


Estimating the Mental Wealth of nations: valuing social production and investment

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There is a growing global movement among economic, public policy and academic communities questioning the appropriateness of gross domestic product (GDP), and specifically its growth, as an indicator of progress. Despite the broad range of indices and dashboards that have been developed to challenge it, GDP remains entrenched as the essential indicator of national prosperity, despite its purpose being to measure the size and performance of the economy. The strength of GDP lies in its established centrality in policymaking as well as its rhetorical and conceptual simplicity; it is in essence the value of monetized tangible goods and services produced in a given period. Unlike well-being indicator dashboards, GDP provides a single measure against which governments, the media and the general community can track and compare national economic performance. And, while many composite indices offer monotonously stable findings, the weekly, quarterly and annual fluctuations of GDP prompt policymakers to act (that is, to assess reforms, identify constraints and shift policy levers to enhance its growth). By contrast, the Mental Wealth metric offers a new approach. Rather than joining the chorus of moving beyond GDP, the Mental Wealth Initiative first recognises the system of national accounts that underpins GDP as a significant human achievement. The initiative then seeks to refine, augment and improve GDP as a measure of social welfare by broadening the boundary of production to include the value of goods and services provided by populations that are not currently monetized but make genuine contributions to social prosperity and quality of life. Hence, the Mental Wealth metric provides a holistic measure of national prosperity, capturing the value of both economic and social production, and recognizing the fundamental importance of brain capital (mental capital, mental health and brain health) and collective cognitive and emotional health and well-being. This paper provides a simple, practical strategy for augmenting GDP by monetizing social production, thereby establishing a more accurate indicator of the wealth of nations.

Humans are ‘ultra-social’ beings¹. The nature and quality of our social ties are central to our health and well-being, which underpin individual-level capability and resilience^{2,3}. At a societal level, how social systems are structured and the strength and operation of social networks are fundamental to community cohesion and social stability². Social networks can profoundly shape people’s access to both resources and opportunities. Participation in socially productive activities has been shown to improve quality of life⁴; physical, cognitive, and mental health^{5–9}; and labour market outcomes through skills training and access to the labour force¹⁰. Social mobilization around ecosystem maintenance and restoration (for example, rewilding) has the potential to contribute significantly to economic prosperity given that at least half of the world’s GDP is dependent on nature^{11,12}, and given that the global ecological footprint has exceeded global biocapacity¹³. Despite these individual, societal, environmental and economic benefits, unpaid socially productive activities are not currently valued within the existing economic framework, leaving their contributions to national prosperity unrecognized. In addition, GDP contains a number of ‘regrettables’ – activities that increase economic activity but do not contribute to quality of life such as war, higher transport costs due to traffic congestion, pollution abatement and reconstruction following natural disasters¹⁴.

The exclusion of (unpaid) informal and socially productive activities from estimates of national prosperity has significant implications. First, social and economic development is fundamentally shaped by what is measured^{15,16}. Measurement makes the invisible visible, giving credence to the value of social production. Measurement helps to assess progress, stimulate public debate, aid advocacy efforts, promote community mobilization, and inform policy and investment priorities. Historically, the system of national accounts (giving rise to GDP as the key measure of economic performance) were created during successive profound crises (the Great Depression and the Second World War) not only to measure the size, growth and composition of national economies, but also to inform war-time production and post-war reconstruction efforts^{17,18}. The mechanisms of national accounting are said to have evolved to serve underlying political purposes, which leads to the question: ‘What would they measure if other purposes were dominant?’¹⁸. As we look to current widespread efforts to shift societal trajectories (such as the movements to achieve greater equality, arrest climate change and catalyse post-pandemic reconstruction for enhanced well-being and community and system resilience¹⁹), our efforts are likely to be impeded by the continued exclusion of socially productive activities from the dominant economic metric: GDP.

Second, the exclusion of extra-market activities sends a signal that society does not value the contributions made by those not in the formal labour market. When employment is privileged as a legitimate social role and indicator of societal integration, structural and social marginalization of the unemployed, older adults and the disabled lead to stigma, inequality, lower social participation, intergenerational dependence and care, and the erosion of mental health and well-being^{20–22}. Placing greater emphasis on the value of non-market activities undertaken in and for communities may guard against these negative effects²³.

Third, neglecting measurement of and investment in social production fails to recognise the extent to which it enhances economic productivity (access to additional networks, resources, opportunities, informal skills training and mentorship, and intergenerational knowledge transmission) and reduces demands on governments (through the networks and norms of reciprocity it fosters)²⁴.

We propose a new ‘Mental Wealth’ metric that seeks to quantify the value of economic and social production to ensure a more complete picture of national (and regional) prosperity²⁵. Mental Wealth is defined as “a measure of national prosperity that captures the value generated by the deployment of collective mental assets and supporting social infrastructure and focuses on the contributions made by all human beings to material and especially non-material standards of living”²⁵. The metric makes an explicit attempt to shift the boundary of

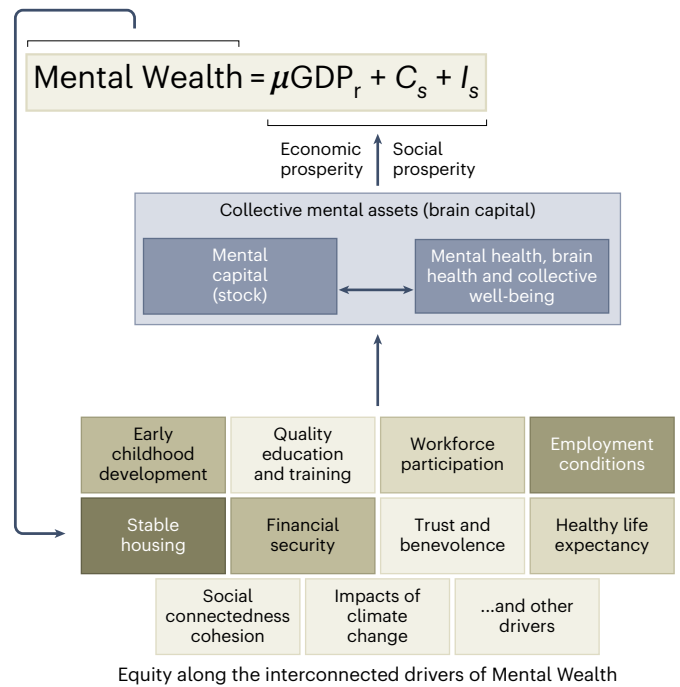


Fig. 1 | Defining Mental Wealth. Mental Wealth is a holistic measure of national prosperity that monetizes the value generated by a nation’s economic and social productivity. Mental Wealth is underpinned by a nation’s collective mental assets (brain capital) and influenced by a range of health, social, economic, and environmental factors.

production of the traditional economy to include the value created by non-market activity that contributes to strengthening the social and cultural fabric of communities and social support in work settings. Further, the Mental Wealth metric recognises ‘brain capital’ (a nation’s collective mental assets: mental capital, mental health and well-being, and brain health) as the foundation of economic and social productivity (Fig. 1). Specifically, Mental Wealth is the monetary value of the market and non-market goods and services produced by the population over a given period, and is calculated as follows:

$$\text{Mental Wealth} = \mu\text{GDP}_r + C_s + I_s$$

where GDP_r is real GDP (for a given period) calculated using the expenditure approach, μ is the devaluation coefficient (the downward adjustment to GDP_r to account for the proportion of expenditure not underpinned by mental capital; for example, the value of mineral exports net of human input). C_s is the consumption of non-monetized, socially provided services; I_s represents social capital infrastructure investment, namely, the sum of government (and non-government) investment in social capital infrastructure (in a given period), not already captured in GDP ²⁵. Detailed discussion of the origins of Mental Wealth, its formulation, comparisons with alternative indicators of national prosperity, the importance of systems thinking and an outline of the research programme in systems modelling of Mental Wealth is provided elsewhere²⁵. This paper seeks to outline more specifically the key constructs of C_s (social consumption) and I_s (social capital infrastructure investment) and define a non-market valuation method to be applied.

Social consumption

Social consumption involves the use of socially provided services outside the market. For tractability, the value of social production will be used as a proxy for social consumption and its estimation will depend on the measurement of time spent undertaking activities that provide a social contribution. Social contribution will be viewed

BOX 1

Activity categories that contribute to estimating the social contribution of individuals to the Mental Wealth of nations

Category 1: Volunteering and unpaid charity work

This category includes unpaid time spent participating in emergency services (for example, lifesaving and firefighting); volunteering at community festivals and cultural events; fundraising undertaken in aid of a charity; community gardening; participation in healthcare delivery and free clinics; working in a soup kitchen; distributing food, medical or material goods; providing legal advice; providing counselling support; and making clothes for disadvantaged populations.

Category 2: Unpaid education and care of children

This category includes unpaid time spent providing education, active supervision and domestic care for a child or children aged under 18 years including own children and children of friends, neighbours and extended family. This also includes time spent undertaking unpaid teaching at a school; providing tutoring or homework assistance; passing on cultural knowledge, customs and traditions (a matter of special importance to Indigenous communities); and unpaid babysitting.

Category 3: Unpaid care of older people and people with illnesses or disabilities

This category includes time spent undertaking unpaid domestic support for older people and people with illnesses or disabilities. Examples include assisting with self-care activities, buying groceries for a neighbour, driving them to appointments, assisting participation in cultural activities and cleaning their home.

Category 4: Crowd service

This category includes time spent providing a 'crowd service' where no direct or indirect (for example, advertising) income is received. Consumers provide information, instructions, tools, advice and so on to each other as an unpaid service (for example, Wikipedia, YouTube videos, open-source software and blogs).

Category 5: Unpaid contributions to the creative arts

This category includes unpaid time spent performing and creating works of art, music, dance, storytelling and drama.

Excluded activities

Excluded activities include individual hobbies; leisure time; vacations; vlogging, reviewing and marketing of products; criminal activities; volunteering during paid time off by an employer; and non-childcare-related domestic activities in own home. Although potentially controversial, under the current conceptual framework of Mental Wealth, domestic duties in one's own home are not considered to contribute to social production, social connectedness, and strengthening the social fabric of communities and nations. Counting unpaid domestic activities within one's own home would detract from an emphasis on encouraging social and economic participation outside the home, it would also introduce a source of potential stability in the metric that would fail to detect changes in social prosperity. For example, large proportions of the population shifting from community-building volunteering activities to domestic activities inside their own homes would significantly affect social prosperity but would not be detected as a change in the Mental Wealth metric (that is, if unpaid domestic work was included in C_0).

through the framework of a sociological model of social productivity based on the notion of exchange reciprocity. This involves the provision of a social service valued by the recipient(s) for which no contract or financial remuneration is exchanged (other than potential reimbursement of expenses)²⁶. Expressions of reciprocity to fulfil unmet individual and community needs create new bonds of solidarity between disparate groups of people, businesses and public institutions through the acts of "giving, receiving and giving in return"^{27,28}. While social productivity contributes value to the measure of national prosperity (Mental Wealth), it also acts in part to redistribute resources between the economic and social arenas, acting as a temporary stabilizer to disruptive events. For example, the services arising from mobilization of volunteers and charitable community organizations in response to natural disasters can help communities rebuild more quickly. Similarly, during the COVID-19 pandemic, social mobilization around public health orders sought to arrest transmission and reduce the overall economic impact^{29,30}. Social production has the potential to reduce the need for government services and can extend beyond government reach (for example, to remote or marginalized communities). It does not, however, replace the need for government provision of social services. Indeed, evidence suggests that a country's social spending (as a proportion of GDP) and civic culture (for example, higher degrees of civil liberties) are positively correlated with volunteerism, helping and caring³¹. An important dimension of prosperity is caring economics comprising affiliative and compassionate personal relationships, a sense of social

belonging, cooperative contributions to the workplace and society, and creating trustworthiness and trust³².

Because the production and consumption of social contributions are not mediated by monetary valuation in markets, and given they are likely to be differentially valued by receivers, monetary value will be calculated based on the value of time spent delivering the social contribution (input valuation). Activities that are socially valued by any given community, region or nation are likely to differ by cultural, historical, social, economic and political context. However, the key activity categories outlined in Box 1 aim to capture social contributions that have universal relevance for estimation of Mental Wealth. The activity categories outlined should not be considered exhaustive as they are likely to evolve and expand over time to account for cultural and technological shifts. They merely offer a starting point from which to elaborate, as per the historic evolution of the systems of national accounts. The listing draws on long-established literature concerning studies of time use³³, feminist economics³⁴, the nature of volunteering³⁵ and principles that underpin the strengths of Indigenous cultures³⁶⁻³⁹. Finally, it is intentional that the activity categories are not weighted—time spent undertaking any of the outlined socially productive activities (which will differ by age, sex, cultural background and socioeconomic status) is considered to be of equal importance.

Social capital infrastructure investment

In devising a more appropriate metric for national prosperity, the other element of gross national expenditure that needs to be augmented

concerns investment. Traditionally, the composition of gross fixed capital formation has concerned dwelling and non-dwelling construction along with investment in machinery and equipment. As national accounts have evolved, new categories of investment have been recognised. The most recent additions have been cultivated biological resources and intellectual property products. Within the Mental Wealth framework, social capital infrastructure investment now seeks to include the sum of government, community and private sector investments in the opportunity structures that enable social production and social connectedness; namely, investments in facilities, spaces, services and networks that are not already captured in GDP. Physical and institutional social infrastructure are key to the propagation and continuity of social connections, stability, the preservation of cultural identity and maintenance of socio-cultural diversity of Indigenous and local communities, and the vibrancy of civic life⁴⁰. Investments directed towards enhancing social and cultural centres can contribute to enriching connections within and across communities, thereby growing the potential for individuals to be engaged in socially productive activities.

Provision of this infrastructure can be seen as an important factor for creating opportunities for social and cultural participation and developing the functional capabilities of a community as well as workplaces. The literature on the impact and value of such an investment has not been sufficiently substantiated yet, given the complexity in determining the sources of social capital investment, its relation to social capital formation, and the consequent socially productive activities⁴¹. Additionally, data sources concerning social infrastructure spending currently exist disparately at the workplace, community and regional levels, adding to the complexity of obtaining a clear indication of the scale and direction of investments. To capture the value that social capital infrastructure investments contribute to national prosperity, a more precise measurement of this expenditure is needed. This would involve consolidating information on social infrastructure and amenities use and their resourcing. Although there is difficulty in capturing private sector investment in social capital, public sector investment can be deduced from national and regional accounts and used as an indicator of investment of this nature^{40,42}. Broadly, social capital infrastructure investment would include expenditure and provision of infrastructure which includes community facilities, services and networks as well as the social dimension underpinning the production of goods and services, prime amongst which are arrangements concerned with informal on-the-job development and associated support structures.

Box 2 summarizes the key data items concerning social capital infrastructure investment currently not captured in metrics associated with the systems of national accounts. They are arranged under three broad categories. The first augments the established categories concerned with land, dwellings and non-dwelling construction. The second augments the established categories of intellectual property. The third set of activities concern an entirely new category of fixed capital formation, which we term 'civic capital formation'. The importance of these data items has been identified in the growing literature concerned with environmental sustainability^{36,39,43}, the development of human capability⁴⁴ and social capital⁴¹.

Valuation

A non-market valuation method will be applied to estimate the monetary value of social contributions and social capital infrastructure in a systematic way. Three distinct approaches to estimating the monetary value of social contributions are often considered: the replacement cost, opportunity cost and social benefit approach³⁵. The replacement cost approach seeks to use either an 'observed market proxy', which would involve pricing time spent on a particular social contribution as the rate of a wage of a paid worker doing roughly the same job³⁵. The opportunity cost approach seeks to determine the value of time an individual could spend at their regular job if they were not volunteering. However, this would be problematic for those making social

contributions that are not participating in the labour market. Of greater concern for either the replacement cost or opportunity cost approach if applied to calculate Mental Wealth, is that they would exacerbate existing distortions in the market economy. For example, foundational economy workers (workers in health, care, education, housing, utilities, food supply and so on) are currently paid poorly despite contributing significantly to the positive drivers of Mental Wealth. The social benefit approach seeks to estimate the value of the output of the social contribution. This approach requires either a market proxy for the output, or where this is indeterminate, it would require a willingness-to-pay assessment that seeks to value the social contribution based on what the provided service is worth to the receiver³⁵. This approach lacks feasibility for macro applications such as estimation of national or regional-level Mental Wealth as it has enormous data collection and management demands. Detailed information would be required on outputs associated with each act of social contribution (some of which would be difficult to measure) and determinations would need to be made regarding the proportion of each output attributable to the unpaid contribution where contributions are made by volunteers working alongside paid staff³⁵. In addition, applications of this method across different populations would require an assumption that individuals have the same marginal value of money.

An alternative, more tractable way of capturing the value of non-market-mediated social consumption is therefore needed. This will be achieved by drawing data from those providing the services. This is easier and likely more accurate than obtaining information directly from households on their consumption levels (for example, a child receiving the benefits of volunteer teaching/tutoring at school may go unreported in a household survey). This approach to estimating consumption activity is similar to the convention followed in valuing public sector contributions to consumption where such services are not mediated through the market. We therefore propose to value the social contributions of individuals using an input-based approach, applying a universal value to every hour spent making those contributions that aligns with the median hourly earnings in a given country in a given year (which equates the value of market and non-market work). The strength of this approach lies in its feasibility, requiring very few parameters to calculate, that is, the number of individuals making social contributions, the number of hours devoted to each activity category (in addition to demographic data), and the median hourly earnings. With the exception of regular surveys on volunteering conducted in Australia, Canada, the US, the UK, Switzerland and Norway, people's social contributions are not routinely measured as part of official statistics in most countries. Uptake of the estimation of Mental Wealth across high- and low-to-middle-income countries requires the simplicity of a universal input valuation approach. Therefore, a regular, digitally deployed, simplified time use survey with representative national samples is proposed to supplement the data infrastructure established alongside the systems of national accounts or other official routine data collection. Many countries conduct regular labour force surveys. These provide a platform for expanded capturing of the key data needed to measure the social contributions of people. To avoid social desirability bias and overreporting common with surveys on volunteering, time use surveys use a rigorous methodology to reconcile reported activities within a 24-hour timeframe^{33,35}.

Conclusions

For too long, researchers in health, business, economics and other social sciences have worked in relative isolation in understanding what determines improvements in national prosperity and human development. Important advances in the literature on the social determinants of health have gone a long way to building bridges between different analytical traditions. The challenge is now to go deeper into integrating insights from different disciplines. At the end of the Second World War GDP emerged as the pre-eminent measure

BOX 2

Categories that contribute to estimating the investments in social capital infrastructure that enable social production

Augmentation of established forms of capital formation (land, dwellings and non-dwelling construction)*Component 1: Facilities and spaces*

This component includes the physical places for people to meet and mobilise in their community. This may include sports clubs and fields, leisure and recreational facilities, community centres, libraries, green spaces (community gardens), art centres, and community-owned spaces. The value of the contribution here would be imputed rent that public authorities (especially local councils) forgo by not charging the public for access to these spaces.

Component 2: Building community infrastructure

This category includes unpaid time spent developing physical and technical facilities for a community. This includes development of digital networks and services (websites and web applications), building community facilities (community hall and recreation areas) and building protective infrastructure (flood defences).

Component 3: Unpaid ecological restoration and rewilding

This category includes unpaid time spent participating in land and sea management; restoration of biodiversity, ecosystems (farmlands, forests, marine, urban areas and so on) and animal habitats; environmental clean-up; and recycling.

Intellectual-property-related investments*Component 4: Unpaid, informal on the job training, development and mentoring*

It has long been recognized that much human development occurs informally, often on the job. This is formally recognized in arrangements associated with the skilled trades and recognised professions. It is, however, also a feature of nearly every form of work, whether paid or unpaid. Amongst employers, experienced workers are often preferred to those freshly out of educational institutions because they have been acculturated in the complexity of work, capabilities that can often only be 'learnt by doing', usually under the tacit supervision of a more experienced colleague. While vitally important for economic success this form of tacit intellectual property growth and transfer is not captured in current national accounting frameworks. This category therefore includes time spent providing informal professional mentoring, guidance, capacity building/training workshops to co-workers where these activities are not the primary responsibilities of the salaried position.

Civic capital formation

Components 1–4 augment established forms of capital formation. An interest in Mental Wealth, however, requires that recognition be

given to forms of capital formation currently totally overlooked in the national accounts. The following categories draw especially on insights from the rich literature on social capital. This literature has identified a wide range of matters "that facilitate coordination and cooperation for mutual benefit"⁴⁹. Considerable work has explored the determinants and impact of factors such as trust for social and economic flourishing. This is of less interest than the other major strand of this literature: that which has considered the infrastructures that enable and support effective social and cultural activity. When considering how to augment established categories of investment, this is best described as a concern with 'infrastructures for effective collective voice' and 'underpinning organisational infrastructures' that support coordination and cooperation for particular communities.

Component 5: Infrastructure of collective association, including networks, participation in community groups and organised civic engagement

This component relates to local organizations and services that assemble groups of people for specific purposes such as neighbourhood associations, cultural and religious organisations, voluntary groups, and environmental groups. It includes unpaid time spent establishing networks and infrastructure that contribute to civic vibrancy (for example, community associations, forums for the maintenance and development of traditional knowledge, language, and practices, a matter of particular importance to Indigenous communities), organising community activities (for example, festivals, sporting activities and teams, clubs and gatherings), and coordinating community responses (for example, petitioning for rights to participation or the preservation of ecosystems and natural resources, establishing a neighbourhood clean-up committee and response to natural disasters). This category also includes unpaid time spent organizing activities to promote social and environmental justice, human rights and cultural identity, and participatory governance, establishing and running co-operatives, performing unpaid activities for a union, working on a voter registration drive, and unpaid involvement in advocacy and lobbying activities.

Component 6: Infrastructural services to support associational activity

This component includes services provided to enable individuals and groups to engage in and conduct voluntary work. This may include community support services such as language support services, community skills training services, library resources and local transport services.

of economic performance and indicator of national prosperity. The nature of what counts as 'GDP' has not, however, been static. To date its evolution has been primarily shaped by those concerned with core realms of commerce: most recently agriculture and holders of intellectual property. As we explore how to ensure GDP's greater relevance in our times, it is vital that health and social researchers, especially those engaged in mental health, neurosciences, and education and training, play an active role. This is particularly important given the fundamental role of brain capital in driving economic and

social production, the recognition of social context as shaping mental capital, mental health and collective well-being, and the historic neglect of mental health as evidenced by inadequate investments in and accountability of mental health systems^{45–48}. If reporting of the Mental Wealth of nations occurred as regularly and prominently as GDP, the possibilities for expanding the realm of debate about the future of national prosperity and human development are enormous. This paper has offered very specific, practical suggestions on how we can work to create those possibilities.

Competing interests

J.B., K.T., Y.J.C.S., A.S., W.H., A.F., S.B., A.P., G.U., A.N.N., T.H. and R.H. declare no competing interests. J.O. is both head of systems modelling, simulation and data science at the University of Sydney's Brain and Mind Centre (BMC) and managing director of Computer Simulation and Advanced Research Technologies (CSART). I.B.H. is the co-director, health and policy at the BMC, University of Sydney, Australia. The BMC operates early-intervention youth services at Camperdown under contract to headspace. I.B.H. has previously led community-based and pharmaceutical-supported (Wyeth, Eli Lilly, Servier, Pfizer, AstraZeneca) projects focused on the identification and better management of anxiety and depression. I.B.H. is the chief scientific advisor to, and a 3.2% equity shareholder in, InnoWell. InnoWell was formed by the University of Sydney (45% equity) and PricewaterhouseCoopers (Australia; 45% equity) to deliver the A\$30 million Australian government-funded project Synergy (2017–20) and to lead transformation of mental health services internationally through the use of innovative technologies. H.E. is a consultant to PRODEO (an executive services group for brain health technologies), the Meadows Mental Health Policy Institute and the Euro-Mediterranean Economists Association. In the past, he has received consulting income from Delix Therapeutics, Neo Auvra, and Johnson and Johnson.

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J.O., J.B. and K.T. developed the concept and drafted the manuscript. All authors critically revised the manuscript for important intellectual content.

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