Chapter 1 - Introducing Landvaluescape

1.1. From ‘land’ to ‘landvaluescape’

Definitions of land

The subject of this research is the activity of visualising the value of land of a particular country. This chapter introduces the concept of “Landvaluescape” – a word invented to describe the economic reality of “the dynamics of land values” (Howes, 1980) – and sets the research in its British context.

“Visualisation” has been defined (Dorling, 1992) as “making visible what was obscure” or “turning information into understanding”. What is “obscure” and to be understood here is the nature of variations in the value of land over space and time, in the United Kingdom (UK) – or, more specifically, Britain.

“Land”, even as a noun, has many meanings. Chambers (2003:833) gives eight dictionary definitions, none of which is quite adequate for the purpose here:

> the solid portion of the surface of the earth; a country; a district; a nation or people; a constituent part of an empire or federation; ground; a piece of ground owned, real estate; soil.

These definitions vary from the mundane (soil) to the intangible (nation). Taken together, they illustrate how fundamental to human existence and society land is.

The definition missing from this modern dictionary is the classical economic one: “the original and inexhaustible gift of nature” (Turner, 1977: 2) or “that element of productive power derived from nature and not at all from labor” (George, 1898: 222), shortened by Andelson (2000:xx) to “a synonym for Nature”. This last, economic sense links to the modern legal definition, hinted at in the earlier penultimate dictionary definition that refers to ownership or “real estate”. “Landed property”, often shortened to “land”, in the legal sense combines that which is “Nature” in classical economics with that which is man-made capital, built on, under or even above ground as *terra firma*. Property rights in land extend from “centre of the earth to sky above” (Turner, 1977:7).

For the purpose of this research therefore, ‘land’ is defined as ‘location on the earth’s surface’. Location matters in the siting of almost any human activity. Competition for land sites arises when there are conflicting uses for them, or competing users for the same use and insufficient time slots to allow suitable sites to accommodate many or various occupants without conflict. This creates a potential market in land rights, which gives rise to the need for mediation and to the concept of ‘land value’. One of the earliest and most important functions of governments in all societies is to mediate between those claiming right of land use, leading to codes of land rights and eventually land and property laws and markets (Powelson, 1988). Because access to land and its natural abundance is essential for human survival, in every society before long “dominion over land was the basis for power over the lives of people” (Powelson, 1988:26) and out of such power arose many – if not all - forms of government, nationhood and statehood.

Origins of ‘value’

In economic theory, for something to have value it must possess utility, be capable of being the subject of ownership and be in scarce supply (Turner, 1977:1). Land is vital for life; societies confer various types of ownership rights (Powelson, 1988); and there only needs to be localized scarcity, where “any single piece is wanted by more than one party…even if remaining land is free” (Powelson, 1988:33), for land value and a land market – or conflict - to arise.

The activities of society, as well as the gifts of nature, affect the value of land sites. Whilst being “inexhaustible” (Turner, 1977), land is not immutable: its value can be enhanced by ‘improvement'. It is also a finite resource (Dale *et al*, 2002:6), both in absolute terms and in respect of particular sites: no two locations are absolutely identical, especially in relation to other sites. Spatially, every location is fixed and immovable; hence it can be identified over time on a map with a suitable spatial referencing system such as the UK National Grid.

Not only do various parties compete for rights in particular land sites; sites (or rather their owners) compete among themselves to attract productive uses. Competition between uses may be regulated by planning law and influenced by tax

and other incentives; but there is normally a presumption that with the right to use land comes a right to transfer use to another person – and also a right to withhold the site from use.

Land values vary with time. When a local economy is booming, there are usually more potential users than there are sites available, hence prices rise. Land owners may choose to withhold available sites from the market, in expectation of a more favourable price if they wait. This further diminishes supply, hence fuels price rises. When the economy falters, there may be an over-supply of sites, so prices fall. Buyers may hold back in the expectation that prices fall further. Lack of buyers, combined with owners needing to re-capitalise, causes further falls. The land market is therefore notoriously cyclical and its cycles mirror those of the classic "boom, bust" cycles of the wider economy (Ball *et al*, 1998), indeed Harrison (2005 and 2006) and others would claim they trigger and exaggerate these cycles. As Spence (1801) and Churchill (1909) remarked, it also naturally tends towards a suppliers' monopoly: "the mother of all monopolies".

Eating, sleeping, thinking, sending emails – all require somewhere, a location. To exclude people from land is to deny them life and livelihood. While human populations and their economic activity expand, effective demand for all natural commodities in a finite world - and hence land values - are bound to rise, relative to the values of 'active' economic factors: capital and labour. Hence the importance of understanding land value everywhere increases over time, particularly in a globalised economic system.

As Ricardo (1817) wrote in the early stages of the industrial age, all production involves the combination of "active economic factors" – labour and capital – applied to the passive factor of land (Gaffney, 1994:39-42). In a modern economy, few sites feature in the land market that have not been to some degree "improved" (i.e. altered by human activity), such that market transactions are effectively transfers of rights in some combination of "natural" land and capital (buildings, etc). Not all uses of land enhance the value of sites: for example, past industrial uses of land can contaminate sites nearby or downstream for long periods into the future

(English Partnerships, 2006). Hence the need to monitor land use as well as land values over time, in order better to inform market players.

“The market determines the economic value of land” (Dale *et al*, 2002:9). For the market to operate fairly and efficiently, land administration systems need to be developed, improved and maintained. Good land management needs well informed managers, hence the increasing application of modern technology to land information systems. In their 2002 and 2006 RICS papers on land markets and the modern economy, Dale *et al* illustrate this figuratively (see Figure 1/1) and assert “good quality land information is essential to support good land information practices” and that this will be driven through “pressure to improve the land market”. For any market to function properly, information about the commodity being traded must be up-to-date, verifiable, complete and consistent. Hence the way that land information is produced and made available to market players is crucial to the workings of that market.

There are many definitions of “value”, even in the context of land. These are discussed in the next chapter. Any site can have more than one value at a time, depending on the context in which the word “value” is being used. Examples are “hope value”, “taxable value”, “value in use”, “capital value”, “rental value”, “fair value”. Before using a particular figure for value, its context and derivation need to be defined. However all kinds of value should relate in some way to the property market: any “value” that does not must itself be of questionable value, particularly in any aggregation of such values assembled for comparative analysis in a normative manner.

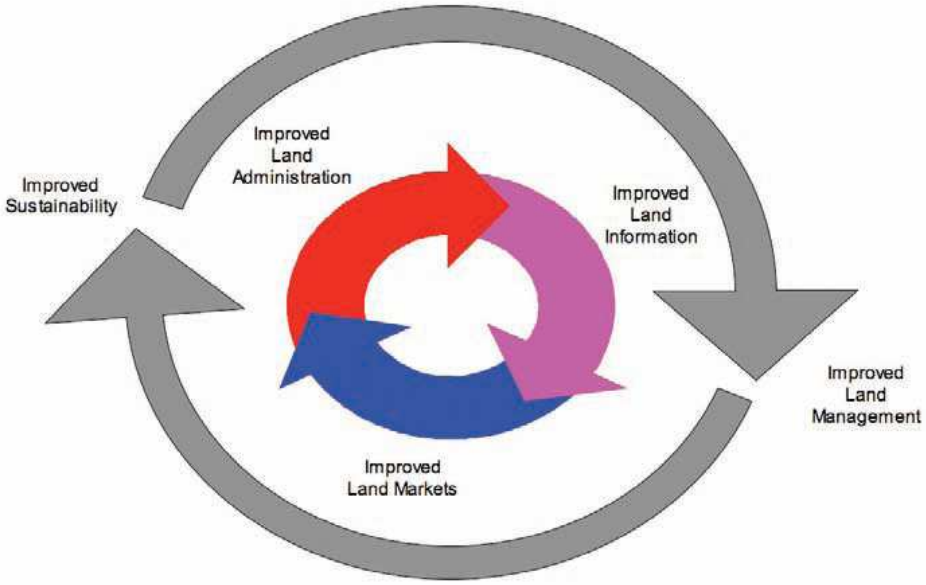

Figure 1/1: The impact of good quality land information
Source: Dale *et al* (2006:13)

In the case of a spatially variable commodity such as land, it is desirable that values be capable of being mapped, to enable their visualization and better understanding. Howes (1980), in an earlier academic study of Value Mapping from a British perspective, found that of the "many countries [that] have sought to demonstrate land and property values in map form…the primary purpose for the production of most of these maps was for reference to values so as to ensure equitable tax assessments" (Howes, 1980:77). Howes found, among the 14 examples illustrated (resulting from enquiries to over 400 institutions and individuals in 37 countries 30 years ago) no examples of comprehensive city-wide - let alone nation-wide - value maps that were not related to either market or assessed (i.e. tax) values.

Land transactions generally take place on any piece of land only infrequently. On the other hand, property taxes operate in a continuum, as what is known as *ad valorem* or "based on value" taxes: the "value" being either annual rental value or capital (sale) value. Values are assessed on the basis of the professional judgment of qualified valuers, usually specialists in valuations for property tax purposes and working to a statutory formula. As Turner (1977:6) states: "statutes may create

concepts of value which did not previously exist". As with valuations for market transactions however, statutory valuations almost always have to take account of evidence of actual prices paid, corrected for time to some "antecedent" date upon which all assessed values are based, with a view to achieve equity as between taxpayers.

Landscape and landvaluescape

"Landscape" is physical reality: the shape of the surface of the Earth, as seen and depicted by humans in their paintings and photographs - and more recently in images generated by computer modelling from spatial data gathered by a variety of means and stored in information systems. Similarly "Landvaluescape" is taken to be economic reality: the shape of the surface formed in computers by spatial data featuring land site valuations or other expressions of value per unit of area.

Unlike Landscape, Landvaluescape cannot be seen directly by the human eye. In order to visualise Landvaluescape, spatially referenced property market and other data must be collected and manipulated, in combination with data for the physical and administrative 'backdrop' without which human interpretation is difficult. It is from these datasets that Value Maps and other graphics are made, as Howes (1980) described.

Also unlike Landscape, Landvaluescape can also change dramatically, at local, national or global level, in response to decisions or events as varied as closure of a railway station, a tsunami strike or outbreak of war. The main, if not only, sensor for such changes, is the property market.

Howes (1980:135) acknowledged that "increasing use of computer-based techniques and the geo-coding of land and property data" would make production of value maps quicker and easier. Lack or expense of such techniques inhibited widespread use of value maps until late in the twentieth century. Many of the examples studied by Howes were created using labour-intensive analogue methods: they were single views of the data that could not be manipulated for viewing in a variety of ways, as is possible with modern technology. Few countries could afford to use computers then, even for property tax purposes. Those that did

only reassessed taxable values and created the datasets from which value maps could be generated at infrequent intervals. The Landvaluescape could not be monitored often enough to serve any purposes for which visualization, using value maps, might have been theoretically possible.

However the common jargon used by those with even a slight interest in property shows that a similar understanding exists of the economic variation in land (market) value as exists of the physical height variation seen by human eyes. An expert can form a mental picture of the shapes and ‘features’ in Landvaluescape without resort to computer models of valuation data. Indeed there is a relationship between many physical mapped features and the shapes or “signatures” that form in Landvaluescape: steep ‘peaks’ approaching city centres through run-down ‘depressed’ inner-city housing and industrial areas; high value corridors or ‘ridges’ along roads with vehicle access; low value corridors or ‘troughs’ along motorways and railways away from junctions and stations respectively, because of airborne pollution; “scarp” ridges adjacent to water features, because humans feel better when close to their cooling effect (Landsford and Jones, 1995; Willis and Garrod, 1993).

Hence landvaluescape is to political economy what landscape is to physical science and the arts: a mental picture of reality, to be discussed and analysed for the advancement of human understanding. Like landscape, Landvaluescape is only a model of the surface. Just as the landscape is only the surface of the physical geoid, so Landvaluescape reflects the fact that all land rights above and below the planet’s surface have hitherto been referenced to that surface even though economic activity occurs in three dimensions (e.g. aircraft landing rights; mineral extraction). Until and unless there is a multi-dimensional model for valuing this super- and sub-surface economic potential, ‘land value’ expresses all such value at the surface, aggregating bundles of property rights and obligations into a normalized form.

Howes surmised at the start of his investigation into value maps (Howes, 1980:3) that “an increase in the amount of published work concerning land and property values” would continue, probably “as a result of an increased public awareness of

the effects of changes in property values on our environment". He went on to state: "undeniably, plans influence values and existing or perceived values influence plan implementation".

In his conclusion, he asserted (Howes, 1980:134) that "a value map ….enables the planner, at an early stage, to make relative comparisons"; and that, drawing on his own maps of Norwich, such maps "may assist in analyzing the reasons for spatial shifts in values [and]...locate those areas where values are rising faster or slower than the average" and "be of particular importance in local plans and Area Action Proposals". However he did not theorise as to the existence of a Landvaluescape and only referred to the various graphical forms in which "the dynamic of property values" could be depicted. He gave no name to the phenomenon that was being depicted.

Following its first use by Vickers (2000a), the word "Landvaluescape" has since been used by the European Commission (Eurosion, 2004:47) in the sense intended. In the context of a review of those datasets that "will contribute to answer [*sic*] critical questions for coastline management", a section in this document on Economic Assets describes landvaluescape as "a key input for a number of analyses, namely assessment of economic capital at risk, and cost-benefits analysis". It was "recommended to extend the spatial coverage of land value up to the contour line corresponding to an elevation of 2 meters" and for up to 10 km inland. No other uses of the word have been found.

Just as 'landscape' is the reality of physical landform and not the portrayal of reality (topographic maps, cartography, geodesy, geomorphology, etc.), so 'landvaluescape' is economic reality. It is not the form by which it is described, such as Value Maps or other graphics that facilitate human understanding of the dynamics of land values.

1.2. The importance of this research

There are three reasons why the subject of this research is considered important, which emerged through the process of this research: climate change and sustainable development demanding better evidence to inform decisions about land use; improved and/or reformed property tax administration; and a globalising, sophisticated modern land market needing to apply technology to improve its efficiency. However the initial reason for this study was simply that Landvaluescape was a reality, yet thirty years after Howes' book, there appeared to be very little British interest in mapping it, despite known advances in geospatial technology, growth in geospatial data collections, and a lively public debate about spatial planning and the workings of the property market.

Climate change and land use decisions

The Eurosion (2004) report and later Intergovernmental Panel on Climate Change (IPCC) publications (especially Nicholls *et al*, 2007) are indications of why the monitoring of land values can be important for public policy decision making. Strenuous efforts are being made to monitor every aspect of global physical science, as climate and weather patterns change. Sophisticated spatial modelling algorithms are deployed, involving measurements and analyses of data over a huge range of subjects. The natural systems alone are exceedingly complex (UNFCCC, 2003) and they interact with human economies in numerous ways. Whether or not climate change is largely human induced or not, it is undoubtedly already having significant impacts on human societies and is likely to have even greater impacts over future decades (Fisher *et al*, 2007; Cline, 2007)). Rising sea levels caused by melting icecaps could displace a large proportion of humanity from some of the most economically productive land on the planet. According to Lawrence (2008), around 145 million people currently live on land below one metre above sea level. Yet coastal zones attract migrants to jobs, leisure and retirement: 100 million (approx. 10%) of Chinese in the past twenty years have moved coastward (Nicholls *et al*, 2007:345). Such migrations will put huge pressure on the remaining productive land – even before taking account of overall population

growth in some of the affected areas (Stern, 2006). This is bound to dramatically affect land values: the supply of habitable and productive land will diminish.

Just as the natural or human-affected planetary systems need to be monitored carefully in order to predict how they will be affected by climate change or might affect it through feedback mechanisms (IPCC, 2007), so too the possible economic impacts need to be factored into policy making. Value mapping can be expected to assist decisions about which areas of low-lying land to protect by strengthened sea defences, for example, and which to allow the sea to inundate.

Any global monitoring programme would need to access UK sourced data, since land values at the necessary level of detail (a minimum of ten points per square kilometre or ideally at individual parcel level is suggested by Eurosion (2004:47)) can only be obtained from national sources. This is because, as Howes (1980) noted, comprehensive market-related property value data for an entire administrative area are only produced by tax authorities.

Property tax reform

Property and land taxes are used as a significant source of public revenues in almost every developed country (Bird and Slack, 2002), generally applied to local government but administered centrally. However the form which these taxes take varies widely between jurisdictions. What they almost all share is a statutory basis: taxable value is defined in law, thereby ensuring that, in theory, the taxes raised are not arbitrary but are to some degree fair as between payers of the tax in that jurisdiction.

For this reason, an “effective land administration infrastructure...includes organisations, standards and technological processes, as well as laws and regulations for property rights, valuation and taxation” (UNECE, 2005:iii), which should be “transparent and meet local requirements and needs”. The UN was here reporting on trends in development of land administration systems since it published Guidelines with special reference to countries in transition (UNECE, 1996) following the collapse of the Soviet Union.

UNECE (2005:45) asserts that “to stimulate economic growth the [property] tax can be based on the property’s potential rather than the present sale price.” Several former Soviet Union countries have, according to UNECE, followed established practice in certain other countries (see Andelson, 2000) which is to use “highest and best use principle” in assessing value for taxation. This requires the separation of the land (location) value element of property value from the current use (building) element. Whatever the statutory definition of taxable value, it should be “where possible based on market values and computer-assisted mass valuation systems” (UNECE, 2005:44).

Mass valuation systems require access to consistent land information in computer readable form and to geographic information systems (GIS) software, as well as mathematical modelling techniques such as geographically weighted regression (Ward *et al*, 2002). The status of mass valuation systems and GIS in land administration in Europe at the outset of this study were described by, respectively, Overchuk (2001) and Remetey-Füllöp (2002). Brown and Hepworth (2003) also recorded the status of property and land tax systems Europe-wide at that time.

Availability of modern GIS and mass valuation systems, together with skilled people to use them, has in some countries led to increased frequency of revaluation for taxation as well as considerable cost savings in tax administration (Müller, 2000). The more frequent the revaluations, the more closely will the assessed taxable values correspond with the actual market values at the time the tax is paid, since these “are dynamic and change over time” and “as a result need to be reassessed at regular intervals” (UNECE, 2005:44). For the tax to be perceived as fair, assessed values of properties in an area need to reflect current local market conditions as far as possible. Increased frequency of revaluation also, as UNECE (2005) points out, evens out the workload of those responsible for them and improves their efficiency. Ultimately, annual updates of taxable values may be possible (Heard, 2005).

Where mass valuation is used, Gloudemans (2002) and others have shown that if the market transaction dataset includes information about the main variables affecting price (apart from location) on each property, then the residual valuation

from some of the more sophisticated models used will bear a direct correlation with land (site) value. Hence there is no need to collect land value as such from each property transaction in order to produce separate site value assessments. Given sufficiently rich data and modern systems for manipulating them, a Landvaluescape model can be produced which ought to aid the understanding by the taxpayers of the spatially variable basis of their property tax bills.

In Great Britain, recent Government reviews show property tax modernisation could prove politically problematic (Barker, 2004; Lyons, 2007). Firstly there is no property tax at present on most land areas: no *ad valorem* tax of any kind on non-urban land and only a hybrid form of tax (Council Tax) on domestic properties, which only requires a rough approximation of the 'band' of market value in which a home falls (Plimmer, 2000). Secondly there is no statutory requirement for periodic revaluation: it has been 16 years since the Council Tax was introduced and tax bands in England still use 1991 valuations; a five-yearly revaluation for non-domestic rates has become accepted but is not embedded in statute. This accords with Bird and Slack (2002:74), whose verdict on property tax reform is that it "is often not too rewarding in either revenue or political terms". Largely as a result of these reasons, mass valuation techniques are not yet being considered by British tax authorities and hence Value Mapping is almost unknown to their stakeholders, as was found by Vickers (2003).

Efficiency in land markets

If, as Dale *et al* (2002) anticipated, "a growth in the globalisation of land markets is to be expected", then "transparency and accessibility of good quality land information" is "also necessary…to reduce the cost of gathering and communicating [it] and registering land and property transactions" (Dale *et al*, 2002: 3). Unless a country wants to opt out of such globalisation, it will need to conform to international standards in valuation methods and property data specifications: market players in at least some sectors of the property market need to be able compare valuations across national boundaries.

As Thurstain-Goodwin (2004) showed, there can be a very significant and immediate effect on the market when property information is placed in the public domain. In the case of Toledo, Ohio, when data previously held in non-accessible form by the County Assessor was put online with software to facilitate its remote access and manipulation in mapped form, the average difference between price offered and price paid fell by half. The authorities responsible for the data which Thurstain-Goodwin was analysing accept that it contributes significantly to the vitality of the local property market, such that "when the website is down, the switchboard is jammed" (German, 2003). Lucas County claims to have benefited in particular through having facilitated access to its data by potential global investors in - and occupiers of – its commercial property.

International Valuation Standards are also an important part of wider globalisation, since property forms a very substantial part of the equity of international corporations and the collateral against which financial institutions borrow. Any variances between national valuation practices and laxity in enforcement of valuation standards could impact on wider business confidence and liquidity. This is recognised by the International Valuation Standards Committee (IVSC) and in developing financial accords, such as Basle-2 (Brett, 2002). It was also supported in RICS' submission to the UK Government on the EU Capital Adequacy Directive (Craig, 2004), pointing out that unless banks' "property collateral" is valued "on a consistent basis", "there can be no level playing field for capital adequacy worldwide".

By allowing values to be mapped and more readily analysed across national boundaries and between tax jurisdictions, it would be expected that the impact of property taxes and other fiscal policies on the property market could more readily be seen. Hence the potential for property market forces to influence the development of British Value Mapping.

1.3. Testing the hypothesis: that a British Value Mapping programme is worth undertaking

This chapter has so far outlined the genesis and nature of landvaluescape and some apparently strong reasons to study it, without explaining why there appears to have been no such British study of Value Mapping since Howes (1980). The purpose of this research therefore was to gain insight into why the subject has not attracted more interest and what barriers exist that currently prevent a programme of land value mapping from being embarked upon in Britain. It investigates what the drivers might be to lead to inception and commissioning of such a programme by the public authorities, possibly in partnership with other stakeholders in land markets; and to indicate what steps might be necessary to activate the drivers and overcome the barriers.

The research has run in parallel with a number of developments in the policy landscape, at global and national level. Changes are ongoing in disparate policy areas, especially climate change science (natural and socio-economic) and the Knowledge Economy. These are detailed in subsequent chapters, as the empirical research is analysed. Finally a model to assist policy makers in this changing environment for Value Mapping is presented.

The hypothesis being tested was that the concept of Visualising Landvaluescape now offers discernable public and commercial benefits for Britain, sufficient to justify immediate and coherent steps to be taken to overcome any institutional, technical and policy (including tax policy) barriers that might be exposed. Three objectives follow:

1. To confirm whether stakeholders in the British property market regard this as an activity that merits serious study, with reasons and any *caveats* to be discovered;
2. To arrive at some order of costs, timescale and benefits, in financial terms if possible, of a British Value Mapping implementation programme; and

3. To establish what the ‘coherent steps’ are that would need to be taken to achieve nation-wide Value Mapping of Britain and devise a conceptual model to assist policy decision makers in this area.

The rest of this work expands on the concept and the theoretical and practical issues relating to it, explains how a research method was arrived at to explore the perceptions about these issues held by key stakeholders and experts in Britain and then describes the conduct of the field stage of the author’s research and analyses the results. It then draws these together, along with findings from a comprehensive literature review, case studies of other countries and a practical attempt to produce a British Value Mapping Demonstrator, setting out a series of possible steps to take this research forward. Finally it tests the validity of the hypothesis against these findings.

The next chapter reviews in some depth the literature on the subjects of: the development of uses for value maps spanning the pre-computer and internet-enabled eras; valuation theory and developing practice, in particular computer aided mass assessment (CAMA) for tax purposes; techniques for geospatial analysis of data; and the range of land, geo-data and tax policy domains that impact upon value mapping.

In the third chapter, the choice of methodology and the way the research was conducted are described. The diverse range of potential stakeholders in value maps are analysed and alternative ways of engaging with them investigated. As a form of Futures Study (McHale and McHale, 1975), the reason for choosing a Policy Delphi (Linstone and Turoff, 1975) as the primary research method is explained. This was supplemented by two other strands of work: production of demonstration value maps using data from a study of Land Value Taxation (LVT) in part of Oxfordshire for the local authorities (Godden *et al*, 2005), and analysis of reaction to them from stakeholder groups; and studies of comparator countries, mainly by questionnaire survey and follow-up correspondence.

Chapter Four lays out the results of the Delphi exercise, with a critical analysis of its findings at every one of its three stages. The attitudes towards a proposed Action Plan that the author put to the Delphi Group in late 2004 are discussed in

relation to other evidence that was presented to them, or which has come to light since the Delphi ended in July 2005. A number of appendices are included to illustrate stages in the Delphi.

In the fifth chapter more detail is given on the problems that arose during the design and conduct of value map demonstrations, and of a number of small group discussion sessions arranged or attended by the author, with and without the aid of value maps. The feedback from these sessions is analysed and related to the findings from the Delphi group, with its ‘virtual’ meetings.

Chapter six contrasts the experiences of selected countries in Europe and elsewhere that have developed value mapping or expect to do so soon, analyzing the reasons why these different forms of development occur and drawing conclusions about the prospects for Britain.

In the final chapter some overall conclusions and recommendations are made, drawing together all three strands of empirical research with what can be deduced from the literature, in particular from official and institutional sources during the progress of various policy debates that ran alongside this research. The original hypothesis and objectives are re-visited, a conceptual model is presented that illustrates the influences on British value mapping in geoinformation polity and the characteristics of this information domain, with recommendations for further research in the light of the findings.