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On the phenomenology of technology: the "Janus-faces" of mobile phones

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Abstract

This paper argues that technologies perform in Janus faced ways; that is, in ways that are ironic, perverse and paradoxical, and it is argued that these qualities are important to apprehend if we are to more fully understand the role of technology in organizations and in our daily lives.

The argument opens with an account of Janus as a metaphorical evocation of irony and paradox, and general examples of Janus faced technologies are given. Prominent philosophies of technology and theoretical approaches to technology are discussed in terms of their capacity to account for generalized examples of irony and paradox. Of these, it is argued that the most satisfactory account is provided by (a) Heidegger's suggestion that our world is enframed by technology, taken together with (b) a logic of sociotechnical systems based in relational and hybrid ontologies. This sketch of the philosophical landscape occupied by Janus is followed by a interpretation of the specific case of mobile phones, which provides concrete and hopefully vivid examples of the Janus faced performance of technology.

The conclusion reached is that the Janus faced metaphor and its philosophical context provides the researcher with the analytic advantages of foregrounding uncertainty, avoiding an essentialist or determinist role for technology, and allowing for the possibility of the presence of tension and contradiction in accounts of sociotechnical outcomes.

Keywords: Mobile phones; Social studies of technology; Philosophy of technology; Paradox

1. Introduction

Technologies of many kinds perform in ways that are ironic, perverse and paradoxical. That is to say, a certain technology applied in a certain way in a certain context may have consequences or implications of one kind, and may necessarily

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and at once be implicated in a contrary set of consequences or implications. It is not simply that the performance of the technology falls short of expectations, or that it has unintended consequences, common though both of these are. The claim here is that the difference the technology makes may be a result of a simultaneous move in both directions along any given axis, and the consequences or implications of this movement may not form a single coherent set, but may result in the co establishment of contrasting conditions.

On the face of it, this is an extraordinary claim. After all, technologies are designed, constructed and used to do *particular* things. They are by definition purposeful, instrumental, directed at achieving a particular end. Works of art may perhaps be allowed to be ironic and paradoxical in their effect, but prosaic artefacts like helmets, motorcars, hospitals, heating systems, drugs, and information systems are not there to behave ambiguously, uncertainly, let alone perversely. Indeed, technologies are carefully designed and applied to do just what we want them to do—to bring about a certain state of affairs—no more and no less. And so how is it that technologies—the rational, goal directed, *instruments* of our will—sometimes (always?) perform ironically?

Certain philosophers of technology have confronted the phenomena on a metaphysical and generalized front, in particular Heidegger and Ellul. Others, such as Ihde (1990); Borgman (1987); Latour (1987) and Bowers (1991) have more directly addressed the question of irony and paradox. Among I.S. researchers, Poole and Van de Ven (1989); Lewis (2000); Robey and Boudreau (1999), and Orlikowski (1991) have made recent contributions. As one would hope and expect, each of these philosophical and theoretical approaches provides a different treatment of observations of irony and paradox, and it is argued here that of these, Heidegger's model of a lifeworld enframed by technology, together with an "amodern" logic that looks to an ontology of hybrids, offers a potentially productive way forward. One objective of the paper is to persuade the reader of this.

Many empirical studies, both formal and informal, have produced examples of technologies' ironic or paradoxical performance, and this corpus is extended in a small way in this paper through the example of mobile phones. The reader will find that observations of the mobile phone provide a rich source of examples of an ironic or paradoxical kind, to a point where the reader might agree that an apprehension of its place in the world is inadequate without an approach that accommodates irony and paradox. Persuading the reader of this is the second objective of the paper.

To this end a metaphor is employed as a rhetorical and analytical device. The mobile phone is described as "Janus faced"—after the Roman deity with two faces, cursed and blessed with the necessity of facing in two directions at once. Janus faced technologies are not simply a mechanism for achieving a given outcome, where desires, means and ends can be understood in reasonably unambiguous, linear and stable terms. Rather, their performance reconstitutes desires and ends, as well as mechanisms, and to account for this reconstituted sociotechnical landscape, we need an approach that allows theoretically and empirically for contrariness, paradox and irony to arise within the analytic frame.

1.1. Organization of the paper

The argument begins by introducing Janus along with some general examples of Janus-faced technologies.

This is followed by a summary of the philosophical and theoretical positions that also attend to the Janus-faces of technology, either directly, or through reference to the notion of paradox.

In the main bulk of the paper, a series of examples of the mobile phones' Janus-faced performances are given.

The paper concludes with an indication of the significance of this approach for the analysis of sociotechnology.

2. Janus

Janus is a Roman Deity cursed and blessed with two faces, and cursed and blessed with no option other than to look in two directions at once, backwards and at the same time forwards, to be always coming and yet going, at once entering and yet leaving.

A metaphorical perspective such as this reveals certain aspects of the technology that might otherwise remain obscure, and conceals elements that might be revealed by other metaphors, and by other interpretive strategies. Metaphor may be used not just as a poetic fiction or embellishment (Stepan, 1986), but as a generative device (Schon, 1979), as an ontological strategy (Lakoff & Johnson, 1980) and as an interactive means of communication (Black, 1962, 1979). In particular, approaching mobile telephony as "Janus faced" is to select, emphasis, suppress and organize certain aspects of the sociotechnical phenomenon to suggest an alternative to the notion that technology manifests a single trajectory of implications synonymous with instrumentality or user purposes. The Janus face metaphor "reframes" the situation (Avery & Baker, 2002) to place paradox or irony front and centre.

In her classic "Manifesto for Cyborgs", Haraway stresses the importance of irony in a comprehension of sociotechnical relations. "Irony is about contradictions that do not resolve into larger wholes, even dialectically, about the tension of holding incompatible things together because both or all are necessary and true" (Haraway, 1985, p. 65).

In the field of formal logic, "paradox" is referred too more so than "irony". Here, a paradox is a self referential statement in two parts, each of which is unremarkable when taken separately, but in combination, is irreconcilable (Smith & Berg, 1988) (Well known examples of paradox include "I always lie", "Ignore this sign", "The following statement is true: the preceding statement is false").

Paradox has also offered strong conceptual leverage to studies of organizations and information systems. Lewis reports the use of the term in over 300 studies published from 1990–1997 (Lewis, 2000, p.760). In Sawyer and Eschenfelder's review of trends in social informatics, the first mentioned finding is that ICT use leads to multiple and sometimes paradoxical effects (Sawyer & Eschenfelder, 2002, p.440). The Academy of Management Review initiated a special topic forum on paradox

(Eisenhardt, 2000). Robey and Boudreau (1999) point to the central importance of theories of paradox, and argue convincingly that those with an interest in information systems in the organizational context attend to a "logic of opposition" as a productive alternative to theories that use determinist logic (a theme that will be taken up again in the next section of the paper). Also in an organizational context, Poole and Van De Ven urge researchers to look to "the opportunities offered by tensions, oppositions, and contradictions", provide many examples and references, and suggest a number of epistemological strategies for dealing with paradox (Poole & Van De Ven, 1989, p.562).

Following the above-mentioned theoretical and empirical work, the Janus faced metaphor signifies notions of irony and paradox, and is applicable in conditions where

- The performance of the sociotechnical system gives rise to multiple implications or sets of implications, at least some of which pull in opposite directions towards contrasting conclusions.
- These contrasting conclusions, implications, or binaries, are observed on the same axis of analysis, within the same conceptual frame, as it were.
- And, these contrasting implications are not a result of error, to be resolved by better methods, but are co-dependent and co-productive, and are intrinsic to a full apprehension of the operation of the system.

It is argued that the mobile phone is such a system, not reducible to a direction or valence tipped with a single arrowhead, but better understood as a conflation of tangential implications, at least some of which can be read as ironically and paradoxically self-contradicting phenomena. The mobile phone is facing each and every way, it is always and at once pointing in different directions. Because Janus is looking north, he is looking south. Because he is going, he is coming. The mobile phone also has us coming and going, this way and that.

Examples of paradoxical and ironic translations of purpose into performance are well known in studies of technologies in general. A purpose of antibiotics and disinfectants is to kill pathogens and to reduce disease. In performing the functions required to achieve this purpose, the technologies also perform to make pathogens stronger and our health weaker. Motorcar brakes perform to slow a car down, and the more effectively they perform, the faster cars go. Heroin was recommended as an effective cure for morphine addiction, and proved efficient for that purpose, though of course addiction was exacerbated. A proliferation of inner-city air-conditioning systems is decreasing internal temperatures, whilst increasing external temperatures—both in the immediate vicinity and more generally through the greenhouse effect. American Football helmets are much stronger and more effective at protecting the skull than their predecessors, and therefore make more effective battering rams, a safety device that increases the net danger of playing the game. (For more examples see Tenner, 1996).

What seems to be at work here, are phenomena that are not susceptible to a linear logic of cause and effect, situation and implication. Rather, we have a situation that

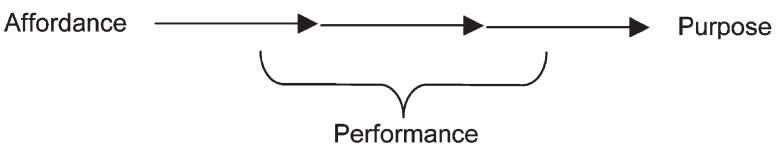

Fig. 1. Linear performance.

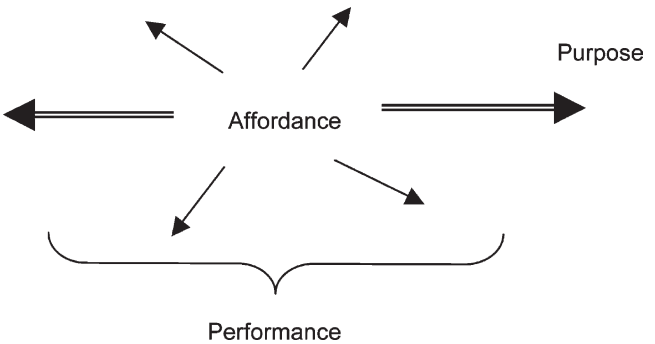

Fig. 2. Contrary performances.

gives rise to a bifurcation of implications, with simultaneous movements in opposite directions. So, whilst a determinist logic seeks to establish a particular chain of implication that flows in a particular direction thus (see Fig. 1). A logic that allows simultaneous binaries, suggests a more complicated array of implications, thus (see Fig. 2). How then have theories and philosophies of technology addressed observations of the kind made above?

3. Philosophical and theoretical antecedents

The most influential theoretical approaches to sociotechnical relations include *substantive approaches* (often characterised as techno-determinist and subject to derision, but generally set up for this as a "straw man"), *social constructivist approaches* (a refreshing and stimulating contribution several decades ago, but perhaps overhauled by theories that deny the social/technical binary that is crucial to this theory's contribution), and *network models* (resting on "amodern" theories of sociotechnical relations, seen most clearly in the work of Latour). These three theoretical schools have each given rise to respective formalisms and analytical models by which the emergence, uptake, use and implications of technologies might be apprehended and represented. Each is able to make a contribution to the Janus question, though in quite different ways, and with different limits.

3.1. Substantive approaches

Substantive approaches (Feenberg, 1999) rely upon a modernist logic that links a technological essence to a known or knowable social impact or social condition. According to this approach, the essence of technology (and science for that matter) lies in an ability to efficiently and effectively express power over nature and ourselves, and thus (potentially) assert control over our condition. That is, the power of technology to effect the shape and expression of human will, is based upon our exploitation of the laws of the universe, as revealed by the modernist sciences of physics, chemistry, biology, mathematics, and their related disciplines. This exploitation finds its concrete expression in technology. An unbroken chain of causality thus begins with the laws of nature, which are mobilized to shape our technology, that in turn shapes our social condition, and ultimately, our own ontology. This instrumental power may be interpreted as by and large an excellent thing (e.g. The Italian Futurists, or the contemporary Californian "digerati") or as a tragedy on a grand scale (e.g. Heidegger or Ellul).

Although substantive approaches are commonly categorized as determinist, I would like to distinguish between substantive approaches that argue a technological "enframing" of our condition, and determinist approaches that link particular technologies to particular social outcomes. I would argue that despite its limitations (Cooper, 2002; Feenberg, 1999), the substantive position, most powerfully put by Heidegger, but also by Ellul, Borgman and others, has made a striking and fundamental contribution to our understanding of technology, and that this contribution is consistent with an argument that draws upon irony and paradox. Simply put, Heidegger's contribution is the insight that we apprehend and constitute the world through a technological frame: that is to say, technology does not answer this or that question, satisfy this or that demand, or extend this or that capacity. Rather, technology works at a more fundamental level; it enframes the world such that the question is changed along with the answer, the need is changed along with its gratification, and direction is changed along with the mechanism. The calculator, the word processor, are not more effective, efficient or convivial methods of doing mathematics or writing—they change what it is to do mathematics and to write. IVF is not just a means of meeting a desire to have children, it also changes the cultural and emotional frame that situates paternity, maternity, and family. A community intranet is not just a means of communication among community members, it changes our understanding of community, along with the performance of community interaction. Technology thus operates at a metaphysical level, and is not simply instrumental.

To see the world as technologically enframed (as opposed to determined), invites one to grasp the ironies of our position. For example, Heidegger argues that the abolition of distance as a practical concern for those in command of ICTs has not produced a world in which we are nearer or closer to one another. Rather, modern communications and transport systems replace a state in which a few people are close and many are not, with a state of "un-distance" (*ent-fernen*) in which all people and places are uniformly and simultaneously near and far. In destroying distance we destroy closeness. In Cooper's excellent account of Heidegger's position, he points

out that our power as subjects, our ability to assert ourselves in the lifeworld, comes at the expense of self-objectification. The massive extension of our personal and collective agency that has accompanied the technological enframing of the world, finds a necessary inverse of agency as the same technological enframing reconstitutes humanity as a "standing reserve", answerable only to instrumental criteria and the logic of power and domination (Cooper, 2002). Not only is nature reduced to a standing reserve of resources, stripped-back to serve technically framed purposes, so we are too. Heidegger's suggested response to the constricting horizons of technological enframing is arguably one of the weakest aspects of his contribution, as least in so far as it is a mystical appeal to an era of spirituality. But his ironic suggestion that we say both "yes" and "no" to technology is more difficult to refute. He argues that we cannot reject or eradicate technology—for it is after all, the way of our being in the world. But nor should we accept the hollowed-out, one-dimensional, abstracting and instrumental reconstitution of the technologically enframed life. Rather, by giving primacy to the place of meditative thinking rather than calculative thinking, we should embrace technology by releasing it. "We let technical devices enter our daily life, and at the same time leave them outside, that is, let them alone, as things which are nothing absolute but remain dependent upon something higher. I would call this comportment towards technology which expresses 'yes' and at the same time 'no' by an old word, *releasement towards things*." (Heidegger, 1969; p. 54).

3.2. Determinist approaches

Although often identified as determinist (e.g. Feenberg, 1999), there is nothing *specifically* determinist about the substantive approach, in the sense that so many contemporary techno-utopians (Gates, Negreponte etc.) and techno-dystopians (Stoll, Bowers etc.) are determinist. In a strong form a "techno-determinist" perspective suggests that specific technologies or clusters of technologies determine our social condition and drive specific social change through historical eras. In weaker forms the approach suggests that technologies allow or enable specific social conditions to emerge, and are necessary but not sufficient for the existence of those social conditions. Technologies are instrumental tools; objective measures of efficiency and effectiveness determines the emergence of some technologies rather than others; and diffusion of innovation models (e.g. Rogers, 1995) account for the spread of technology through society, first through early adopters and last through conservatives and sceptics. The process is linear, and the technology is a fixed artefact with an essential character and known or knowable impacts or effects, to be adopted or not.

In both the strong form and the weak form, technology performs in a way that is determined and is therefore, in principle, determinable. In any particular case, the full implications of the deployment of a given technology may be unknown, but they are not unknowable, and the logic does not allow for opposite effects to be placed within the same effect frame. However, this is not to say that a determinist perspective entirely disallows paradox or Janus faced implications of the kind described here. It is able to handle them—but only through the method that has characterised

the modernist episteme—that is, through a method of dissection and reduction, and through the establishment of hierarchical stratas of analytical categories. As Wise (1997) reminds us, the modernist episteme arises from three central dissections and the binaries thus created. They are the separation of time and space (privileging time), subject and object (privileging subject), and cause and effect (privileging cause). In the case at hand, the modernist strategy enables technology to be separated analytically from society in symmetry with the separation of cause and effect. Having made this crucial move to separate society from technology, and to purify the essence of each, (a move so much engrained in our traditions that it is scarcely visible), it becomes possible to stratify by aligning technology with causality and society with effect, producing McLuhan's Global Village, Bell's Information Society, Marcuse's One Dimensional Man, Toffler's Third Wave, Mitchell's City of Bits, Poster's Second Media Age, Gates' Frictionless Economy, and so on. At a micro level where particular technologies and particular social outcomes are the focus of attention, the strategy of dissecting and stratifying enables complexity to be rendered more tractable. Hugely complicated phenomena, such as the operations of the human mind, global trading, or large-scale historical change, can be broken into ever-smaller chunks, each a component of the larger whole, until we reach a point where the actions of a chunk can be comprehended. These actions can be traced through time as they determine an effect on other chunks, and so the arrow of causality is traced, and the potential for control is mapped. A great strength of the strategy is the production of a universe that is consistent, lawful, and predictable. Implicit in the enterprise is the understanding that causes of a certain kind, produce effects of a certain kind, and not both effect X and its opposite. Should such a paradox be alleged, the method responds in either of two ways. The first is to allow the existence of both (say, mobile phones produce wealth, mobile phones produce poverty), but only by situating them at different levels in the stratas of analysis. The Janus face is thus erased. If both are alleged to exist within the same conceptual frame, on the same level (say, mobile phones cause brain cancer, or they do not), the contrary propositions become fierce contenders for truth, and because there is only one truth, not two or more, the Janus face is erased. Rather like the ambiguous visual illusions that can be resolved as two figures, but only as a single figure in any one instance, determinist logic can only focus on one impression at one time, when the interesting thing about the phenomenon can be the coexistence and co-production of both effects.

3.3. Social construction approaches

The theoretical orientation that is referred to as the "Social Construction of Technology", uses similar determinist logic, but has a different beginning point and end point (see for example MacKenzie & Wajcman, 1999). Whereas the determinist approach described above begins with science and technology and ends with social conditions, the social construction approach begins with social conditions and ends with technology. At least it does in one sense. In another sense it begins with technology as an artefact (the bicycle, the failed O ring, the digital lathe, the refrigerator

and so on) and traces the chain of causal logic back from there to social conditions that are said to have given rise to this technology. In any event, society and its imperatives are prior to the technologies that emerge from it, and is privileged to cause technologies to be as they are. There is no doubt that any study of technology needs to attend in an interpretive way to the human context in which it emerges and performs, an argument that scarcely needs rehearsal in the journal "Information and Organization". However, in addition to the strengths of the method, it has a number of shortcomings in the context of the issues raised here. Firstly, like the techno-determinist approach, social construction operates within the modernist frame, and uses the same determinist logic, reliant upon linking linear chains, from social cause to technical landscape. As well as separating cause and effect, it also cleaves and separates the technical from the social, in ways that are arbitrary and analytically unsupportable, but are required if the social is to be privileged. Having made this arbitrary distinction, a line is drawn connecting the social to the technical, with an arrowhead of causality pointing in one direction.

The problem with this move from Janus's view, is that its logic does not allow one to agree that technology is determined, whilst asserting that it is determining, or to say that society is both prior to technology, and emerges from technology. Allowing a sharp cleavage between the social and the technical disallows the reflexive, ironic and paradoxical assertion that each is both cause and effect, an assertion achieved analytically by erasing the distinction between both binaries—social and technical, and cause and effect. As well as privileging the social in the construction of technology, social construction is a tradition that embraces a pluralist interpretation of the meaning, significance and implications attached to particular technologies, and allows technology to present itself in different ways to different people when viewed from different perspectives. The bicycle, or the failed O-ring, may therefore be both safe and dangerous, cheap and expensive, controlled by engineers and business people, and so on. At first glance this "interpretive flexibility" would appear to be more supportive of Janus than the afore mentioned insistence on a single truth. But there is nothing strictly ironic about this relativism. Different perspectives will produce different views because the frame, or the axis of analysis is different. A plurality of views and frames may well be interesting and important, but it is only when the same perspective produces contesting views that an understanding based in irony cuts in.

3.4. Network approaches

The amodern or network approach goes some way to overcome the problems associated with each of the determinist approaches sketched above, at least in so far as the Janus effect is concerned. What the amoderns want to say is that technology is both a cause and an effect—that the social is both a cause and an effect, that each is both emergent and structuring (e.g. Orlikowski, 2000). This amodern move is achieved by collapsing the modernist distinction between the two, and referring instead to the "agency", of an assemblage of "actors", or, in the term preferred in this paper—to the *performance* of an actor—in this case, the mobile phone. "Per-

formance" may be thus be taken to mean the cluster of actions that constitute use, and emerge in the course of use, when the whole ramified and very extensive assemblage of heterogenous beings call upon one another to cooperate, and do so. In the same context, "mobile phone" may be taken to refer to the handset's performance, the cell antennae's performance, the user's performance—to all of the artefacts, protocols, human beings and others than are implicated in use. In this understanding, both the human and the mobile phone are agents (actors or performers) that shape each other in conjunction with each other. As amoderns, we may thus refer to people and telephones in the same analytic terms (as agents), collapsing the distinction between the human and the technical as well as the cause and effect. Of course this is not to say that people are telephones, but we are not interested in people or telephones per se. That is, we are not interested in the essence of humanity, or its boundaries, nor the essence or extent of the telephone qua artefact. Rather, we are interested in people only as they are in conjunction with telephones, and telephones as they are in conjunction with people. We are interested in the agents-in-relation that constitute a sociotechnical hybrid when a call is made. Which is to say, the ontology of any given actor is a matter of its relation in any given network, and the ontology of the network as a whole is also a matter of its internal and external relations. The relation, the links between actors that are established and maintained by those actors, and the hybridity of the new forms of ontology established by that relation, is the fundamental unit of analysis. Concentrating as it does on uncategorized forms of interconnection and relation, on undifferentiated imbroglios of politics, physics, machinery, bureaucracy etc., all situated within the same frame of analysis, the amodern approach does not foreclose the coexistence of contrary implications or paradoxical observations. Multiple (though overlapping) ontologies coexist. Multiple (and even contrary) implications are possible.

3.5. Other contributions

Contemporary philosophers of technology and theorists of information systems and organizations that have contributed to an understanding of the Janus phenomenon are located across the range of the above orientations, though the deeply seated ambivalence of the substantive approaches, and the flexibly interpretive methodologies favoured by the social construction and network approaches gives these a clear edge in this matter.

Ihde (1990) for example, refers to technological mediation in phenomenological terms, drawing particular attention to the necessary co-occurrence of amplification and reduction. That is, an increased capacity to engage with the world in a particular way, is accompanied by a reduced capacity to engage with it in other ways. So, for example, the precision of the probe used by a Dentist to examine the surface of the teeth amplifies a feel for contours, but achieves this by eliminating the feel the finger has for the texture or temperature of the gum. The amplified view provided through a microscope closes off the view of the room. The height of an observation tower enables us to see more of the landscape, but makes plants and small animals invisible. Ihde's amplification and reduction model bears an obvious relation to the Janus

phenomena, but differs from the argument made here in so much as Ihde is suggesting that technological mediation is in a sense a "zero-sum game". That is, there is always a price to be paid; an extension of a capacity in a particular direction is achieved through a process that simultaneously reduces capacity in other directions. I do not want to disagree with this here, and it may well be taken to be a particular class of paradox, but I want to take it further and argue that in the case of the Janus faced phenomena, it is not just a case of achieving x at the expense of y, but a case of achieving +x and −x simultaneously. Or more formally, the performance of a function of a given kind may be identified in an ironic or paradoxical process whereby a function of a contrasting kind is simultaneously identified. The observation is that in the case of mobile phones, the chains of implication that flow through the actors associated with a sociotechnical assemblage are multiple, and they flow in more than one direction, including opposite directions.

Borgmann (1987) writes from a substantive tradition that echoes Heidegger, and suggests that a paradox of a kind exemplifies an essence of technology. In the regime of the "device paradigm" we devise ever more efficient and effective devices to facilitate our purposes. In order to achieve a purpose, let's say, cooking, we employ technology which strips-back and attenuates the performance of cooking. Ultimately, technology facilitates cooking by entirely eliminating cooking. We don't join with technology to perform a task; we join with technology to change the task, with the ultimate effect of eliminating the task. In Borgmann's view, the essence of technology is to ramify and attenuate, and thereby eliminate our connection with the social and material world in which we live. In terms of the argument made here, Borgmann's "device" performs more and more functions of many diverse kinds, as we perform fewer and fewer. As we are able to do more and more (through the application of technology), we actually do less and less (existentially). In a sense, the device relates to the world through a richer and richer set of performances, as we retreat to the margins. These ramified performances have implications that might be pursued in many directions, and occur in many domains, only tenuously related to singular, goal-directed purposes. An appreciation of technology in Borgman's view, requires that we attend to the implicit ironies of a technological life, though Borgman by no means exhausts the phenomena.

Latour (1987) is an amodern who uses the Janus metaphor to develop his thinking on the relationship between science and society. One face of Science (with a capital "S") speaks directly for nature, to the public and through scientific journals, with objective knowledge of facts and proofs. The other face—the face of science in action—speaks of problems in obtaining research funding, of rats or compounds that won't cooperate, of competition within and between teams, of doubts and uncertainty, and of the politics and power of facts and proofs. Each face makes the other face possible. An appreciation of science, in Latour's view, requires that we attend to the purified rationality of Science, arising out of the impure mess of science, made possible by the unsullied, rational and objective articulation of Science (and on and on, around the circle). Science is in these terms a Janus faced hybrid.

Bowers (1991) draws on Latour and also uses the Janus metaphor, this time in a critique of the design of systems for "computer supported cooperative work". In a

series of vignettes Bowers argues that systems design brings together simple models of the world, with complexities that defy these models; claims of improved task efficiency with changed tasks and changed measures of efficiency; a need for accurate problem representation with uncertainty about the existence and nature of problems; technology that needs people to be convinced of its efficacy to work as it should, and people that need the technology to work as it should in order to be convinced.

Ihde, Borgman, Latour and Bowers are not arguing that one face of Janus is truthful, correct, and just, and the other tells lies, makes mistakes, and is wicked. Rather, these authors argue that multiple faces work together in the shaping and implications of science and technology. Contrariness and irony arise out of the performance of technology, accompany our purposes, are not unusual, and are essential in an understanding of how science and technology operates in normal conditions. It is not an aberration in the translation of purpose to function, it is a principle.

4. The case of the mobile phone

In this the main section of the paper, the performances of the mobile phone will be discussed in terms that make its Janus-faces clear. The range of contexts in which the mobile phone is implicated is clearly very large. It is embroiled in the commercial world of costs, profits, investments and business plans; which connect through to actors in the technical world of signals, circuits, protocols and data bases; which connect through to the social world of teenagers, mothers, business people and cultural mores; and so on. Rather than attempt to cover all of these interconnected networks, I shall "black-box" the phone qua technology to concentrate on the social and organizational contexts of mobile phone use, and try to illustrate the ironically contrary but co-dependent performances that arise out of the purposive action mediated by the mobile phone. The choice of a social context to illustrate the case will no doubt surprise readers who might quite reasonably anticipate an argument situated entirely in the context of formal organizations. In defence of this choice, I suggest that firstly, the examples are no less accessible and no less evocative than others might be, drawing as they do upon everyday experience in the developed world. Secondly, they are intended to illustrate a general case that applies to sociotechnical relations across contexts: in terms of the argument, the choice of illustration and example is thus rhetorical rather than definitive. And thirdly, the organizational context is extensive and has no clear boundary anyway: "... modern households appear to have many features in common with formal organizations … household members display typical organizational behaviours." (Avery & Baker, 2002, pp. 111–112). Family life is a form of organizational life. Social life is not bounded from work life. Informal organization exists within and around formal organization and vice versa (and of course, the mobile phone is assisting in this blurring of worlds).

4.1. Mobile and fixed—liberated and leashed

The obvious and defining affordances of the mobile phone are those related to mobility in space. (See Leung & Wei, 2000; Katz & Aspden, 1998; Roos, 1993;

Fabre, Jenkin, Thompson, & Senjen, 1999). The mobile phone handset is wireless, small and light enough to fit in a pocket or handbag, and is designed to be taken anywhere. In association with a complex assembly of antennae, frequency protocols, switching systems, electrical engineers and so forth, the mobile phone can function to communicate from anywhere to anywhere. The very point of the mobile phone's affordances is that the user is able to move in the world with the phone, without losing the capacity for voice exchange or text exchange, and a whole range of purposes are served through these performances.

Then again, if the phone-user hybrid is to be geographically mobile and still perform communication functions, it must also be fixed in place—in particular, fixed in what Castells (1996) calls "the space of flows". Without this fixity, the mobile phone is not functional as a point-to-point communications device. And in performing this function, the mobile phone number is the affordance that provides the nomad with a fixed address. In the case of the "road warrior" salesperson, the self employed tradesperson, the consultant, the independent contractor, the student, and other peripatetics, their mobile number is their only fixed address—their only fixed place. And so the purposes of mobility are achieved through performances that simultaneously require fixity. We can move, but we are always there.

Because the mobile phone is portable, yet provides a fixed individualised address, it provides its users with a high degree of independence, mobility and flexibility. In organizational terms for example, an implication of this functionality is that one need not be constrained by the office, the workshop, the studio, or any other particular place, especially if a laptop computer, wireless modem-fax and portable printer complement the phone (see Fabre et al., 1999; Cronberg, 1994; Majumdar & Venkataraman, 1998). One may stay busy, engaged, in the loop of work activity anywhere, all the time, and at the same time, one has the freedom and flexibility to move around as one wishes. The phone thus performs to liberate us and make us free, without entirely isolating us. One potent appeal of a mobile phone to our subjectivity is a thus a link to the unlimited iconography of independence, and somewhat more limited *performance* of independence, which writes the mobile phone user as flexible, responsive and self-sufficient. The user of the mobile phone can travel light and fancy free, far less encumbered by reliance on fixed places, fixed technologies, or fixed schedules. The user can improvise social arrangements and work arrangements, responding and initiating flexibly and rapidly, with a minimum of forward planning or inflexible coordination. In terms of organizational structure and personnel management, such an arrangement may allow coordinated workflow to occur without the requirement for all to be in one place at one time. Members of organizations may therefore engage in more flexible, responsive and devolved work practices without sacrificing coordination. Readers will recognize that this is consistent with post-Fordist approaches to organizational theory and practice (see Kumar, 1992; Mathews, 1989)—so consistent that the mobile phone is a business icon, inseparable from the image of the empowered decision maker, acting in the world as an independent agent, but remaining engaged, in the loop, integrated with her team. Management practices that are built around "disintermediation", "devolved decision making", "flexible work teams", "constant change", "flat hierarchies", "multi-skilling" etc. etc.

draw freely on this imagery in representing contemporary work force management structures (Smith, 2001).

But in regard to work arrangements, a different face prevails if Janus turns 180 degrees on the axis. One then reads the phone not as liberating agent, but as a leash. Being an independent individual, able to move at will and to be anywhere, whilst at the same time remaining fixed in place at work, breaks down the distinction between a work-place and a place that is distinct from work, a work time and a time distinct from work, a person at work, as distinct from a person at leisure. We can move from the office, but we are always there. The mobile phone means that potentially there is no escape from work, family, friends, or anyone else for that matter. An organization of working personnel constituted in mobile communications rather than fixed places and agreed times, is an organization that is everywhere, rather than nowhere. There are no boundaries to the organization and no boundaries to work, either in terms of time or in terms of place, and no constraints on an organization's potential to make demands of its members. The virtual organization is always everywhere. The un-wired member is always, everywhere, a functionary of the organization. This performance of the mobile phone positions us as a resource—a work resource for the employer, a social resource for friends and acquaintances, a family resource for relatives, always at call, fixed in position, ready to be accessed and pressed into service. We are digitally leashed because we are un-wired. Only when we remain leashed electronically can the organization set us free geographically.

4.2. Independent and co-dependent—vulnerable and reassured

The mobile phone thus performs to facilitate independent, footloose and fancy-free social and organizational arrangements, but ironically, this performance is only comprehensible in a context that includes integrated others, with whom the user communicates and coordinates. The phone does not contribute to independence, and is entirely redundant, if in fact the user is independent of others. Indeed, the iconography and functionality built around independence is matched by equally potent iconography and functionality built around co-dependence and social and organizational integration. A degree of independence is facilitated only when the user is co-dependent, and the connection between self and the Other must be maintained at all times, in all places, in synchronous time. When independent, and out and about in the world, co-dependence is thus affirmed (I'm always contactable, always (potentially) with you). When co-dependent, independence is affirmed (I'm out and about in the world, even as we coordinate, even as we speak).

And for some, being independent and out and about brings with it a sense of isolation and vulnerability, particularly say, for older people in retirement, for lone women, or for young ones separated from family or friends, away at university, or in the search for work. (See Rakow, 1988; Rakow & Navarro, 1993; Dimmick, Sikand, & Patterson, 1994; Moyal, 1992; Ryan, Anas, Hummert, & Laver-Ingram, 1998). The perceived need for technology to enable communication at a distance perhaps indicates that one is distant from those one might like to communicate with, if not be with. However, communication is possible at a distance, through the phone,

which is reassuring for those who are independent, but who also feel isolated or vulnerable. Even if the phone is never used, it can be carried at all times, and the very fact that it is possible to communicate, of itself creates a link that reinforces connectedness. The phone thus speaks of both a sense of isolation and a sense of reassurance. We are distant but we are connected. In the formal organizational context also, the faces of isolation, vulnerability and reassurance emerge in the presence of the mobile phone. People working independently at the edge or beyond their level of experience are vulnerable, but may be reassured by the presence and potential performance of communications technology. The organization is vulnerable in insisting or allowing people to work independently at the edge or beyond their level of competency, but is reassured that the geographically dispersed and isolated workforce is digitally integrated, coordinated and connected. Our workers in the field are on their own, but connected.

The use of the phone in conditions of geographic isolation and vulnerability is also reassuring of our continued position and significance in the world as existential beings. When I telephone I am part of a social network or familial or organizational network. I am related to others. I exist, they exist, and our relation to one another exists. I am confirmed. I have a position in the scheme of things. I am reassured.

4.3. Close and distant—reached and breached

The freedom to be mobile enables the mobile phone user to be distant from people—to be physically separated from family and friends, work colleagues and work places, yet communicate at will. Face to face communication in conditions of separation is not possible, and wired communication may not be possible either. As Virilio (1998) points out, we live in a condition that concentrates time and diminishes space as a focal concern in our lifeworld, and the mobile phone is of great assistance in creating an organizational and social environment in which movement in space is routine, and the problematic is our movement and coordination in relation to time. Through the performance of the mobile phone, position in space is still less relevant, and the user may remain close to people no matter how distant. The connection between physical proximity and social proximity is broken. The user is not physically close to others, and does not necessarily want to be physically close. But the user is not distant either, and does not want to be distant. The close/distant, near/far hybrid, configures a user who is always available, but not present. Distant, but connected.

A collapse in the relevance of distance to connection should not be interpreted as implying that people are closer to one another through the performance of technology. As discussed in the earlier summary of Heidegger, rather than creating a space in which we are close to others, the mobile phone abolishes distance by abolishing nearness. One may be sitting next to a person on a train, or sharing the same table at a café, in a potentially intimate social position. However, one may well ignore those to whom one is physically close, and converse with someone not present. The phone peforms to shift people who are not spatially present into communicative presence, and eliminate the social presence of those in the same space.

In pretty obvious ways, this requires an adjustment to the moves that guide our conduct in social and organizational interaction. In contemporary society, people who are in the same space do not have the privilege of being near. Family who share the same house may not be near. Colleagues who share the same office building may not be near. Rather, nearness is abolished as the transaction costs associated with global interaction fall closer to zero. People at the same table, in the next room, or at the next desk, are as far away as people in New York or Calcutta. And in less obvious but no doubt more profound ways, the separation of physical co-presence from social and organizational co-presence has implications for what it is to human in a society.

Another way of exploring the implications of a function that enables us to be close to those who are distant and just as distant from those who are close, is to say that the mobile phone gives us new senses, or extends the reach of our senses through space. In the McLuhanesque model of technology as extensions of embodiment (McLuhan, 1967), the mobile phone is an extra organ carried with the body at all times, and is activated from time to time to extend the reach of the voice and ears across vast distances—even across the globe—in real time. With the mobile phone we are not constrained by the reach of the vocal chords or by the reach of wires. With this small device placed against the cheek, we extend our capacities to talk and to listen, out of sight, out of presence, to whomsoever, whensoever. But in reaching out, it is also necessary that there be a "reaching-in". If we can call, then we can be called. We can reach others anywhere, anytime, but they can reach us anywhere, anytime.

For formal organizations this irony of extension and invasion expresses itself most profoundly in the problematics of globalisation. ICTs such as the mobile phone facilitate both the dispersal and the integration of the organization. Even modestly sized businesses can reach out to wholesalers, retailers, sources of capital, labour, and professional services, wheresoever they might be located. (See Bauman, 2000; Smith, 2001; Kelly, 1997; Graham & Marvin, 1996; Noble, 1977). But again, the extent to which an organization can extend a commercial presence anywhere, also establishes the extent to which an organization has no particular presence anywhere. That is to say, the ability of an organization to establish its place, its own "turf" that it can work within, provide services for, and defend and build through time, is compromised by the reach and flexibility ICT infrastructure allows. An organization's "territory", that may be everywhere and thus nowhere, is most obviously envisaged spatially or geographically—as local, regional, national or transnational territory. But the principle applies no less to an organization's range of services or products, to its market demographic, or to its brand image than to its geography. In an information economy, these too are defined and maintained through an ICT infrastructure. The organizational presence (in geographic terms and in operational terms) is shaped and asserted through digital media that equally allows a reshaping and reassertion of territorial reach, and lines of services and products. An identifiable, defined, "place" (territory, customer demographic, brand image), is occupied by an organisation at any given time, but that place is extensible, transient, and mutable. ICTs (including of course, the mobile phone) thus render the boundaries of the organization in rubber. The

organizational boundary can ride ICT infrastructure and extend to this or that place, or withdraw from this or that service, or re-brand in this or that way. The boundary can be dissolved entirely in respect of a workforce that is contracted, outsourced, contingent, casualised, and is neither in nor out of the organization. Importantly for the organization, the boundary is subject to transgression by other organizations that are just as capable of reshaping their boundaries to penetrate our territory, our services, our demographic, our brand image.

In social terms, boundaries are no more fixed. Invasion of personal social space and the disruption of the flow of embodied life through the phone is not only commonly tolerated, the absent invader is typically welcomed and given precedent over those who are physically present. The mobile phone reaches out and gives the capacity to intervene in all public and private spaces, and this performance reaches in and invades and disturbs face-to-face conduct in these places. Stories of people making and receiving calls during theatre performances, weddings, funerals, and at other socially inappropriate times and places are the stuff of urban legend (see Alderson, 1997; Frissen, 2000). Negotiation about business deals, arguments about family and social affairs, the sweet nothings of lovers, and any amount of everyday chitter-chatter, occurs in crowded cafes and on trains, on the street, any place (place is irrelevant), sometimes with extraordinary candour, and within ready hearing of any passer-by (who may be present but has no social presence).

4.4. Private and public

In this sense mobile phone use is anything but private, and a mobile phone conversation is often not private conversation. However, using the word in a different context, the mobile phone is very much “private”, certainly in a way that other phones are not. Public telephones are widely available in many buildings and streets, and are clearly public conveniences for public use and the public good. Fixed-line telephones are available in most homes and businesses in developed countries, and these phones are also, in a sense, public property. In the home they are often located in a hallway, lounge room, kitchen or other public place in the house, and all members of the household typically share its use. In an office, the phone is clearly the property of the organization. Offices and sitting rooms are ambiguous places—both private and public (see Gillard, Wale, & Bow, 1997). In contrast, the mobile phone is typically owned, carried and used by a single individual, and is not available for use by all the members of a family, workplace, or a neighbourhood, even if the phone is supplied by the head of the household or by the organization. The mobile phone is typically customised for private use, with the user’s particular collection of phone numbers, speed dialling settings, caller identification settings, ring tones, clip-on fashion covers and the like. The possession of a mobile, and the desire to possess a mobile, even in the ready presence of shared public phones, work phones and family phones, is consistent with a trend which extends individuation further and deeper into our social condition, and is consistent with a 50 year retreat from public service provided for the public good, to services purchased by individuals for private benefit (Kumar, 1992). It is therefore no surprise that in many places the uptake of

mobile phones has been rapid. In my own country of Australia for example, mobile phones were first marketed in 1987 and by July 2000 the number of mobile connections reached 11.1 million, outnumbering the 10.9 million total of fixed line connections (Australian Associated Press, 2002).

4.5. Busy and available—important and not so important

The presence of one's own private phone on the hip, in the bag, or on the desk, signals many things. It signals that one is at least connected, but perhaps more, that one's social life or business life is dynamic, lively, often unpredictable, but certainly full (Frissen, 2000; Gillard, Wale, & Bow, 1997). At any moment the phone may ring and one must be ready, at call, reachable. At any moment one may have the need or desire to communicate, and one must be equipped to reach out. Should that potential be realized, and a call made, conspicuous socialising or wheeling-and-dealing is acted out. Making a call in a public place is raised to the level of a performance art, or street theatre, in which the phone figures as an essential prop in the delivery of a soliloquy, and the user's dialogue becomes the audience's monologue. But the conspicuously busy phone user is also conspicuously available—open to engagement, indiscriminately, promiscuously. The phone on the table is not just a sign that the user is busy, is in the loop, is wanted, or may be wanted, but is also a sign that the user wants to be wanted, and wants to be available. A mobile phone is a two-way street, again facing in both directions. One can't demonstrate that one is "booked-up", in demand, busy, without also being available. One can't be available without taking calls, making arrangements, being booked up and busy.

Consistent with the above, the presence of the mobile-phone signals that other people *need* the user; that the individual is at the centre of an important flow communication and is at the centre of a network of relationships (Frissen, 2000; Dimmick, Sikand, & Patterson, 1994). The user needs a phone not for herself but for the sake of others, to keep the ship of commerce, or the ship of family, or one's social group, on course and on an even keel. The mobile phone user is an important person, and is in an important position at the centre of information flows and subsequent events. The mobile phone is important in signalling the important position of the user, and the phone in use sustains and affirms this.

On the other hand, one might say that being "at call" signals that the user is not so important. Important, but not *so* important. To carry the mobile phone is to be a flunky at the beck and call of others. Access to the user is more open, democratic, facilitated, and the user is not protected from the demands and attentions of others, as one expects of an important person. But of course this is not entirely true. The mobile phone is not just an open conduit, it also does important work at the boundary, where inclusion and exclusion and relations of access and importance are played out. I guess that the Prime Minister and the Queen do not carry a mobile phone; they are too important to be accessible and that avenue is closed. All their "minders" carry phones though, for the Queen and the PM are too important not to be accessible on a 7/24 basis, and that avenue must remain always open. The minders and their phones ride the boundaries of inclusion and exclusion. In other cases, important

people, say a CEO, or a rock-star, will carry a phone (they are important and must be accessible), but those given the number are tightly restricted (the CEO and the rock-star are too important to be accessible to all and sundry). The boundaries of inclusion and exclusion are maintained by controlling information about the phone (the number), rather than through minders who carry the phone.

4.6. Production and consumption

Of course, one of the reasons that the mobile phone is popular is this position at the boundaries of our relations. It can allow, and to a lesser extent control, entry and egress in respect of ones social space and work space. By functioning as this sort of conduit, in a political economy that values information transfer with a minimum of transaction costs, the mobile phone may be read as productive capital equipment, as an important tool in achieving efficiency in a post-Fordist economy (Smith, 2001). If technologies of production crystallise work relations in a political-economy, the mobile phone crystallises a set of work relations described as flexible, devolved, flat, accountable, team-structured and project-centred. Critical to production in these Post-Fordist, Information Economy regimes, is information management, time management, and team coordination (Kumar, 1992; Mathews, 1989), and the mobile phone is sold as an investment in all three. In a context where time is read as a limited, non-extensible resource, the conservation of time through effective time management and through optimal (perhaps maximal) use of time, is regarded as crucial to efficient production in work life and efficient consumption in social life. The mobile phone user is productive because the phone enables information flows and command and control flows to occur at all times and in all places, optimising (that is, maximising) participation within and between business life, family life and social life.

The phone user is therefore a responsible person and an effective manager of scarce resources (Fischer, 1992). The user carries the phone in order to fulfil their responsibilities and maximise their productivity and effectiveness in conditions of late-modernity (Smith, 2001). At the same time though, the mobile phone is an object of consumption. It is costly to run and the more it is used the more costly it is. This is not just in terms of call costs and service costs, substantial though these are, but also in terms of the productive use of time. Production requires consumption, and the mobile phone consumes time, and potentially wastes time, and intervenes in the efficient conservation, management and expenditure of time.

4.7. “Boyish” and “Girly”—matriarchal and patriarchal

In the current still patriarchal cultural context, where production is masculinised and consumption is feminised, productive work, hard work, responsible work, is manly work. Buying, consuming, using, is a feminine pursuit. And so, phones are business-like—for responsible production. Phones are also “girly”—for frivolous consumption, marketed as fashion accessories rather than electronics. Phone use is loud, disruptive, ill-mannered and “boyish”, but is also caring and cooperative and “girlish”. The mobile phone is thus gendered in many ways (Leung & Wei, 2000;

Frissen, 2000; Lycett & Dunbar, 2000; Rakow, 1988; Rakow & Navarro, 1993; Moyal, 1992; Cast & Burke, 1997; Smoreda & Licoppe, 2000; Ling, 1998a; Claise & Row, 1989; Lange, 1991).

The masculinized-feminised binaries can be further extended in the context of gender relationships and roles as they are played out in family life. Parents need to coordinate with one another to perform their family duties, and parents and children need to remain in touch with one another throughout the day. The phone thus performs to reinforce close and nurturing familial relations, the exercise of parental responsibility, and safeguards the security of children.

Whilst facilitating traditional familial relations, the mobile phone and its user is also more independent of family constraints, moving in the world as an individual rather than as a family member. Young people, for example, need to coordinate with their friends, and stay in touch with their own society throughout the day (Carroll, Howard, Vetere, Peck, & Murphy, 2001). For them, the phone is important in the conduct of social relations, and is important in developing and maintaining social relationships independent of family. In the case of the Mother the mobile phone might well mediate the performance of a traditional maternal role, but it also mediates her performance in the role of contemporary breadwinner. And so the phone performs to maintain family relations and social relations, traditional sex roles and contemporary roles (See Bates & Charlton, 2000; Sonera, 2001; Ling, 2001, 1998a, 1998b; Ling & Yttri, 2000; Rakow & Navarro, 1993; Carrol et al., 2001; Smoreda & Licoppe, 2000). The father may ring the daughter who is at a nightclub and check on her well-being. The daughter may ring her boy-friend to meet at the club, and "text" her girl-friends with the arrangements. The daughter, turned club-goer who has had too much to drink, may ring her mother to pick her up from the club. Space is created for social relations, but family ties are present. The mobile phone user is a child. Not a very young child in need of direct supervision and physical containment, but still a child unready to be alone in the world. But grown-up enough to move off in the world, beyond containment and direct supervision, to meet people, make decisions, do things on their own. The phone is a safety-line, which simultaneously writes the user as being unready to move alone in the world, but facilitates moving off into the world of adulthood. In performing in this way, the mobile phone is a symbolic as well as practical gift from parents to child, signifying a "rite of passage", just as the door key remains a symbol used at 21st birthday celebrations. The phone is used as a gift for quite young children also, just as the key to the door is given to young people, and is rarely withheld until the child reaches the age of 21. Both the phone and the key symbolically and practically locate the child as out of the family nest, but still dependant on it. Traditional roles are played-out and maintained, but so are changed roles. Family relations are asserted, but social life may occur. The mobile phone user nurtures, protects and releases. The phone user is free in the world, but not beyond family.

And a similar set of relations may be observed in formal organizational contexts. The mobile phone facilitates post-Fordist, devolved, high-discretion, flat organizational structures through allowing mobility and independence, whist at the same time enabling Fordist chains of hierarchical command to be maintained at all times in all

places. The post-Fordist front-line worker can act independently in the world of clients, products and services, whilst traditional hierarchy is mediated through the mobile phone. The mobile phone user is a minion, a functionary, not afforded independence and autonomous action, but the mobile phone user is also a decision maker, free to act and move without direct supervision, using discretion and judgement. The mobile phone is a safety line that simultaneously writes the user as being unable to be alone in the world, whilst being alone in the world. Traditional hierarchies are asserted, but so are changed roles.

And so one might go on to describe other Janus faced performances, but enough examples have probably been given to illustrate the point. To summarise the ironies, let's return to the figures used earlier. The reader will recall that a "single face", represented in Fig. 3 thus—has been rejected.

And rather, in the above discussion, we have fleshed out Fig. 2 to produce Fig. 4, thus –our purposes—to be connected, independent, reassured, productive, or whatever—at once calls into play contrary performances. Technologies can turn us to the east, but in order to do so another face turns west. Irony abounds in the technology's implications.

5. Conclusion

The use of a metaphor for rhetorical and analytical purposes has the effect of manifesting a certain disposition, and framing certain possibilities, and issues. In this case, the description of mobile phones as Janus faced has framed irony and paradox as important in an analysis of the performance of the technology.

Having set out in this way to open up a certain line of enquiry, an appropriate philosophy of technology is required to probe the issues. In this case, the philosophy must be capable of apprehending and explicating the performance of the technology in terms of irony and paradox. An exploration of the technological life in these terms carries a number of analytic advantages.

1. Uncertainty and ambiguity are implicit in the co-presence of diametric positions, and uncertainty befits the analytic project. Interpretations remain open to the possibility of moves in all directions, including incompatible directions.
2. In metaphysical terms, we might thereby consider the technological life in terms of liberation but also in terms of domination, in terms of its transformative potential as well as its origins in existing power structures, in its totalising possibilities, and the opportunities it provides for plurality and heterogeneity. The technology

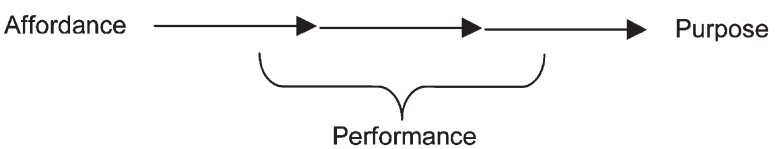

Fig. 3. Linear performance.

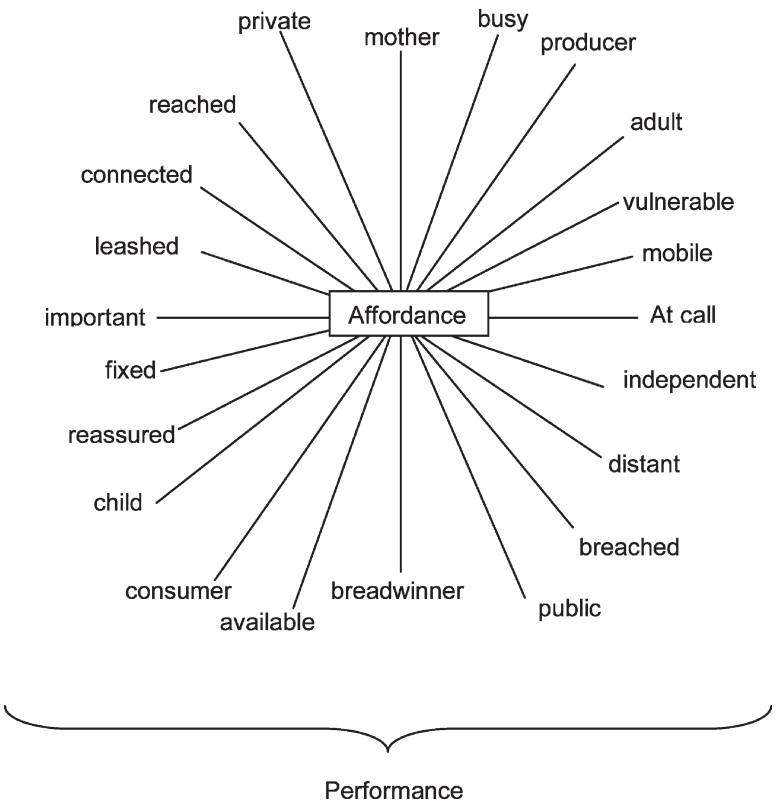

Fig. 4. The Janus faces of mobile phones.

is not presumed to be essentially benign or essentially malign, but is presumed to be always both (and neither), operating as it does, at a level that reconstitutes the ground upon which we differentiate the benign from the malign.

3. In more prosaic terms, where the everyday performance of a particular sociotechnical configuration is to be understood, we might consider the truth-value of claims made of behalf the technology not in terms of either this or that outcome, this or that hypothesis, but in terms of the tensions arising in the presence of both. Rather than seeking support for claims of increased efficiency, speed, convenience, accuracy, safety, etc., or seeking support for the contrary, the researcher and the practitioner might begin with the assumption that the deal we strike with technology is Faustian, and that pure, unmitigated, unambiguous moves in any one direction, are not of this world.

Which is not to say that having made these metaphysical and analytic moves, we are better placed to identify and choose between the diametric outcomes that might be revealed. The important point about being open to irony and contrariness, to a "logic of opposition" (Robey & Boudreau, 1999), is that this approach reaches down

through empirical observation and provides access to the reconstitutive qualities of technology (rather than technology's instrumental qualities). For example, an approach that is based in the reconstitutive qualities of technologies allows us to say that work is both more efficient and less efficient (and neither), not because different measures of different things can produce both results, but because the ground upon which work is understood, and the ground upon which efficiency is understood, are each altered (together). Seemingly hopeless inconsistencies such as these, are a product of this ontological shift, not a failure of method.

It has also been argued that an approach capable of exploring these ironies will be based in an amodern logic rather than a determinist logic, in order that irony and paradox be maintained in the frame rather than dissolved through a shift to a transcendent category, or worked through to a singularity by arbitrating truth claims. The determinist logic of social construction begins with the view that the social, or the human, is distinct from and prior to the technical, and that the social provides the appropriate perspective to witness the emergence of technologies and to assess the implications of technologies. Amodern logic erases this frame by denying the distinction, thus denying the privilege afforded the social. To frame technologies in terms of ironic or contrary performances, invites an analysis that works through these performances, and is sensitive to shifts in the ground upon which the performances are based. For example, the existential experience of the increasingly technologized working life might be approached as being driven by cultural and scientific desires and imperatives with profoundly dominating and liberating implications (and neither). Seemingly incompatible binaries such as culture and science, desire and imperative, are important in an analysis because they enable us to see that the character of culture and science, desire and need, domination and liberation, are altered along with the working life. In this sense there is no stable social frame to give rise to technology, or from which to assess technology.

The conceptual strategy of the Network approach focuses on linkages, connections, or relations between actors, and performances or other analytical entities of many kinds. It does not seek to nail-down a technical artefact's intrinsic "essence", as either a cause or an effect. Rather, actors and networks of actors have an ontology that is contingent, extrinsic, and is constituted dynamically in the performance of relations. This approach to an analysis of our sociotechnical condition demonstrates a disposition sympathetic to relations of many kinds, including those that transgress boundaries, and hybridise seemingly contrary positions, in often-unstable configurations. If the analytic frame allows for paradox and irony by admitting the co-presence of the contrary performances and implications summarised in Fig. 4, the analytic frame calls into question the foundation that has produced the contrasts. So, if the performance of the mobile phone produces the maternal-businesswoman, fixed-mobility, independent-dependence, busy-availability etc., the question ceases to be "which of these mutually exclusive alternatives is correct?" and becomes "what is the contemporary nature of motherhood and work, mobility, independence, and so forth?". The framing of technologies such as the mobile phone in Janus faced terms, allows the complexity and ambiguity of our mediated social position to be maintained in the course of analysis, and invites an examination of ontological fundamentals.

Our position is allowed to be one that faces this way by facing that way; our direction is coming and going.

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