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**The Future is Boring:
Stories from the landscapes of the mobile telecoms industry**

(draft)

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Abstract

This paper weaves two stories of the future in the mobile telecoms industry, attentive to what is rehearsed and what is made absent. It follows the concerns of social studies of science and technology, in which futures and practices of future-making are always embodied and epistemologically situated; the future as a social and material activity of knowledge-making. The paper draws on a four month ethnography of the mobile telecoms industry but enacts two different methods: the first method is a reflective critique of the future in the industry; the second is a generative and inventive interference. The first method weaves a story around the lines of movement near London Heathrow airport, creating a linear, universal, and fixed future. The second method weaves a story around the island archipelago of Orkney, Scotland, to make a mutable, local, and fluid future. In this paper landscapes and futures are inseparable.

Keywords

Ethnography; Mobile Telecommunications; Futures; Science Studies; Method

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Introduction

The future is not out-there, as though disconnected from past or present. As with other forms of technical and scientific knowledge, it is made in ongoing, everyday practices and places (see discussions in the field of Science Studies, for example Latour, 1987; Rosenberg and Harding, 2005): at shareholder meetings, in design studios, in science fiction stories (e.g. Bloomfield, 2003; Cochrane, 1997: 77-78). The future is always situated, particular to the places where it is made. So what happens to the future when its sites of production move from place to place? What is the effect of landscape and environment on future-making? This paper explores the generative effect of place on futures for one particular case: the UK mobile telecoms industry. It considers *situated futures* in the sense of both the epistemologies and the landscapes of future-making (Haraway, 1991).

In 2000, five consortia spent £20 billion on UK radio spectrum licences for the 3rd Generation of mobile telephony, or 3G; despite the technology, the network infrastructure and handsets, still being in development. 3G was a story, a highly influential story of the future told in diagrams on PowerPoint charts, in technological standards meetings, and (most crucially) in eager predictions of revenue. Analysts have suggested that the auction of 3G radio spectrum licenses, which occurred across Europe, led to a global economic slowdown (Cheng et al., 2003). Others estimate that over a million workers were forced to leave the mobile telecoms industry as a direct effect of the auctions, which may have created over £370 billion in corporate debt (*ibid*).¹ Stories of the future matter in mobile telecoms.

Telling stories of the future is always a social, material, and political practice. It always has effects; it is always non-innocent (Haraway, 1997). In using the trope of story I am intending to evoke its performativity. Stories can rehearse and stabilise particular futures, and in so doing make others absent. For example, the Victorian science fiction story of a global

electronic brain, an intelligent planet, as told by Nathaniel Hawthorne in 1851, inspired Marshall McLuhan to tell his story of the global electronic village, a story which continues to be reproduced as potent vision of a global telecommunications network (Kaku, 1998: 43-44; McLuhan, 1964). But arguments and critical accounts are also stories, with a particular literary form (Ashmore, 1989), therefore it matters what versions of the future are told in social science and other literatures. This paper attempts, not only to create a critical account of the future, but also to rehearse other futures.

Methods

In her important paper on the partial nature of objectivity, Donna Haraway argues that technoscience knowledges are always situated rather than floating nowhere, and therefore always have a partial rather than universal perspective (Haraway, 1991). Following the enlightenment analogy of light as knowledge, Haraway then develops the optical metaphors of reflection and interference as differing methods for knowledge-making: the mirrored reflection of critique versus a generative interference (Haraway, 1994, 1999). Knowledges are a material-semiotics, they are stories that make a difference to the world. And they are made differently with different methods. The point of this refiguring of knowledge 'is not to just read the webs of knowledge production; the point is to reconfigure what counts as knowledge in the interests of reconstituting the generative forces of embodiment' (Haraway 1994: 62).

Briefly, reflection occurs when light waves collide with the surface of a solid and are reflected away; the light waves are simply displaced, and remain unchanged. Critical debates that reflect back and forth between the same dichotomy (nature-culture or subjective-objective, for example) reproduce and retain the same dichotomous configuration. This endless mirroring can often participate in the stabilising of existing hegemonies. Resonating with these concerns have been recent calls in the social sciences for methods that move beyond deconstructive critique, towards a generative critique that cares for, and is concerned with, its real-world effects (Latour, 2004; Law, 2004).

In contrast, interference occurs when light waves meet in a place, when they superpose and add together constructively and destructively. It creates a pattern of light and dark, partial and fragmentary points of knowledge; knowledge made in pieces, in moments, in fragments of evidence. The pattern of superposition is specific to a place: shift either light wave slightly and their relationship changes, the pattern changes. Knowledges made through interference are made differently in different places, in the double sense of both topographic place and epistemological location. Location and partiality are therefore central to interference; in interference methods, the knowledge created is always partial and explicitly dependent on its location. For example, in writing ethnography from diverse ethnographic evidence, which always comprises incomplete parts that are not part of any whole (Strathern, 1991). Or in archaeological knowledges, which alter as an archaeologist moves through parts of an excavation or monument (Turnbull, 2002); as Tim Ingold says so succinctly 'we know *as we go*, not *before we go*' (Ingold, 2000b: 230). Moreover, interference as a metaphor for method also makes visible and germane both knowledges (light) and the creative work necessary to connect them into a meaningful account (pattern). Interference methods acknowledge the always generative work of weaving partial knowledges together; that such creativity is an inseparable part of doing empirical work. In the words of Haraway, 'what if the study and crafting of fiction and fact happened explicitly, instead of covertly, in the same room, and in all the rooms?' (Haraway, 1997: 110).

This paper weaves two ethnographic accounts of the future in the UK mobile telecoms industry.² Both accounts are based on evidence collected during a four month ethnography of various sites of future-making in the industry. The first account practices a method of reflection, and creates a generative critique of the evidence. The second account performs an interference, and shifts the location of the evidence to explore the effect of place on future-making. This second account is perhaps one answer to Haraway's question above: it is highly inventive as well as rigorous and empirical, due to its explicit rather than covert distinction

between partial evidence and creative work (for further discussion of this method see Watts, 2005, 2007).

A Reflection

I had negotiated permission to attend a closed industry association meeting, a gathering of company representatives to discuss 3G trends in mobile telecoms.

It was a very dim December morning in 2003, and the local bus service abandoned me in a cul-de-sac of heavily-roofed corporate boxes, squatting besides a dual carriageway; an electricity pylon buzzing overhead.

I was within an area known as the M3/M4 Triangle, a region defined by four lines of movement: the M25 London orbital motorway to the east, the M3 motorway to the south-west, the M4 motorway to the west, and the vertical line of the Heathrow flight-corridor above. The author J. G. Ballard had long regarded this Heathrow suburbia, its walled-in/off employees and car-enclosed lives, as a landscape where mundane corporate life slipped easily into psychosis (Ballard, 1973, 2006). It was here that the futures of the mobile telecoms industry were being made. Here were the walled campuses and UK headquarters of corporations such as Motorola, Sony Ericsson, Nokia, O₂, Vodafone, Nortel, and Microsoft.

The directions to the meeting took Ballard's view, and assumed I would arrive by car - the location was given in motorway and road junctions. Taking the bus and walking was an act of insurrection, a rising up onto my feet. In his work on the inseparability of world-making and landscape, Tim Ingold remarks that 'through walking... landscapes are woven into life, and lives are woven into the landscape, in a process that is continuous and never-ending' (Ingold, 2004: 333). Movement makes a difference to how landscapes and lives are made; movement by car weaves together a very different landscape compared to walking for example (*ibid*; Edensor, 2003).

People did not walk or hike in the mobile telecoms industry; they did not experience beneath their boot-soles, as I did, the trimmed grass or the disused pavement that began and led nowhere. Their landscape was a cambered strip of tarmacadam. The optical fibres beneath my feet (I noted the telecoms manhole covers as I walked) and the radio signals within the air, allowed bits of people, binary-encoded life, to move through this landscape far more easily than I. My mobile phone was at full reception strength, the mobile telephony network unimpeded by the paved world around me.

This corporate location floated like a mirage above its heavily-manicured landscape of grass lawns and parking spaces (Ingold, 2004). The topography of the Thames river valley had been flattened into submission, made subservient, bulldozed, offering almost no resistance to either the embodied or electronic movement of the industry; rather it enabled the movement of high-speed automobile, aeroplane, and wired/wireless communications. The landscapes that were woven through the futures of the mobile telecoms industry (and the futures that were woven through these landscapes) had a politics that were isotropic, flat and unresisting.

Along with twenty or so other attendees of the meeting, I was called in to a long room with a vast boardroom table around which we sat, as though for dinner. Head down to my ethnographic notebook, I listened and wrote.

The director of the industry association set the tone:

*Once bandwidth increases... the sky's the limit... the only limit is our imagination,*³

he said.

The future was being mapped onto a line of increasing bandwidth. More bandwidth implied broader (and broadband) possibilities. 2nd Generation, 2G, systems had generally only allowed 9.6 Kbps, whereas 3rd Generation, 3G, systems permitted 384 Kbps, a vast

difference. The numbers mattered. 2G was considered very limited (the speed for downloading information was more than five times slower than a typical dial-up modem over a landline). 3G was envisioned as limitless, constrained only by the imagination of those present. The future was being technologically determined by how fast information could be sent to a mobile device. Time and technology were being made into a linear progression; more bandwidth was the future, less bandwidth was the past.

The director handed over to an analyst from one of the large multinational consultancies, who were crucial participants in the reproduction of futures in mobile telecoms. She ran through a series of PowerPoint charts, which predicted future revenue growth for 3G, subscriber numbers, handset sales, volumes of video messages. Yet, although the y-axis metamorphosed from one radically different unit to another, all the graphs retained the same shape: an exponential line, an asymptotic curve reaching ever-upwards over time. No matter the politics, economics, materials or labours involved, the future always had the same shape, it was always an exponential curve. The sky was indeed the mathematical limit.

By 2006 there will be 2 billion 3G subscribers worldwide,

she divined from one particular curve. An act of prophecy that I now note over-estimated by a factor of four.⁴ Although more accurate than a prediction in 2004, which over-estimated 3G subscription by a factor of one hundred and sixty.⁵ In retrospect, the story of 3G was wildly optimistic, more fantasy and financial desire than actual fact. The shape of the future, that exponential line, did not seem to fit the evidence in practice.

But it was at another of the association's meetings, later that year, where I heard the specific vision which this line led towards.

It was an overcast but sticky midsummer day as the taxi leaped over the ramps towards the golf club house, only minutes from the M25 motorway. The cab pulled up to the door and the

taxi driver announced in passing that the country house façade was an old Victorian sanatorium; and I was flung back into Ballard's world of the landscapes of suburban psychosis. In following the signs to the conference suite, I passed a large printed tapestry of a knight-in-shining-armor, a set of decorated plate armor, and a billiards room, the décor of a suburban fantasy of an English country house.

Today was the annual forecasting event for the membership. Forty men and four women (according to my tally) sat on gold-painted chairs at one end of the pseudo-Georgian conference room, before a felt-covered table with a whining projector pointed towards a small portable screen. It was hot and humid.

One of the forecasters made a series of predictions concerning future technologies of importance to mobile telecoms:

*Fuel cells [are the] alternative power technology... Key drivers are Moore's Law... process and power goes up at an exponential rate...*⁶

There it was, the key driver of exponential growth named: Moore's Law. This was the oft-misquoted prediction by Intel founder, Gordon Moore, of the exponential doubling of components per integrated circuit year on year (Moore, 1965). Since that publication over forty years ago, and in the rehearsal of the pervasiveness of silicon technology, Moore's Law had become synonymous with the exponential growth of almost any system in the high-tech industry. Moore's Law pulled the future of the mobile telecoms industry into a linearity of thought: no rhizomes, no regions, no other topology. This relational shape, as a line, had a politics (Law, 2002). It was predictable and safe; just follow the curve, you can't miss. As time moved forward on the graph, mobile telecoms technologies and revenue all increased exponentially. The predictions by the analysts might be hopelessly optimistic but given sufficient time, and without deviation from the curve, they would eventually be right.

So, to make a successful investment on the basis of Moore's Law required careful pruning away of any other possibilities, so that only the line remained; a self-fulfilling prophecy. At this meeting there were no other futures discussed, although concerns over the cost of the auctions were raised. 3G was a *fait accompli* for there were no other shapes, no other futures, imagined. The 3G licenses were a necessity to participate in making that future, with its predicted revenue, present. No matter the actual extraordinary financial losses and social effects of the relentless move along the line from 2G to 3G, no matter the doubts. It had not surprised me when a 4th Generation, 4G, mobile telecoms future began to be discussed; another step on that insatiable line.⁷

But then the next analyst took to his feet, and I began to write again in my ethnographic notebook. He spoke passionately concerning a limitless future mobile network – this was where the line was leading:

[Current network] is not good enough. We really need to download the attachments. We really need that always on, anytime, anyplace, anywhere. [Three-and-a-half Generation network] in 2008 is the next big thing... Real life high quality TV on our mobile...

This was the vision of the industry: 'anytime, anyplace, anywhere' mobile telecommunications. Time and place would be made irrelevant; the planet would become a single network, a global system of wireless intelligence. It was that centuries old and familiar vision discussed earlier, a re-wording of Hawthorne's Victorian imaginary rehearsed and reproduced by Marshall McLuhan. In this vision the social and material landscape had been overcome, colonised or bulldozed, but imagined as though flat; as though the planet were devoid of landscapes that resist mobile telephony infrastructure and transmission: mountains and sea, jungle and desert, dispersed populations. Sitting here in this pseudo-Georgian country house, formerly a Victorian asylum, I could look out of the sash window and see the neat lines of cut grass, canal, and electricity cables. In this suburban landscape such a future

made sense, was possible. A future of *anytime, anyplace, anywhere* mobile telecoms was woven through this landscape of 24-hour motorway services with wi-fi access, and vast concrete airport terminals with extra cellites to boost mobile phone signal. Here a future mobile network that was always on, anywhere, was almost present, so close, so unimaginative. 2G to 3G to 4G. Follow the line. Linear movement, linear future, linear time. This suburban landscape and its predictable future were woven together. I felt haunted by J. G. Ballard:

I would sum up my fear about the future in one word: boring. And that's my one fear: that everything has happened; nothing exciting or new or interesting is ever going to happen again... the future is just going to be a vast, conforming suburb of the soul. (Ballard, 1984)

An Interference

The sky was filled with grey clouds of luminous water. Rain hung in the air, a metallic atmosphere above the surface of the loch. Here, on the archipelago of Orkney, where the Atlantic and North Sea met above Scotland, I was closer to the Arctic Circle than to London, closer to Norway than to France.

I stood, watching, sheltered inside the grass-covered dome of Sand14, a design company working on a future for mobile telecoms. Through the studio window the distant black edges of the prehistoric stone circle of the Ring of Brodgar had been filed and softened by the rain. Five minutes walk away, just out of sight, were the remnants of another stone circle, three towering shards of flagstone stabbed into the earth. And on the hills all around were more prehistoric standing stones, hidden within the mist. Sand14 was located at the heart of a continuing four thousand year-old architectural project. The temporality of the landscape was suffused with the *long durée*, with technologies that had endured, and would endure (Ingold, 2000a).

But this company was not bricks and sods of earth, but a literary experiment. It was an interference into future-making, a superposition of Orkney and ethnographic evidence collected elsewhere. For Orkney was a place where my mobile phone signal seemed so erratic as to rise and fall with the wind; where even television struggled through the hills and over the water between the islands. This landscape resisted radio signals; 'anytime, anywhere, anyplace' was meaningless. Here, perhaps, other futures might be imagined.

In the low-lit foyer of Sand14 the social researcher, Anne, sat hunched into a round red fleece ball, concentrating on video footage from her research. She rotated and gave me a broad smile, her wide-frame bouncing with energy. She pointed to a freeze-frame image of a wooden drawer. It was stuffed with flattened photographs, a surface of faces and yellowing colour.

*[How do people] access something you hand on from generation to generation...
Digging slides up, boxes of prints from the attic. That's an experience we should
understand. That nostalgic experience,⁸*

she said.

I nodded, scribbling in my notebook.

Anne rotated back to the image.

[We need to] help create living memories...

she murmured.

Later, as the atmosphere transmuted from steel to titanium in the early dusk, we joined Simon, the mechanical engineer, for a walk down the isthmus towards the Ring of Brodgar stone circle.

The wind was a slow, buffeting chill, and the white stars of hemlock in the verge tossed back and forth in the wet air. Simon and Anne, in dark suits of waterproof clothing, walked purposely ahead, chatting, and I listened as their words were blown back along the road.

'It's nothing to do with the quality of the image,' Anne was saying. 'Not really. You can keep your megapixels and bandwidth. It's sharing the stories with everyone else...'

[So] how to create an experience for your senses?

asked Simon.

It's the qualitative part of what sharing is all about... It's the magic of sharing.

We rose up on the isthmus between the lochs, off the road. The stones on the near horizon formed a suture between hilltop and heavy cloud.

As we crossed the line of stones, we stepped from grass into heather. All around us the ground slipped away, so that the distant hills and lochs around the isthmus seemed to encircle us; an orchestration of earth, sea, stone and sky that created an extraordinary experience of a circular landscape, as though the world spun around this monumental axis (Richards, 1996).

We walked clockwise around the inside of the circle, up the slope, whilst Anne and Simon talked on. At the fragments of one fallen stone they slowed. The flagstone lay flat and

severed on the ground, and a small green sign read: this stone was struck by lightning on 5th June 1980 and shattered.

Simon crouched down to touch the splashes of lichen, spikes of white hair pointing down from his woollen hat; he drew his fingers along a gouge between the bedding planes.

'It's as if the stone's remembered the lightning,' he said, looking up. 'And we're here, reading that memory, written in the shattered fragments.'

Anne stood chin to chest, gold-rimmed glasses cast downwards at the stone. 'That's what we need,' she mused. 'A stone that remembers a moment. A moment in stone that can be passed on from generation to generation – a mobile telecommunications that endures through people.'

A few months later, the group had translated those insights into a shape to hold a mobile telecoms future; a three dimensional shape of a future they named the Camerastone.

The prototype was an oddly sculptured polished-stone ball, with six thick nodules extruded from opposing sides (facing left, right, front, back, up, and down) – a shape inspired by prehistoric artefacts found nearby. From the base of the stone a tangle of ribbon cables thrashed their way uncomfortably towards the back of a PC tower.

Carefully, I moved the ball and tried pushing the dial at the base. The smooth nodules on the other five sides made my fingers slide up and down as I grasped its cool surface.

'I think you'll need to rock it,' suggested one of the illustrators sitting nearby, reminding me that the device was kinetically powered; movement was intrinsic to the workings of the Camerastone. She leaned over and held out her hand, twisting it back and forth to show me.

I gripped the stone and rocked it back and forth a few times, feeling it come to life. Then I bent to peer into one of the nodules, through a lens, and into a bright LCD screen.

On the screen, as though through a telescope, there was a vision of a heather-encrusted domed mountain, scree slopes falling out of frame. I looked in to the other screens around the surface of the ball, and saw the same mountain from the other four directions; one side falling towards pasture and sea, an image taken from a ferry or boat. And then I looked in the top of the stone, and there was a photograph of a well-wrapped person standing on the stone summit of the mountain before a seascape of gold-green islands falling over a far horizon. It was a seductive experience, as if the mountain had been miniaturised, was some tiny other universe caught inside the scrying glass of the Camerastone. It was like looking in to another time.

In a design meeting many weeks earlier I had heard how they had produced, not just this prototype, but also a series of plastic models of the Camerastone (replicated on their 3D printer). Anne, the social researcher, had been handing these out all over the islands. Across Orkney, jewellers and architects, grandmothers and teenagers, had been inspired by the shape and initial concept of the model. But each had transformed the Camerastone into something slightly different.

A jewellers had electro-plated and etched their model, creating a show-piece in a display of photo-frames. Their future object held images and videos of a family close together; everyone in the family could have their own Camerastone, linked and updated constantly. An elderly lady called it a wishing stone, and hoped friends and family could send her pictures of their lives into which she could peek from time to time (after rubbing the stone like a magic lamp to switch it on). An American tourist at the cathedral had said she would buy one if it contained an experience of the building, a little world that she could take with her, leave in the bottom of a drawer, and then rediscover years later. And the local newspaper was awash

with letters suggesting links with social networking internet sites, with ideas for how to create fantasy worlds within the stone, with stories of hand-knitted covers.

There was no single Camerastone as a technological future, but only multiple instances of the Camerastone, over which Sand14 did not lay intellectual claim but rather perpetuated, inspired, and made possible. It was not one future, but many mutating futures.

However, Sand14's approach foundered in one crucial respect: how to communicate those multiple futures back into the mobile telecoms industry. As Anne had noted, the Camerastone was embedded here on the islands. You could not simply move it somewhere else. The Camerastone futures were inseparable from the lives and imaginations of the many people and businesses who made them. The industry would therefore have to travel to Orkney to understand those futures. But she did have a suggestion.

'Invite them to the Ring of Brodgar,' she proposed. 'Show them how the stone circle has to be there, in that place, otherwise the stones and hills no longer create that special experience of a circular world. Shift those stones anywhere else and the skyline is all in the wrong place. It'd be nothing more than some misshapen flagstones, not that wonderful orchestration of earth, sea, and sky. If you wanted to move the Ring of Brodgar you'd have to completely change the architecture. It's a local technology, see. The technology of the stones and the landscape are irreducible – you cannot separate them out.'

She gave her wise smile. 'It's the same with the Camerastone. The Camerastone and the Ring of Brodgar are both enduring, local technologies. They're both part of the landscape.'

Conclusions

Two shapes for the future of mobile telecoms are made present in this paper, in two different places: the line of Moore's Law close to London Heathrow, and the mutable Camerastone on

the islands of Orkney, Scotland. Yet, as Tim Ingold might say, those futures are woven into their landscapes, as the landscapes are woven into those futures.

The shape of Moore's Law is a fixed and unchanging future, an exponential line perhaps forty years old. It is a universal story that is understood to hold anywhere, anytime in the world; an immutable mobile, so to speak (Latour, 1987: 223-228). It is also a story intrinsic to a landscape where mobile telecoms networks are themselves experienced as pervasive and everywhere.

The shape of the Camerastone, by contrast, is a solid object, but one whose story shifts and mutates as it moves from person to person, from jeweller to tourist. It is locally specific, always changing as it moves. The Camerastone, it might be said, is a mutable mobile. This located future is intrinsic to a landscape where telecoms networks are experienced as patchy and localised.

Marianne de Laet and Annemarie Mol have developed a detailed case study of a mutable mobile (de Laet and Mol, 2000). In their closely argued study they note several characteristics of a mutable mobile technology: its boundaries are vague and moving; it is variable over time; and it endures through local adaptation (rather than universal stability). And in their particular case, it achieves much of this through its status as an open and public domain technology.

The Camerastone, as a possible future, fulfils all of these criteria. First, as an object it is inseparable from the social networks who are inspired by, and imagine its use, in everyday life. Its boundaries as an object do not simply end at the edge of the stone shape but must include those people who participate in creating it as a future. Sand14 do not provide both object and future, they seed the object, which then gathers futures; it is future-tropic. Secondly, the Camerastone is not a fixed future but a series of ongoing and changing futures, constantly re-told and re-made over time. It does not hold still but continually inspires new

futures. And finally, the future that is the Camerastone is part of the lives and landscapes in which it is imagined. It endures because it is able to alter and adapt to different business ideas, and different inspirations. This is why the Camerastone is so difficult to transport, since it is not a neat, well-bounded future, but is locally entangled, and constantly being re-invented. For these reasons I would argue that the Camerastone is what de Laet and Mol call a *fluid technology* – and it creates a fluid future in contrast with the fixed future of Moore’s Law.

The shape of the Camerastone and of Moore’s Law are the effect of two methods, which create two very different stories of future-making. These stories are not written to obfuscate the future: ‘telling a story... is not like unfurling a tapestry to cover up the world, it is rather a way of guiding the attention of listeners or readers into it’ (Ingold, 2000a: 190). These stories guide attention to the inseparability of landscapes and future-making more generally. They suggest that different places - their temporality, topography, sociality, and sensory experience – may lead to very different everyday practices, and therefore the creation of very different futures. Place interferes with how futures are imagined and made. Rather than global futures as universally the same, *situated futures* are located in landscapes and epistemologies around the globe, and are not everywhere the same, do not have to be fixed or linear, and they do not have to be predictable or boring.

Endnotes

1. The suggestion that a million workers left the industry was made by an industry journalist interviewed in 2004.
2. The paper refers to the *mobile telecoms industry* as a singular group. This colloquialism does not hold in practice, there are very diverse views held by network operators and manufacturers, by North American versus European companies, and so on. However, the stories of the future that circulate between all these have a coherence and stability, which is the basis for my use of the term.
3. This and following quotes are taken from ethnographic notes made during an industry association meeting in December 2003.
4. According to the UMTS Forum, an industry association representing the interests of 3G, there were only 50 million worldwide 3G subscribers in January 2006. Source: UMTS Forum press release 9th February 2006.
5. Ericsson predicted that, by early 2004, 100 million people will use 3G technology for voice and data. (Source: Wireless World Forum, Hall of Hype <http://www.w2forum.com/item2.php?id=14303>. Accessed 21/12/03). This is compared with a statement by Analysys Research, which reported only 600,000 3G users at the end of 2003. (Source: 3G.co.uk, 5 Million 3G European Users in 2004, 30th April 2004 <http://www.3g.co.uk/PR/April2004/7002.htm>. Accessed 23/05/06).
6. This and following quotes are taken from ethnographic notes made during an industry association meeting in June 2004.
7. High Speed Downlink Packet Access (HSDPA) networks, which are five times faster than 3G, have been widely discussed as the stepping-stone to 4th Generation, 4G.

8. This and following quotes are taken from ethnographic notes made at a mobile phone manufacturer internal workshop on future cameraphone concepts in May 2004.

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