Article

MEDIA CULTURE &SOCIETY

Border communication: media sociology and STS

Media, Culture & Society
34(6) 673–690

DOI: 10.1177/0163443712449496
mcs.sagepub.com
SAGE

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Abstract
This article examines the curious interplay between media sociology and Science and Technology Studies (STS). Recent media research is increasingly drawn to STS, while STS analysts are increasingly drawn to research media technologies. While it is routine practice in STS to stress the 'materiality' of the objects under investigation, media technologies pose a challenge to this. Their 'materiality' is difficult to distinguish from their communicative/symbolic dimensions, the latter often being misframed as ideal/immaterial. By contrast, media research traditions have thought through these issues in terms of the concept of articulation and the related conceptual legacy of aesthetic modernism. While far more attentive to the specificity of 'the symbolic', these frameworks have been only partly informed by macro-social theoretical reflection. Here we advocate Calhoun's placement of communications within his 'infrastructure of modernity' as the most suitable overarching framework for discussion of this border communication. However, Calhoun's framework itself can benefit from re-invigoration by the socio-technical insights of both traditions.

Keywords
articulation, media technology, medium theory, modern, social theory, STS

Convergent ubiquity and mobility are givens in contemporary communications. Similarly prominent is the sense that the boundaries between digital media and everyday life are dissolving. Much current research moves from such givens. We wish to consider whether the rush to address the new has paid sufficient heed to existent intellectual traditions and,

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most especially, to social theoretical protocols that mitigate the likelihood of poorly framed ad hoc social theorization.

For us, the most interesting work is now emerging at the intersections between media/communications studies and cultural theory[1] on the one hand, and science and technology studies (STS) on the other. Before looking in detail at what these diverse literatures might offer, it may be useful to provide some background. Our review is highly selective, as our aim is to prioritize points of common ground and mutual benefit rather than to capture the richness and diversity of each of these fields.[2]

While STS has developed into a major field of social science over the last 30 years or so, media or communication technologies have not been as central a topic for it as have biotechnologies, for example. The emergence of STS from the sociology of scientific knowledge/science studies, and the initial preoccupation with engineering, industrial machinery and technological systems, largely account for this focus. Moreover, the influence of Marxist debates on the labour process can be seen in early collections, such as Mackenzie and Wajcman (1985), where revealing the social interests shaping the design of production and military technologies was key. Practices of innovation and design (rather than consumption) formed the research agenda. This served as a critique of technological determinism that also promoted an emancipatory politics of science and technology. Indeed, from the outset, STS has had an 'engaged programme', and this concern with the democratization of technoscience has now moved to the centre of the field (Sismondo, 2008).

By contrast, concerns with reception and consumption of post-print mediated messages and content were always central to media sociology. Indeed, in hindsight, this can be seen as a consequence of the socio-technical configuration of *broadcasting*, research on which easily outweighed that on telephony. Broadcasting's configuration sharply divided professional content producers who broadcast via large-scale 'hardware' from audiences who listened to/watched radio and television 'receivers', devices that had been configured without any transmission capacity. With the development of network computing and telecommunications technologies in the 1970s and 1980s, and especially the prospect of their convergence with broadcasting, this research field expanded to encompass the so-called 'new media' of the internet and mobile phone.

While there had always been a stream of research on communications technologies, the moment of 'the interpretive user' (of media technology rather than 'content') arrived much later in media sociology traditions than it did in STS. Accordingly, many communications scholars have been drawn to STS approaches, such as social shaping and the social construction of technology, in order to theorize the distinctive socio-technical character of new media technologies, such as increased portability and especially the increasing replacement of the limited communicative agency afforded to 'audiences' by that of 'users'. For example, the classic *Handbook of New Media* edited by Lievrouw and Livingstone (2006 [2002]) is subtitled: *Social Shaping and Social Consequences*. Indeed, many media sociologists now generally huddle 'between "soft" technological determinism and "soft" social shaping' (Preston, 2001: 110–15).

This raises the question as to whether the STS concepts being borrowed by media scholars are adequate for analysing information and communication technologies (ICTs),

or whether there is something about the specificity of ICTs that standard STS concepts and/or methods cannot speak to. After all, these technologies are not only 'material artefacts', but are also the means of creating, circulating and appropriating meaning; they are at once 'cultural material and material culture' (Boczkowski and Lievrouw, 2008: 955). To reframe our question, does these technologies' defining capacity to bear meaningful 'content' present a challenge to the routine practice of STS and much STS-influenced cultural analysis which stresses the 'materiality' of the objects under investigation? We argue that it does.

While there has been increasing attention given to the role of users in STS, this has largely examined the differing meanings or interpretations that *devices* afford. Now, recognizing such a 'symbolic' dimension to all technologies is not equivalent to recognizing the entire communicative capacity of ICTs. However, it is precisely STS work on materiality that has attracted the attention of communications scholars. The socio-material or socio-technical perspective adopted in contemporary STS foregrounds the reciprocal relationship between objects and subjects, treating all 'actants' as simultaneously semiotic and material (Callon, 1998; Latour, 1996).

It is this treatment of agency, as not simply the product of either persons or things but rather as the 'materialization of subjects, objects, and the relations between them as an effect … of ongoing sociomaterial practices' (Suchman, 2007: 286) that appeals to some communications scholars (Monteiro, 2004). Indeed, the ontological project of STS has been claimed as being precisely to rethink the relationship between materiality and signification, in order to show 'how matter comes to matter' (Barad, 2003).

This 'new materialist' perspective finds a kind of elective affinity with the recent ethnomethodological turn, as well as with the so-called 'empirical' and 'descriptive' turns in sociology. Indeed, in both fields, microanalytic ethnomethodological methods have become *de rigueur* (e.g. Adkins and Lury, 2009). In media sociology, these 'turns' are particularly evident in research on mobile devices (e.g. Ling, 2008).

However, while this new, apparently common, ground is both fruitful and productive, its social theoretical scope has been too limited. Without framing these developments within a broader sociological metadiscourse, these conceptual innovations risk merely listing a set of relativized micro-relations or 'materialities'.

As we shall see, there is a real collateral risk of rendering the 'symbolic configurations' of ICTs less material than their material-technical form, so reducing the former to the latter.

There is also a further risk of projecting inadequate de facto grand theories on the scale of information society theories and/or the risk of the kind of 'uncritical conformism' Feenberg (2003: 90) has identified in Latour.

This article maps a path through this conceptual minefield in five stages: (1) the 'rise of the user' and associated models of flexibility and user-interpretation in STS and media sociology; (2) a critical examination of 'articulation' in STS-influenced media sociology; (3) media sociology's 'modernist' reconfiguring of the material/symbolic binary; (4) the social theoretical reframing of 'medium theory'; (5) the potential fruitfulness of Calhoun's (1992) 'infrastructure of modernity' when re-invigorated by the insights of both STS and media sociology.

From designers to users

As we mapped above, a major historical distinction between STS and media sociology can be characterized by the former's primary focus on the design of technologies. In contrast, media sociology from the outset has also been interested in media consumption and use, albeit often within frameworks of 'media effects'. However, over the last decade there has been renewed interest in user–technology relations within STS, even talk of a 'turn to the users' (Oudshoorn and Pinch, 2008: 557). Again, while it is not possible to do justice to all the work within STS, it is worth briefly sketching these important developments.

The definition(s) of technology adopted in the early STS collections did explicitly include not only physical objects, but also human activities, and the technical knowledge or 'know-how' to use them (Mackenzie and Wajcman, 1985: 3). Such notions were central to classic studies of manufacturing, such as Noble's (1984). He showed that, whatever the promises of industrial automation, management would always rely on skilled machinists to operate machines; hence the machinists' power to resist. More broadly, the linear model of technological innovation and diffusion, which represented innovation as an activity restricted to engineers and computer scientists in research and development, was soon revised. The notion of users as passive consumers of technology was replaced by a recognition that, long after artefacts leave the industrial laboratory, the process of technological design is still taking place.

One of the first approaches to focus attention on users was the Social Construction of Technology (Pinch and Bijker, 1984). Here users are conceived of as one of the 'relevant social groups' that play a part in the closure or stabilization of a technology. Different relevant social groups, including user groups, can construct radically different meanings of a technology, known as a technology's 'interpretative flexibility'. These groups thus play an active role in establishing the meaning that new artefacts acquire as they move from early adoption to stability. Interpretative flexibility attempted to capture the idea that technological change is a contingent and heterogeneous process.

However, this flexibility does not imply that technology can be treated as infinitely plastic and tractable. The materiality of artefacts places limits on the possibilities for reinterpretation. Although Woolgar (1991) introduced the notion of the user as a reader of machines as 'texts', he was concerned to show how the design process limits the interpretative flexibility of technological objects. How users 'read' machines is constrained because the design and the production of machines entails a process of 'configuring' the user (Woolgar, 1991: 59). Again, the focus was on the design process, drawing attention to the way experts in design organizations configure users.

With the development of actor network theory (ANT), the agency of objects has taken centre stage. The emphasis is on the reciprocal relationship between objects and subjects, human beings and non-human entities (Latour, 2005; Law and Hassard, 1999). The concept of 'script', for example, describes how technological objects enable or constrain human relations as well as relationships between people and things (Akrich and Latour, 1992). In the design phase, technologists anticipate the interests, skills, motives and behaviour of future users and, subsequently, these representations of users become materialized into the design of the new product. As a result, technologies contain a script that

delegates specific competences, actions and responsibilities to users and technological artefacts. Latour's (1992) widely cited examples of automatic doors and road bumps illustrate how technical objects define actors, the space in which they move and the ways in which they behave and interact. The emphasis here is on how technology becomes an actant, imposing programmes of action on users.

In sum, while all these STS approaches conceptualize both designers and users as active agents in the development of technologies, they are primarily concerned with the world of designers and how the material world makes society possible.

By contrast, because of the very character of feminist concerns, feminist STS scholars have played a leading role in granting agency to users. Feminist historians showed that women had been historically under-represented as innovators because of the exclusive focus on the design and production of technologies, as well as the focus on industrial machinery. A focus on users and use, instead of engineers and design, immediately brought women's relationship with technology into view (Lerman et al., 2003; Wajcman, 1991). Furthermore, the conventional association of women with consumption meant that household technologies had been neglected as serious objects of study (Cockburn and Ormrod, 1993; Cowan, 1983). By widening the lens to include a much broader range of things and activities, such studies examined the ways in which gender relations are inscribed or materialized in technologies that, in turn, shape their use.

Deconstructing the designer/user divide and, more generally, that between the production and consumption of artefacts, has then been central to feminist technoscience/technofeminism, as it is 'these divides that conventionally place men on one side and women on the other' (Wajcman, 2004: 46). For example, ANT's focus on the observable socio-technical networks of innovation effectively silences the voices of excluded or marginalized actors, such as women (Star, 1991). It is ill equipped to deal with power as a structural phenomenon. This can be seen as a product of both its dispersed conception of power and a reliance on micro, case study methods.

Finally, the idea that the articulation and performance of gender identities and relations is bound up with machines has been a continuing theme in feminist work. Men's affinity with technology as a culture has been seen as integral to the constitution of masculinity and femininity, at home, at school and at work. Just as earlier studies showed how 'using' domestic appliances or tinkering with cars was a source of gender identity, cyborg and cyberfeminisms argue that newer technological developments, such as biotechnologies and the internet, both embed and enable the transformation of gender relations (Haraway, 1997; Plant, 1998). We would thus disagree with the summation by Oudshoorn and Pinch (2008: 552–3) that:

> Compared with technology studies, cultural and media studies thus articulate a perspective on user–technology relations, which emphasizes the role of technological objects in creating and shaping social identities, social life, and culture at large.

While this is an accurate depiction of mainstream STS studies, as we have seen above, it does not do justice to feminist technoscience.

Moreover, this feminist STS literature echoes comparable work in media and cultural studies. The emergence of such a media/cultural studies approach depended heavily on

the feminist critiques of models of a 'passive' broadcast audience (Ang, 1985; Radway, 1984). However, consistent with broadcasting's socio-technical configuration discussed above, this feminist challenge was argued on the basis of women's critical interpretation of programme content, not on their role as active communications technology users. These feminist critiques expanded Hall's earlier typologization of encoding and decoding possibilities in the production and reception of television programmes (Hall, 1973). Indeed, Hall's delimitation of decoding options bears an uncanny resemblance to Woolgar's (later) work in science studies (Jones and Holmes, 2011).

The recognition of means of communication as STS-like 'technological objects', however, is much more recent. It has only developed since the dominance of broadcasting was challenged by convergent systems of communication. Media audiences were increasingly redefined as 'users'.

Mutual shaping or double articulation?

In a trope familiar to many in media sociology, Boczkowski and Lievrouw (2008) have recently suggested that it was the US-dominated 'administrative research' tradition that was the home of technologically determinist approaches to communications. They contrast this with the 'critical, cultural perspective' of a 'British and European tradition' that shares much with STS (2008: 953). We concur with the broad strokes of their historicization but differ significantly with their analysis of its implications.

Certainly the most influential analogue to the early social shaping approach to technology *within* media sociology is Williams's *Television: Technology and Cultural Form* (1974). Its opening critique of technological determinism is still routinely cited and taught, even in 'new media' studies (for example, Lister et al., 2009). Williams provided a de facto social shaping account of the socio-technical constitution of broadcasting. A key innovation in his account was the recognition of the homologous constitution of the suburban consumerist sphere of domestic life. Williams situated this domestic realm as the typical site of broadcast reception, so challenging the US mass society-based 'effects' models, which he read as still tending to assume a reception environment more akin to a fascist rally. 'Mobile privatization' was his famous formulation of this socio-technical configuration of broadcasting and consumerism which, in his view, diminished the social capacity for 'horizontal' forms of social solidarity. Boczkowski and Lievrouw rush to equate Williams's position with a contemporaneous 'mutual shaping' STS perspective. Rather, it resembles more closely the earlier, more Marxian STS literature. This has considerable consequences for the understanding of 'symbolic content' examined in the next section.

However, there is one branch of British/European media sociology that overtly identifies with STS: the 'domestication' school established by Silverstone. Although premised on Williams's critique of technological determinism, and in dialogue with his 'mobile privatization' (Silverstone, 1994), Silverstone initiated a differently focused approach to communications technologies, including domestic broadcast receivers, as STS-like artefacts. Accordingly:

> Media technologies are doubly articulated into the social: both as technologies whose symbolic and functional characteristics claim a place in both institutional and individual practice, but

> also, as media, conveying through the whole range of their communication the values, rules and rhetorics of their centrality for the conduct of the quotidian. (2005: 200)

Silverstone's summation of the domestication perspective on communications technology thus directly addresses Boczkowski and Lievrouw's (2008: 955) conundrum: 'in no other class of technologies … are material form and symbolic configurations so intimately tied and mutually constructed'. The appeal of 'articulation' to them is plainly its potential to resolve this 'material'/symbolic conundrum in the case of communication technologies without risking the reduction of the latter to the former.

As with their account of Williams, Boczkowski and Lievrouw read such a formulation as the equivalent of a 'mutual shaping' perspective (2008: 953). Instead we would read Silverstone as here having opened up a far more complex set of issues than a 'mutual shaping' of 'material' and 'symbolic' can encompass. As we saw, Silverstone uses double articulation to reconcile the STS-like sense of a symbolic dimension of all ('material') technologies and the media sociology sense of the specific role of (symbolic) mediation only communication technologies can play. But they are not equivalent. If 'mutual shaping' is taken to mean 'textualization', or at best a relativized co-constitution, we are no longer on the terrain of Silverstone's double articulation.

In an essay on the ethnographic analysis of domestic communication and television, Morley and Silverstone (1990) employed a near-identical 'Silverstonian' STS and media sociology distinction between two layers of meanings of television for the microsocial situation of households – television as (mediated) text and television as technology. While they go on to argue that all acts of consumption have a rhetorical or signifying dimension (1990: 51), there is no necessary rendering of all technological use as a textual process. Moreover, this household frame was in turn located within, 'but not necessarily determined by', a broader one of 'neighbourhood, economy and culture' (Morley and Silverstone, 1990: 33).

We would suggest that this 1990 formulation reveals a set of wider concerns that, in our view, still await theoretical resolution. Crucially, Morley and Silverstone provided a fateful alternative to 'necessarily determined by' for the relationship between their doubly meaningful microsocial location of television, on the one hand, and that microsocial environment's broader 'situation', on the other. They argued that 'acts of consumption' provide 'the articulating dimension' between these two 'situations' (Morley and Silverstone, 1990: 33). It is consumption rather than 'textualization' that prevails here.

Now, this near-invocation of the traditional micro/macro binary and its microsociological resolution in 'acts of consumption' is highly revealing; its proposal as an alternative to 'necessarily determining' even more so. This microsocial focus has remained effectively hegemonic in much new media studies ever since.

Indeed, the formulation of television viewing as 'consumption' is indicative of broader movements within subsequent sociological research on modes of consumption that Livingstone (2007), for example, has argued are highly relevant to understanding the domestication research project. What is more striking for us, however, is that this resort to consumption as 'the articulating dimension' *reverses* the model of non-necessary

determinacy that operated within the equally influential earlier use in media sociology of 'double articulation' by Hall. Silverstone's and Hall's differing usages of 'double articulation' have received surprisingly little comparative comment (Jones and Holmes, 2011).[3]

While it was his analogy with a (doubly) articulated lorry that became well known (Hall, 1996), Hall's primary understanding of the articulation of production and consumption was developed from Marx's '1857 Introduction' (Hall, 1974; Marx, 1973). Central to this text was Marx's non-reductive privileging of production in his dialectical account of a circuit of production and consumption. It was widely drawn on in the 1970s as an alternative to ontological readings of Marx's base and superstructure metaphor. Hall, however, combined it with his model of encoding/decoding media messages (Hall, 1973). While its importation of semiotics challenged all linear 'media effects' models, the encoding/decoding model also privileged the *production* context of *both* media technologies and media texts.

Only in the late 1990s was Hall's model supplemented by a 'circuit of culture' in which cultural consumption is privileged – as in the much-cited Sony Walkman example (du Gay et al., 1997).

The continuing appeal of Hall's 'double articulation' for us is that it openly sought a resolution of the micro–macro problem within Hall's Marxian framework. Silverstone was clearly conscious of such a possibility. In one formulation of technologies' material/symbolic dimensions, in which he invokes the pioneering STS scholar Winner, Silverstone stresses that they 'cannot be understood outside their systematic embedding in the political, economic, and cultural dimensions of modern (and pre-modern) societies' (1994: 81). But the empirical focus on households limited Silverstone's opportunities to develop this point further.

A fuller conceptualization of articulation thus provides one route towards 'resolving' the quasi-ontological conundrum that besets much work at the interface of STS and media sociology. This would require a fuller, most likely Marxian, theorization of the relationship between the dimensions Hall and Silverstone recognized: the production and (domesticating) interpretative use of communications technologies; the production and reception of the cultural/semiotic forms they bear; and the social framing of those conditions of the doubled 'circuits' of production/use and production (encoding)/reception. This reformulation builds on Silverstone's crucial recognition of *two* relevant senses of 'symbolic' for ICTs: that related to the 'interpretative use' of communications technologies as STS-like devices and, second (using Hall's terminology here), the encoded and decoded 'meaningful discourse', such as television programmes, for which the communications technologies are bearers.

The chief unfinished business would then be that broader 'social framing'. We believe social theory is best placed to fulfil this need.

Enter 'modern'

Certainly, the material/symbolic binary has a history in media sociology. It was a mainstay of critical political economy and still operates as a straw figure in critiques of that approach – in that its alleged economism reduces the symbolic to the material/economic.

However, that straw figure was long ago overtaken by the increasing dialogue between critical political economy and social theory. This dialogue has grown noticeably since the early advocacy of the public sphere thesis by critical political economists (Garnham, 1986). Likewise, Williams and some political economists moved their critique of technological determinism onto the conceptual terrain of modernism and modernity, in part to contest postmodernist frameworks (Murdock, 1993; Williams, 1989). These were also often linked to simultaneous critiques of the technologically determinist features of Bell's (1973) post-industrial society thesis and its mutation into a variant of the information society thesis (Garnham, 2004; Williams, 1983). Here, especially, recent critical political economy and some contemporary social theoretical approaches to ICTs become almost indistinguishable (Fuchs, 2008; Garnham, 2000). These shifts frequently paralleled or anticipated movements in Jürgen Habermas's thinking. Of most relevance here is the dual critique of postmodernism and Bell's neoconservativism in Habermas's defence of the concept of modernity (Habermas, 1996; cf. Williams, 1976).

These convergences are highly significant in weighing the social theoretical resources available at our STS/media sociology border.

First, let us schematically rehearse some established points relating to 'modern' in Williams's 'keywords' mode. There remains a fundamental conceptual confusion related to 'modernity' and 'modern' with three major meanings in play:

(1) A French understanding of '*modernité*' aligns it with aesthetic modernism, notably the modernist avant-gardes, and related transformations in everyday life. It is thus usually periodized from the 1850s.
(2) At odds with this is the Habermasian understanding which aligns 'modernity' with the 'incomplete project' of European Enlightenment (which would undoubtedly include science and technology). This in effect overlaps with the Habermasian account of the emergence of the public sphere and so periodizes modernity from the 18th century. This social theoretical sense draws on the Weberian tradition which also informs philosopher of technology Andrew Feenberg's (2003) work on 'modernity theory' and STS.
(3) A now largely rejected instrumental understanding of 'modernization' which proliferated in post-Second World War sociology and elsewhere (including popular science fiction). It is closely related to technological determinism in that 'technological diffusion', notably including communications, was often thought a means of facilitating a shift from 'undeveloped' to 'developed' status for nation-states. Bell's (1973) post-industrial society thesis, built on a claimed updating of 'industrial society' models, easily fits this sense of modernization.

Much rides theoretically and methodologically on these distinctions and, more notably, their conflation, especially as all can share the same adjectives: 'modern' or 'modernist'. STS's own intellectual avant-gardist, Bruno Latour, for example, casually equates all three in his *We Have Never Been Modern* (1993: 10). At the other end of the scale is Daniel Bell's (1996) neoconservative insistence that modernist avant-gardism has succeeded in destroying all traditional values, so enabling the (determinist) dominance he attributes to technologies and markets.

Thus the ambiguities within 'modern' risk similar conflations to that of the material/symbolic binary. The chief 'modernist' conflation is between the aesthetic-cultural and technologies of communication, deriving from an understanding of technological 'media' as primarily new means of aesthetic expression. From Habermas's perspective, for example, modernist aesthetic avant-gardism ('*modernité*') was an insufficient resource from which to challenge the project of modernity or the 'modernizing' of contemporary capitalism as portrayed by Bell.

Habermas had in mind Walter Benjamin's celebrated essay, 'The work of art in the age of its technological reproducibility' (2008) and its optimistic predictions of the radicalizing potential of technological innovation in aesthetic composition, notably cinematic editing. Benjamin's enthusiasm for such technical innovation was shared not only by the Surrealists, on whom he drew, but also by most of the modernist avant-gardes (Poggioli, 1968). It was most famously challenged by Adorno (1977) who pointed to the potent role of technical innovation in cultural reproduction and transmission in the formation of the culture industry.

In media studies, McLuhan's fateful equation of 'medium' and 'message' was, in this context, a reworking of the aesthetic modernist conflation of the aesthetic-cultural and technologies of communication. It is Williams who plays Adorno to McLuhan's Benjamin in media sociology. Unusually, however, Williams's critique challenges McLuhan's conflation from both sides: first, there is the well-known challenge of 'sophisticated technological determinism' against the reduction of medium-as-message to medium-as-technology; but Williams *also* rejects the cultural reduction of medium-as-technology to (aesthetic-cultural) medium-as-message, a failing that he terms 'formalism'(1974: 126–7; see also Jones, 2004). Hence the title of his *Television: Technology* and *Cultural Form* (emphasis added) can be read as an explicit riposte to 'the medium is the message'. It rescues 'cultural form' from McLuhan's conflation and enables discrete recognition of cultural forms borne by 'media'.

However, defenders of Benjamin and McLuhan would rightly point to a key absence in the Habermas/Adorno/Williams critiques. Aesthetic modernist insights were among the first forms of recognition of everyday transformations in *modernité* in sense (1) above, such as speed and time-space compression. Benjamin and McLuhan are not linear technological determinists while Bell is, precisely because he grants no socially creative role to *modernité*. It is Bell, not McLuhan, who seriously proposes a progression of communications technologies, from printing to ICTs, that follows a linearity comparable to his societal progression from pre-industrial to post-industrial/information society (Bell, 1989).

The significance of these failings in Bell is considerable for selecting an appropriate social theoretical frame that speaks to both STS and media sociology, not least because of Bell's influence on Castells (see Webster, 2007).

Bell and Castells aside, social theory was notoriously slow to critically address innovations in ICTs. What was lacking was both an appropriate social theoretical means of recognizing 'the symbolic' and a means of translating the anti-linear 'modernist' gains of McLuhan.

As is well known in media studies, the latter was the task of Meyrowitz's *No Sense of Place* (1985), later consolidated as 'medium theory'. Accordingly, Meyrowitz sought to

'bridge the gap offered by the medium theorists and the sociological perspective' (1985: 33). McLuhan's 'media' are so seen to 'shape' certain social situations; for example, McLuhan's claims about television's capacity to alter 'sense-ratios'. Such McLuhanist 'shaping' was understood almost exclusively by Meyrowitz as the Goffmanian analysis of 'situations'. Crucially this translation involved, first, the re-rendering of McLuhan's aesthetico-modernist metaphors as concepts and, second, their location within a social-theoretical frame. Despite its considerable achievements, however, *No Sense of Place* remains confined within its situational perspective.

Nonetheless, Meyrowitz's more reflective conceptualization of the social consequences of the signifying dimensions of *both* 'mediums' and social practices moves in parallel with the STS recognition of a signifying (aka 'symbolic', 'inscribed') dimension of the design and use of 'ordinary' non-media technologies. Accordingly, commonalities between McLuhan and Latour, for example, are now increasingly recognized (van Loon, 2008; Jones, 2010).

Meyrowitz's analysis notably breaks down when he attempts to translate McLuhan at his quasi-sociological worst – that is, in his attempts to locate these new situations within a broader socio-historical account of societal changes, as in the global village thesis. Even Meyrowitz leaves undone the task of fully locating medium theory within social theory.

These shifts in media sociology occurred in tandem with the first embrace of a social shaping perspective. Although they contributed to continuing controversies, they were not limited by a material/symbolic binary. The legacy of '*modernité*' provided a more elaborated ground of disagreement *that enabled recognition of the specificity of the medium/message as 'symbolic content'*.

'Medium theory' pointed to important absences in neoconservative social theory like Bell's and, indeed, in critical social theory like Habermas's. But it failed as a viable 'macro' social theory itself. It did, however, lay the ground for two fuller reworkings into such social theory by Thompson (1995) and Calhoun (1992). This work has not yet figured in discussions of STS and media sociology.

From medium theory to social theory

Thompson's *The Media and Modernity* (1995: 7–8) directly acknowledges the gains and limits of medium theory and especially Meyrowitz's Goffmanian frame. Meyrowitz's 'behaviour' is effectively replaced by a social theoretical conception of *action* previously developed by Thompson (1990) from the work of Weber, Habermas and Bourdieu. Thompson so provides a powerful, action-based typology of forms of 'mediated interaction' and 'quasi-mediated interaction' which was extended to the internet by Slevin (2000). Significantly, Thompson distinguishes between a 'technical medium' and 'symbolic form', thus remarkably eliding a focus on ICTs as 'technologies'.

Calhoun's (1992, 1998) lesser-known and somewhat fragmented project is, in many ways, the more ambitious. Rather than sociologically reformulate 'social effects of mediation' *pace* Meyrowitz, Calhoun locates mediated communication itself within a broader historical shift from the dominance of direct towards *indirect* social relationships (modelled on the work of Cooley). For him, the ever-increasing prevalence of indirect social

relationships is a constituent feature of modernity. Calhoun thus creatively conjoins features of senses (1) and (2) of 'modern'.

Indirect relations are established through the mediation of large-scale markets and administrative organizations, *as well as* via 'information technologies'. Calhoun focuses far more than Thompson on such infrastructural technologies (especially transportation and communication) as part of this continuing trend towards the increasing salience of indirect social relationships. Compared with most comparable approaches, Calhoun's framing usefully decentres means of communication as well.

Yet classical sociological theory is found wanting by Calhoun in that it gives conceptual priority to impersonal systems and structures and, subsequently, neglects concrete social relationships and thus the kind of reconfiguration evident in Table 1. While Marx, for example, recognized that the commodity form facilitates indirect relations, he underestimated the significance of horizontal forms of social solidarization and social integration. Marx, for Calhoun, produces a theory of capitalism, rather than a theory of society. Centrally, 'indirect relations do not eliminate direct ones, but they change both their meaning and their sociological significance' (Calhoun, 1992: 211–12).

Our own research on mobile phones, for example, found that their predominant use was for strengthening primary relationships (family and friends) and that these new technologies provide historically novel opportunities for routine phatic communication that strengthen earlier forms of social bonding (Wajcman et al., 2008).

Calhoun's theoretical recognition of this phenomenon relied on his reading of medium theorists who would argue similarly that 'new media' do not replace 'old media', as in a linear technological determinism, but rather reconstitute (or 'remediate') them. Moreover, such a conception mirrors the STS understanding of the role of technical innovation generally. The chief gain of the Calhounian reframing of mediation *within* the social theoretical frame of modernity is its avoidance of quasi-epochal claims of 'new eras' spontaneously attributed to technical innovation in ICTs. Indeed, Calhoun (1992: 208) developed his approach to counter Bell's (1973) epochal claims about post-industrial society, a tendency critics have identified too in Castells' work (Webster, 2007). This 'anti-epochalism' (cf. Savage, 2009) was also pitted against then current conceptions of postmodernism (Calhoun, 1993).

Table 1. Calhoun's four types of social relationship **(**based on Calhoun, 1992)

Type of relationship	Primary (from Cooley)	Secondary (from Cooley)	Tertiary	Quaternary
Characteristics	Affective ties	Impersonal groups	No embodied co-presence; 'mediated' but parties aware of relationship	One party unaware of relationship
Direct/indirect	Direct	Direct	Indirect	Indirect
Example	Family/ friendship groups	Committees	The corporation; correspondence; Information technology	Surveillance via information technology

Calhoun avoids 'epochalism' by establishing his central role for social integration via 'concrete social relations' understood as including both direct and indirect forms. The significance of this innovation is not its mere distinction between face-to-face and non-face-to-face relations, one today echoed in mundane conversational reflection on what are now everyday habits.

Rather, Calhoun's breakthrough lies in the *conceptual placement* of this dimension and the related role of social integration as a (conceptually) mediating 'buffer'. By including within indirect relations the role of markets and corporations, Calhoun reduces the likelihood of the resort to epochalism – the projection of a new era on the basis of minimally demonstrated or claimed evidence of social change. This, as we have seen, was a major failing of McLuhan as well as Bell.

In doing so, Calhoun also overcomes the opposite tendency, the reduction of sociality to the micro. Attempts to theorize mobile devices have proven especially prone to this reduction. For example, in *New Tech, New Ties: How Mobile Communication Is Reshaping Social Cohesion* (2008), Ling articulates recent empirical studies of mobile communications with social theory. Remarkably, however, having recuperated the Durkheimian sense of social cohesion (on which Calhoun builds his case for increased attention to concrete social relations), Ling explicitly sets aside all of Durkheim's work other than his contributions to the interactionist tradition that leads to Goffman. As a result, the relationship between mediated interaction and social cohesion assumes the now familiar form of being restricted to small groups. Tellingly, Ling (2008: 54–6) subheads this discussion 'From macro to micro, from co-present to mediated'.

Second, Calhoun's typologization of new forms of social relations articulates a clear alternative to employing a material/symbolic binary in discussion of technical innovation in communications. Rather, informed by a sociological re-rendering of 'medium theory' he identifies new forms of *social interaction*.

However, because Calhoun's project is not informed by socio-technical models of communications from STS or media sociology, his conception of infrastructural technologies, while welcome, is inadequate. Nor does Calhoun pursue the related question of the relationship between his infrastructure and the forms of 'content' it might bear. His innovations need revitalization by developments at the STS/media sociology border as much as his work is needed there.

Conclusion: interdisciplinary border country

A Calhounian conception of modernity thus meets our desire for a viable social theoretical frame within which to situate the STS/media sociology dialogue. Elements of this need were recognized within media sociology by figures such as Hall, Silverstone, Murdock and Garnham. Feenberg's (2003) rejection of 'a priorism' for a conception of modernity informed by his own hermeneutic model of user interpretation (which he has applied to ICTs) points in a similar direction from the STS side; as do debates over Latour's ANT-based critique of conceptions of 'modern' and the partial identification of his work with McLuhan's.

What then might we offer as a reworked Calhounian conception of the 'infrastructure of modernity', one that reduces the need for *over-ontologization* of the consequences of

designer-innovation and user interpretation of communications technologies and mediated cultural forms?

To begin, the conceptual repertoire of consequences of innovations in communications technologies would need to include historically informed understandings of the social alteration of direct/indirect relations. This first step would require a reworking of Schlesinger's famous critique of 'mediacentrism' (1990). Where Schlesinger was concerned with decentring media as a necessary prime cause in media sociology, we would advocate decentring technical innovation/design in communications as a necessary starting point for such research. This is an important lesson from STS, whether that decentring takes the form of social shaping or the ANT attribution of agency to already constituted objects as devices. This may seem an obvious point, but it sits uneasily with current trends in commissioned research on new media.

The kind of decentring historical reach that Calhoun's work requires is not unknown in either field, as we noted. In the case of STS, we discussed the example of Noble's work on productive forces. In media sociology, Williams's social shaping conception of broadcasting was situated within both technical and social histories. His conjectured emergent trend of 'mobile privatization' has proven prescient, if overly pessimistic.

A more nuanced example is Murdock's neglected 1993 lead essay for this journal. He sketched a place for communications in the social theoretical conceptualization of modernity that shares much with Calhoun's 'infrastructure' version (Murdock, 1993). Murdock sought to move beyond the then current post-McLuhanist focus on time-space compression, which had featured prominently in the social theory of Giddens (and later in Thompson, 1995). Instead, Murdock worked from the critique of technological determinism to a focus on the 'unintended contradictory consequences' of communications technologies, which were often at odds with the power relations prevailing at their initial design and production. His version of social shaping focused on the role played by such 'new media' in the reconfiguration of 'systems of power and networks of social relations'. They are thus the site of 'continuing struggles over interpretation and use'.

Finally, to Calhoun's limits. His infrastructure framework can only have effective traction today if it incorporates an STS-like socio-technical framing of communications. While he is well aware of the risks of technological determinism, his 'information technology', rhetorically widened in order to make plain the links with other indirect relations, is too much a 'black box' concept for concrete research. Of considerable relevance here is the STS distinction between device and system, which recognizes degrees of autonomization in technical innovations. It was incorporated into media sociology by Garnham (2000) and impressively elaborated by Preston (2001). Just as fundamental to improving Calhoun's account is the need to employ conceptions of audience/user interpretation from both fields. As we have indicated, the conceptual parallels between, for example, Woolgar in STS and Hall in media sociology are considerable. For these two at least, user-interpretation options are constrained rather than open-ended and consequences follow for power dynamics.

In his parallel historico-empirical discussions of these matters, Calhoun (1988, 1998) stresses the political risks at stake if mediated indirect relations were to develop at the expense of other forms of indirect association, such as those based in democratic institutions. In an important essay on populism (Calhoun, 1988), for example, he argued that

then emergent online community activism may take a dominantly plebiscitory form and that such 'communities' would be more anonymized and spatially dispersed than the public spheres historically formed around city-based newspapers.

Such an analysis, while highly prescient, tends to rely on the given configuration of technical systems rather than their socio-technical design and their potentially contradictory dynamics. Finally, no specificity is granted to the journalistic cultural forms and conventions borne by specific newspapers in specific cities.

In no way could Calhoun have addressed all these determinants in his short studies. But it is essential that they be addressed at the STS/media sociology border today. It is the dual usage of articulation by Silverstone and Hall that offers greatest promise of more summarily locating the innovations in these fields within Calhoun's framework. To reiterate, a tripled dimensionality to these issues is essential:

(1) the social shaping of the design of communications technologies 'as technologies' (which may entail the role of media organizations and policy);
(2) the recognition of the role of communications technologies as 'mediums' *pace* medium theory and STS *with their own situational social consequences*; and
(3) the recognition of discrete cultural forms (such as television programmes) borne by communications/media technologies.

Each dimension entails discrete, but in practice overlapping, forms of use/reception with contingent balances of 'interpretative flexibility' and thus contradictory alterations in 'systems of power and networks of social relations' (*pace* Murdock).

Such a conceptual framework, we contend, would help constitute a revitalized conception of the infrastructure of modernity.

Acknowledgements

This article benefited from an Australian Research Council Linkage Grant, *The Impact of the Mobile Phone on Work/Life Balance* (LP0667674). We would also like to acknowledge the valuable research assistance of Louisa Lawrence and Ben Manning.

Notes

1. For ease of exposition, from here on we will primarily use 'media sociology' to refer to these fields.
2. Accordingly, we have tried to compose this article in a style sufficiently open to be readily followed by participants in any of these fields.
3. Silverstone states that he derives his usage directly from the linguist André Martinet (1969) and makes no reference to Hall (Silverstone, 1994: 122).

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