

## Chapter Seven

# Conclusions: The Cartographic Imagination of Cyberspace

[T]he domains that explorers chart, and the maps they produce, open up territories to interests that view them differently ... be they gold deposits or stands of timber or dispensable human cultures. The maps serve as the groundplan, the blueprint, the graphic agenda for subsequent exploitation.

-- Stephen S. Hall, *Mapping the Next Millennium*, 1992.

How many maps, in the descriptive or geographical sense, might be needed to deal exhaustively with a given space, to code and decode all its meanings and content?

-- Henri Lefebvre, *The Production of Space*, 1991.

### 7.1 Introduction

In conclusion, I would argue that this thesis, along with the wider research into cybergeography I have undertaken, has made three contributions to understanding the evolving forms and functions of cartography in terms of: (1) showing how cyberspace cartographies are new, significant politically in the work they do, and as such are worthy of examination; (2) applying a semiotic reading of meanings and critical cartographic deconstruction of a range of novel empirical case studies; and (3) revealing valuable information about how cyberspace has developed and its varied spatial characteristics as seen through the cartographic imagination created to make it visible and tangible to different audiences.

#### 7.1.1 Why do cyberspace cartographies matter?

I have argued that cyberspace cartographies are important because they chart new virtual spaces of human interaction and economic transaction, and they are deployed in service to powerful interests that seek to shape what these spaces will be like in the future. They are active components in many wider-ranging cyberspace discourses, in large part because they create potent imaginable geographies for virtual media and hidden infrastructures that are otherwise

intangible and hard to comprehend. (The two major discourses analysed in chapter five and six were role of the Internet in development as represented in statistical maps and the commercial promotion of Internet infrastructure performed through marketing maps.) As explained in chapter four, the impact of spatial metaphors and geographic representations on the perception of what cyberspace looks like, how it works and what it can do, can be quite profound precisely because it is essentially an invisible infrastructure. Their production and consumption occurs in various settings, for example, many cyberspace cartographies are used operationally to document network structure, as inscriptions to virtually witness online experiments and measurement, or as means of the legitimising results of policy analysis. Many more maps of cyberspace are used strategically by business interests, as the ‘blueprints’ and ‘groundplan’ for commercial exploitation, to use Stephen Hall’s phraseology from the quote above. Most significantly, like all maps, cyberspace cartographies, regardless of their declared purpose, have an impact in shaping how people perceive cyberspace, and as such need to be subjected to academic analysis, considering both how they work semiotically and also what power they have in the wider world in terms of effecting change.

Furthermore, cyberspace cartographies are increasingly prevalent and should be seen as a distinctive aspect of contemporary mapping practice and part of wider visual cultures. Yet, it is also important to recognize that the maps of cyberspace have multiple and sometimes unstable meanings which makes academic interpretation and deconstruction challenging. In the main case study chapters, the analysis focused on the semiotic strategies adopted by the mapmakers in discourses of development and marketing, drawing a distinction between the denotative and connotative uses of cartographic symbolisation to effect particular kinds of meanings. Such an analytical route can be profitable, but as Vujakovic (1999a, 4, original emphasis) tellingly notes from his work how the news media exploits cartography: “[c]are has to be taken to not read too much, *or* too little, into cartographic images. Any apparent contradictions between a map and the discourse in which it is embedded may reflect the limitations of cartography as a representational medium, ..... rather than a hidden agenda or internal tensions within the discourse itself. We may, however, be equally tempted to treat the

medium as *too limited* (especially if restricting analysis to linguistic approaches) and ignore the (visual) subtleties of the form.”

Furthermore, another reason why cyberspace cartographies merit scrutiny by cartographic scholars is because, by and large, they are produced outside the mainstream map-making industry. In some senses, then, they are a challenge to established knowledge and practices but also, I would argue, an opportunity for cartographers to gain insights and novel ideas on map ontology and mapping epistemologies. As discussed in chapter three there are many new groups and individuals becoming active as map-makers to meet their needs to represent and understand cyberspace. (Although, the authorship of the most significant elements in the cartographic imaginary of the cyberspace originates from the United States predominantly.) Cyberspace cartographies, I feel, are a key part of a larger contemporary reinvigoration of creative mapping practices, as well as popularising new map uses. They also open up new scope for resistance to established representations of space as more people are empowered by fashioning their own maps rather than consuming predetermined cartographic products (cf. Sui 2008 for discussion of the implication of the new ‘wiki’ ethos of user-generated content to the GIS industry).

Whilst in some respects the shifting power of authorship is creative and empowering, there are also serious questions about the effectiveness of many of results in normative terms of design quality, intelligibility, accuracy and more general appreciate of aesthetics. Given the unstable meanings, it is also important to keep in mind when interrogating the maps that the mapmaker, or the mapping institution, themselves may well not be cognisant of the implications of particular design decisions made. In some cases denotative choice in design and symbology produce connotative meanings that are not at all what the mapmaker would have intended. This is evident in projection selection for many of the world maps used to display network infrastructure for marketing purposes that diminish the connotative sense of the corporations coverage of the globe (chapter six). Acknowledging such unconscious failings in mapmakers and their unintended impacts is not new of course (cf. Wright 1942), but poor projection selection persists even with people who, one might think, would know better, geographers

writing undergraduate textbooks (Vujakovic 2002b). So the mismatch between denotative intentions and connotative outcomes in cyberspace cartography should not be seen as necessarily implying a 'hidden agenda' to deceive, yet it can still have serious implications for how readers (mis)interpret the mapped world.

Besides questions of effectiveness and imperfect understanding of connotative meanings by authors, it should also be acknowledged that the drawing of maps of cyberspace - even empowering, counter-hegemonic ones - are also acts of boundary-making, which inevitably contribute to the commodification of virtual spaces in the service of some particular interest or set of interlocking interests. Once cyberspace is mapped, it is changed. The nature of space becomes known, exposed for others, made available as territory that can be exploited, often in ways not anticipated or welcomed by user communities. New forms of mapping can all too easily open up cyberspace to a new kind of surveillance, revealing interactions that were previously hidden in unused log files and databases. The act of mapping itself may constitute an invasion of privacy of individuals and impinge on community rights. If the appeal of some virtual spaces is their anonymity, then users may object to it being placed under wider scrutiny, even if individuals are unidentifiable. In some senses, these maps may work to shift the spaces they map from what their users consider semi-private spaces to public spaces, and thus the maps may actually change the nature of cyberspace itself. As Smith (1999, 211-212) points out, reflecting on his own research ethics in mapping online discussion space: "[t]he bright light of social science research can create an unpleasant glare for participants drawn to a dimly lit online space." Thus, it is important to consider the ways, and the extent to which, cyberspace cartographies are 'responsible artefacts', which do not destroy what they seek to represent or enhance.

A desire for totalising knowledge of a territory (real or virtual), with mapping as a logical, necessary process is long standing characteristic of capitalist political-economy, as Stephen Hall's quote at the beginning of the chapter nicely encapsulates. Many of the most effective examples of cyberspace cartographies can be critiqued for their active role in expansionist rhetoric and technological

hyperbole, a naïve faith in the inherent beneficial nature of economic growth and capital accumulation flowing from opening up online space. For example, driving an unsustainable building bubble in network infrastructure in the 1990s exploited maps to show where the investment was going, to make the construction programs tangible, to make the dreams of growing market share and future profits seem much more likely to come true. The infrastructure marketing maps in of that time were part of the proof that the Internet ‘doubling every 100 days’, yet such exponential network traffic growth turned out to be a myth and the predicted fortunes from selling bandwidth were millennial hubris (see chapter six for further discussion).

While visions that represent an alternative to the development of the ‘virtual frontier’, based on communitarian values rather than capitalist imperatives, are manifest in some cyberspace cartographies, these have a much lower profile. Moreover, these tend towards the utopian, being underwritten by ‘one network - one world’ idealism that all too often naively denies the importance of place relations. The reality is much more contested and contestable, with evidence strongly indicating that cyberspace is yet another technological layer which replicates and reinforces existing inequalities and power structures within societies and between different regions and nations. The crucial issue to bear in mind here, is that the maps do not just represent capital accumulation or social difference, but are active in their ongoing reproduction, including in cyberspace. This is one of the core themes that have resonated throughout the discussion in the case studies, in the analysis of marketing maps of commercial networks (chapter six) and the statistical mapping of Internet globalisation (chapter five).

### *7.1.2 Critical theorisation of cyberspace cartographies*

I have defined cyberspace cartographies in three distinct modes, following Edney’s (1993) non-progressive theorisation of map history. The modes are: maps of cyberspace, which are maps that describe cyberspace as a phenomenon from an external perspective, maps for cyberspace, which are interactive maps and spatialization for navigation within virtual spaces, and lastly maps in cyberspace, which are conventional (terrestrial) cartographic representations that

have been transmuted through online presentation. The focus of the thesis was primarily on the first mode, particularly in the case study chapters.

The analysis of maps of cyberspace concentrated on in-depth case studies of Internet infrastructure mapping. This was situated conceptually within contemporary cultural analyses of representational practices, employing a hermeneutic epistemology that sought, both, to understand the semiological nature of the map designs, and also expose the power of the maps as texts. As discussed in chapter two, I interpreted these maps of Internet infrastructure as sets of signs with complex denotative and connotative meanings and as expressions of power/knowledge of new infrastructure spaces. As such the act of envisioning Internet infrastructure can never be unbiased and objective, it is always a social construction that connotes multiple meanings and that serves the interests of some groups. Maps are thus the products of privileged and formalised knowledge and they also produce knowledge about the world. Map construction, dissemination and use, therefore, must also be read within political-economic milieu. As Harpold (1999, 5, original emphasis) argues: “[t]he lines of force defining information flow in the networked and unnetworked spheres are not merely geographical or technological; they are also – irreducibly – *political*”.

As discussed in chapter two, such critical theoretical approaches to cartographic texts as expression of power have been well developed over the last ten to fifteen years, but have most often been applied in historical contexts to untangle the power that infuses old maps. Virtually all empirical work by Edney, Pickles, Crampton, Harley, et al. deconstructs by looking backwards, which in some senses presents easier targets and with less at stake in relation to contemporary political relationships. The present thesis is innovative in the application of the theories in a forward looking way, a productive act of map deconstruction to reveal the ‘power’ of cyberspace mapping, unveiling its purposes, the interests served and social implications of this new mode of mapping.

Yet, there has been very little socially-informed analysis of cyberspace cartographies. And as was noted in chapter three, most analysis focuses on technical aspects and design performance rather than interpreting semiotic

meanings and political ideologies. This thesis, along with my other publications on cyberspace cartographies (see appendix one), has played a role in building understanding of the social effects of these new maps and spatializations. At another level, this thesis has sought to move beyond thinking epistemologically (the techniques for mapping the Internet), to focus ontologically on what aspects of the Internet infrastructure are chosen to be mapped, which are ignored and which are deemed un-mappable. As the Lefebvre (1991) quote above suggests, an almost infinite number of possible maps would be needed to fully encode and decode meanings of a given space, yet only a small percentage of possible maps are every actualised and an even smaller number enjoy wide circulation and have the power to effect change in the world. It is important to realise that much else is unmapped and that this has political implications, not just pragmatic limitations. The discussion in chapter five on how people have tried to measure and map Internet globalisation highlighted this. The choice of what to map can reveal as much about the cartographer as how they actually seek to represent it (allowing for the instability of connotative meanings and the uncertainty of the intentions lying behind design decisions discussed above).

### *7.1.3 What is revealed about cyberspace?*

Through critical interpretation, focused on connotative meanings and social power, I revealed new details on the nature of Internet infrastructure and the spatial nature of cyberspace more generally. At the same time, the analysis provided insights into the worldviews and agendas of the map-makers themselves and the institutions they work for. As chapter four discussed, maps of infrastructures shape perceptions of the reality of the Internet by making its invisible routes and flows visible and aiding the analysis of its uneven geographic structures across different scales and seeing the spatial effects on interaction and mobilities.

Internet infrastructure maps do important, and sometimes counter-intuitive, work puncturing the spaceless rhetoric of cyberspace. In their denotative representation of 'what is where', they connotatively counteract the deterministic 'death of distance' notions by demonstrating that place matters in the so-called Network Society (Castells 1996). Despite the virtualised rhetoric, the socio-technical

assemblage of the Internet remains embedded in real places and maps are effective at denoting the intersections between cyberspace and geographic space. Even maps in the services of Internet promotion, show the discontinuity in infrastructure provision as much as the coverage, particularly in the ongoing inequalities between core and periphery at the global scale (chapter six). Location remains crucial in terms of political and cultural contexts – for example territorially defined freedom of expression and privacy rights - and the geopolitical power of the nation-state still holds sway in much cyberspatial interaction. This is very evident in the ways institutions and individuals have mapped statistics on the worldwide growth and diffusion of the Internet into a framework of countries rather than flows of traffic between places and through borders. Although this is not unusual, because Vujakovic (1999a, 4) notes, “[c]artography is an excellent medium through which to represent spatially distinct areas (legally defined territories), and lines (national borders), but less good when it comes to ‘fuzzy’ boundaries (culture regions), or intersecting and overlapping ‘classes’ of information (dialect groups, religious affiliations, etc.)” It is also apparent that the intersections and overlaps of aspects of cyberspace make it hard to represent cartographically.

## **7.2 Infrastructure mapping and the importance of the technical**

This thesis has taken the object of the infrastructure map as the prime vehicle for the wider political interpretation of the Internet and, simultaneously, as a notable signifier of the new era of the Network Society (Castells 1996). Seeing the possibilities and the partialities of map representations of infrastructures of the Internet can assist people, I think, in the realisation that the technical is not natural or pre-given. Breaking through the cultural naturalisation of everyday technologies to see that the technical is a political project is vital for a more nuanced understanding of the socio-spatial effects of the Internet. This kind of approach can be categorised as materialist media studies, which, Thacker (2004, xii) argues: “shows how the question ‘how does it work?’ is also the question ‘whom does it work for?’. In short, the technical specifications matter, ontologically and politically.” Within this notion of ‘technical specifications’ one should include all manner of infrastructure maps. Interrogating the connotative

meanings created by maps of infrastructure, therefore, does not merely show ‘how the Internet works’ but begins to disclose ‘whom does the Internet work for’. This is an important and worthwhile project, given the degree to which the Internet is fast seeping into everyday life and is already slipping into the cultural background in developed countries.

In addition, while the topic of Internet infrastructure might seem narrowly drawn, it actually raises many substantive questions in the creation of effective and legible cartography. Understanding infrastructure is a conceptual and representational challenge, in large part because of its invisibility and lack of definite metaphors. I described several dimension to this in chapter four - materially hidden and unseen activities, taken-for-granted background services and institutional obscurity. Infrastructure is something you notice more by its absence than its presence, it is a kind of ‘second nature’ according to Thrift (2004, 584), “the surface on which life floats.”

The potency of cartographic imagination was examined in terms of how it works to make the invisible Internet infrastructures visible, but in certain ways, with certain kinds of connotative meaning. Firstly, for general audiences, the power of verbal and visual geographic metaphors was considered. Part of the capacity to influence enjoyed by some of these metaphors (for example, organic form of abstract network graphs; Figure 4.10) comes from the way they conform to what people *expect* the Internet to look like. Visual metaphors are typically chosen deliberately to reinforce existing preconceptions, thus it is easy to understand how people willingly accept certain kinds of maps and diagrams as ‘natural’ pictures of the actual Internet, rather than entirely contrived images.

Secondly, for the research-engineering audiences, the significant role of scientific inscriptions in constructing ‘matters of fact’ about the Internet’s structure and operations was demonstrated. The theory of virtual witnessing was used here to understand the mechanism for creating credible connotations using particular kinds of denotative strategies. Many Internet infrastructure maps are part of the lineage of ‘scientific illustrations’, which includes architectural plans, engineering blueprints, anatomical drawings and statistical graphics. The value

of infrastructure maps produced by scientists is not in what they show, so much as in how they show it, to make the Internet a plausible, a known, a measured artefact. They are able to convince others ‘at a distance’ of the matter of the factual reality of the infrastructure.

As Latour and Woolgar (1979, 243, original emphasis) note from their laboratory ethnography: “Scientific activity is not ‘about nature’, it is a fierce fight to *construct* reality.” The infrastructure maps construct the Internet scientifically, they construct it literally as a visible reality. (This also applies to the cases of worldwide Internet globalisation and network marketing which are made real through the representational acts.) Yet these messy (social) processes of construction should themselves be invisible to maintain the impression of scientific objectivity. The result is an authoritative illusion that the Internet is a natural phenomenon from which scientifically measurable objects are simply ‘discovered’, rather than manufactured: what the science and technology studies literature calls the ‘ship in the bottle’ conceit, which then presents complete Internet ‘facts’ as if found fully formed.

### **7.3 Case studies in infrastructure mapping**

The empirical core of this thesis has comprised two case studies in cartographic imagination of Internet infrastructure. These unpacked distinctive visions of what the Internet looks like and what various interests want it to become. The case studies were not designed to give synoptic coverage of cyberspace cartographies<sup>1</sup>, but sought to provide in-depth portraits, highlighting the connotative meanings and the power of maps for imagining particular aspects of Internet infrastructures.

The case studies analysed maps that purposely work as ‘representations of spaces’ (Lefebvre 1991, 233). They are formalised works of planners, statisticians, engineers/technocrats and marketers that attempt to structure everyday social life through rationalised, organised, and commodified

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<sup>1</sup> The range of my publications, as part of the larger cybergeography project, does provides comprehensive coverage; discussed in appendix one.

(re)productions of spaces. In terms of visual form they were recognisably cartographic - they were static, planar maps based on a geographic framework generally using established design conventions.

A key part of a hermeneutic approach to cartographic analysis is to break down the superficial anonymity of viewing map artefacts as a distanced audience, and to begin to understand the context and power relations involved in their authorship. In terms of authorship, the cartographic imaginary of Internet infrastructure examined in the case studies arose from a distinctive set of institutional contexts. Significantly, none were produced by trained cartographers working within recognised cartographic institutions, such as a national mapping agency or a commercial mapping company - reflecting that much of the authorship of maps of cyberspace is happening in new contexts. Chapter five's statistical maps were produced by academics, artists, activists, and also technocrats working for international agencies and designers employed by U.S. magazines. Chapter six's promotional maps were produced in the marketing departments of major Internet infrastructure corporations, typically by unnamed graphic designers and illustrators. It is apparent that the cultural-linguistic setting of these cartographic visions of the Internet is Euro-American because of the domination by these institutional contexts (academic, corporate and governmental).

All the maps examined in case studies were disseminated free of charge and were publicly available. In terms of the mechanism of publication as graphic artefacts, some of the statistical maps in chapter five were published conventionally in print (magazines, official reports and academic articles) and others were designed to be solely delivered online. The marketing maps analysed in chapter six were all published wholly through the web (although some have no doubt also been physically printed in various outlets to meet particular needs, e.g., promotional brochures). The media of presentation for the statistical maps were digital files (colour raster graphics and postscript), the marketing maps were all digital files primarily in PDF format and also Flash animation.

### *7.3.1 The statistical cartographic imaginary*

The first case study explored how statistical maps of Internet work semiotically and politically to produce a particularly kinds of imaginary of the worldwide Internet globalisation. The analysis examined eight different maps in detail. While they all premised upon the dominant geopolitical framework of nation-state as their units of measurement and representation, they produced a range of viewpoints onto the world. In many respects their reliance on this nation-state metageography is both a conceptual and design shortcoming, however, in other respects these maps are successful in creating a compelling cartographic imaginary of the worldwide status of the Internet because they play to these established conventions. In addition there are still relatively few other kinds of maps produced which offer a competing synoptic - and one might say seductively simple – a view of the Internet on a single page. Most other maps and visualisation tended to be more technical in nature, showing specific company's infrastructures denoted as link-node graphs (as in chapter five).

There are few statistical maps of the 'whole' Internet, so the ones that exist are powerful. The empirical examples included maps, such the 'International Connectivity' and DOI maps, which are some of the most widely seen geographic maps of Internet infrastructure and enjoy an influential position as 'immutable mobiles' (Latour 1987), securing a particular imaginative geography of Internet globalisation through their denotatively conventional and clear visual narrative design. They employed a range of different area-based thematic map designs, but they nearly all exuded a recognisable techno-scientific aesthetic, as they sought objective authority through an unadorned, sparse and perfunctory style of representation. (Scarponi's flag-based cartogram was the one noticeably different case.) The maps are typically presented intertextually as a 'matter of fact' envisioning the Internet using semiotic strategies of scientific inscription. Of course, this denotative 'simplicity' in their design was in part due to expediency in production but it had political consequences in how people perceive Internet globalisation.

To make sense of the sample statistical maps of Internet globalisation, in semiotic terms, a simple fourfold classificatory model was used to characterise them according to their overall connotative meaning. The classification was formed by two dimensions of meaning, ‘difference’ between nations (evident in denotative signs) and the ‘complexity’ of the patterns (denoted at scales from local to global). In diagrammatic form these two dimensions were drawn as axis running from low-to-high, forming a grid of four quadrants. These quadrants are connotative meanings for four separate classes of map: orderly representations (lower ‘complexity’ with higher ‘difference’), divergent representations (higher ‘complexity’ and higher ‘difference’), disorderly representations (higher ‘complexity’ with lower ‘difference’) and, lastly, convergent representation (lower ‘complexity’ and lower ‘difference’).

The case was also made in chapter five that there are two broad, and competing, discourses that seek to ‘explain’ the relation between the Internet and ICTs and the prospects for fostering economic and social development across the world. These were termed ‘diffusionists’ for organisations and individuals who see basically positive relations, with the Internet being empowering and able to foster progressive development, and the ‘divisionist’ institutions and activists who are sceptical and highlight the negative consequences flowing from a developmental model premised on the Internet and ICTs. In terms of the fourfold model, the maps classified, according to their overall connotations, as orderly or convergent are arguably likely to envision the world statistically in ways that are supportive of the ‘diffusionist’ agenda. In opposition, the divergent and disorderly map categorises are more likely to have connotations that would be advantageous to the ‘divisionist’ perspective on Internet globalisation. From the eight maps analysed connotatively, three were assigned to classes supportive of the ‘diffusionists’ and four were categorised as ‘divisionist’ representations of the world. One map, Scarponi’s flags cartogram, could not be assigned neatly into one or other camp because it displays ambivalent connotations that are both divergent and convergent.

The three ‘diffusionist’ categorised maps were created primarily for the cause of securing wider network connectivity in poorer parts of the world. They are

working tools of techno-missionary efforts to connect up the ‘unwired’ nations by Internet pioneers and development bureaucrats. Enhanced Internet capacity will also be beneficial for capital in securing access to new markets and emerging economies.

The final ‘International Connectivity’ map created by Landweber in 1997 and ITU’s DOI map were both classified as strongly convergent, connoting gradual and limited degrees of inequality between countries (low on difference dimension) and overall consistent pattern across the world (low on the complexity dimension). It was also demonstrated how they are a problematic representation of Internet globalisation, demonstrating many common problems with choropleth maps, in terms of zone selection, the occlusion of geographically small areas, ecological fallacy and grouping bias. The connotative effect is the production of authoritative looking images, ones that epitomises the imposition of the normalising ‘statistical’ vision onto the world, ordering rhizomatic processes of Internet globalisation into country-based units and a rigid hierarchy of classes. The outcome, I would argue, is that these convergent statistical mapping of Internet infrastructure work to ‘lockdown’ the complex, multi-vocal processes of diffusion into a systematic cartographic form favouring hegemonic narratives about the ‘naturalness’ of technological expansion. They connotatively reduce the perception of difference in the world and advance the case that ICTs and the Internet are a beneficent driver of economic development and social integration. As such they could be seen to be replicating colonial representation of old, a kind of neo-colonial cartography for the so-called information society, providing an authoritative view from centre and conscripting the rest of the world into economically productive digital relations.

Several of the maps analysed presented a different imaginative geography of Internet globalisation with more confused and complex narratives, in semiotic terms, about the state of the world. These maps were seen to be likely to work in favour of the ‘divisionist’ line of argument that sees a generally negative relationship between the Internet and the prospects of inclusive and progressive development. Three maps had overall connotative meanings of a divergent world that emphasises the large inequalities between countries at a local scale and also

wide differences between regions of the world. The statistical patterns were also read as disharmonious which suggested undue complexity and the lack of systematic development process at work. The first ‘International Connectivity’ map from 1991 was classified as divergent in meaning between of the high degree of difference starkly evident between nations. The other two divergent maps were the three-dimensional stepped surface ‘Bit Map’ with its cliff-like digital divides between regions and the ‘Network Society Map’ that selectively targeted only nations that matter while excluding large parts of the rest of the world. The other ‘divisionist’ map was the dasymetric reconfiguration of the ‘International Connectivity’ data, produced by activist Mike Holderness, that connotatively emphasises a much complex and fragmented vision of Internet globalisation so was classified as an essentially disorderly representation.

I concluded the chapter by looking beyond the critique of cartographic imagination of Internet globalisation, considering other kinds of statistical vision that are not based on infrastructure capacity but its capacity to effect social change. This was about assessing the value of Internet infrastructure and I discussed work trying to get at a more subtle analysis of the digital divides and infrastructure diffusion, using local ethnographic studies of individual and communal use of network technologies to achieve everyday tasks and also advancing a rights based agenda. Such a ‘view from the ground’, so to speak, contrasts starkly with the synoptic vision offered by ‘God’s-eye’ global statistical maps that actually hide much more than they reveal about the real state of the Internet infrastructure across the world.

### *7.3.2 The promotional cartographic imaginary*

The second case study interrogated marketing maps produced to promote the networks of the Internet and the work they do in selling a positive geographical imagination of Internet infrastructure as reliable and trusted to potential customers and investors.

To begin it was shown how Internet network marketing maps could be situated within an established lineage of cartography used to promote commercial networks for transportation and communication. This genre of mapping practice

is also interesting theoretically because the facade of ‘objectivity’ is negated by its serving an overt, singular commercial purpose: namely to attract prospective customers and investors from competing firms and maximise profits. Yet, for this commercially-biased mapping to work well it still seeks the cloak of objective cartographic authority in its presentation of deceptively selective data. However, the maps also silence competitors by not admitting the existence of alternative routes owned by others. This is a key differentiator of promotional cartography, that serves solely the interests of one company, from informational cartography, which serves the broader interests of consumers by mapping all available network routes.

To understand the prevalence of network maps in the marketing narratives of Internet infrastructure, a survey of the top fifty networking companies was undertaken. It revealed that over two-thirds of their corporate websites deployed network marketing maps and of these nearly thirty percent featured them prominently on the home page. Nearly all the maps denoted infrastructure using arc-node symbology on a geographic base map. Such arc-node representations are the conventional and culturally ‘obvious’ format for representing physical transportation infrastructures and this clearly translates meaningfully for virtual networks.

Network marketing maps work as a tangible form of proof of, firstly, the material existence of a large scale network that is beyond the limits of human vision and, secondly, the superiority of its design and engineering by showing a network that is dominant in size and fully able to span the globe. Yet, further interpretation of many of the maps showed that the network infrastructure was not world-wide at all, connecting only a small number of cities.

To consider in more depth how network marketing maps work semiotically their denotative designs were interrogated using an eight point framework of ideal connotative meanings that effective promotional cartography should produce. The framework was applied to a sample of maps from five global telecommunications corporations. Their world scale maps of their infrastructure were examined in terms of how well they were able to connote positive

impressions on the range of the network links across the whole globe, the ability of the network to reach key cities, to provide direct connections to these cities, and to signal abundance coverage of continents, the network should also ideally appear to be centrally positioned to serve key markets, to offer ample capacity to meet customer demands, display their network exclusively and, lastly, to silence competitors. The analysis showed a mixed performance overall, with none of the five maps interrogated achieving all eight connotations, of an ideal network, consistently and strongly. Out of the sample, the maps of two corporations, AT&T and Verizon, performed markedly above the others. This was due partly to their simpler design and more abstract symbology that gave superior impressions of range of the network, direct connections and exclusivity. The France Telecom marketing map suffered significantly weaker connotations than its competitors, which was, in part, because it denoted the company's infrastructure too realistically and honestly. The result, in connotative terms, made the network appear to have quite limited geographic coverage of the world, unable to reach many of the important cities or to offer directness of routes necessary for rapid flows of data.

The second part of the chapter six analysed the evolving marketing of network infrastructure of one company, Worldcom through a series of maps produced over an eight year period from 1997. Again, it is evident that the maps sought to communicate persuasively and with authority, to potential customers and investors, the benefits of using Worldcom's services above those of another company by highlighting several key aspects of their infrastructure. Analysis showed the most important of these were: visually demonstrating its geographic range, the routes to reach important places and its capacity to meet customer demands. In serving these promotional goals, the semiotic analysis showed, however, Worldcom's marketing maps were only partially successful. The most significant failing in the maps was the all too obvious mismatch between the bold claims of WorldCom to offer a global network service and the mapped reality of its infrastructure that barely connected a third of countries in the world. The analysis demonstrated the real difficulties in effectively mapping Internet infrastructure of a single organisation, even for commercial persuasion.

Despite these semiotic failings, current marketing maps are enrolled in the discourses sustaining demand for new network infrastructure construction. They do critical work proving cartographically where the investors' money is going. They do this by conjuring up a sense of tangibility, a kind of second-hand experience of the network to compensate for the lack of visibility in the environment or physicality of experience. People tend to believe what they see on the map as real, particularly when it is shown using the familiar metaphors of geographic world maps.

#### **7.4 The true vision of Internet infrastructure**

A critical interpretative approach was applied to understand the ways that the Internet as a material infrastructure has been cartographically portrayed and proselytised by different interests over the last decade. As the analysis highlights, it is impossible to imagine a single 'true', objective map of the Internet. As such, there will always be a range of maps produced, for a range of purposes. I have shown how reading beyond the surface messages as intended, to interrogate the 'second text' of infrastructure can be productive for understanding the new modes of mapping that are coming into existence to chart cyberspace.