

Recognizing knowledge capital in the private and public sectors

Ian McAuley, University of Canberra
and Center for Policy Development,
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The problem and options

The prime task of this committee is to build recognition of knowledge capital through the establishment of universally accepted reporting standards.

As pointed out in the SKE submission to the US Securities and Exchange Commission, it is correctly stated that corporate balance sheets do a poor job in reporting the value of knowledge capital.¹

Balance sheet valuations almost always under-record a firm's asset values, particularly in firms which, by traditional methods, are not capital-intensive.

Even in firms in sectors such as manufacturing, however, the balance sheet vastly understates the value of a firm's assets. To take three examples, showing the proportion of market value captured by the balance sheet measure of net tangible assets:

Hills Industries Ltd – 37% of market value captured

CSR Ltd – 32%

Crane Group – 28%

When it comes to firms in what would reasonably be classified as “knowledge intensive” the differences are even more stark:

CSL Ltd 7%

MYOB Ltd 7%

Even retailers, such as Woolworths and JB Hi Fi, which have a substantial proportion of their assets in tangible stock, show low measures of net tangible assets.

The origin of the divergence is easily explained. Although they have gone through many incremental changes, the financial accounting standards we use today emerged in the manufacturing sector in the late nineteenth century. Plant and equipment was expensive, and the factory laborer's job was either to provide muscle power (F W Taylor's Schmidt at the Bethlehem Steel Company) or to supplement the processes of an expensive machine (such as process workers whose task was to feed blanks into cutting and pressing machines). In many industries (within the last sixty years in the case of stevedoring) labor was hired by the day.

The changes are very evident. The price of most machinery has tumbled (consider what you or your employer paid for a desktop computer thirty years ago). There are very few occupations which could be classified as “unskilled” in the way such a word was used a hundred years ago – Taylor's Schmidt would not find a job in a 2008 mine or factory. And, in many cases, the relation between machine and worker has reversed, from the worker

1.. Society for Knowledge Economics Submission to the Enhanced Business Reporting Consortium for the US Security Exchange Commission's *sic* Advisory Committee on Improving Financial Reporting, January 2008.

supplementing the process of the machine to the machine supplementing the processes of the worker. Nowhere is this more evident than the case of information and communication technology.

Only part of a firm's value lies in its so-called "tangible" assets; the rest belongs in the way knowledge capital, in the form of organizational, technical and relationship skills, are brought together to create value.

In relation to the task of recognizing knowledge capital, therefore, there seem to be three options:

- (1) To accept that the task is too hard. There are insurmountable hurdles in definition (there is not even a clear taxonomy) and in measurement. There are conceptual problems in defining the ownership of knowledge capital. The costs of resolving these difficulties would exceed any possible benefits.
- (2) To modernize accounting standards, so that firms' balance sheets and statements of profit and loss can come as close as possible to revealing true and accurate values, integrating traditional tangible and intangible values.
- (3) To develop standards which report on knowledge capital, but which stand aside from traditional financial statements.

In defence of the first approach, it is arguable that it is the safest. One of the foundation concepts of financial accounting is conservatism. If there is any doubt about the value of an asset, it should be valued at the lowest defensible level. Even for tangible assets, balance sheet values reflect two conservative practices – cost valuation and depreciation – which (almost always) result in valuations way below market values.

In any case, events of 2008 suggest that there is no problem of under-valuation of assets. Had accountants and auditors applied the concept of conservatism more rigorously, then the bloated asset values of the sub-prime boom and bust would not have arisen.

In fact, one result of the crises of 2008 may be that external stakeholders (lenders and shareholders) place less value on any accounting data that relies on the application of accounting conventions (cost, materiality etc), and focus on those few indicators which are more objective, such as cash flow. They will not necessarily welcome the addition of new elements, such as "knowledge capital", which, in the minds of external stakeholders, may be seen to rest on questionable conventions and to be manipulable by a firm's managers.

The second approach seems to where many advocates are heading, or would like to head if only they could sort out definitional and measurement problems. It is noted that the Securities and Exchange Commission sees the exercise in the context of improved *financial* reporting, as if intangible assets can be reported in the same monetarized terms as apply to tangible assets. The EU Study on the Measurement of Intangible Assets and Associated Reporting Practices² points out that "external financial reporting regulations define assets to

2. "Study on the Measurement of Intangible Assets and Associated Reporting Practices" prepared for the Commission of the European Communities April 2003.

encompass all resources expected to generate future benefits, but exclude many intangibles with the reliable measurement rule". While the study does not specifically advocate integrating intangible assets with traditional tangible assets on the balance sheet, it is strongly in favour of quantification, and of integrating all intangibles (environmental, social, goodwill) in one report. In particular it calls for a "reliable" measurement system.

The quest for "reliable" accounting can be never-ending, and may be based on a misunderstanding of what accounting is all about. All that traditional accounting tries to do is to prepare reports which are consistent between different reporting entities. Setting aside fraud and the more creative practices of impression management, accounts may be "reliable" by reference to the conventions of accounting, but not in any absolute sense. By analogy, Mercator's cylindrical mapping projection provides an easily-recognized standard, and a map may be said to be "reliable" by reference to that standard, but it does not conform with what the observer looking at the land may see, particularly in high latitudes. (To follow the analogy, look at the distorted map of Greenland in a school atlas – "reliable" to Mercator's projection, but not to any commonsense meaning of the word..)

The pressure for "reliable" accounting should not be under-estimated. There are many advocates of accounting reform, urging more accuracy in financial accounts to overcome the dated conventions in accounting, and to add new elements and layers of sophistication. Some seek an integration of financial and management accounting, so that internal stakeholders (managers) can use the firm's accounting system to produce cost estimates to allow managers to make pricing, investment and other decisions.³ (This belief is not confined to the private sector; shortly after introducing accrual accounting the Commonwealth produced a guide *Beyond Beancounting – Effective Financial Management in the APS*, which claimed that accrual accounting "provides the basis for the recognition of full costs" and that costing can be systemized.⁴)

The reality is that, with the possible exception of some process industries (e.g. electricity production), no accounting system can produce reports which can provide costs on which managers can base decisions or which can be called "reliable" by any commonsense meaning of the word. Different evaluations and decisions require different cost estimates – short run or long run costs, marginal, average or full costs. There is always a degree of arbitrariness in allocation of costs which cannot be traced to particular products. This holds for the comparatively simple problem of estimating tangible costs; *a fortiori* there would be even more ambiguity (masked by spurious accuracy) if non-tangible costs were to be included. Sound managerial decision-making may start with costs produced by accounting systems, but this data will always have to be supplemented with other information.

When managers believe accounting systems can produce reliable costs, there is a risk they will suspend judgment, overlooking the conventions which govern accounting standards, and accept whatever the accounting systems report. To draw another analogy, in the early days of aviation, airplanes did not have fuel gages. Pilots carefully inspected their tanks with

3. See, for example, H Thomas Johnson and Robert S Kaplan *Relevance Lost: The Rise and Fall of Management Accounting* (Harvard Business School Press 1987).

4. Fortunately, the document, produced by the Management Advisory Board in 1997, has been withdrawn.

dipsticks, and made calculations on fuel flow, allowing wide margins for error. When fuel gages were introduced incidents of fuel starvation rose; there was too much faith in the new, convenient gages. So it can be with accounting. While there are advocates for comprehensive accounting reform (particularly among accountants who see an expanded role for the profession), there are critics, such as Theodore Porter of UCLA.⁵

The third approach seems to be the most practical. It is already embodied in the “Intellectual capital statements” of some European entities. In standing aside from the traditional accounts, it does not risk spurious accuracy. It may not present all information in a quantified form, and where it does present quantified data it may do so in different units, so that consolidation in a single dimension (in particular a monetarized dimension) is not possible. But that limitation is its value. It can recognize “intangibles”, without imposing high transaction costs and without presenting decision makers, internal and external, with single figures which obscure the conventions and assumptions which lead to their generation.

Knowledge capital – public good and other characteristics

Knowledge has many characteristics which distinguishes it from other productive inputs, such as trucks, sewing machines and shopfittings.

First, it is *non-rival*. That is, my acquisition of knowledge is not going to deprive you of acquiring knowledge. Land at Milson’s Point and Nolan’s painting of Robert O’Hara Burke are definitely rival; if I own these you do not. Tangible production equipment is rival. It is possible to produce more trucks, lathes etc, but their production consumes scarce resources.

Second, it is often *non-excludable*. If I produce a solution to Fermat’s Last Theorem, then, once I have published it and collected my Nobel Prize, there is no way I can exclude you from having it. Of course, since time immemorial, there have been attempts to make knowledge excludable. Aboriginal elders carefully guard certain tribal knowledge and firms keep their marketing and product research under wraps. But knowledge is easier to steal than a truck, sewing machine or shopfitting. Patents can provide some proprietary rights over knowledge, but they are expensive to obtain and they provide only temporary property rights.

Third, much knowledge is *embodied*. Disembodied knowledge comes in the form of patents, textbooks, encyclopaedia, process instructions etc. Embodied knowledge is what you and I carry around with us. It dies when we die, when we forget what we learned in Physics 1, or when we lose our mental abilities. It belongs to us, not to our employers. And, without appearing too Rumsfeldish, there is much that we don’t really know we know.

Embodied knowledge is hard to identify, and even harder to measure, in part because it has many dimensions.

Classical Greek has many words for what we bundle into the one word “knowledge”. There is *doxa* – commonly-held opinions, belief and judgements. Even if people have good technical education, if their opinions and beliefs are deep rooted in superstition, or if they are

5. See, for example, Chapter 5 (on accounting) of *Theodore M Porter Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton University press 1995)

intolerant of dissent, then creativity and the capacity to take on new technologies are likely to be suppressed. Historians generally accept that the Enlightenment of the eighteenth century was the precursor to scientific development which in turn was the precursor to the technological progress of the nineteenth century.⁶

In this regard there is often a false conflict established between liberal and technical knowledge, as if, because our capacity for learning is limited, one must necessarily be at the expense of the other. But in reality they are likely to be highly complementary. (A complementarity recognized in 1862 when Lincoln established the US Land Grant Colleges which were designed to provide training for the “working classes”, not only in agriculture and mechanics, but also in classical studies in order to provide a liberal education. A society with a tradition of liberal education is likely to be less fearful of change and more likely to adapt to the disruptions resulting from adaptation of new technologies, and its members are likely to be more willing to engage in retraining to adjust to change rather than marshalling political energy to resist change. But it is hard to imagine any firm’s human resource manager counting the workforce’s exposure to liberal studies as an asset on the balance sheet.

Other Greek terms covered by our word “knowledge” include *techne*, roughly translated as art or craft, and there is *metis*, or local knowledge. *Techne* and *metis* are hard to identify, and can be easily overlooked. James Scott of Yale University ascribes the failure of Soviet collective collectivized agriculture to the failure by central planners to appreciate these forms of knowledge, and lest we think his message applies only to central planned economies, he has similar warnings about management in market economies, where corporate managers may focus purely on disembodied knowledge and associated formal qualifications.⁷

Practically, this multi-dimensionality runs the risk that any system of recognition is likely to give undue attention to those dimensions of knowledge that are easily identified. Like the Soviet central planners, those who make allocation decisions, guided by any measures generated by biased accounting systems, are likely to be misled into over-valuing some enterprises while under-valuing others.

Neither embodied or disembodied knowledge can have much value on its own. A patent for a new pharmaceutical would have no value without highly qualified scientists who could interpret that patent. Conversely, technical or university qualifications, generally hold little value unless there is some form of organization in which it can be applied.

To quote Don Aitkin, former Vice Chancellor of the University of Canberra, referring to the notion that higher education is the site for the production and transmission of new knowledge:

But it’s a bit over the top. We academics like to construe knowledge that way, but we are really talking about academic knowledge, the kind of stuff that gets into internationally referred journals and counts for research funding.

6. See, for example, Neil Postman *Building a Bridge to the Eighteenth Century: How the past can improve our future*. (Knopf 1999).

7. James C Scott *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (Yale University Press 1998)

There is also a universe of knowledge that is not of that kind.

It is what you encounter in factories and workshops, in family homes, on the sporting field, indeed anywhere that human beings gather to do things together.⁸

What all this means is that, although at any one time, a firm can have access to a large stock of knowledge capital:

- it is not owned by the firm; workers can walk out the door, taking with them not only their embodied knowledge, but also those skills which allow them to make value from the firm's disembodied knowledge;
- it is hard to hold on to; even when there are legislated property rights, there are mechanisms such as reverse engineering which allow competitors to have access to that capital;
- it is hard to recognize;
- its benefits may not be captured by the firm. For example, creative workers with broad skills and a willingness to take risk by shifting jobs may count as "liabilities" on a firm's balance sheet, but as "assets" to the industry and the economy as a whole. In economics terms, much knowledge capital may be an "externality" as far as a firm is concerned. Even if it could be added up across all firms, it would be understated for the economy as a whole.
- it may lie latent if a firm does not recognize and make use of skills held by its workforce. While certain technical skills are signalled by certificates, many others may go unrecognized and unexploited.

Also, it may depreciate quickly. Depreciation can occur because people's skills atrophy (a particular risk is learning is not timed well) or because of obsolescence. (Personally, as an engineer who graduated in the 1960s, I have a vast stock of knowledge of the operation of thermionic electronic devices, and a measure of competence in several dead computing languages.)

For these reasons firms are likely to take a conservative attitude to valuing knowledge capital. Perhaps, in a dynamic sense, that may not matter greatly, if a firm's net stock of knowledge capital is turning over quickly but is holding its value as renewal balances depletion. Some accounting for knowledge capital may be useful to a firm, however, when there is a need to invest more heavily in knowledge capital, when there are untapped resources in the firm, or when a low stock price makes it a potential target for takeover.

Conventional economic thinking tends to support this notion of conservatism. Economic theory suggests that any competitive advantage enjoyed by a firm will be short-lived as competitors catch up, and that the returns from any factor of production tend to diminish as more is applied. But there is another aspect to knowledge capital, articulated by Robert Reich, former professor of public policy at Harvard University's Kennedy School of Government and Secretary for Labor in the first Clinton administration:

8. Don Aitkin "Over the top and underappreciated" *Financial Review* 23 June 2008

But human capital operates according to a different principle. Because people learn through practice, the value of what they do usually increases as they gain experience. This system is not self-correcting, in the sense that those who first gain the experience eventually lose whatever premium price they command in the market when others catch up with them. To the contrary, people fortunate enough to have had an excellent education followed by on-the-job experience doing complex things can become steadily more valuable over time, making it difficult for others ever to catch up. In fact, their increasing advantage may extend beyond a single generation, as extra earnings are invested in their children's education and training. Such widening divergences may be endemic to a global economy premised on high-value skills rather than on routine labor or capital.⁹

When we appreciate the public good nature of knowledge capital (its non-rivalry and its non-excludability), and the fact that it may have benefits way beyond the scope and life of any one firm, it is evident that the main value of recognizing knowledge capital may come in public policy.

Public policy – another look at our balance sheets

Governments, even to a greater extent than corporations, have difficulty in asset valuation. Even for the hard infrastructure owned by governments – bridges, buildings, navy ships, hospitals – valuation is difficult. Many assets are very old, so any historical cost is meaningless. Many have no market equivalent. Governments do not have the information of a share price, which can give a firm some indication of how the market values its “intangible” assets, and they are not subject to takeovers which, for a time at least, bring these “intangibles” to account on a firm's balance sheet.

More basically, government management of value differs from a firm's management of value. A firm's concern is for its own well-being – formally the financial interests of its shareholders, while holding certain prescribed obligations to creditors and employees. Governments, by contrast, are custodians of the common wealth. While a firm can draw a cordon around its responsibilities, a government's responsibilities are to the whole community. A firm's responsibility is to manage and create private value, a government's is to manage and create public value. In fact, in issues such as climate change and regional security those responsibilities are not constrained by national borders.

While private sector accounts have means, even if imperfect, of measuring private value, government accounting practices do a particularly poor job at capturing public value.

To illustrate, consider the Commonwealth Government's balance sheet, showing the total value of the Commonwealth's assets (excluding financial assets) at \$87 billion.

9. Robert Reich *The Work of Nations: Preparing ourselves for 21st century capitalism* (Knopf 1991)

Commonwealth General Government Sector Balance Sheet, \$ billion, June 2008	
Financial assets	184
Non-financial assets	87
Total assets	271
Total liabilities	210
Net worth	61
Source: Table 2, Part 9.4, Budget Paper #1 2008-09	

If that were the balance sheet of a corporation (say scaled back to millions of dollars) it would raise some serious questions straight away. A debt to equity ratio of 3.4:1 appears to verge on recklessness. And, indeed, the obsession of successive Commonwealth governments with debt bears out that interpretation.

But, while financial liabilities and financial assets are reasonably easy to bring to account, what does that \$87 billion of “non-financial assets” tell us?

Theoretically, that \$87 billion is the gross community wealth accumulated by the Commonwealth over 107 years! Our national highways, defense assets, museums, publicly funded knowledge To put this into perspective, assets of \$87 billion imply a value per head of around \$4 000, or less than \$10 000 per household. There is no similar consolidation of state and local balance sheets, but, if shown, they too would almost certainly reveal an absurdly low figure under government accounting conventions.

Whatever the needs are in the corporate sector, the most pressing need for recognition of “intangibles” would seem to be in the public sector, which, while not necessarily being the owner, has responsibilities for the community’s assets in those areas where markets fail partially or completely. These include:

physical capital – roads, hospitals, engineering works, school buildings etc

environmental capital – water, soil, atmosphere, ecosystems

social capital – the trust which holds communities together, reducing transaction and compliance costs

institutional capital – financial, cultural, political and other institutions

human or knowledge capital – the nation’s stock of knowledge, particularly that which has public good characteristics¹⁰

The same issues arise in public accounts as in the corporate sector, but because of valuation

10. This five part classification I have borrowed from Professor Glenn Withers.

problems, and complex questions surrounding questions of ownership and responsibilities, these issues are even more difficult to grapple with in the public sector.¹¹ But the arguments for recognition hold, perhaps even more strongly, for there has been a political emphasis by governments of all hues to focus on one narrow aspect of the balance sheet – public financial debt. Even if financial consolidation is not practical, some recognition of these assets, and their changing state year-on-year, brought together in the Commonwealth Budget statements, may allow more sensible and meaningful political and administrative consideration of the national balance sheet.

The other implication for public policy lies in the economic tradition of classification of the factors of production – natural resources, labor and capital. As this note suggests, the distinction between “labor” and “capital”, which may have made some sense 100 years ago (when Taylor and any other observer walking into a factory could easily make the distinction) is close to meaningless. Yet, public policy is still concerned with measures such as GDP shares going to “profits” (return to capital) and “wages” (return to labor). National accounts count education as “consumption”, and politicians and others talk about tradeoffs between “economic” and “social” policy. These are major issues to be confronted, beyond the immediate work of this committee, but which have to be taken into account.

11. For some of the complexities around “public value”, see Mark Moore “Public Value As the Focus of Strategy” *In Australian Journal of Public Administration*, Vol 53 # 3, September 1994