teams, incomplete contracting, trust mechanisms, bargaining and negotiation, transfer pricing and internal markets and much

else, which might be deployed in order to theoretically embrace the idea of taking a horizontally coordinated network as a unit of analysis. Although, truth be told, the networks Castells refers to are in fact an amalgam of horizontal and hierarchical relations. He appears however, to be unaware of all of this – or at least chooses to ignore it. In fact the word network, as he uses it, brings no intellectual added value. Allusions are all we get, genuine theory is entirely absent.

If one is intent on centering attention upon the variety of semi-horizontal *networks* which populate the ‘information rich’ world (from industrial districts to global corporations) then one must be immersed in the technicalities of network analysis and sensitive to the multiplicity of contractual and informal relationships between changing coalitions of actors with their partially matching and opposing interests. It is not sufficient to coin the term network, for it does no theoretical work and in particular by failing to incorporate insights from both network theory and the theory of contracts (etc.) the mechanisms which link changes in IT to changes in network structures and functions cannot be adequately grasped. Indeed, in this context it is entirely unclear whether or not IT is a ‘neutral force’ which can be adapted to very different corporate structures, and changes in the latter are in turn driven by other causes. Castells implicitly recognizes this possibility by apparently postulating an interaction between IT and ‘institutional context’, but the level of specification of their relationship is so vague as to be theoretically valueless.

Let us now turn to what Castells has to say about the cultural implications of the network society. Two of his basic ideas are perhaps uncontroversial, namely, that developments in IT are changing our perceptions of and attitudes towards time and space – although as we shall see the language in which he writes these ideas is pretentious beyond belief. The third idea, what he terms the ‘culture of real virtuality’, is more difficult to tie down.

Again, Castells starts uncontroversially but quickly wanders into a linguistic maze. Cultures are assembled from the supply and consumption of signs inherent in communication processes. Furthermore, the semantic denotation of such signs is often somewhat ambiguous. This enables him to assert that reality is always ‘virtuality perceived’. Although this epistemological standpoint is not uncontroversial, as is his practice, Castells asserts it with unblinking confidence. So what is real virtuality?

It is a system in which reality itself (that is people’s material/symbolic existence) is entirely captured, fully immersed in a virtual image setting, in the world of make believe, in which appearances are not just on the screen through which experience is communicated, but they become the experience. (p. 404)

Perhaps it is not surprising that reality itself is virtuality perceived when filtered through expressions like this. Be that as it may, the quote is followed by an illustrative example where former Vice-President Quayle is engaged in a debate with a character in a soap opera (not the actor playing the

role). Of course we are all amused by this sort of thing and there may be something intellectually compelling to convey about it, consequent upon a careful psychological/ sociological analysis. But to puff the phenomenon up by endowing it with the status of a definitive cultural trait, beggars belief. As does

All messages of all kinds become enclosed in the medium because the medium has become so comprehensive, so diversified, so malleable that it absorbs in the same multimedia text the whole of human experience, past, present, and future, as in that unique point of the universe that Jorge Luis Borges called 'leph'. . . . (p. 404)

Here we have a good example of the social theorists' tendency to avoid detailed analysis of empirical complexity by elevating a particular empirical phenomena beyond its importance in pursuit of the application of a putative 'theoretical' category.

Castells continues

the new communication system radically transforms space and time, the fundamental dimensions of human life. Localities become disembodied from their cultural, historical, geographical meaning, and reintegrated into functional networks or into image collages, inducing a space of flows that substitutes for the space of places. Time is erased in the new communication system when past, present and future can be programmed to interact with each other in the same message. The *space of flows* and *timeless time* are the material foundations of a new culture . . . (p. 406)

What are we to make of all of this? What is the nature of Castells' failure? On the empirical side things are not too bad. Trends in international trade (Ch.2) and the history of the internet are well documented. The historical account about the rise of IT and its impact upon the organizations and institutions of the economic and social world, though largely based upon others' research, is at least arguable. He is however extremely selective when reporting studies which support his own (ill-specified) story and ignoring others which do not. There is little evidence of a careful balancing of empirical materials and no attempt to discuss the adequacy of empirical studies and the data he reports. Certainly, IT developments are most probably influencing the way many things are changing, though to give IT the pivotal role he does is questionable as is his insistence on 'discontinuities'. What a genuine theorist would have attempted would have been to set up explicit tests derivative of his 'theory' which would in some way distinguish the claims of his 'theory' from rivals which would merely give IT a facilitating role in trends which find their root causes elsewhere. Who knows where the truth lies but the point is that Castells' 'theoretical' formulations are not going to help us.

It is Castells' 'theoretical' contribution, which is fundamentally flawed. In the previous pages we have provided a number of quotations which do,

we think, portray the style of his ‘theorizing’. And, as we mentioned in our opening paragraphs, his approach is not unique to him but is typical of large swathes of ‘social theory’. First and foremost, the writing style is profoundly unclear – many of the above quotations, without extensive interpretation (which is not provided) are either meaningless or open to such diverse interpretations as to render them unintelligible. Serious social (sociological) theory cannot be written in this manner. Associated with this is the evocation of neologisms and epigrammatic phrases, one suspects, to conceal the tenuous intellectual contribution. Occasionally, the text is also supported by technical sounding words (variable geometry) which are almost invariably inappropriately used. If social theorists were to struggle with deep ideas, which prove difficult to get on the page, then one could sympathize, but this is not the case. Indeed, it is difficult to evade the conclusion that it is more a matter of wilful obscurantism. The signature of a good theory is its ability to develop a small ratio of invented terms to empirical insights. Castells and his fellow ‘theorists’ fall foul of this injunction by confining their attention to renaming complex trends rather than elucidating latent causal mechanisms. Indeed, as we noted above, Castells’ theory of networks adds nothing to the quasi-empirical story he tells, e.g. what insights do we gain from labelling the European Union a network state (p. 111)? Like most social theorists he attempts to formulate ‘theories’ without properly addressing the technically demanding problems involved.

In choosing to reject social theory as an intellectually serious endeavour we shall be accused of failing to recognize that the standards we seek in the construction of genuine social theories derive from one possible paradigm only, amongst many. Social theory as embodied in Castells’ book, it will be argued, rests upon a perfectly acceptable alternative paradigm to the one we espouse. This line of argument is, we believe, untenable and the source of much mischief in the social sciences (notably sociology) and should be vigorously resisted. Alternative paradigms are indeed possible within the social sciences when groups of scholars differ profoundly about basic assumptions. Nevertheless, they divide along lines of mutual understanding; each group usually fully comprehends the other’s assumptions but, for contestable reasons, rejects them – at least temporarily. This does not fit the case of social theorists. Social theory is constructed as a fugitive framework, it comprises an attempt to formulate theory without engaging in or understanding the intellectually demanding technical problems involved. It in fact evades serious technical issues, even sometimes propounding quasi-philosophical justifications for so doing. It would then be wrong to legitimize it as an alternative paradigm. It is just not intellectually serious though it does attract many adherents – why?

One of the tools of the trade of this type of theory is the coining of striking (although vacuous) phrases which, while not helping our understanding of the world one iota, will be picked up by colleagues. No doubt we will read about Castells’ space of flows, Castells’ timeless time, time reversibility,

the end of history, the supersession of space, the annihilation of time, . . . His pseudo-poetic expressions will be quoted, e.g. 'Timelessness sails in an ocean surrounded by time-bound shores, from where still can be heard the laments of time-chained creatures' (p. 497).

Good social science uses facts to inspire theory and/or to check the empirical validity of a theory. Neither approach is attempted here although the author occasionally postures as in the trepidation evoking 'I must tighten the analysis and raise it to a more theoretical level', (p. 429) or 'But my reference to such complexity goes beyond rhetorical pedantry' (p. 407). The latter statement is borne out later on in the wonderful chapter on space and time as the 'fundamental material dimensions of human life' (p. 407) when we learn that 'as time becomes more flexible, places become more singular' (p. 429) and 'space is crystallized time' (p. 441). How do we square any of this with any reasonable notion of progress in social science?

In vain one keeps searching for an original contribution amidst the morass of banalities and truisms (e.g. 'Thus, people do still live in places' p. 458). This volume provides nothing but unendurably extended description without any form of analysis or attempt at formulating a genuine theory. The reader is asked to stomach page after page of trends in employment. Why? To be told that they are 'in line with the predictions of post-industrial theory' (p. 240). If an original idea is too much to ask for, maybe we might expect a coherent summary and interpretation of other researchers' original ideas? Unfortunately, when social theorists of Castells' ilk try to 'pull it all together', it all falls apart. The whole is less than the sum of the parts. (e.g. 'architecture and design may be digging the trenches of resistance for the preservation of meaning in the generation of knowledge' p. 453) or 'we may be heading towards life in parallel universes whose times cannot meet because they are warped into different dimensions of a social hyperspace' (p. 459).

It is fairly easy to explain the role which social theory plays within the social sciences, (notably sociology) and, thus, how it takes on the mantle of success. The rapid expansion of the number of social scientists some three decades or so ago drew in many who had no technical expertise. They came to construct social theory largely in an 'arts' framework as a non-technical endeavour; they prospered and attracted students of a like disposition. This expansion led to a self-sustaining sub-optimal equilibrium. Neither theorists nor students have an incentive to dissent and, indeed, publishers are also drawn into its ambit. Why should they worry about quality – they are reasonably assured that there is a market amongst social scientists which will bring them the appropriate returns.

But why do those outside the social sciences and publishing give their approval to this sort of theory? We suspect it is largely because it provides a portentous vocabulary, which both impresses and enables the layman to impress by glossing over difficult issues. It is well suited to sound bites and what could be more beguiling than speaking of 'timeless time' and the

'collapse of space' rather than the more mundane things which underpin these phrases.

None of this would be consequential, if it were not for the lamentable impact it has had upon repeated generations of students wasting their time trudging through massive amounts of verbiage. Those who want to avoid the hard work involved in constructing genuine theories spend their time puzzling over the imprecise and empty prose of social theorists. It is our responsibility to prevent this happening. Social theory must be reconstructed taking into account the technical issues involved. In so doing we should also observe a moral injunction to write clear and precise prose.

Castells, M. (2000) *The Rise of the Network Society The Information Age: Economy, Society and Culture, Vol. I*, Blackwell, 2nd edition

(Date accepted: July 2000)

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