Concepts of capital: applying the metaphor to sustainability

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Introduction

This paper considers the appropriateness of the metaphor of ‘capital’ when dealing with assets of a non-financial nature. We argue that even though the term ‘capital’ can be useful in connection with some types of asset, it appears to be less helpful with others. This is particularly the case with reference to natural assets, which come in many different guises and which require different measures to help monitor and manage them. We conclude that a balanced scorecard approach may potentially provide a helpful basis for monitoring and managing different types of assets.

Capital is a concept that comes from economics and has been operationalised in the theory and practice of accounting. But its use has more recently been extended to cover a variety of different types of ‘capital’, including natural capital, human capital, intellectual capital and social capital. However, these new capitals do not necessarily share the same characteristics as economic capital, and may need to be accounted for in different ways. This paper articulates some of the differences and considers ways of measuring other types of capital that are helpful to establishing accountability and control. It suggests that flows may be a better management tool than aggregate values.

It appears that the concept of economic capital is being transferred to these other contexts in a metaphorical manner, and its applicability may be open to doubt in some cases. Metaphors are a useful way of transferring ideas from one domain to another, but they must be used with care as some components of the idea may not transfer as readily as others. In particular, the use of monetary valuation may not always be helpful in promoting accountability or establishing better control. In addition, other performance measures need to be carefully designed to ensure that they are helpful in monitoring use of assets and that they are robust against potential misuse. Setting ill-designed targets can easily prove to be counter-productive.

This paper argues that the different ‘capitals’ now being espoused have a variety of different characteristics that need to be taken into account in designing systems intended to manage them more effectively. In particular, these capitals have multi-dimensional attributes that cannot sensibly be reduced to the uni-dimensional scale of monetary valuation. Not only does such an approach lose sight of many important aspects of the capital involved, but it may actively change behaviour in harmful rather than desirable ways. A more balanced approach is proposed, which acknowledges these differences at the cost of having a more complicated measurement system that differs from asset to asset.

Economic and accounting capitals

The core meaning of capital stems from the idea of tangible resources that are used in the production of products or services, but which have a long-term life. However, these resources generally become depleted with use, and the practical consequence is that their asset value is depreciated over an expected lifetime. It should be noted that any such calculation requires an estimate of such an expected life, and that asset values may be affected by technological obsolescence, as well as by just the passage of time. Although economists have tended to use the more general concept of utility in comparing alternative possibilities, accountants have always operationalised such utilities in terms of money.

From an accounting point of view, complementary views of assets and their value appear on the balance sheet. On the one side, the physical assets appear with some estimate of their monetary value, although this can be computed in a variety of ways (such as depreciated cost, replacement cost, value in use). On the other side, there is a statement of ownership (for example, shareholder, loan provider) and a similar estimate of the value to the owner. Again it should be noted that such estimates of value can be quite subjective, although both sides are always equal.

The main purpose of defining capital in this way has been to allow an estimate of distributable income to be made, so that the entity does not distribute more ‘profit’ than it has earned. The underlying idea here is that the business is a long-term entity that should be maintained in a sustainable condition, rather than being run down. Two major issues are immediately apparent. First, this conceptualisation pays scant attention to the idea of change (economic, market, technological for example); the idea that a business is likely to continue in a basically unchanged form over time has become increasingly rare. Second, most systems of accounting pay no attention to the change in value of money, so that conventional accounting systems attempt to preserve money capital rather than real value.
From this perspective, the concept of capital maintenance becomes somewhat tenuous, and subject to a range of practical difficulties of estimation, which accountants have attempted to grapple with over the years. But it does have a practical usefulness, and differentiates between the asset itself and the ownership claims upon it. However, it is also noticeable that the management of even private for-profit enterprises has moved away from a concentration on using monetary numbers towards using a wider set of performance measures, perhaps most concisely typified by the idea of the balanced scorecard.

The concept of capital has been nevertheless transferred into other domains (such as human, social, environmental, intellectual capital) where its applicability is by no means obvious. We will consider some of these capitals in turn.

### Human capital

Human capital provides a good starting point as it has been extensively explored over the past decades. It is undoubtedly true that individuals possess a set of skills and abilities that can be represented as a capital asset that can be deployed over time. But this may not behave in the same way as conventional economic capital, as it may not become depleted by use. Indeed, it may increase by virtue of the experience gained by the individual by deploying their skills and talents. However, there is a limit to its lifetime, and individuals have choices in how they use their time and deploy their talents. From a management point of view not all human capital is the same, even though it may be valued similarly. Organisations need a wide range of employee skills and talents to function, and keeping an inventory of such skills and the likely future requirement for them is a considerable task that involves keeping track of a wide range of different skills.

Further, the ownership of human capital generally (short of slavery) resides with individuals rather than with an organisation that employs them. In economic terms, the individual may be seen as renting the use of their skills to the organisation in return for a wage. But although individuals are selected by the organisation for their skills, and the organisation may invest considerable amounts of money in developing and augmenting these skills, the individual retains the right to leave the organisation and work elsewhere.

The lack of success of attempts to engage in human resource accounting and to make it useful bear testament to the difficulties in transferring the idea of capital into the human domain. The concept may yield some useful insights, but its fit is far from perfect. The idea of ‘network’ capital may be seen as an extension of this approach, but where some of the value of a network might be seen as the property of an organisation, with individual components of the network being replaceable over time.

### Social capital

Social capital, a distinct concept which is nevertheless related to human capital, refers to the networks of relationships between individuals and groups and the creation of value that these may give rise to. Social capital can be distinguished at the individual and group level. While some scholars (for example Bourdieu, 1980; Flap, 2002) describe social capital as an additional resource which may help individuals attain their goals, macro-level theories describe social capital as a ‘collectively produced and owned entity’ (Coleman 1990; Putnam, 1995).

In this context, social capital is typically based on trust and shared values. Examples of social capital range from neighbours helping each other to connections among individuals in the workplace and across institutions, and the benefits that individuals or groups may derive as a result of their formal or informal membership in groups.

Even though quantifying social capital may be potentially useful, it is certainly not a straightforward task; any attempt to do so is further complicated by the necessity to consider aspects at both the individual and group levels. In addition, changes in the value of social capital – if, for example, the composition of a formal or informal group changes – are also not easily measured. Further, ownership of social capital is on many occasions difficult to determine, yet benefits may be realised at the individual, organisational or community level.

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Attempts to quantify social capital typically focus on observable variables, which are perceived to be good proxies for social capital. Decisions to be made revolve around whether to use a single or multiple measures of social capital and if it is necessary or even useful to aggregate different resources when attempting to construct a quantitative measure of social capital. An attempt to quantify social capital at the individual level involves a decision about whether to focus on access to social capital or actual use of social capital (Lin 1999, 2001). Measuring access to social capital entails ‘making an inventory of resources within the individual social network …’. Measuring use of social capital on the other hand focuses on actions and outcomes. Given that in reality it is only a part of social capital that will be used and will contribute to the attainment of goals, focusing on the use of social capital probably makes more sense. Having said that, the appropriateness of a measure will depend on how the information will be used or for what purpose it is sought. Quantifying social capital typically involves aggregation of measures of different items over the members in the network. However, the usefulness of such an aggregate measure is open to question and clearly depends on the purpose for which information is sought. It is likely that a more complex system involving the collection and analysis of information about numerous sub-dimensions of social capital will be more useful.

Natural capital

Natural capital is probably the most pressing issue in the modern world, with increasing pressures on sustainability on a global scale. As O’Neill puts it: ‘the metaphor of natural capital conceives of the natural world as a stock of assets which give a stream of benefits to humans’ (Chapter 12, Adger and Jordan (2009)). But even here, there are various ‘capitals’ with different characteristics that require treating in different ways. Even when confining discussion to those aspects of natural capital that can be thought of as ‘resources’, there are considerable differences. One can imagine a continuum that starts with those resources that are inevitably depleted by use through to those which can be re-cycled or renewed in various ways. Ideas of capital maintenance may have to be operationalised in different ways to account for these different situations and to manage them.

a) Non-renewable (extraction) assets

The most obvious resources in this category are various types of natural resources that are sources of energy, such as oil, gas, shale oil and coal. Their common characteristic is that the world supply of such resources is limited (although the size of the reserves may be difficult to assess and is dependent upon extraction methods and costs) and that the asset is not maintained but depleted by use. But even here there are differences. For example, some energy uses are very dependent on one type of energy (eg, air travel and oil) and energy is not necessarily substitutable between uses. In addition, valuation of such assets is very dependent on factors ranging from forecasts of likely future prices to ideas of inter-generational fairness. Finally, the use of these assets produces waste products that need disposal, and the costs of such disposal are also difficult to assess. For these, and other, reasons, accounting for the use of such assets may require quite complex models.

b) Recyclable resources

There are other types of extraction that produce resources that are used in the production of products, but where the underlying resource is not necessarily destroyed in use. Minerals such as metals provide one such example, where iron and steel can be reclaimed from products that have reached the end of their useful lives and be recycled into alternative uses. Motor cars provide a good example, and legislation requiring manufacturers to provide recycling routes for components demonstrates one approach to the management of such resources.

At one end of the spectrum, it is worth considering the use of water which is fundamentally self-recycling, although it may appear in places that have little need for more, at the expense of places that are suffering acute shortages. Given its value and weight, transportation is a solution of limited applicability. It also generates acute political pressures, for example where water is extracted from a river in one country, depleting the supply to downstream users. Thus water is not a uniform resource, but one which is highly dependent upon where it is naturally located. At the other end of the spectrum, a precious metal such as gold is always very carefully recycled (given its intrinsic value) and here monetary valuation may be an adequate representation of its characteristics to act as a useful accountability and control device.

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c) Renewable resources

Finally, there are resources which can be provided by renewable means, most notably energy produced from solar, wind or wave sources. Such sources are widespread, making the asset being managed to be more weighted towards the equipment needed to extract the energy rather than the energy itself. But even here sensible management requires a full life-cycle approach which considers the energy and pollution used in the construction of the equipment used, as well as its operating characteristics. The simple-minded view of assets such as electric cars and wind turbines being pollution free is inadequate.

An important subset of this category are self-renewable resources, on which agriculture and fishing are very dependent. At certain (low) levels of extraction, fertile soil and fish stocks will renew themselves by natural processes. However, at higher rates of extraction, soil becomes depleted and fish stocks may rapidly decline in ways that are difficult to repair. Here the problem is concerned with the sustainable management of such resources, with estimates having to be made of likely depletion rates if current practices are continued.

It is clear from this limited set of categories that the information needed to monitor the use of the resources differs from category to category, as does the ability to control the key variables. Economic valuation of these assets often seems to be peripheral to developing methods of managing these resources on a global scale. A useful ‘account’ for managing and controlling such capital assets requires quite a complicated, multi-dimensional approach which will differ in its detail from asset to asset. The appropriate approach will also depend on the purpose for which information is sought (eg, monitor use of resources, reduce use of resources, achieve specific targets or increase efficiency).

Further, great care needs to be taken in developing non-financial measures and using them as the basis for setting targets. The literature is replete with examples of the undesirable consequences that can occur when this is done badly, and the less well-defined areas of social and natural capitals make the issue even more acute. For example, the optimisation of motor car engine management systems to produce good results under test conditions, even though they may produce worse results under real world conditions, provides an obvious warning.

A balanced scorecard approach

The discussion in the previous sections suggests that given the different types and qualities of this diverse range of assets, a more complex set of measures as opposed to a single monetary measure may be more appropriate to measure and manage different assets. In this context, the balanced scorecard which espouses the utilization of a diverse set of financial and non-financial measures may provide a good basis for managing different types of assets. More importantly, the choice of financial and non-financial measures under the balanced scorecard framework is not arbitrary. Rather, the appropriate measures are chosen that will provide lead and lag indicators of business performance and will help an organisation to achieve its strategies. The balanced scorecard is also based on a plan designed to achieve the objectives specified, and contains measures of both outputs (outcomes / results), and most importantly measures of factors which are controllable by the business; and where targets are set that are believed to lead to desired outcomes if they are achieved. The balanced scorecard also pays explicit attention to stakeholders and these can easily be extended to a wider range of interested parties.

The implementation of behavioural controls (indicating desirable behaviours and also behaviours to avoid when working towards achieving a specified target) as well as linking the achievement of this target with the performance evaluation and reward system will also ensure that the control system in place is sound. Most measures used in balanced scorecards represent accounting flows rather than capital values, and it seems likely that most management purposes are better served by calculation of flows (whether in monetary or physical terms) rather than trying to assess capital values and the changes that take place in them.
Conclusions

We have argued that ‘capital’ is a metaphor, drawn from economics and accounting, which can be used as a measure to account for, to manage and control different categories of ‘assets’. In a general sense, many aspects of our world can be considered as resources which can be used in ways that benefit humans. However, the use of an economic calculus reduces the complexity of such activities to a uni-dimensional representation. Although this may be useful in aggregating information at a high level of generality, and may draw attention to the overall size and importance of particular issues, we argue that it is generally an inappropriate tool for trying to manage and control the use of natural and human resources.

In particular, attributes of assets(s) are multi-dimensional. Not only do different assets have different attributes which need to be managed in different ways, even a single type of asset has a range of attributes that cannot usefully be combined when attempting to manage it. For example, human resources are infinitely varied and need to be considered along multiple dimensions. We therefore suggest that aggregation in monetary terms to obtain a capital value is of very limited value in the management and control of many resources, and that a more ‘balanced scorecard’ approach is more useful. Not only does this approach allow multiple dimensions to be considered, but it can also explicitly identify stakeholders whose views need to be taken into account in the management process.

This is not to say that monetary valuation is not an important dimension. It is, but it is only one such dimension. Its value can be demonstrated in activities such as carbon trading and creating a market in carbon emissions, which has given a starting point for motivating the reduction of such emissions by invoking an economic rationale. However, this approach can also backfire as Sandel (2013) has pointed out in his book (‘What Money Can’t Buy’) and lead to the real asset being de-valued by attributing just a monetary value to it. He argues that attaching monetary values to some activities devalues them, and causes the moral reason for undertaking them to be subsumed into a pure economic calculation. This indicates that the use of monetary approaches needs to be undertaken with care and applied only in circumstances where their benefits outweigh their costs.

Our conclusion is that we need complicated methods to deal with a complicated set of problems and issues. In particular, a performance measurement system such as the balanced scorecard including financial and non-financial controls, as appropriate, will be better able to deal with the monitoring and management of different types of capital. The metaphor of capital may be helpful in some circumstances but not in others. More generally, we need to keep track of the multiple dimensions that are relevant to each particular resource and not to oversimplify. Also, different resources will have different sets of attributes we need to monitor. The ‘balanced scorecard’ will appear to be complicated, but it stands a chance of having the requisite variety to deal with the complex issues we need to face up to.

In this paper, we have attempted to explore the application of the concept of capital to different situations where it has been used in recent years. We also explore the feasibility and desirability of monetising the value of such capital, and conclude that concepts such as the balanced scorecard, triple bottom line accounting and the A4S sustainability reports all give insights as to how reporting can be developed without using monetary values where these are difficult or meaningless to provide. Overall, we take the view that although capital is a useful concept in its economic context, and although it may give useful insights when extended outside this domain, it is essentially being used as a metaphor. This requires careful consideration of its validity and thus usefulness.

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6 He argues, for example, that the use of tradable pollution permits may transform the reduction of pollution from a moral imperative to merely a cost of doing business.