



Issues in Valuing Cultural and Heritage Capital in the National Accounts

Hasan Bakhshi, Diane Coyle and Ricky Lawton

ESCoE Discussion Paper 2023-04

April 2023

ISSN 2515-4664

DISCUSSION PAPER

Issues in valuing cultural and heritage capital in the national accounts
Hasan Bakhshi, Diane Coyle and Ricky Lawton
ESCoE Discussion Paper No. DP 2023-04
April 2023

Abstract

Many cultural and heritage assets are not recorded in national accounts, yet the capital services they provide can create economic value. This paper discusses the challenges in trying to incorporate this ‘missing capital’, including the absence of market prices or exchange values for many cultural and heritage assets, the presence of externalities, and the need for sufficiently clear definitions and classifications. While consistency with the approach taken in the national accounts requires the use of exchange values for cultural and heritage capital, measuring its social value – as part of inclusive wealth in the ‘Beyond GDP agenda – requires the use of accounting or shadow prices.

Keywords: culture, heritage, accounting prices, national accounts, inclusive wealth

JEL classification: E02, D62, Z11

Diane Coyle, Bennett Institute, University of Cambridge
dc700@cam.ac.uk

Published by:
Economic Statistics Centre of Excellence
King’s College London
Strand
London
WC2R 2LS
www.escoe.ac.uk

ESCoE Discussion Papers describe research in progress by the author(s) and are published to elicit comments and to further debate. Any views expressed are solely those of the author(s) and so cannot be taken to represent those of the Economic Statistics Centre of Excellence (ESCoE), its partner institutions or the Office for National Statistics (ONS).

© Hasan Bakhshi, Diane Coyle and Ricky Lawton

Issues in valuing cultural and heritage capital in the national accounts

Hasan Bakhshi¹, Diane Coyle², Ricky Lawton^{3,4}

Abstract

Many cultural and heritage assets are not recorded in national accounts, yet the capital services they provide can create economic value. This paper discusses the challenges in trying to incorporate this 'missing capital', including the absence of market prices or exchange values for many cultural and heritage assets, the presence of externalities, and the need for sufficiently clear definitions and classifications. While consistency with the approach taken in the national accounts requires the use of exchange values for cultural and heritage capital, measuring its social value – as part of inclusive wealth in the 'Beyond GDP agenda' – requires the use of accounting or shadow prices.

Keywords: culture, heritage, accounting prices, national accounts, inclusive wealth

JEL codes: E02, D62, Z11

This paper discusses the challenges in incorporating cultural and heritage capital (CHC) in the System of National Accounts (SNA) framework, as part of a suite of 'missing capitals', alongside natural capital and some intangibles not already included within the national accounts asset and production boundaries. In addition, including where such assets are currently incorporated, we discuss the prices attached to these capital assets, given the frequent absence of any market transactions to provide prices, and the gap between private and social value in this category of assets.

There is no *a priori* reason why CHC assets not currently included in national accounts should be treated differently from other types of asset, which are increasingly being included in the national accounts framework, and similarly to its potential extensions to broader social welfare measures 'Beyond GDP'. To include CHC assets in the national accounts on the same basis as other assets, the valuation basis should be the exchange value, or a method approximating a market price such as replacement cost, consistent with the approach required for the System of National Accounts (SNA). This is the approach that has been taken with natural capital assets. However, even more than is the case with natural assets, it will be difficult to value CHC assets in this way: few markets exist for distinctive cultural assets, and they may be irreplaceable. We therefore also discuss alternative valuation approaches, reflecting the approach to valuation taken in the cultural economic literature. As is also the case with nature, there may be an argument for considering both market (national accounts-consistent) and also non-market approaches to valuation of CHC assets, as well as physical measures of the assets. For national accounts purposes, as with the System of Environmental Economic Accounting (SEEA) for natural capital, market values (or a close proxy such as sum of costs) would be needed, but shadow (or 'accounting') prices would provide an alternative valuation giving a better measure of overall social welfare.

¹ Creative Industries Policy & Evidence Centre

² Bennett Institute, University of Cambridge

³ IPSOS UK

⁴ This research has been funded by the ONS as part of the research programme of the Economic Statistics Centre of Excellence (ESCoE). We thank ONS colleagues for their helpful comments on an earlier draft.

A companion paper (Lawton et al 2023) reviews the extensive academic and grey literature on valuing CHC assets and pilots an empirical approach to valuing one class, historic houses, using the example of Blenheim Palace. It provides a proof of concept for applying one of the stated preference methods to the valuation of cultural and heritage assets, although raising some questions concerning the gap between difference valuation approaches.

Here we set out some key issues informing that empirical work, drawing on the literatures on natural capital and intangibles, on prior work commissioned by AHRC/DCMS, and in the context of current debates about inclusion of some missing capitals in the SNA25 revisions process by which the UN is updating the 2008 SNA, and the corresponding basis for pricing them. The non-market character of many CHC assets speaks to the ongoing ‘Beyond GDP’ debate about inclusive wealth and the gap between exchange values and accounting prices (ONS 2022).

Having noted this significant issue, there is nevertheless a good case for extending the coverage of CHC assets and their service flows in the national accounts, despite the inadequacy of exchange values; for instance, replacement cost for rebuilding a significant collection or important historic building is not a natural way to think about the value of these assets – consider the British Museum’s collections or Shakespeare’s birthplace in Stratford upon Avon. Even so, there is self-evidently economic value in the nation’s wealth of cultural and heritage assets, alongside non-economic value. They support a creative industries sector accounting for 5-6% of UK GDP, and is a focus of the UK Government’s creative growth strategy (House of Lords 2022). Some of the economic value of CHC assets is captured within the national accounts production and asset boundaries, generally using a pricing approach such as cost of replacement. Elements such as revenues from entry fees to historic monuments and commercial activities (such as shops, restaurants etc) will be captured in existing data. The general definition of culture and heritage is imprecise, however, potentially embracing both tangible and intangible assets, and overlapping with (or bundled with) other categories such as natural capital or housing stock. In addition, many will not have a market price, and it would be desirable for some purposes to include ‘non-market’ price elements, for example to reflect the value to future generations.

In a 2012 report exploring the construction of a culture satellite account, the European Statistical System Network on Culture defined 10 cultural domains and six functions (Table 1)

Table 1

Domains	Functions
Heritage (museums, historical sites, archaeological sites, intangible cultural heritage)	Creation
Archives	Production/publishing
Libraries	Dissemination/trade
Books & press	Preservation

Visual arts (plastic arts, photography, design)	Education
Performing arts	Management/regulation
Audiovisual and multimedia	
Architecture	
Advertising	
Crafts	

Source: ESSnet-Culture 2012, p44.

Other classifications have been suggested and can be (partially) mapped onto existing statistics. The Department for Digital, Culture, Media and Sport (DCMS) publishes regular economic statistics for the creative and cultural industries, for example. These comprise multiple SIC07 codes and include a mix of market and non-market activities. The former are inside the production boundary, and in the national accounts priced on a market or exchange value basis, whereas a satellite account can accommodate non-market activities and assets. The national accounts (and SEEA for natural capital) also use market prices or exchange values, but in some contexts, including culture and heritage, shadow (or accounting) prices are needed to reflect non-tradability and externalities, and thus provide an economic welfare measure.

Thus, while there is already some accounting for cultural and heritage assets, and the capital services that flow from them, part of the case for expanding their coverage of CHC in the national accounts is their importance in final consumption. For example, the ONS Living Costs and Food Survey shows a growing share of spending on recreation and culture (14% in the pre-pandemic year 2019/20). The DCMS participation survey does not collect data on expenditure but does show trends in physical and digital engagement.⁵ Expenditure on this cultural/heritage engagement is captured in current statistics, as are some of the associated CHC assets.

This nevertheless leaves significant assets and the associated capital services unmeasured. Just as with other missing capitals, enhanced measurement is desirable for decision-makers using official statistics so that decisions can be based on a full evidence base including investment in and the sustainability of the use of economically important assets (Obst & Vardon 2014).

The questions we consider in this paper are:

1. *What conceptual steps would be needed to develop measures of CHC in a set of definitions, analogous to the SEEA for natural capital?*

⁵ <https://www.gov.uk/government/statistics/participation-survey-october-to-december-2021-report/participation-survey-october-to-december-2021-main-report#chapter-1---culture>. The Participation Survey has been designed to capture more on digital engagement with DCMS sectors.

2. What *valuation methods* can be used for CHC assets and their associated capital services; how can *shadow (or accounting) prices* be estimated if welfare measures are desired?
3. What treatment of *discounting* and *depreciation* is appropriate for CHC assets, which may have distinctive characteristics (including asset lives) compared to other assets?
4. *Classification*: what are the boundaries and overlaps between the asset classes in the missing capitals framework?
5. What *data sources* might be used, both secondary and involving primary data collection?
6. Finally, what can we conclude regarding the extent to which CHC assets can be better reflected in the national accounts?

1. Concepts

There is a large literature (academic and grey) in cultural economics concerning the valuation of CHC, in particular for Social Cost Benefit Analysis, but no settled consensus on concepts and methods, and for the most part not considering questions of aggregation across many assets or types of asset. Previous research conducted and commissioned by DCMS has focused on developing a valuation approach for specific assets compatible with Green Book principles (Sagger et al 2021, Kaszynska et al 2022). Social Cost Benefit Analysis or project appraisal and national accounting are different exercises. What's more, the focus in the cultural economics literature has been the Total Economic Valuation (TEV) model, which – as discussed below – serves a different purpose than the production function approach in shaping thinking about natural and intangible capital values, being used as an organising framework for Social Cost Benefit Analysis. Indeed, there is some dispute about whether monetary valuation is appropriate for CHC at all (see Throsby 2003 for a discussion), although nobody would challenge the idea that both cultural heritage and nature have inherent non-economic value, nor that there is a policy need to make cultural and heritage assets more visible in the context of policy decision-making, and their value more readily communicable across different sectors (Kaszynska et al., 2022).

In both the prior work through the development of the System of Environmental Economic Accounting (SEEA) and the current revisions process for the System of National Accounts (SNA), the approach to addressing some of the challenges raised in the debate about measuring economic welfare 'Beyond GDP' has involved the concept of inclusive (or sometimes 'comprehensive') wealth,⁶ or 'missing capitals'. This wealth framework has been used in relation to nature for some years, pioneered empirically by the World Bank (2021) and UNEP (2018 using exchange and welfare values respectively) and with a theoretical basis as set out in Dasgupta & Maler (2000). The UK has been at the forefront internationally in implementing natural capital accounting within the SEEA in a national accounts context, in bringing together natural and human capital with the productive and financial assets included in the SNA to construct a first inclusive capital stock estimate for the UK (ONS 2022), and in further developing the framework for incorporating other types of assets (eg Bucknall et al 2021, Heys et al 2019), while the US government has announced it will start constructing a US natural capital

⁶ Originally used interchangeably, usage is settling down to use inclusive wealth for wealth valued at shadow or accounting prices and thus being a social welfare metric, and comprehensive wealth for wealth valued at market prices or exchange values.

account.⁷ The UK has also been at the forefront of developing a framework for thinking about cultural and heritage assets in terms of Cultural and Heritage Capital (CHC) in the Social Cost Benefit Analysis context, in response to gaps in HM Treasury Green Book guidance specific to culture and heritage capital, and seeking to develop a robust evidence base for decision-making connecting heritage science and economic valuation methodologies (Sagger et al. 2021).⁸

As noted in the introduction, there is an important distinction between current SEEA/SNA methods and the ‘Beyond GDP’ focus on better measurement of economic welfare. The former requires the use of market prices (or another estimate of exchange values) for valuation purposes. The latter requires the use of shadow or accounting prices (the terms are used interchangeably) that also include the social benefit of spillovers and externalities (positive and negative). If all assets available for economic uses are included, any change in their sum – weighted by their societal shadow or accounting prices – indicates an equivalently signed change in social welfare; in other words, an increase in the value of inclusive wealth necessarily implies an increase in social welfare (Dasgupta & Maler 2014, Dasgupta 2019). The intuition for this is straightforward: social welfare simply depends on how the resources available are used and how they are valued. Inclusive wealth captures the complete range of the resources available, while the use of shadow prices as weights in aggregation reflects the welfare value placed on them by society. It is worth noting that CHC assets - like any other assets - can see large and/or sudden changes in valuation, for example if tastes or technologies change or tipping points are reached. This is a feature, not a bug, in wealth accounting. (See Appendix for some additional detail.)

Here we set out an approach to including CHC assets that builds on the comprehensive/inclusive wealth framework.⁹ We briefly compare the TEV and production function approaches (both being used in natural capital measurement for different purposes as noted above). TEV can be partly mapped on to the latter as a categorisation of the welfare arising from consumption, but the production function framework encompasses intermediates and value added. We describe how the introduction of natural capital in national accounts, using market prices in the SEEA, offers a useful model for culture and heritage assets, and also forms a basis for the subsequent use of shadow prices in a welfare evaluation. This would be part of a broader approach going ‘Beyond GDP’ aiming to capture some externalities in a fuller welfare metric. For in any case market prices do not exist for many significant CHC assets and alternative methods for estimating (shadow) prices are needed. We also discuss the extent to which this conceptualisation leads to useful analogies between CHC and natural or intangible capital assets before turning to valuation, classification and data questions.

TEV and production function approaches

The TEV framework has been widely used in the literature to date on cultural and environmental economics, separating use from non-use values and further sub-dividing these top-level categories.

⁷ <https://www.whitehouse.gov/ostp/news-updates/2022/04/24/accounting-for-nature-on-earth-day-2022/>

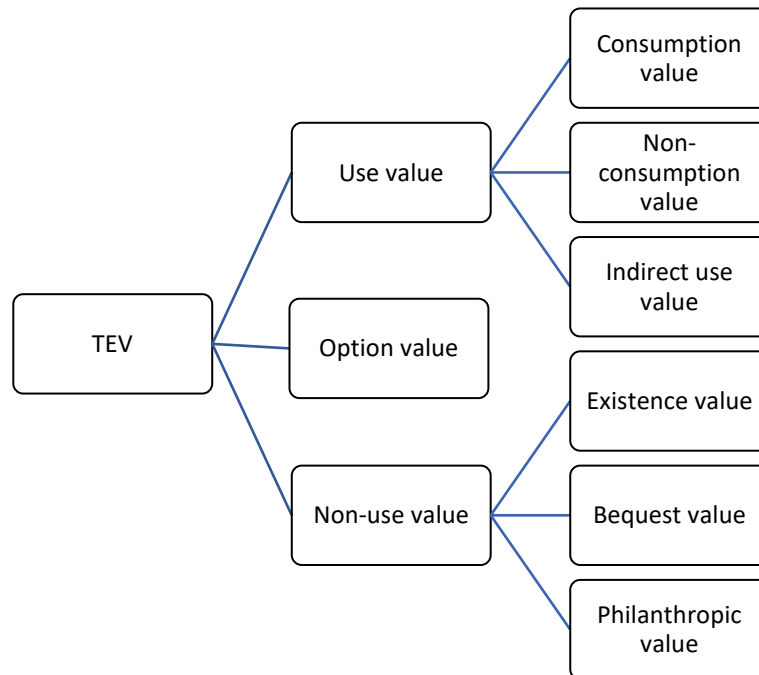
⁸

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/955203/GOV_UK_-_Framework_Accessible_v2.pdf

⁹ While usage is not firmly settled, and the two adjectives were originally used interchangeably, usage is settling on ‘comprehensive’ when market or exchange prices are used and ‘inclusive’ when shadow prices are used.

The TEV model is set out in Figure 1. Although widely used in this or similar forms, the categories do not map readily into price and production theory. They can all be considered as contributors to individuals' utility (although the distinctions between use and non-use value are not always clear, for example between bequest use values and philanthropic non-use values).¹⁰ But it is not evident how these separate elements of a vector of utility-giving attributes would be separately priced in practice. Furthermore, the TEV approach does not address the production side of the economy, which is critical to national accounts.

Figure 1: Total Economic Value



Source: authors' elaboration

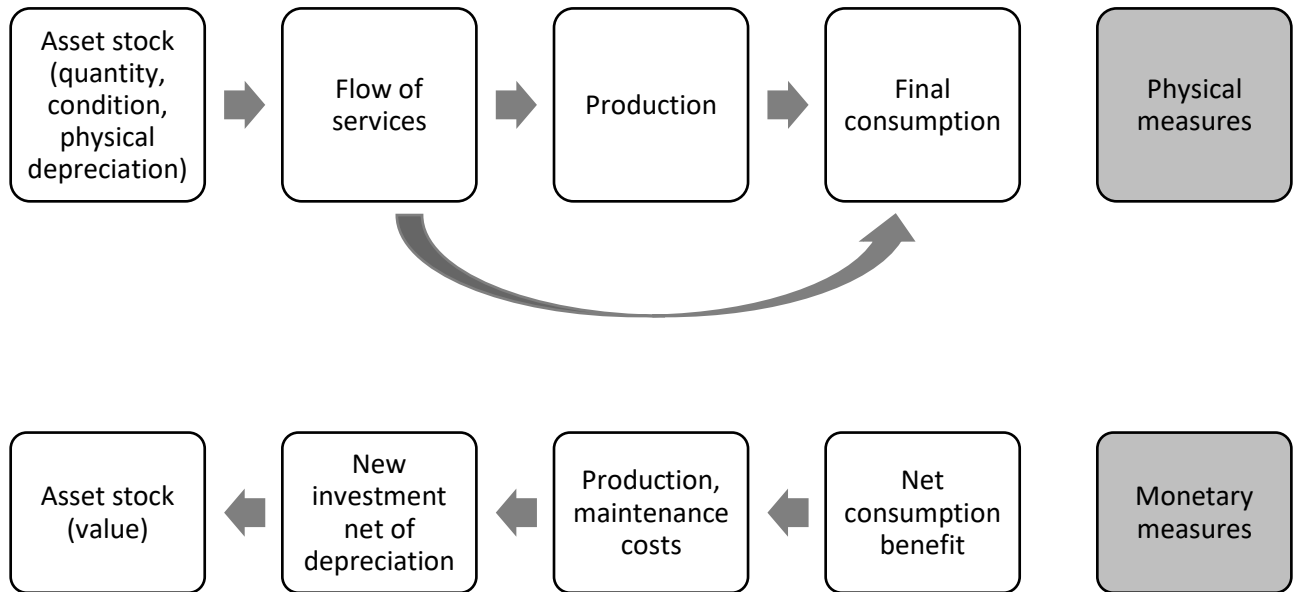
For these reasons, the government's advisory Natural Capital Committee, based on a report it commissioned, (Maddison & Day 2015) recommended: *"We propose that it would be more useful to distinguish different types of value according to whether they affect household wellbeing (for example through the provision of natural areas for recreation) or affect the production decisions of organisations (e.g. by ensuring uninterrupted supplies of water for manufacturing processes). This classification system would help to ensure that there are no overlooked ways in which an environmental change might affect individual and economic wellbeing."* In particular, as the NCC noted, introducing an additional classification system such as TEV risks omitting some socially and economically valuable flows from the calculation. These flows may be intermediate services or aspects affecting the productivity of other factors, while the TEV framework gives a household valuation perspective. This reasoning about natural capital applies equivalently to cultural and heritage capital.

¹⁰ It may seem odd to include 'non-use' as a component of utility; while the utility function concept can accommodate these elements, many in the CHC sector consider assets to have intrinsic value entirely outside the purview of economic valuation.

The broader framework combining final consumption and production in a standard economic stock-flow process (Figure 2) is therefore used in measuring natural capital and associated flows of services. It is generalisable to any type of asset that provides economically useful services.

A similar framework is used in measurement of some intangibles, where there are also significant externalities, in particular due to extensive non-rivalry in use. Corrado et al (2022) introduce into the basic stock-flow construction for intangible assets an upstream and downstream component (Figure 3); there is upstream production of intangible assets and downstream use of intangible capital services in the production of final output. This conceptualisation of a stock-flow economic process with an upstream production aspect and downstream use of CHC capital services in production and final consumption is relevant to artistic and literary originals, a produced intangible, intellectual-property based category of CHC already included in the national accounts (Martin 2019). The conceptual intangibles framework is increasingly important as more CHC assets are digitised, not only enabling wider access and participation in their consumption, but also, crucially, as an input into production. For example, generative artificial intelligence is making widely available at low price tools (such as DALLE-2) for generating digital cultural products, with hard-to-predict implications for the structure of the cultural sector.

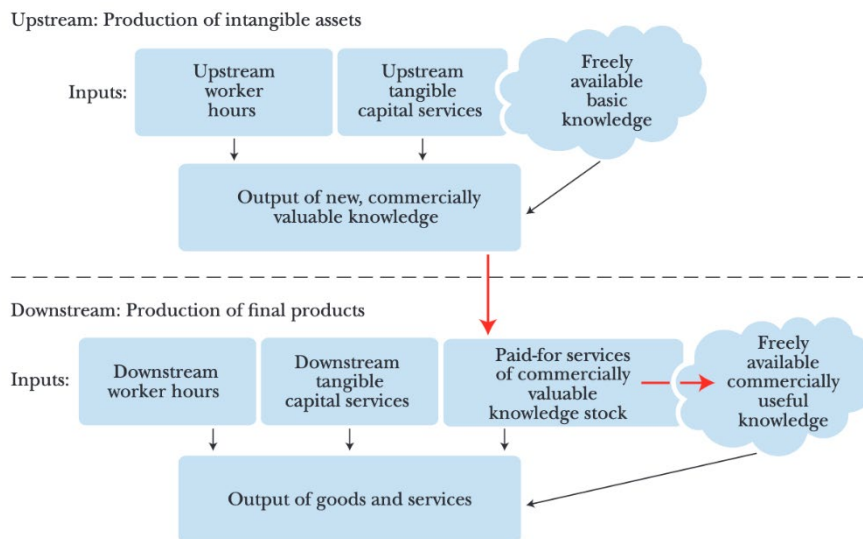
Figure 2 Schematic of economic stock flow model



Source: authors' elaboration

Figure 3 Proposed framework for intangibles measurement

Figure 3
Conceptual Framework



Source: Authors' illustration.

Source: Corrado et al 2022

CHC compared to other missing capital types

There is a useful parallel between the potential treatment of omitted CHC assets and the existing treatment of both natural capital and some intangibles. For example, the SEEA2012 standard for natural capital, “Is designed to complement and extend the accounting of the SNA through the valuation of environmental assets, the integration of physical data about the environment (e.g. flows of energy, water, and air emissions) and the recognition of ‘environmental’ activities and transactions in standard economic accounts,” (Obst & Vardon 2014). It extends the scope of the SNA by including physical/biological measures, as many natural assets do not have economic owners or appropriable income streams. Physical change in the assets is used to measure depreciation or depletion. The extension to ecosystem accounting (SEEA EA, formally adopted in 2021) includes the public good services provided by ecosystems. Similarly, the physical state (and location) of CHC assets could usefully be considered, along with physical change or degradation.

In the natural capital case, there has been a twin-track move toward incorporating ‘omitted’ capital service flows at market prices (or an exchange value alternative) into the measurement of GDP, and subsequent growth accounting exercises, and the corresponding stocks; and more recently a consideration of whether the (possibly increasing) wedge between GDP and a broader measure of economic welfare should be taken into account by applying shadow prices to the same quantities. However, the SEEA retains the convention that exchange values are the appropriate ones to use for monetary valuation in the accounts. This latter point is an issue of current debate. These developments in accounting for natural capital, and the debate about extension of coverage of intangible assets, offer a framework for the inclusion of CHC assets.

The current SNA 2025 revisions process is expanding the treatment of both natural capital and intangibles. On the natural capital front, with the SEEA already well-developed, attention is focusing on some specific issues, including natural resource depletion, the definition of economic ownership of natural resources, and valuation methods. The guidance on the process observes: “It has been concluded that, when it comes to the alignment with the SNA, the revised SEEA EA should not incorporate valuation concepts that include consumer surplus, nor consider including monetary values reflecting alternative institutional and policy contexts,” (UNECE 2022). But it adds that non-market valuation methods may be needed as a supplement. As noted, this is certainly the case with CHC where markets or exchange values for certain types of assets do not exist, and the price needs to be calculated as the discounted sum of non-priced flows of services.

The SNA revision process involves proposals to include two new categories of produced intangibles currently not included in GDP, firstly incorporating both branding assets and a range of data assets. Currently ‘databases’ are included in GDP; this will be expanded to include all the costs of acquiring and producing data. ‘Free’ digital assets and services are to be considered in a satellite account. Economic competencies (such as training or operating models) and some intellectual property (such as non-patented financial innovations) are excluded. The distinction is that internally generated intangible assets of these types are not capitalized in international accounting standards. Although

their omission is pragmatic, it means the national accounts will not track these significant investment flows.

The conventional criteria for the asset boundary in the SNA have been: the existence of a production process; economic ownership; and the creation of economic benefits. Fixed assets are defined as those used repeatedly in a production process for more than 12 months. Over time the asset boundary has been expanded to include more natural and intangible assets - for example, spending on mineral exploration and on computer software in the 1993 revision, and some water resources and R&D in the 2008 revision. However, it is increasingly accepted that assets that are not produced, not owned, and/or not fixed contribute meaningfully to economic growth, even though their characteristics - absence of market prices, absence of economic ownership in some cases (eg climate), non-rival nature and difficulty of appropriating returns - have made it difficult as a practical matter to include them in the SNA framework. Valuing stocks and measuring capital formation for such assets is challenging (Moulton 2015).

Nevertheless, the SNA asset boundary continues to expand, as economists and statisticians are developing the comprehensive wealth framework which can in principle accommodate assets not previously captured within the asset boundary. Depending on the type of asset, physical measures, valuations at market prices, and valuations at shadow prices could be set out separately, one as a standard accounting approach, the other as an economic welfare approach, as is being demanded in the 'Beyond GDP' debate. CHC assets not currently included in the national accounts would fit into such a framework - although open questions about classification and valuation methods remain. We turn to the valuation questions next, and depreciation/degradation, before discussing classification issues.

2. Valuation of assets

To assign a monetary value to the physical stocks and flows of capital services, there are as noted above two possibilities. The approach taken in the SEEA in the case of natural capital is to follow the principles of the SNA and therefore use market prices to value the flows, and a net present value approach to measuring the value of the stocks (§2.10 SEEA Central Framework 2012).¹¹ This could be the preferred approach for some CHC assets such as physical or intangible artistic originals or some types of property that are bought and sold, such that there are meaningful exchange values.

However, the inclusive wealth framework delivers a measure related to economic welfare if the shadow prices are used rather than market prices, whenever externalities or spillovers create a wedge between marginal market and social values. In any case, market prices or alternative exchange value estimates are simply not available for many CHC assets, some of which are unique and are rarely if ever transacted in a market. It may be hard to conceive how they could be valued at all in some cases (the Crown Jewels, Stonehenge) – although even for rarefied CHC assets such as these, there are various methods applied in the extensive cultural economics literature for estimating the economic welfare value (or shadow prices) of CHC assets:

¹¹ Although it extends the asset boundary of the SNA in order to include natural assets which may not be owned by economic units or have direct economic value but are used in production processes.

- Revealed preference (eg use visit numbers and ticket prices)
- Hedonic methods (eg house prices near an amenity, controlling for other influences)
- Stated preference (such as contingent valuation surveys)
- Discrete choice experiments (developed from stated preference, force consistent choices)
- Wellbeing evaluation
- Production function approach (include cultural asset service as an input in estimating productivity of a marketed activity, and compare to estimates without that input)
- Benefit transfer (apply one of the above methods in contexts other than the original source)

There are some important complexities if the aim is to develop social welfare measures (or carry out a social Cost Benefit Analysis, CBA):

- There may be non-marginal changes in the case of assets whose condition is deteriorating – a heritage site or library might have to close altogether below certain operational thresholds. CBA is poor at recognising threshold or non-marginal effects. The underpinning scientific evidence will be important for some CHC assets and needs to be integrated into the CBA.
- There may be system effects, due to externalities or to correlations between different assets not recognised in the analysis. For instance, does one attraction in a locality benefit from the presence of others?
- Valuations may vary for objectively similar resources in different social contexts: such as a CHC asset in a big city where many people can see it as opposed to a small town where its marginal benefits for users might be much higher?

Addressing these complexities is beyond the scope of the companion empirical paper (Lawton et al 2023), which uses a stated preference survey approach for one class of CHC assets, historic houses and their landscaped gardens, attributing stated willingness-to-pay to different elements in the bundle involved in visiting such a site through a discrete choice exercise. We triangulate this against the partial revealed preference measures available (entry fees, commercial revenues), expecting stated WTP to exceed the actual price of visiting to the extent there are spillovers. We also consider whether time use statistics collected in the survey might enable further triangulation of the valuation. The exercise finds a wide range of values from about £8 per visitor to about £37; perhaps surprisingly, the hypothetical CV survey used to estimate elements of the visit experience produces the lower figure, while the higher figure is the revealed preference of travel costs plus entry price, while an estimate of the value of time spent is closer to the higher figure, at about £26. The paper discusses the challenges of using values derived from stated preference methods.

The valuation challenges noted here are not unique to CHC: similar challenges apply to some intangible assets, such as data or organisational capital, which equally are rarely transacted in markets or may even be inalienable from their economic ‘owner’. There is a nascent debate about how to value these (eg Coyle & Manley 2022), as indeed about natural capital assets inside and outside the current production boundary. Many economists are uncomfortable with the use of stated preference methodologies in particular because of their general lack of incentive compatibility (eg Hausman 2012), but others point out that the critics have not provided a better alternative when there are no revealed preference measures (Blinder 1991). Johnston et al (2017) set out best practice in stated

preference methods. There is an important research agenda to develop appropriate valuation methods for different asset types, as Kaszynska et al. (2022) recommend. ONS has under way a programme of work considering methodologies for the estimation of shadow prices.

3. Depreciation and discount rates

An important consideration in moving from physical to monetary valuations is the selection of an economic depreciation as distinct from physical degradation rate for different assets, and a discount rate for the construction of NPV estimates of asset value. Selection of depreciation rates for such frequently long-lived assets is inherently challenging; it would be difficult to think in terms of applying a single average. What's more, there could be changes in the appropriate rate – sometimes sudden. For example, the prospective future lifetime value of statues commemorating certain individuals can shift or even turn negative, reflecting fundamental shifts in their utility. Also described in detail in Kaszynska et al (2022) is the question of physical asset degradation, one element in estimating a depreciation rate, is complex in the case of CHC. It has several elements:

- **Degradation:** the deterioration of a material as a result of a reaction with its environment (such as light or fungi) through a set of physico-chemical impacts and changes.
- **Dose-response function:** the related empirical relationship that can be observed over time from the application of a dose or concentration of a damaging agent, e.g., pollution, light, dust, oxygen, or an accident.
- **Damage and Damage functions:** Strlič et al's (2013) paper characterises damage functions in heritage science as *unacceptable change* (over and above everyday degradation as captured by the dose-response category) occurring through physical or chemical processes. What makes change unacceptable is determined by a value-based decision applied to estimates determined through dose-response functions.
- **Opportunity Cost:** In cultural heritage science, degradation of and damage to assets is frequently framed in terms of opportunity cost, whether in the present or for future generations.

As the report notes: “Many assets have undergone some form of management that has significantly altered their condition. Even in cases like Stonehenge, previous regimes have changed the original fabric significantly and these alterations can come to be considered part of the monument's character. These considerations are relevant to the question of how the state of an asset (even after significant change) relates to its value.” Economic depreciation is further affected by other considerations. The value of assets may increase as their perceived authenticity and historical uniqueness changes over time. The use of assets can change significantly, and their value can also be affected by official designation as ‘at risk’ or listed. So, depreciation is at least to some extent endogenous to such decisions. Nevertheless, some assumptions have to be made; CHC assets broadly speaking are likely to depreciate slowly, but this would be an issue worth considering in more detail for different asset types.

When it comes to the choice of discount rates for calculating asset net present values, ONS previously commissioned a review to inform its approach to valuing assets, although this did not include CHC assets (Freeman et al 2017). The theoretical underpinning here is the Ramsey formula for the social discount rate:

$$R = \rho + \mu g$$

where $\rho = L + \delta$

L is the risk of catastrophic loss

δ is pure time preference (how much less do we inherently care about future people?)

μ is the elasticity of marginal utility of income (the increase in utility gained by a future person from higher income), usually set at 1

g is the trend future growth rate

The Stern Review argued for a 1.4% discount rate applied at all time horizons; much of the debate at the time focused on the pure rate of time preference, which Stern and others have argued should be zero, the future having the same moral weight as the present. The nature of long-lived culture and heritage assets may similarly argue for a zero rate of pure time preference.¹²

4. Classification

In the wealth framework, the nation’s wealth comprises a great many assets. These can be classified in different ways. One classification – the World Bank’s Comprehensive Wealth framework – includes elements of produced, natural, human, and social capital (World Bank, 2021); another adds to these intangible and organisational capital (Ferreira and Hamilton, 2010). CHC classification involves both internal elements and a set of questions about boundaries and overlaps with other capitals.

Our aim is to suggest where CHC assets fit into a broader set of asset classifications, with a focus mainly on physical assets. Table 2 sets out a potential full wealth taxonomy including CHC assets. Noteworthy is the relative importance of produced capital for CHC assets as compared to natural capital.

Table 2: Components of comprehensive/inclusive wealth with CHC extensions

Produced assets		
Fixed assets	Dwellings, buildings, structures	Historic buildings, heritage structures and sites
	Machinery & equipment	Religious buildings
	IP products incl. digital	Public artworks
	Goodwill & marketing assets	Museums, galleries

¹² Given that trend growth is now around half the 2% rate assumed in the Green Book application of the formula, the case could be made for applying a social discount rate of 1% to some CHC (and other) assets.

	Inventories	Collections Archives & libraries Performance venues CHC intangibles (see Table 3) Incl heritage brands
Non-produced assets		
Ecosystems	Terrestrial Freshwater Marine Subterranean	
Land	Including land under buildings	Heritage landscapes Spiritual/cultural landscapes Parkland National parks
Other natural assets	Cultivated biological resources Water resources Renewable energy Mineral (incl energy) resources Atmospheric systems (incl spectrum)	
Environmental liabilities		
Other non-produced assets	Contracts/leases/licences	
Human capital	Cognitive & non-cognitive skills Health	Creative skills
Financial assets & liabilities (net at national level)		
Social & institutional/organisational capital	Social infrastructure Economic competencies	Cultural capital

Source: authors' elaboration

It should be noted that many would consider the final row to be different in character from the other economic assets; Dasgupta (2014) terms them 'enabling assets', affecting total factor productivity as a type of 'technology' rather than providing capital services.

In Table 3 we set out how we consider *intangible* CHC assets in addition to Artistic Entertainment & Literary Originals could fit within appropriate parts of the CHS intangibles structure, which covers all intangibles where current profit is foregone for expenditure that will deliver a future stream of benefits.

Table 3 CHC assets in the CHS intangibles framework

Category	Components	Extensions to CHC assets
Digitized information	Software Databases (coverage being extended)	Any digital CHC assets eg digitized collections not already counted under IP
IP	R&D Mineral exploration Artistic entertainment & literary originals Attributed industrial design Financial product development	Digital creations eg NFTs, digital art Attributed (non-industrial) design
Economic competencies	Market research/branding Operating models Employer provided training	

Bold: already included in GDP; elaboration of Table 2 in Corrado et al 2022.

From a national accounts perspective it is important to avoid double counting, and yet CHC assets often overlap with other categories. For instance, some historic buildings (such as Chatsworth House or Blenheim Palace) may be part of the stock of residential property for example, while intangibles already include some artistic originals. Perhaps still more complicated is the question of blended CHC and natural capital. Natural capital sites such as ancient woodland or mountain areas may have heritage value, and heritage sites will often be ‘bundled’ with natural capital such as parkland that is also valuable for ecosystem services such as cooling, pollination, or recreation. For some indigenous people, nature is in itself an inseparable part of culture. Ultimately, the classification of these assets as natural or cultural at the boundaries will be arbitrary, and perhaps does not matter as long as consistent criteria are applied to avoid double counting. (The same point applies to other overlaps such as cultural assets and housing or other structures; where the exact position of the dividing line matters less than its clear specification). It will be obvious in many cases which predominantly creates value; for example, ancient monuments may sit in unremarkable landscapes, whereas in national parks the landscape adds value to the buildings rather than the other way round. One clear marker of distinction is that cultural and heritage assets are produced assets, while natural assets are not, so one could imagine a criterion such as proportion of a given land area that contains buildings.

In practice, boundaries have to be selected. The two key ones in this context are between natural and CHC assets, as some of the latter sit in landscapes or include a landscape element; and between standard economic structures and heritage structures. Taking the first of these, one criterion might

be the presence of a dominant built structure that is listed as a heritage asset (for example in the National Heritage List for England). Thus Blenheim Palace would be classed as a CHC asset but a parkland with a non-listed large house as a natural asset. Listing is also likely to be a useful boundary condition in the second case. For example, many structures now considered as CHC assets began life as standard economic assets, such as mills built during the Industrial Revolution. The listing process is also useful for thinking about more recent buildings, including those that come to be considered as important to heritage as perceptions change – such as significant ‘brutalist’ buildings. The difficult cases here are likely to be houses still in use for that purpose, but these may be considered as part of the housing stock as when sold the market price should incorporate their heritage ‘premium’. Unlike natural capital assets, heritage assets are produced as well as (sometimes) destroyed, so constructing an asset register or mapping is not a one-time exercise. As Kaszynska et al (2022) discuss, the status of some heritage assets is complex; notions change over time, the condition affects the perceived value (either positively or negatively), some assets may disappear (if a building collapses for example), and so on.

Turning to the classification of CHC assets themselves and the flows of services, there is no standard taxonomy in the cultural economics literature, which has been concerned instead with categorisation of “cultural values” (for example, aesthetic, spiritual, social, historic, symbolic and authenticity in Throsby, 2001). The introduction to this paper presented (in Table 1) a classification developed by the European Statistical System Network on Culture. DCMS and other publications use the pragmatic but somewhat different categories set out in Table 4. The former is perhaps better suited to analysis of the cultural production, with the categories linked to SIC07 classifications, while Table 4 may be more useful to think about asset categories. In the end, classification decisions are arbitrary so the one most useful for current purposes should be used; and even within any classification framework there will be boundary choices to make – for example, physical objects in collections or historic buildings may overlap with archives and libraries.

Table 4 Classification of CHC assets

Historic or noteworthy buildings: museums, galleries, houses, castles
Collections: physical objects
Archives and libraries (physical or digital)
Landscapes, parklands
Performance venues
Digital creations: games, films, TV programmes, digital art
Ancient heritage sites (with or without constructions)
Industrial heritage sites

Places of worship

Source: DCMS <https://www.gov.uk/guidance/culture-and-heritage-capital-portal>

In thinking about the economic role of these assets, is there a useful parallel with natural capital assets? In that case, one approach classes physical types (e.g., species, soils, atmosphere, land, minerals etc); or ecosystem services provided (pollination, biomass, water cleaning etc). Another approach classes type of capital service provided, in the PCRS framework: provisioning, regulating, cultural, supporting. The discounted sum of the value of these services would constitute the value of the stock.

- **Provisioning services** provide products such as food or water.
- **Regulating services** regulate a natural process in beneficial ways such as wetlands reducing flooding or trees improving air quality.
- **Supporting services** provide services to help ecosystems function, such as photosynthesis and soil formation.
- **Cultural services** provide non-material benefits to human health and wellbeing such as sense of identity, recreation and aesthetic quality.

Many of the capital services provided by CHC assets naturally seem to fall under the heading of cultural services, when there is direct benefit e.g. from tourism and recreation or aesthetic appreciation. Others might be considered regulating or supporting services. For debate, we map the cultural services onto the PCRS framework in Table 5.

Table 5 Cultural capital services in the PCRS framework

Provisioning	Regulating	Supporting	Cultural
Generate new ideas Social infrastructure	Mental well-being Social relations Safeguarding heritage	Civic pride Cohesion/trust	Recreation Aesthetic pleasure Sense of identity Spiritual benefit

In the companion paper to this one, the discrete choice experiment considered a bundle of complementary services that form the consumption experience of visiting a stately home, Blenheim Palace (Table 6). Not surprisingly, the stated values were higher on the part of those who had visited the site. However, this part of the empirical work did not provide consistent results. Full details can be found in Lawton et al (2023).

Table 6: Components of visitor experience

<i>Areas of Blenheim Palace and gardens open to public (DCE attributes)</i>
<i>House: Walking around the exterior</i>

<i>House: Walking around the interior of the house, including the Palace State Rooms, upstairs and downstairs rooms</i>
<i>House: Collections and curated exhibitions, e.g. Churchill Exhibition</i>
<i>Gardens: Walking around the formal walled gardens/maze</i>
<i>Access to Parkland and wider landscape</i>
<i>Access to Lake Walk</i>
<i>Walking over the Grand Bridge</i>
<i>Blenheim Palace Shop</i>
<i>Café/Restaurant: Eg Orangery Restaurant, Stables Café, Oxfordshire Pantry</i>
<i>On-site talks and tours</i>
<i>360 Degree Virtual Tour</i>

5. Existing data sources

In this section we provide a summary of potential data sources, with a view to considering how ONS could make use of pre-existing and regular sources of data on cultural and heritage assets to construct cultural and heritage stocks and flows in the national accounts. This also requires consideration of what the requirements of the data would be for constructing reliable shadow prices for aspects of non-market cultural and heritage assets that provide welfare gain to individuals and contribute to the productive economy.

Some CHC assets may already be included in the national accounts. This could include some that have been sold, - such as heritage houses – so a market price was available, and some recent constructions – such as places of worship – likely at replacement cost. ONS (2022) estimates of inclusive capital include the value of land as a (non-produced) component of natural capital. Heritage brands may henceforth be included as a produced marketing asset (which have to date been treated as non-produced assets and marketing expenditure as intermediate consumption), as part of the forthcoming revisions to the national accounts.

Comprehensively identifying all of the UK’s CHC assets would be a major task, including determining which are in scope. The more realistic alternative is to mirror the approach taken with natural capital assets, measuring in a more aggregate way within the production boundary the flows of services derived from them. There are several available potential sources of data on the flows of capital services from CHC assets. In terms of data on direct engagement in cultural and heritage assets, data is regularly collected on audience engagement with CHC assets, for instance by the Audience Agency and other market engagement and segmentation analytics companies.¹³ DCMS performed a comprehensive review of surveys and administrative data was undertaken in 2022 to identify the impact on engagement in DCMS sectors since the COVID-19 lockdown was imposed in April 2020, using non-DCMS surveys. These surveys (Table 7) used varying methodologies and time periods which makes comparisons with the Taking Part Survey or the Participation Survey that has replaced it problematic and unreliable, but they can provide some contextual information.¹⁴

Table 7: Existing survey data

Insights Alliance – Missing Audiences , Sept 2021 – Mar 2022	Participant numbers
Audience Agency – COVID-19 Cultural Participation Monitor , Nov 2021	Participant numbers
Creative Industries Policy & Evidence Centre – Digital Culture Consumer Tracking Study , Nov 2020	Digital cultural activities
UCL – The role of the Arts during the COVID-19 Pandemic , Aug 2021	Cultural activities, wellbeing, cultural sector
Visit England – Visitor Attraction Trends in England 2020 , Aug 2021	Visitor numbers & categories, charges and revenues, employment, marketing expenditure
Network of European Museum Organisations – Impact of COVID-19 on museums in Europe , Jan 2021	Visitor numbers, museum finances
Visit England – COVID-19 Consumer Sentiment Tracker , Sept 2020 – Feb 202	Travel data and travel intentions
Clearsight – Recovery & COVID-19 , Oct 2021	Consumer sentiment
Ofcom, ONS	Internet usage, online activities, time use

Further work may be required by DCMS and its arms-length agencies to explore ways that this data can be extended to include monetary revenue streams, and be made available. Systematic data collection might require new survey instruments, however.

¹³ See <https://www.theaudienceagency.org/>; <https://www.artscouncil.org.uk/participating-and-attending/culture-based-segmentation>

¹⁴ <https://www.gov.uk/government/publications/participation-survey-methodology/comparability-between-taking-part-survey-and-the-participation-survey>

Turning to valuation, work is under way in the SNA revisions process to develop guidance on alternative valuation methods (UNStats 2022). One starting point for considering data sources on non-market prices is the HMT Green Book, with its implicit hierarchy of market and non-market prices (see Box 20, p61 Green Book 2022, reproduced as Table 8 below). Treasury economists put greatest confidence in consumer preferences demonstrated through market prices, either in direct or parallel proxy markets (revealed preference) for goods and services in the economy (e.g., hedonic house prices as an indication of the spillover benefits of cultural and heritage assets to the local area, or travel cost methods for people’s preferences in accessing cultural and heritage sites). A DCMS-commissioned rapid evidence assessment (Lawton et al 2020) summarised the available valuation studies, and provided an evidence bank.

Data on proxy markets could potentially be linked to consumption data on the direct consumption on cultural and heritage sites (cafes and shops) and in the surrounding area (tourism contributions to the gross value added of the local economy). House price data could potentially be used to estimate welfare values associated with proximity to CHC assets using hedonic methods (ONS 2019). There are methodological challenges as outlined in the AHRC scoping report: “[Revealed preference techniques] rely on the assumption that the ‘proxy’ market is an accurate representation of the preferences that people hold for the non-market good. But in many cases, these proxy markets provide a very incomplete and partial picture of the welfare gains/losses associated with cultural and heritage assets.

Table 8: Valuation methods for non-market prices

Market prices		
Prices from the relevant market (excluding taxes and subsidies). In some cases a closely comparable market can be used where a direct market prices is unavailable.		
Generic prices		
Use of a Green Book approved transferable price applicable to the proposal		
Revealed preference		
Techniques which involve inferring the implicit price placed on a good by consumer by examining their behaviour in a similar or related market. Hedonic pricing is an example of this where econometrics techniques are used to estimate value from existing data.		
Stated preference: willingness to pay	Stated preference: willingness to accept	Wellbeing
Research study by professionally designed questionnaire eliciting willingness to pay to receive or to avoid an outcome.	Research study by professionally designed questionnaire eliciting compensation to accept a loss	Use of direct wellbeing based responses (in existing data or from research by questionnaire) to estimate relative prices of non-market goods
Estimation of a central value and a range		
Based on available data.		

Source: Green book <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government/the-green-book-2020>

In order to operationalise such data into ONS national accounts, it would be necessary to link non-market data to market data on direct market behaviour (spending in and around the site) in a way

that successfully removes any double counting (e.g. through well-designed travel cost surveys which exclude ancillary tourism spend). It would also be necessary to observe changes over time, to allow analysts to isolate the changing impact of a change in the flow of cultural and heritage services on these data sources.

In terms of non-market data from proxy markets, to date, no analysis of longitudinal evidence on changes to the value of CHC assets in proxy markets has been undertaken at the national scale. However, it may be feasible, in some cases, to apply hedonic methods to construct a database of house price fluctuations associated with changes to the provision of cultural and heritage services. There is considerable room for innovation in this area. In many ways, RP analysis in the cultural and heritage sector is still based on twentieth-century data technology, but twenty-first-century data exists on people's actual direct and indirect spend in the enjoyment of cultural and heritage assets. This can also be explored in the form of 'big data' like mobile phone travel records, credit card purchasing behaviour, etc. This data is available at scale but can be costly to access and complex to analyse, with new avenues, in this regard, opening up all the time. Scoping is needed to understand better the potential for 'big data' to measure value in CHC assets. However, this would have to be explored through large datasets of house prices and housing attributes, linked to mobile phone footfall data and bank/credit card spending patterns, which may require costly licences to access. Further work may be required by DCMS and its arms-length agencies to explore ways that this data can be opened up to researchers and evaluators at a reduced cost.

Travel cost methods have been applied to environmental sites in the UK using the Defra Monitoring of Engagement with the Natural Environment survey (recording details of a respondents visit to a natural environment site) as part of the University of Exeter Outdoor Recreation Valuation tool (ORVal).¹⁵ Some of these natural environment sites may also be classed as heritage sites, for instance Hadrian's Wall has an estimated welfare value of £29,878,787 (Per Year), with estimated visits of 8,497,190 (Per Year).¹⁶ However, the ORVal tool does not contain a longitudinal element and is not comprehensive in its reach of sites, which includes only those heritage sites which sit within the 'natural environment'. No comparable public survey exists in the cultural sector to the Defra Monitoring of Engagement with the Natural Environment survey (DCMS's Taking Part/Participation Survey does not collect information on individual trips and costs incurred). Furthermore, travel cost methods require detailed information about all points and stops on the trip, to avoid over-attributing

¹⁵ <https://www.exeter.ac.uk/research/leep/research/orval/>

¹⁶ The method underlying these values is explained in the ORVal User guide: "The Recreation Demand Model can be used to estimate welfare values for green spaces. By 'welfare value' we mean a figure describing the monetary equivalent of the welfare enjoyed by individuals as a result of having access to a green space. In economics this welfare value is often alternatively called an 'economic value' or a 'willingness to pay'. Our calculation of welfare values is enabled by the fact that the recreation demand model provides an estimate of the recreation welfare function. This identifies how much welfare an individual enjoys as a result of beneficial attributes of a green space (e.g. the extent of woodland, the presence of a children's playground). Likewise, it identifies how much welfare is lost from each extra pound of cost incurred in travelling to a green space. The latter amount ... tells us the amount of welfare a person considers is equivalent to having one extra pound. In other words, it provides an exchange rate that we can use to convert estimates of changes in welfare into equivalent amounts of money. Welfare values for an existing site are estimated by calculating how much each individual's welfare would fall if they were no longer able to access that site and then converting that welfare quantity into an equivalent monetary amount. Those welfare values can then be aggregated over the adult population of England and Wales for an entire year using the same sequence of steps as used to aggregate estimates of visitation). https://www.leep.exeter.ac.uk/orval/pdf-reports/ORVal2_User_Guide.pdf

value to a single site, which may have been visited as a partial element of a multi-destination trip. It may be possible to make use of ONS time-use data in the future to dig further into people's behaviours when engaging with cultural and heritage assets, but to date this does not provide enough data on engagement to explore these relationships further.

In the cultural sector, the dominant source to date has been primary survey data collected via Stated Preference surveys (including both Willingness to Pay, WTP and Willingness To Accept, WTA, studies) targeted at one or more sites. These can be collected on-site as exit interviews or as retrospective surveys online. The surveys allow analysts to collect detailed information from visitors about their trip, their experience and behaviour at the site, and their preferences for all or part of the asset. However, such surveys are subject to a known set of biases, related to the hypothetical nature of the survey (putting into the question the realism of the price elicitation exercise and its concordance with actual behaviour in genuine market situations) and the possibility of focus bias, whereby the survey prompts respondents to over-estimate the value of the particular asset being valued due to insufficient consideration of substitutes and other non-market goods and services the respondent may also value and want to pay to support (sequence effects and insensitivity to the laws of diminishing marginal utility). However, these limitations can be minimised through good practice survey design, ex-post sensitivity analysis, and behavioural experimental techniques for testing for the presence of cognitive biases. In addition, data sources developed through Stated Preference methods also have a significant advantage over other non-market valuation data sources because in theory they are able to capture more of the 'non-use' values that people may hold for a cultural or heritage site, whether they use them or not. Such methods are also increasingly being used to assess the value of digital services without a market price (Brynjolfsson et al 2019, Coyle & Nguyen 2023).

Over the past decade, the DCMS and arms-length bodies have developed a programme for collecting Stated Preference valuation evidence on a range of cultural and heritage asset types, using a consistent survey design approach and a set of rigorous transfer tests from the academic literature (Johnston et al 2015), which allow analysts to ascertain the level of 'transfer error' that would be incurred by transferring average values one set of sites (for which willingness-to-pay evidence has been collected) to another (where there is no available evidence). This has been compiled into the DCMS CHC Benefit Transfer database,¹⁷ which has collected point value estimates for the average welfare benefits associated with the non-market aspects of a range of cultural and heritage assets, elicited from users and non-users as a willingness-to-pay value to maintain current levels of service provision using Stated Preference surveys. Assets for which values currently exist include: regional museums, local museums, regional galleries, regional theatres, public libraries, historic city centres, historic high streets, historic civic buildings, football clubs. As well as collecting point data, the Benefit Transfer process has highlighted a number of methodological considerations and questions that are relevant to the aggregation of WTP values at the national scale, which have been articulated in the AHRC scoping study¹⁸, and have informed a funding call for new research that pushes the methodological boundary of the Benefit Transfer database to allow it to incorporate non-use value in a more robust way, and to deal with marginal changes over time and by scale/scope.

¹⁷ <https://www.gov.uk/guidance/culture-and-heritage-capital-portal>

¹⁸ <https://www.gov.uk/government/publications/scoping-culture-and-heritage-capital-report>

Finally, wellbeing valuation is a relatively recent method for non-market valuation which in principle has the potential to transcend some of the technical problems within Stated and Revealed Preference non-market valuation methods by directly asking people to quantify their utility in subjective wellbeing terms. However, the method for interpreting this in equivalent income terms is still under methodological development and has not been applied in a reliable way to CHC assets, in part because individual visits to cultural and heritage sites are unlikely to be detected with the low sensitivity of an 11-point life satisfaction scale. Moreover, this method sits well outside what would be required for national accounts.

One experimental approach, undertaken in the AHRC-funded 2015 comparison of Stated Preference and Wellbeing Valuation methods as applied to the Natural History Museum and Tate Liverpool applied a hybrid wellbeing-Willingness-to-Accept survey (Bakhshi et al 2015). In this approach, respondents are asked directly how much monetary compensation they would require if they were not able to enjoy a CHC service for a period of time (one year) such that their life satisfaction would remain unaffected. The advantage of this approach is twofold: First, it screens out those who indicate that their wellbeing would be unaffected by the proposed change before any discussion of compensation is made, which reduces the likelihood of strategic answers by respondents to the Willingness-to-Accept question for whatever compensation is on offer, regardless of its expected impact on their welfare. Second, by asking people to consider the change to the CHC service in wellbeing terms, it is hypothesized that people are better able to internalise the hypothetical loss, which should aid the cognitive process of elicited Willingness to Accept in compensation terms. Note that this is essentially a contingent valuation study using a Willingness-to-Accept elicitation format. A similar approach was described in Day et al.'s (2002) manual. Since the approach makes explicit mention of 'wellbeing', it is best described as a hybrid contingent-wellbeing valuation approach.

The hybrid wellbeing-WTA approach has not been tested on a large enough sample to ascertain whether it produces more robust results than standard WTA alone. Further research could look to simultaneously test for efficacy of this method, while collecting a full sample of standard WTA results for use in analysis in a scenario where the hybrid model is not found satisfactory.

Another possibility is applying more robust quasi-experimental analysis to test statistically the association between proximity to CHC assets and household wellbeing. For example, listing data from Heritage England (all listed buildings in England),¹² could be used to construct a GIS variable to measure the coverage (concentration) of heritage sites at the geographical level (eg postcode or local super output areas (LSOAs)).¹³ This new variable could be matched to geolocated survey responses on wellbeing from ONS or from Understanding Society, a large nationally representative panel survey. Using a wellbeing regression with individual-level and local-level controls, it would be possible to test the statistical association between concentration of heritage sites at the local level and self-reported wellbeing at a national level (adjusted for other major determinants of life satisfaction). Using analysis of this sort, it may be possible to disaggregate wellbeing regressions by heritage type, age, and local variations, and to apply wellbeing valuation methods outlined in the Green Book Supplementary Guidance¹⁹ to estimate the monetary value of the flow of benefits associated with proximity to CHC assets at different concentration levels, in order to measure the welfare value of the current stock of

¹⁹ <https://www.gov.uk/government/publications/green-book-supplementary-guidance-wellbeing>

heritage assets in a given area, or nationally. Such measures should seek to account for the difference between spillover benefits (a ‘passive’ welfare gain from being surrounded by cultural/heritage sites, eg, in an area with a high concentration of historic buildings and museums) and whether people regularly engage with them, in a way that takes into account both the demand and supply side of the flow of benefits. This may require merging of other datasets on cultural engagement from within Understanding Society, Taking Part, and other data collected by cultural/heritage organisations where available.

6. Conclusions: CHC assets and the national accounts

Inclusion of cultural and heritage assets in the national accounts is currently only partial and omits many assets that are likely to be economically valuable. The broad framework for understanding comprehensive or inclusive wealth readily accommodates missing CHC assets. Their inclusion would be consistent with the way the asset boundary in the SNA (alongside the production boundary) has been steadily expanding as the economic value of various assets is recognised. There is a parallel with the SEEA approach to natural capital, which conceives of an expanded production boundary including services from the associated assets created through a production process and having economic value. In this paper, we suggested for discussion the classification of types of services associated with CHC assets, in the PCRS framework, and suggested some data sources that could potentially inform estimates.

SNA principles require the use of market or exchange values, and this is reflected in the SEEA for valuing natural capital. Many of the CHC services have some associated market or exchange values, such as ticket sales or membership fees, that could inform the national accounts. A companion paper to this one uses stated preference and discrete choice methods to evaluate the value visitors assign to different components of one specific heritage asset, and triangulates these against other data sources. However, there is a case for also using non-market valuation methods – just as with natural assets. CHC assets involve externalities and many cultural assets also have a public good aspect. For some CHC assets no close-to-market price is conceivable: there is no plausible market price or replacement cost for Stonehenge or the Crown Jewels. Others may admit more easily of a market-type valuation: a replacement cost estimate for the House of Commons or a transfer value for an art market price for a Matisse painting are conceivable. Even in such cases, though, non-market elements of valuation will be of interest for wider, ‘Beyond GDP’ welfare measures. For this reason, and because the cultural and heritage sector’s own preferred approach to valuation typically includes non-market elements, we have discussed both approaches here. The national accounts approach to CHC assets will be useful in its own right, but also as an element in a wider approach to measuring economic welfare, as set out in the ‘Beyond GDP’ agenda.

References

- Bakhshi, H, D Fujiwara, RN Lawton, S Mourato, and P Dolan (2015). Measuring Economic Value in Cultural Institutions Cultural Value Project Arts and Humanities Research Council.
- Blinder, A. S. (1991). Why Are Prices Sticky? Preliminary Results from an Interview Study. *American Economic Review*, 81(2), 89-100. <https://www.jstor.org/stable/2006832>
- Brynjolfsson, E., Collis, A., Diewert, W. E., Eggers, F., and Fox, K. J. (2019b). GDP-B: Accounting for the Value of New and Free Products in the Digital Economy. NBER Working Paper No. 25695. <https://doi.org//10.3386/w25695>
- Bucknall R., S Christie, R Heys & C Taylor (2021). GDP and Welfare: Empirical Estimates of a Spectrum of Opportunity. ESCoE Working Paper 2021-08, July. <https://www.escoe.ac.uk/publications/gdp-and-welfare-empirical-estimates-of-a-spectrum-of-opportunity/>
- Corrado, C., Haskel, J., Jona-Lasinio, C., & Iommi, M. (2022). Intangible capital and modern economies. *The Journal of Economic Perspectives*, 36(3), 3–28. <https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.36.3.3>
- Coyle, D., & Manley, A. (2022). What is the value of data: A review of empirical methods. Bennett Institute for Public Policy Working Paper, July. https://www.bennettinstitute.cam.ac.uk/wp-content/uploads/2022/07/policy-brief_what-is-the-value-of-data.pdf
- Coyle, D. & D Nguyen (2023) Free Digital Products and Aggregate Economic Measurement, *Economie & Statistique*, forthcoming.
- Dasgupta, P. (2011). *Inclusive National Accounts*. Working Paper 67-12, The South Asian Network for Development and Environmental Economics. http://www.sandeeonline.org/uploads/documents/publication/967_PUB_Working_Paper_No._67-12.pdf (also at <https://www.econ.cam.ac.uk/people-files/emeritus/pd10000/publications/11/EXPERT2.PDF>)
- Dasgupta, P. (2014) Measuring the Wealth of Nations. *Annual Review of Resource Economics* Vol. 6 (2014), pp. 17-31 Stable URL: <https://www.jstor.org/stable/43202779>
- Dasgupta, P., and K. -G. Mäler (2000), Net National Product, Wealth, and Social Well-Being, *Environment and Development Economics*, 5(1/2), 69–93
- Day, B., Hanemann, M., Hett, T., Bateman, I., Hanley, N., Carson, R. T., Jones-Lee, M. (2002). *Economic Valuation with Stated Preference Techniques: A Manual*. United Kingdom: Edward Elgar.
- European Statistical System Network on Culture (2012), Final Report. https://ec.europa.eu/assets/eac/culture/library/reports/ess-net-report_en.pdf

Ferreira, S and K Hamilton, Comprehensive Wealth, Intangible Capital, and Development (2010). World Bank Policy Research Working Paper No. 5452, October. <https://ssrn.com/abstract=1695323>

Freeman M & B Groom (2016). Discounting for Environmental Accounts: Report to the ONS. <https://www.ons.gov.uk/file?uri=/economy/environmentalaccounts/methodologies/naturalcapital/discountingforenvironmentalaccounts1.pdf>

Hausman, Jerry. 2012. Contingent Valuation: From Dubious to Hopeless. *Journal of Economic Perspectives*, 26 (4): 43-56. DOI: 10.1257/jep.26.4.43

Heys, R, J Martin and W Mkandawire (2019). GDP and Welfare: A Spectrum of Opportunity. ESCoE Discussion Paper 2019-16, October. <https://www.escoe.ac.uk/publications/gdp-and-welfare-a-spectrum-of-opportunity/>

House of Lords (2022). Arts and creative industries: the case for a strategy. <https://lordslibrary.parliament.uk/arts-and-creative-industries-the-case-for-a-strategy/#heading-1> (December)

Johnston, Robert J., Kevin J. Boyle, Wiktor (Vic) Adamowicz, Jeff Bennett, Roy Brouwer, Trudy Ann Cameron, W. Michael Hanemann, Nick Hanley, Mandy Ryan, Riccardo Scarpa, Roger Tourangeau, and Christian A. Vossler (2017). Contemporary Guidance for Stated Preference Studies. *Journal of the Association of Environmental and Resource Economists* 4:2, 319-405

Johnston, R, J Rolfe, R Rosenberger, R Brouwer (2015). *Benefit Transfer of Environmental and Resource Values*. Springer. ISBN : 978-94-017-9929-4

Kaszynska , P., D Coyle, E Dwyer, R Lawton, P Riganti, S Watson, M Damaso, Y Wang. (2022). Scoping Culture and Heritage Capital. <https://www.gov.uk/government/publications/scoping-culture-and-heritage-capital-report>

Lawton R, Fujiwara, D, Arber, M, Maguire, H, Malde, J, O'Donovan, P, Lyons, A., Atkinson, G. (2020). Rapid Evidence Assessment: Culture and Heritage Valuation Studies. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/955142/REA_culture_heritage_value_Simetrica.pdf & <https://www.gov.uk/government/publications/rapid-evidence-assessment-culture-and-heritage-valuation-studies>

Lawton R, D Coyle & H Bakshi (2023). Cultural Capital Services Valuation Study. Working draft.

Maddison, D. and Day, B. (2015). *Improving Cost Benefit Analysis Guidance: A Report to the Natural Capital Committee*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/517027/ncc-research-improving-cost-benefit-guidance-final-report.pdf

Martin, J. (2019). Measuring the Other Half: New Measures of Intangible Investment from the ONS. *National Institute Economic Review*, 249, R17-R29. doi:10.1177/002795011924900111

Moulton , B., and N Meyerhauser (2015) The Future of the SNA's Asset Boundary. Conference Presentation <http://old.iariw.org/papers/2015/moultonmeyerhauser.pdf>

Obst, C., M Vardon, Recording environmental assets in the national accounts, *Oxford Review of Economic Policy*, Volume 30, Issue 1, SPRING 2014, Pages 126–144, <https://doi-org.ezp.lib.cam.ac.uk/10.1093/oxrep/gru003>

Office for National Statistics (2019). Valuing Green Spaces in Urban Areas. <https://www.ons.gov.uk/economy/environmentalaccounts/articles/valuinggreenspacesinurbanareas/ahedonicpriceapproachusingmachinelearningtechniques>

ONS (2022). Inclusive Capital Stock UK 2019 and 2020. <https://www.ons.gov.uk/economy/economicoutputandproductivity/output/articles/inclusivecapitalstockuk/2019and2020>

Sagger, H., Philips, J. and Haque, M. (2021). Valuing Culture and Heritage Capital: A framework towards informing decision making. DCMS. <https://www.gov.uk/government/publications/valuing-culture-and-heritage-capital-a-framework-towards-decision-making/valuing-culture-and-heritagecapital-a-framework-towards-informing-decision-making>.

Strlič, M, D Thickett, D Taylor, M Cassar (2012). Damage Functions In Heritage Science, *Studies in Conservation*, 58(2), 80-87.

SEEA (2012). System of Environmental Economic Accounting: Central Framework. https://seea.un.org/sites/seea.un.org/files/seea_cf_final_en.pdf

Throsby D., (2003). Determining the value of cultural goods: how much (or how little) does contingent valuation tell us. *Journal of Cultural Economics*, 27(3), 275-285.

UNEP (2018) *Inclusive Wealth Report*. <https://www.unep.org/inclusive-wealth-report-2018>

UNECE (2022). A broader framework for wellbeing and sustainability in the System of National Accounts. https://unstats.un.org/unsd/nationalaccount/aeg/2020/M14_6_5_Wellbeing_Sustainability_Framework.pdf

UN Stats (2022). Guidance Note AI.1, Valuation Principles and Methodologies. https://unstats.un.org/unsd/nationalaccount/aeg/2022/M21/M21_7_AI1_Valuation_Principles_Methodologies.pdf

World Bank (2021) *The Changing Wealth of Nations*. <https://www.worldbank.org/en/publication/changing-wealth-of-nations>

Appendix

A long literature (JR Hicks (“The Valuation of Social Income,” *Economica*, 1940), then inevitably, Paul Samuelson (“The Evaluation of ‘Social Income’,” in DC Hague, ed., *The Theory of Capital*, 1961), and subsequently James Mirrlees (“The Evaluation of National Income in an Imperfect Economy,” *Pakistan Development Review*, 1969), and Amartya Sen (“Real National Income,” *Review of Economic Studies*, 1976)) established the equivalence between real national income and social well-being as the normative basis of real national income, on the assumption that the weights being used on goods and services to estimate real national income are accounting prices, *not* market prices – unless the two sets of prices happen to be the same. Weitzman (“On the Welfare Significance of National Product in a Dynamic Economy,” *European Economic Review*, 1998) first addressed the dynamic context, using the Ramsey formula -to discount the welfare all future generations. Dasgupta & Maler 2000) assumed that welfare is a non-linear function of consumption and showed that in a dynamic economy, total wealth corresponds to well-being across the generations, not income or output. In defining wealth, the weights that are to be attached to capital assets (including natural capital) are accounting prices, not exchange prices. This accommodates multiple distortions and externalities; no optimality assumption is needed for the equivalence to hold.

A simple version is as follows. There are M capital assets, labelled by i. Let $K_i(t)$ be the stock of asset i at time t and $P_i(t)$ be its shadow price. If $W(t)$ is the economy's wealth at t is the sum over all i,

$$W(t) = \sum [P_i(t)K_i(t)] \quad (1)$$

We presume that intergenerational well-being increases from time t if and only if wealth per capita at constant shadow prices increases over that same period of time.

Let $V(t)$ denote intergenerational well-being at t. Then equation (1) and the proposition about well-being imply

$$\Delta V(t) = \sum [P_i(t)\Delta K_i(t)]. \quad (2)$$

If Δt is a short interval starting at time t, then

$$\Delta K_i(t) = [\Delta K_i(t)/\Delta t]\Delta t$$

which substituted into (2) yields

$$\Delta V(t) = \sum [P_i(t)\{\Delta K_i(t)/\Delta t\}]\Delta t. \quad (3)$$

The right hand side of equation (3) is net investment during Δt . That implies that intergenerational well-being increases over a brief period of time if and only if net investment in total wealth is positive in that same period of time.

See Dasgupta (2011) & Dasgupta & Maler (2000) for more general proofs.