

CEVITA™: the valuation and reporting of strategic capabilities

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Abstract

New types of “measurements” are needed for both tradable and non-tradable assets in order for organisations to meet the challenges present at the corporate, national and international levels, especially in the areas of strategic decision-making and valuation. The focus of attention in recent studies has been on the valuation of intangibles. This paper argues that it is the combination of both tangible and intangible assets that provide an organisation a “capability” that ultimately drives its economic value. The paper then reports on a research study conducted to value organisational capabilities for a strategic military unit (SMU), and a reporting framework comprising a strategic balanced sheet and strategic income statement that was developed for this purpose. The valuation approach is basically to calculate the Capability Economic Value of Intangible and Tangible Assets (CEVITA™) of an organisation by leveraging its capability-enhancing expenses to economic values by using specific Expense Leveraged Value Indexes (ELVI™).² This paper illustrates a technique that will not only make these strategic valuations more relevant, but also show how to report these tangible and intangible asset combinations in an organisation’s financial statements. Even if generally accepted accounting principles cannot accommodate such value-creating information for external reporting, it is argued that, we need to develop them for internal reporting that is less constrained.

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1. Introduction

Many business surveys around the globe suggest that managers believe that in both manufacturing and services, it is the *intangibles*—brands, intellectual property, know-how and copyrights—that are increasingly critical to a company’s value (see Ratnatunga, 2002; Andriessen and Tissen, 2000;

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² The CEVITA™ and ELVI™ trademarks are owned by Profitable Marketing Pty. Ltd in Melbourne, Australia, who were the principal consultants appointed by the Australian Department of Defence for its Strategic Capability Valuation Project.

Leadbeater, 2000; Litman, 2000; Barskey and Marchant, 2000; Barth, 1998). They argue that *competitiveness* is increasingly based on how organisations harness these intangible assets, as it is harder to sustain competitiveness in today's global economies purely on the basis of the traditional tangible assets, as these are also easily available to the competition. The view is that it is the intangible assets that now provide the true *competitive advantage*. Many professionals and analysts recognise that book valuations have been slow to adapt to the changing asset base of modern businesses, which rarely record intangibles on balance sheets, and are mostly in other (notes) sections of company annual reports. For example, the UK Accounting Standards Board, quoted a 1991–1992 survey showing that 81% of large companies reported no intangible assets in their balance sheets. A more recent survey found that 76% of 226 quoted companies did not record any intangibles on their balance sheet (Leadbeater, 2000).

As convincing as these arguments may be, this paper argues that we need to go beyond individual asset classifications and values, be they tangible or intangible, to recognising how these assets work in combination to provide the *capability* of an organisation to enhance its economic value.

It is important to point out that the value of an organisation's asset capabilities is highly *context-dependent*. These assets increase in value only when they can be used in such a way that competitors find hard to imitate. Tangible and intangible assets that are valuable in one setting may lose their value elsewhere. For example, although accountancy and advertising companies depend heavily on human capital, they do so in quite different ways. A qualification and experience-based measure appropriate for an accountancy firm may not be that relevant in an advertising company which is idea generating. These "context-dependent" assets provide a source of competitive advantage because they incorporate unspoken, routine or tacit ingredients, which competitors find hard to imitate. This issue will be explored further in the paper.

The above discussion indicates that even if tangible assets such as machinery and intangible asserts such as patents and copyrights can be valued, what is hard in practice is the valuing of the associated *tacit knowledge* and *judgement* required to combine these differing assets to enhance the capability of the organisation. This paper will consider how these tangibles and intangibles come together to give a company a source of competitive advantage, i.e. how they are recognised as the organisation's "*capabilities*", rather than as assets or capital in some fixed sense, and provide a practical approach to value and report such capability values.

2. Motivation and objectives

The impetus to consider *asset capabilities* as against *asset values* came via a research project undertaken for the Australian Department of Defence (DOD). The DOD's publicly available annual report in 2000 lists in Section 2 of the DOD's financial statements as per generally accepted accounting principles (GAAP), as well as in Section 3 under Output Performance Australia's defence capabilities in terms of resourcing costs (e.g. strike capability, surveillance capability, ground-based air defence capability, amphibious lift capability, etc.), but there was no link between the two sections.

The DOD, like most government entities is being continually pressured to report under conventional accounting standards relating to private sector organisations. The Australian Department of Finance and Administration's "Accrual Budgeting Project" is being implemented throughout the government service, and the DOD has also to adhere to this new framework. One of the key publications in this project is the "Beyond Bean Counting" manual (Australian Public Service Commission, 1997) that highlights the

approach to effective financial accounting in the Australian Public Service. In this document, departments are urged to incorporate best practices such as “activity based costing”, “benchmarking”, “the balanced scorecard” and accrual based financial statement reporting.

The research project to consider strategic capability values at the DOD was an offshoot of a larger project to integrate the assets registers of the Australian army, navy and air force and report tangible asset values under accrual accounting principles. As 60% of Australia’s public assets were defence assets, this integration was a massive undertaking in itself. However, some real concerns as to the “informational value” of the task been undertaken soon arose. Of the many examples, one in particular highlighted the problem. DOD had built in Australia, based on a Swedish design, a “Collins Class” Submarine and found that there was, initially, a problem with their noise levels; in, that it was able to be tracked by world-war two technology based sonar as it moved underwater. Thus, whilst its cost value was substantial, its strategic value in terms of strike capability at that time was in the negative value territory.³ The DOD had a “Defence Capability Plan for the period 2001–2010” (Defence Materiel Organisation, 2001) but in financial terms all that was reported was estimates of expenditure in each phase, and not the strategic value to the organisation of having such capabilities.

A research team consisting of university academics, professional accountants in practice and senior members of the DOD was formed to study this mismatch between cost values being recorded in the assets register, and the capability values of those assets. The authors were part of this team. At this stage, the scope of the project was also extended not only to study the capability value of tangible assets, but also the capability value of intangible assets.

In stage one of the project, the DOD research project was given the brief to identify the “new types of measurements” required by organisations for the valuation of intangibles, and then in the next stage apply them to a defence forces unit, particularly with regards to how they could be used to value defence capabilities. As the “building blocks” of strategy, it was argued that these new measures could form the informational basis of creating sustainable competitive advantage.

The shift from reporting “tangible asset values” under accrual accounting concepts to reporting “capability values” of tangible and intangible asset combinations requires a shift in ontological assumptions (see Morgan and Smircich, 1980) and epistemological orientation. Whilst GAAP assumes reality within the concrete ontological spectrum of structure and process, these new measurements consider reality within a spectrum of a contextual field of information to a symbolic discourse to a social construction. Lave and Wenger (1991) argue that contextual knowledge is created primarily through ongoing interactions and improvisations that an organisation’s employees undertake in order to perform their jobs. Indeed they state that this learning could be regarded as a product of a community, i.e. the organisation learning rather than of the individual in it. There is synergy to the capability measure of an organisation, which may be greater than the sum of the individual parts. This can increase during the process of learning and any drop in one component may reduce the total in excess of the individual component’s worth. Such lessons learnt, therefore, cannot easily be transferred from one setting to another, giving an organisation a true competitive advantage. The measure developed here incorporates these possibilities.

This paper first summarises some new measurements that have been developed to make organisational valuations (see Ratnatunga, 2002; McPherson, 1998; Skyrme, 2000), and compares and contrasts the strengths and weaknesses of these new measurements. The paper then reports the *new value measure*

³ This problem has since been fixed and thus by spending more money the submarines capability values have been restored.

developed for the DOD incorporating the various strengths of these metrics that is particularly suitable in a defence context. The principle value metric developed by the DOD research team is the Capability Economic Value of Intangible and Tangible Assets (CEVITA™) measure. The DOD's CEVITA™ would be the value of all of the tangible and intangible traits and resources, and how they combine to provide the capability that makes the DOD unique.

The paper next provides a case study of how the CEVITA™ was used to calculate and report the strategic value of defence capabilities in one strategic military unit (SMU) of the air force. This SMU was used as a pilot study in the capability valuation research project, and the Head of the SMU was assigned by the DOD to a key role in the project team. The scope of the study included the redesign of the unit's Chart of Accounts and consideration of the journal entries required for recording purposes. The report generated by this pilot study is currently being studied by the DOD for wider implementation, and forms the basis of this research paper.

Finally, questions are raised as to the generalisation and applicability of the lessons learnt from the case study in a commercial environment. It is argued that, in a commercial setting, valuing organisational capabilities can be undertaken, especially with regards to the tangible and intangible capability-asset combinations, which have become the main source of competitive advantage because they are so difficult to be imitated by competitors.

3. The accounting challenge at the DOD: a new information reporting paradigm

Valuation problems affect most tangible and intangible assets, let alone how they combine to form asset capabilities. As a start, the research team at the DOD looked at the commercial world, to study several theories and possible responses to the intangible asset valuation problem. What the team found was a multitude of practical responses (see Keller, 2003; Ratnatunga, 2002; Leadbeater, 2000; Sveiby, 1997; Rappaport, 1986), but a lack of strong theories underlying these responses. The team also found that whilst there was good theory development in the area of understanding organisational capabilities and contextual knowledge accumulation (see Teece et al., 1997; Lave and Wenger, 1991; Orlikowski, 2002; Bontis, 2000), there was little work done in valuing the effect of *asset combinations* in the valuation of capabilities. Thus, the DOD team had to develop a theoretical core from diverse areas in order to develop a model specifically for the valuation of defence capabilities. These diverse theoretical strands will be discussed at relevant points in the paper.

The conventional financial statements used in the DOD did not report on its position in terms of the *competitiveness* of Australia's defence forces, especially how the military harnesses its intangible assets, such as the combat readiness of its personnel and combines such with its military hardware. In an increasingly hostile world order, especially in the light of the terrorist attacks in the USA, the war in Iraq, etc. it is harder to sustain competitiveness purely on the basis of the traditional tangible defence assets, such as strike aircraft, tanks and battleships, as these are most often not only also available to the competition (enemy), but also not effective if the enemy employs non-traditional means in battle, such as guerrilla tactics and chemical weapons. Especially in the armed forces, it is how both the tangible and intangible assets are deployed in some tacit, context-dependant, manner that now provides the true *competitive advantage*.

Capabilities are sometimes referred to as the distinction between “knowing” and “knowledge” (Ryle, 1949; Polanyi, 1967); or as Schon (1983) states: “our knowing is in our action”. What is relevant in

Schoen's observation to this paper is the essential role of human agency in knowledgeable performance (Orlikowski, 2002; Brooking, 1996). This paper extends Schoen's observation further by considering the role of human agency and tangible hardware. For example, does a strike aircraft have any value at all, if there are no trained pilots to fly it? Thus, at the core of the paper is the theoretical question: "Should the valuation of assets be based on what one has or what one can do?"

For example, Orlikowski (2002) provides a comprehensive case study of a company in the commercial world that has developed significant capabilities in global product development. She identified a repertoire of practices that can be seen to constitute a capability in distributed organising. To be successful, the company had not only to collectively *know how to do* distributed product development, but also repeatedly enact this competence over time. Orlikowski (2002) suggests, therefore, that "knowing" is not a static embedded capability or stable disposition of actors, but rather an ongoing social accomplishment, constituted and reconstituted as actors engage the world in practice.

Teece et al. (1997) put forward the "dynamic capabilities" approach in which a firm's strategic dimensions are its managerial and organisational *processes* (essentially its decision-making capabilities), its present competitive *position* (technological capability and intellectual property, customer base, supply relations, etc.), and the *paths* open to it (technological trajectories and business opportunities). For example, understanding competitive advantage that accrues from IT requires viewing firms as a blend of interacting relationships resources, organisational values and technology, and that this interaction sometimes creates path dependencies which lead to unique resources or *context-dependent* assets, which increase in value to owners and consumers (the Government of Australia, in the case of the DOD), if the competitors (the Enemy) find it hard to imitate such capabilities.⁴

Lave and Wenger (1991) state that there is a strong link between knowledge and society, and that this is based on the idea that, in its essence, knowledge has a practical nature. In other words, knowledge, far from being an abstract matter based on a factual representation of reality, is closely linked to the *context* of social practices, which are created, generated, and reshaped within an organisation.

The view that the combination of tangible and intangible assets that make-up a capability is highly *context-dependent* is particularly relevant in terms of defence capabilities. For example, it is accepted in the Australian Defence Forces (ADF) that whilst youthfulness may be relevant for the capability of ground troops, in terms of fighter pilots the amount of flying time (experience) is the key-indicator that determines capability. Thus, whilst promotion of more senior people to managerial tasks in the Army's may increase the strike capability of its ground troops, similar promotions may reduce the strike capability of the air force.

The above discussion indicates that even if formal intellectual property such as defence patents can be valued, valuing the associated *tacit knowledge* is hard. Often this tacit knowledge is embedded in defence routines, which are constantly evolving both within the organisation, and with external entities. For example, the know-how of the DOD may only become valuable when combined with the know-how of its partners, suppliers, contract manufacturers and other strategic partners.

The DOD team found that in the defence forces, the capability valuation model was simpler to construct than in the commercial world. Even its more traditional assets such as its military equipment and facilities are all required for one strategic purpose, its *capability* in defeating the enemy. This capability can be broken down into two sub-asset levels, *force structure* and *preparedness* as shown in Fig. 1.

⁴ The DOD has one customer, the Government, which also is the DOD's owner—the main objective of the DOD is to keep Government convinced that money spent on defence is a worthwhile investment in capability development.

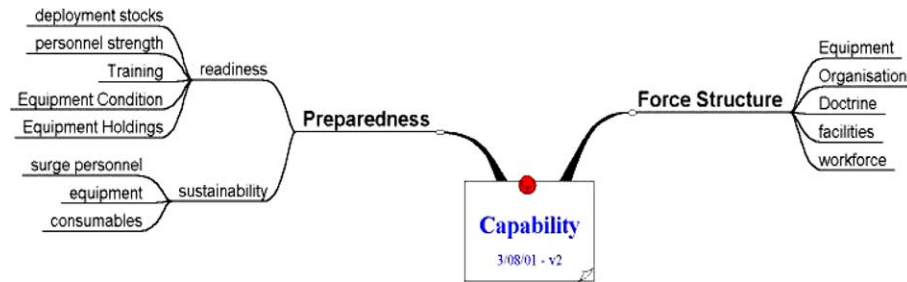


Fig. 1. Military capability example.

4. Traditional valuation approaches to intangibles

The more common traditional valuation responses suggests the use of one of three approaches to value tangible assets, i.e. *replacement cost*, *income projections* and *market valuation*, and extend them to value intangibles. However, Ratnatunga (2002), Leadbeater (2000), Barskey and Marchant (2000), Andersen and McLean (2000) amongst many others have discussed at length how these traditional approaches do not work well for intangibles.

Considering these traditional valuation approaches in terms of defence assets, assessing the full costs of replacement is very hard as often a tangible asset (e.g. a strike aircraft) is tied up with the training and other costs of the personnel attached to that tangible asset. We have already referred to the Schon (1983) observation of the role of human agency in knowledge performance. Thus, although the *replacement cost* of an F111 strike aircraft can be determined, do we also include in our valuation the pilots required to fly it? With regards to *income projections*, this method is also not relevant for organisations such as the DOD, which procure assets for purposes not associated with the generation of future income. It is anyway difficult to isolate the income attributable to an intangible, especially where it is wrapped up with a tangible product. A past income stream will be a misleading guide to a product's value in a market experiencing rapid technological change. With regards to intangibles, *market valuation* may not at first appear as being relevant for organisations such as the DOD (which itself has no market value). However, many of its knowledge workers and people assets do have, in fact, a market value. For example, a trained fighter pilot is a very tradable commodity as a pilot in a commercial airline such as Qantas.

4.1. New valuation attempts for intangibles

The more recent valuation approaches to intangibles takes the view that whilst many of the assets that make up an organisation's capability may not be visible, they can still be measured and managed (see MERITUM, 2002). The argument is that if managers want to cultivate intellectual and other intangible resources, they need to develop performance measures that link internal productivity to market value. The question is: how does one link reasonably objective financial statement measures to the somewhat subjective measures of intangibles such as intellectual capital and organisational capability?

There have been numerous attempts to value intangibles more reliably (Johansson, 1996). The DOD research team ascertained that these were developing from three directions in terms of applications in the

commercial world. First, there is a range of new approaches to performance measurement and internal corporate reporting using modified *discounted cash flow* techniques and *accrual accounting* adjustments (Boston Consulting Group, 1993). Second, there are the *index-based measures* (such as the Balanced Scorecard), which attempts to link financial performance to intangible drivers like employee quality and morale and customer satisfaction (Kaplan and Norton, 1992) and then link this financial performance to a company's share market valuation. Third, there are the measures that attempt to directly value intangibles such as brands, patents, R&D and customer loyalty by either linking them to *market values* if a market exists, or if not, obtaining a *consensus* of their likely market values (Giriliches, 1996; Lev and Zarowin, 1998).

These approaches are not mutually exclusive. Different kinds of measures might be more relevant to different stakeholders. Some are designed primarily to give managers and workers a clearer picture of the strengths and weaknesses of their organisation and change the way they think and act. Others may be designed to help analysts and investors assess the contribution that these intangible assets make to the financial performance of the organisation.

The DOD team believed that whilst all of the above measures had strengths in moving the valuation of the organisation closer to its true capability value, the most relevant for its purposes would be the accrual accounting, index-based and consensus-based measures for the reasons outlined in the following. Also, due to the specific nature of the DOD, many of these measures also have weaknesses. However, if certain features of some of these models are combined, it was believed by the DOD team that their combined strengths would overcome their individual weaknesses.

Cash flow measures were not considered relevant for organisations such as the DOD, that procure assets for purposes not associated with the generation of income or cash flow, and thus they were not be used in the CEVITATM measure discussed at length later.

Accrual accounting based measures such as Economic Value Added (EVA[®]) that incorporate a cost of capital charge were, however, viewed as being particularly relevant for the DOD, especially because the current Australian government policy dictates that an interest charge on assets called a "capital utilisation charge" (CUC) of 11% is levied on the net-difference in the budget versus actual net assets.⁵ However, the EVA[®] calculation would have to be significantly modified, because concepts such as profit, tax and market value are not relevant to the DOD.

Market-based measures (Deloitte and Touche, 1996) were not considered relevant for organisations such as the DOD, because, whilst it has individual assets that would have market values, the DOD as an organisation does not have a market value as understood in a commercial sense. Also, individual assets that had market values were often combined with non-market intangible assets to provide organisational capabilities. Thus, it was considered that in most cases this approach could not be used in the CEVITATM measure of the DOD.

Index-based measures, especially the non-financial metrics of the Balanced Scorecard were considered to be extremely relevant to the DOD. The DOD itself has a Balanced Scorecard.

Consensus-based measures use some amount of managerial judgement in the valuations. The approach is to estimate the dollar-value of intangible assets by identifying its various components. Once these components are identified, they can be directly evaluated. In the index-based measures they are evaluated by using an aggregated coefficient. In this approach they are evaluated individually. This consensus-based approach would be extremely relevant to the DOD as will be discussed at length in the following.

⁵ This capital use charge is no longer applied by the Australian Government of Defence assets.

5. Steps used in the DOD in the CEVITA™ work method

We will now present the conceptual model developed by the research team at the DOD to generate strategic financial statements that would enhance the ability of the DOD to determine the capability value (in contrast to the financial accounting value) of its intangible and tangible assets. This value was referred to as the DOD's CEVITA™.

In order to calculate CEVITA™, the DOD Team recognised that it needed to first prepare a *strategic income statement*. As discussed earlier, some asset values were measured using EVA® principles, others were appraised to obtain market values (if relevant in a capability sense), and still other assets were valued by using key performance indicators (KPIs) and consensus measures similar to those found in organisational Balanced Scorecards. Those KPIs that could be used as an economic lever of value were recognised as the many *Expense Leveraged Value Indexes* (ELVI™) found in organisations such as the DOD. The ELVI™ measure will be explained in detail in the next major section of this paper.

5.1. What are the total strategic assets of the DOD?

An asset may be a factory or warehouse or some specialised machinery. It also may be a website or internet-based channel exhibiting impressive visitor reach and frequency. It could be a patent or a particular training routine. The DOD Team believed that it was the leveraging of *all* of its resources, whether digital, physical, people, or programs in combination, that will drive the Australian Defence Forces success against its enemy.

Therefore, in order to develop strategic value statements for the DOD, one must first recognise what are the capability-based tangible and intangible assets (some which are more easily identifiable than others). Some of the more-identifiable (but still troublesome) key intangibles found in most organisations, including the DOD are summarised in the following.

The first category of intangibles is *human capital* and *customers*. The former is all of the trained personnel that give each SMU its competitive advantage, and the latter for the DOD is the Australian government.⁶ Most of the new performance measurement systems in the corporate world, which include measures of customer and employee acquisition and retention, life cycle, turnover and age profile, are also relevant to the DOD. The challenge is to show how these non-financial measures can be translated into financial measures that could be relevant to the accounting value of the DOD in terms of its capabilities. For example, in terms of human capital KPIs, one SMU might need a high turnover rate to bring in younger people; another might wish to lower its turnover rate to create a more stable workforce.

An organisation's *brands* are also an important intangible asset category. A strong brand can give a company benefits like greater customer loyalty, less vulnerability to competitive marketing, larger margins, and more inelastic customer response to price increases. In the current "volunteer" environment of the Australian military, much advertising of the defence brands has to be carried out for recruitment purposes. Again, these expenses can be leveraged to ascertain the asset value being created, using the KPI index. Such KPI-based indexes are the ELVI™ that were to be used by the DOD to build-up an enterprise's overall CEVITA™ measure.

⁶ As discussed before the Government is both the DOD's owner and principal customer. The Government is income generating as far as the DOD is concerned—thus it is not so much a matter of the DOD having more customers, as of keeping this one customer focused on an acceptable level of investment in order to develop capabilities for its use as its main customer.

Research and development, intellectual property and patents make up the last category of intangibles. There are various kinds of R&D, each with a different impact on the strategic capability of the armed forces. Some R&D is basic research which may be highly risky but which might provide the basis for substantial long-term growth. Other forms, such as software development, are aimed at developing products with a short life span. This product development type of R&D differs from research designed to make production/logistics/supply chain processes more efficient. Financial accounting regulators often take the view that such R&D spending should not be recorded as an asset but treated as an expense. However, such expenditure could be leveraged to provide a capability-asset value in its defence forces. Similarly, patents are becoming a focus for intellectual capital management within most organisations. Whilst many defence patents are in the “Top Secret” category, many are utilised in income generation through licensing etc. Even when they are not, the existence of these patents increase the capability of the defence forces, and thus must form part of the CEVITA™ measure.

5.2. Market appraisals and market consensus values

It is clear that both tangible and intangible assets are “relevant” to the understanding of most organisations’ capabilities, especially in non-cash generating organisations like the DOD. However, such valuations, especially of intangible assets, may not be considered “reliable” for external reporting purposes under current GAAP (King, 1999).

The DOD research team believed that *capability appraisals* of intangible assets can be relevant and reliable when undertaken by (often a team of) experienced professionals. Accountants may not feel qualified to determine the value of intangible assets, but if they can review valuations of oil properties (which they are routinely doing in oil exploration companies) then it is not unreasonable to expect them to review the valuations of intellectual property and other capability-enhancing assets.

King (1999) notes that just as there is GAAP, so there are *generally accepted appraisal principles*. Appraisers have to follow the *uniform standards of professional appraisal practice* (USPAP), which incorporate basic valuation principles. Appraisers, in general, use a combination of the cost, market comparable and income-based valuation approaches (Connolly, 2000).

The *cost* approach asks what it would cost today to acquire the same or similar assets, while the *market comparable* approach looks to the market to see what the same or similar assets are actually selling for. The *income* approach asks what investors are willing to pay for an asset with a given income stream in the future, and is perhaps only relevant for a few cash generating assets in the Australian Defence Forces. If the market comparable values or income streams are not immediately available, *consensus-based measures* are used, where the experience and judgement of the valuer is used in the valuations.

It was considered by the DOD research team that for most capability-enhancing assets of the DOD, the *cost approach* combined with *market consensus values* was the most appropriate. Measures often use non-financial information such as “brand strength” or “combat proven” to illuminate the way stakeholders reach market valuations. For example, the French Exocet missiles capability value soared well over its cost value when the Argentines used it successfully in the Falklands war. Such an approach would make market valuations more reliable and could in turn help to inform accounting valuations of an organisation’s intangible assets. The non-financial information needed for such approaches is being generated in the DOD by the new performance measurement systems such as Balanced Scorecard that has been implemented. As noted earlier, the DOD research team termed these non-financial measures as the many *Expense Leveraged Value Indexes* of the DOD as they are used

in leveraging the DOD's financial accounting expenses into the value of the underlying asset they support.

5.3. Valuing and accounting for non-cash flow based assets

In the commercial world there are those who believe that these “other intangible asset values” could also be captured in cash flow terms by first using a “market consensus” approach as discussed above, and then brought into the total business value computation via a discounted cash flow (DCF) analysis. This approach was, however, considered by the DOD research team to be overly complicated for an organisation such as the DOD, which does not have cash generating assets in the traditional sense. Instead the DOD research team proposed that such capability-asset values be ascertained (revalued) and brought directly into the strategic balance sheet via a single-period valuation process, very similar to the revaluation of a non-current asset in traditional financial accounting.

However, many inconsistencies arise under current GAAP, especially the principle that firms cannot (usually) bring in the value of intangible assets on their balance sheet in the above manner unless a company is taken over (i.e. a transaction has occurred).

It is clear that in implementing current GAAP, financial professionals face a dilemma in that they want financial statements to be both *reliable* and *relevant*. Reliability is easy to achieve, but relevance is not. This is especially true when it comes to the Armed Services because the intangible assets are not referenced in their statements, yet these assets are highly relevant to its stakeholders.

It was therefore concluded by the DOD research team that a *strategic balance sheet* has to go beyond GAAP, and incorporate far more asset investment categories than those captured by traditional financial accounting standards. What was required is to capture the totality of the DOD's CEVITA™ on the asset (investments) side of the balance sheet. In addition, in order to adhere to the principles of double-entry accounting, the DOD also needed to develop the *financing side* of the balance sheet, which, in totality must equal the CEVITA™ of the *investments side* (if the strategic balance sheet is to balance). Such a balance sheet is illustrated in Fig. 2 for the DOD.⁷

The categories of intangible assets that were particularly relevant to the Armed Forces in general, and the DOD in particular, in valuing its capabilities were: *innovation assets* that are created by the pure research capability of the organisation; *human resource assets* that are enhanced by the motivation, morale and empowerment of its labour (troops), management (officers) and knowledge workers; *organisational image assets* that are enhanced by its image in the wider community which ultimately funds the DOD; *external relationship assets* based on the quality and levels of trust afforded to it by its strategic partners, customers, distribution channels, suppliers, trade unions, financiers and government agencies; and *internal infrastructure assets*, which enable the DOD to get its job done. These include unique technological assets such as software or code, unique process core competencies, and unique physical assets such as specialised or well located plants or warehouses (see Ratnatunga, 2002; Leadbeater, 2000; Litman, 2000; Barskey and Marchant, 2000).

Therefore, the first step in obtaining the DOD's CEVITA™ would be to redesign its *Chart of Accounts*. The new Chart of Accounts would need to reflect the view that resources, not products or

⁷ Note that Fig. 2 has some real-accounts in “italics-parentheses”, indicating that these are more relevant for commercial organisations. Also, some real-accounts are in “bold” indicating these are specifically for military based financial reporting. The commercial applicability of Fig. 2 will be dealt with later in the paper.

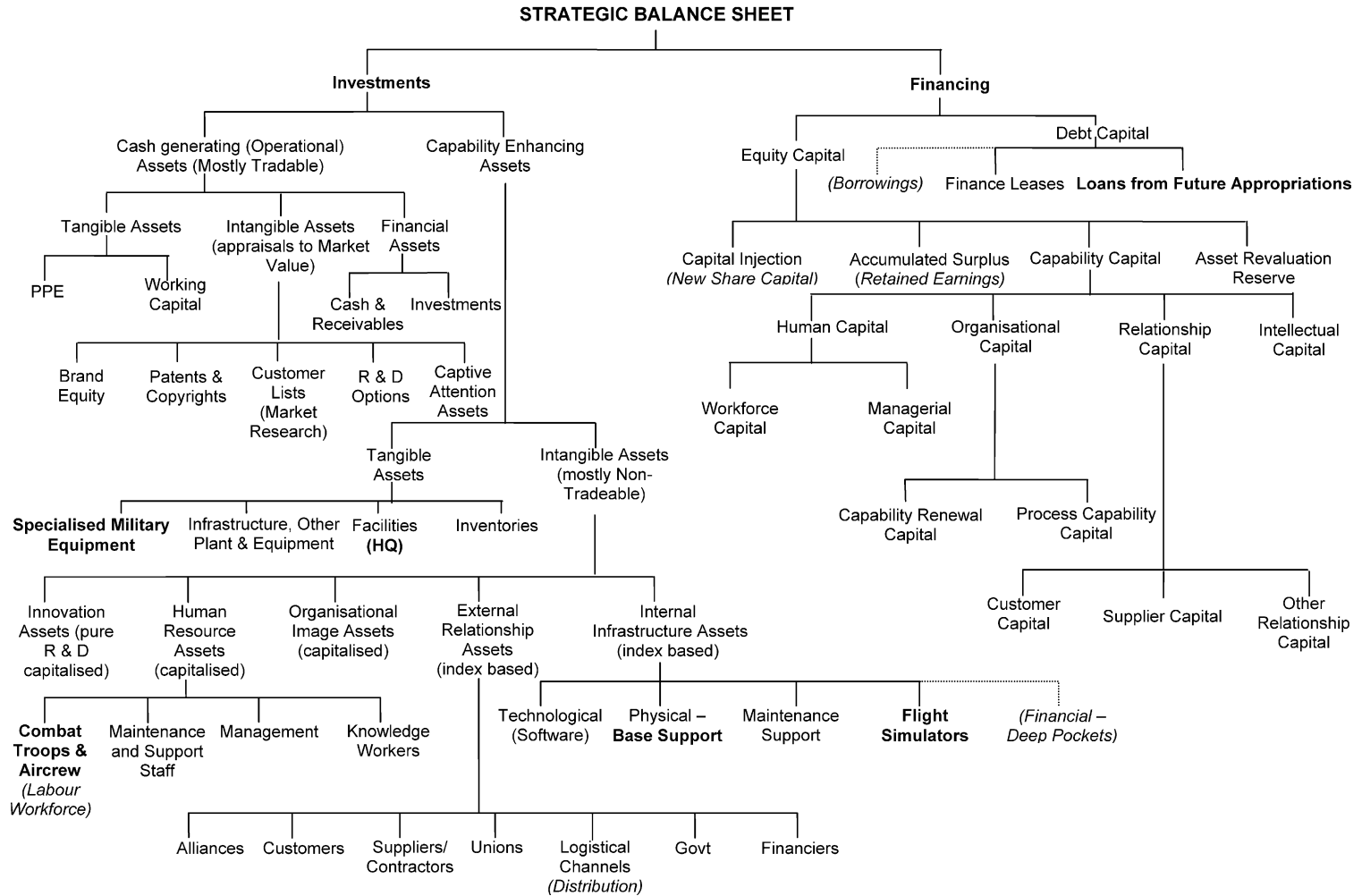


Fig. 2. The strategic balance sheet.

services, constitute the primary source of the DOD's strategic capability advantage. Specific resources include both the traditional tangible assets such as property, plant and equipment (PPE) and working capital, and also intangibles such as, combat trained troops, skilled personnel, trade contracts, access to capital, and all of the other intangibles listed above. As we have noted, most of these resources do not currently appear directly in traditional financial statements of the DOD due to GAAP restrictions. However, as such resources drive the DOD's competitive advantage, it needs to identify and manage them.

The Chart of Accounts for the capability assets and intellectual resources was designed to track the accumulation, maintenance, and availability of the resources that combine to create an organisation's capability. What was needed then was a sophisticated tracking and monitoring system in order to permit organisations to control both the availability of resources and their strategic deployment.

Current activity-based costing and related process re-engineering systems in most organisations do a good job of capturing and measuring basic resources, and the product and period costs generated by the activities they undertake, but they miss the value of intellectual assets like research and development, information systems, and other specialised functions. Simply increasing the number and volume of scorekeeping measures does not represent a step forward; integrating these measures and improving upon them does (Barskey and Marchant, 2000; Cooper and Kaplan, 1988; Johnson and Kaplan, 1987; Ittner and Larcker, 1998; Kaplan, 1984).

The DOD research team believed that a truly resource-based system can, however, be designed to capture all resources and then help shape organisational strategies, by developing a system for tracking activities and inputs into specific resource categories and their related financing costs. There were ongoing ABC projects within the various parts of the DOD, and in their "fully-rolled out versions" the researchers believed that such systems should be able to capture the "shared resources" aspects required by the CEVITATM valuation measure.

In the framework proposed, the asset resources of an organisation were divided into two fundamental groups (cash generating and capability-enhancing assets), with each group having two further sub-divisions (tangible and intangible). Each sub-division was further divided into various sub-categories. Thus, category-by-category, the DOD's CEVITATM was built up by developing and utilising financial and non-financial indicators for each basic asset resource pool, and then linking these asset values to the financing side of the balance sheet (see Fig. 2).

The *cash generating (or operating) assets* of commercial organisations are mostly "Tradable" in that one can find a market (or market appraisals) for such assets based on expected future cash flow from those assets. In the case of the DOD and its CEVITATM, there would be very little "cash generating assets", i.e. asset that generate cash via its operation. Military assets are mostly 'capability-enhancing assets'. They lose their "capability value", once they are either utilised in battle, destroyed or sold to "friendly countries". Certainly the sale of the asset itself will generate cash, but this is not an operational cash flow.

While the DOD's *capability-enhancing assets* can also be tangible or intangible, this category of intangible assets is mostly "Non-Tradable", and encompasses categories such as *external relationship, internal* and *infrastructure assets*. Here, no "market" exists for the trading of these resources. In such cases, a "market consensus" approach needs to be taken as to their value. The DOD research team was of the view that this market consensus will be more objective if it is based on the achievement of certain benchmarked KPIs, and less so if based on SMU managers' subjective opinions. This "consensus"-based KPI can then be used to leverage (up or down) the capability economic value of these intangible assets, as will be illustrated later.

6. A defence case study of a strategic military unit (SMU) capability

The airborne early warning and control (AEW&C) capability will now be used as an extended illustration of how the ELVITM and CEVITATM measures were to be implemented in practice within a SMU. The business model for the operations of the AEW&C involves the preparation, conduct, support, and evaluation of operations.

The Australian Defence Forces is divided into a number of Groups, which include each of the three traditional military services of Army, Navy and Air Force. Each Group is then broken down into numerous divisions called Strategic Military Units (SMUs), and the Airborne Early Warning and Control (AEW&C) Division is the Group called the Defence Material Organisation.

Within the AEW&C, the preparation and conducting of operations requires the *availability of aircraft and crew*, and the *support of operations*. The *availability of aircraft* pertains to aircraft strength (including the enhancement of aircraft via competitive evaluation, and the development, incorporation and testing of enhancements) and maintenance availability (including scheduled and unscheduled maintenance). The *availability of crew* refers to personnel strength (including providing crews and maintaining crew currency), training (in both ground and airborne training) and mission planning. The *support of operations* includes base services maintenance facilities and squadron facilities.

The AEW&C requires the capability to carry out the above business model, and this capability involves more than its tangible assets (such as aircraft), or human assets (such as its crew). It requires the development, maintenance, enhancement of its capabilities in a number of key intangible areas, such as operations, operational support, maintenance engineering and other support capabilities.

The AEW&C develops this capability within a number of components in its structure. The main tangible assets are its aircraft, which drives (affects) the other AEW&C components such as base support, aircrew, maintenance support, etc. The more that is “expensed” on behalf of these components; the more the AEW&C’s capability is enhanced. These expenses should be seen as the operating costs of having the capabilities. The obvious example is that the more that is spent on training aircrew, the more is the AEW&C capability enhanced, thereby increasing its CEVITATM value. Thus, for each of these sub-components, ELVITM values can be derived. This requires the management team responsible for deriving the values to ask questions such as: “Who is responsible for the provision of this capability; is this capability being actually provided; what is the appropriate KPI to measure performance/value of this capability; what the current value of the capability is; and how much is currently being expensed on this capability?”

Therefore, a flow model was thus developed, detailing the various sub-components within the AEW&C, each requiring capabilities that enhance the CEVITATM of the AEW&C (Fig. 3 depicts a flow model that gives an overview of the capability base of the AEW&C operating statement). AEW&C business (operational) model was then further analysed into the capabilities required by the AEW&C, and the components within which such capabilities reside, enabled the DOD team to redesign the Chart of Accounts of the AEW&C based on the natural accounts listed in Fig. 3.

6.1. Deriving indexes to determine market consensus values at a strategic military unit

To obtain “market consensus valuations”, especially for its capability-enhancing assets, the DOD research team recognised that the organisation must obtain a number of ELVITM based on non-financial

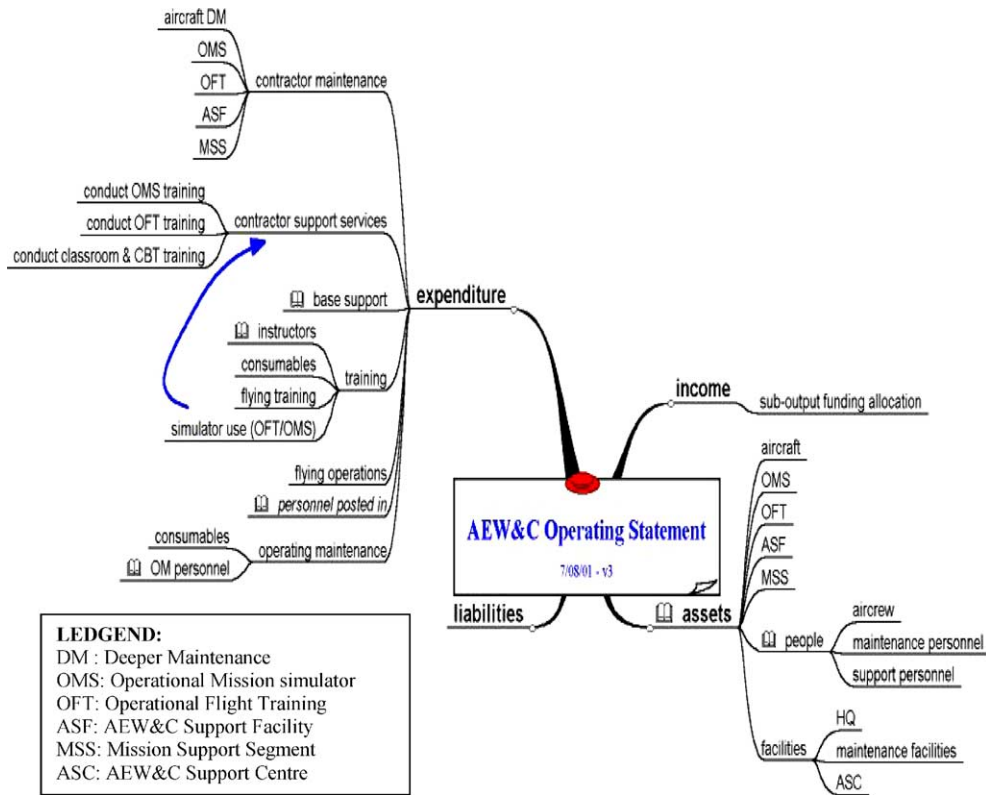


Fig. 3. The AEW&C operating statement.

measures that are not only relevant, but also relatively easy to collect and have a proven relationship to capability value. The relationship of the ELVITM to the market consensus value is demonstrated using the following equation:⁸

$$\frac{dS}{dt} = rE \left(\frac{M - S}{M} \right) - \delta S$$

The equation indicates that the change in the *economic value* (dS/dt) of a *capability-enhancing asset* at time “ t ” is a function of five factors:⁹ E : the costs/expenses incurred to support the capability; r : the *value-increasing constant* (ELVITM No. 1—defined as the value generated per expense dollar when $S = 0$); M : the maximum consensus value of the capability; S : the current value of the capability; and

⁸ The theoretical underpinning of this model was derived from the Vidale and Wolfe (1957) model employed to describe the sales response to advertising efforts.

⁹ Over time, and with experience, these co-efficient values should reflect the value–expense relationships that exist in most spending decisions, but remain largely un-quantified. The ELVITM essentially attempts to quantify the “qualitative” aspects of the cost-benefit approach (Ratnatunga, 2000).

δ : the *value-decay constant* (ELVI™ No. 2—defined as the fraction of value lost per time unit when $E = 0$).

The equation says that the change (increase) in the capability value will be higher when r , E , and the untapped capability potential are higher, and the value-decay constant is lower.

Note that many of the equation variables and constants are obtained via the questions listed earlier that needed to be asked by the management team responsible for deriving the capability values.

As discussed earlier, the DOD’s ABC cost allocation model needed to be extended to allocate shared capability expenses to the AEW&C component-accounts listed in its *Chart of Accounts*, which are summarised in Figs. 2–4. As one can see, the asset and liability accounts are derived from the “investments” and “financing” accounting framework illustrated in Fig. 2 as the *strategic balance sheet*. The revenue and expense items are illustrated in Fig. 4, the *strategic income statement*.

The following example will illustrate the point.¹⁰ An air force strike aircraft pilot becomes more capable in terms of strike capability, the more flying time he is given. The age becomes a factor only at around 50 years of age, by which time he would have reached his maximum consensus capability potential of (say) \$10,000,000 (M). Currently, let us assume he has had 6 years of training and his capability value is estimated as \$4,000,000 based on the training, flying time and other facility costs expensed on him. The air force, based on its past experience, estimates the value-increasing constant (r) to be 4 (i.e. ELVI™ No. 1), and the value-decay constant (δ) if he is transferred to a desk-job or does not do active flying to be 0.05 (i.e. ELVI™ No. 2). If the air force in year 7 expends \$100,000 (E) to support the strike-capability of the pilot by providing additional flying time, the capability’s value will be enhanced as follows:

$$\left(\frac{dS}{dt}\right) = 4 \times 100,000 \left(\frac{10,000,000 - 4,000,000}{10,000,000}\right) - 0.05(4,000,000)$$

$$\left(\frac{dS}{dt}\right) = 4(0.6)100,000 - 200,000 = \$40,000$$

Thus, based on these ELVI™, despite spending \$100,000 on flying training, the capability value has been leveraged up by only \$40,000 or a net-ELVI™ of 0.4.

In the early years of an air force pilot’s training there may be no value-decay ELVI™, in which case the capability value will be enhanced as follows:

$$\left(\frac{dS}{dt}\right) = 4 \times 100,000 \left(\frac{10,000,000 - 4,000,000}{10,000,000}\right) - 0.0(4,000,000)$$

$$\left(\frac{dS}{dt}\right) = 4(0.6) \times 100,000 - 0 = \$240,000$$

In such a case, by spending \$100,000 on flying training, the capability value has been leveraged up by \$240,000 or a net-ELVI™ of 2.4. This is in keeping with what is observed in all types of training, that capability value is leveraged rapidly in the early years of training, and then increases at a diminishing rate in the later years.

¹⁰ All examples are for illustrative purposes only and the numbers have no relationship to expenditure levels or asset values of the DOD and have not been supplied in any way by the DOD legacy system.

INCOME STATEMENT AIRBOURNE EARLY WARNING AND CONTROL

<i>CAPABILITY PROVIDING INCOME</i>	SMU A	SMU B	OTHER	SUPPORT	TOTAL	Net-ELVI Index	Capability Asset Value
Revenue from Government	\$ 5,000,000	\$ 8,000,000	\$ 50,000,000	\$ 10,000,000	\$ 73,000,000		
Sale of Goods and Services		\$ 1,500,000		\$ 25,000	\$ 1,525,000		
Sale of Assets	\$ 300,000	\$ 900,000	\$ 2,500,000	\$ 10,000	\$ 3,710,000		
Interest and Dividend				\$ 5,000	\$ 5,000		
Other Income			\$ 8,000	\$ 1,000	\$ 9,000		
	<u>\$ 5,300,000</u>	<u>\$ 10,400,000</u>	<u>\$ 52,508,000</u>	<u>\$ 10,041,000</u>	<u>\$ 78,249,000</u>		
<i>CAPABILITY PROVIDING EXPENDITURE</i>							
Material Costs (assigned Directly)	-\$ 15,000	-\$ 12,000	-\$ 8,000	-\$ 20,000	-\$ 55,000		
				<u>-\$ 20,000</u>			
<i>Resource Costs(assigned via Activity Based Costing)</i>							
<i>Operations</i>							
Plan Operations	-\$ 4,000	-\$ 3,000	-\$ 2,000	-\$ 12,000	-\$ 21,000	0.4	\$ 8,400
Conduct Operations	-\$ 9,000	-\$ 9,800	-\$ 7,000	-\$ 50,000	-\$ 75,800	- 10.0	-\$ 758,000
Control Operations	-\$ 4,000	-\$ 3,500	-\$ 9,800	-\$ 600,000	-\$ 617,300	2.4	\$ 1,481,520
Operations Asset Procurement				-\$ 2,000,000	-\$ 2,000,000	1.0	\$ 2,000,000
	<u>-\$ 17,000</u>	<u>-\$ 16,300</u>	<u>-\$ 18,800</u>	<u>-\$ 2,662,000</u>			
<i>Operational Support</i>							
Policy Guidance	-\$ 2,000	-\$ 1,000	-\$ 1,000	-\$ 11,000	-\$ 15,000	- 0.9	-\$ 13,500
Tactical Development	-\$ 5,000	-\$ 4,000	-\$ 6,000	-\$ 25,000	-\$ 40,000	- 0.7	-\$ 26,000
Operational Support Services	-\$ 4,500	-\$ 8,700	-\$ 6,400	-\$ 35,000	-\$ 54,600	- 0.5	-\$ 24,570
Base Support	-\$ 7,600	-\$ 5,300	-\$ 9,000	-\$ 8,000	-\$ 29,900	- 0.7	-\$ 19,435
Op.Support Assets Procurement				-\$ 31,000,000	-\$ 31,000,000	1.0	\$ 31,000,000
	<u>-\$ 19,100</u>	<u>-\$ 19,000</u>	<u>-\$ 22,400</u>	<u>-\$ 31,079,000</u>			
<i>Material Support</i>							
Maintenance Engineering	-\$ 3,000	-\$ 5,000	-\$ 8,000	-\$ 8,000	-\$ 24,000	0.8	\$ 19,200
Capability Upgrades	-\$ 5,000	-\$ 4,000	-\$ 6,000	-\$ 7,500	-\$ 22,500	- 6.0	-\$ 135,000
Supply Support	-\$ 4,000	-\$ 3,500	-\$ 9,800	-\$ 600	-\$ 17,900	- 12.0	-\$ 214,800
Material Support Assets Procurement				-\$ 19,000,000	-\$ 19,000,000	1.0	\$ 19,000,000
	<u>-\$ 12,000</u>	<u>-\$ 12,500</u>	<u>-\$ 23,800</u>	<u>-\$ 19,016,100</u>			
<i>Training</i>							
Maintenance Personnel	-\$ 20,000	-\$ 45,000	-\$ 1,000	-\$ 100,000	-\$ 166,000	4.3	\$ 713,800
Aircrew	-\$ 4,500	-\$ 8,700	-\$ 6,400	-\$ 50,000	-\$ 69,600	- 0.9	-\$ 62,640
Support Personnel	-\$ 5,000	-\$ 4,000	-\$ 6,000	-\$ 30,000	-\$ 45,000	- 0.5	-\$ 22,500
Training Assets Procurement				-\$ 25,000,000	-\$ 25,000,000	1.0	\$ 25,000,000
	<u>-\$ 29,500</u>	<u>-\$ 57,700</u>	<u>-\$ 13,400</u>	<u>-\$ 25,180,000</u>			
<i>Total Expenses</i>					<u>-\$ 78,253,600</u>		
NET SUPLUS/DEFICIT					<u>-\$ 4,600</u>		
Add: Accumulated Surplus b/f					<u>\$ 1,840</u>		
ACCUMULATED SURPLUS C/F					<u>-\$ 2,760</u>		
NET INCREASE IN CEVITA							\$ 77,946,475

Fig. 4. Illustrative strategic income statement for a strategic military unit.

If the objective of the air force is merely to maintain its capability level, then dS/dt will be zero, thus the equation becomes:

$$\begin{aligned} 0 &= 4(0.6)E - 0.05(4,000,000) \\ 200,000 &= 4(0.6)E \\ \frac{200,000}{2.4} &= E = \text{approx. } \$83,333 \end{aligned}$$

This provides an important strategic tool for military planning for the air force, as it now is able to determine what expense levels must be included for the *maintenance* of that particular capability at a zero-base. This concept is no different to the expenses a company would need to spend on *repairs* and *preventive maintenance* of its machines. Just to keep the machine running at its current level of economic capability, a certain level of expenses would need to be incurred.¹¹

Note that if the air force spends only \$50,000 on training, by applying the *capability-enhancing asset equation* the change in economic value (dS/dt) works out to be a *negative* \$80,000, or a net-ELVITM of -1.6 . Thus, the DOD would have a range of net-ELVITM *s*, some greater than 1, some between 0 and 1, and some negative. This range will be used on all capability leveraging expenses as illustrated in Fig. 4. Note also that the negative net-ELVITM values reduce capability-asset values, this is conceptually very similar to the depreciation/amortisation of assets under traditional GAAP, whilst the positive net-ELVITM are similar to the revaluation of asset values under traditional GAAP.

This model with many more factors can be embedded in a number of long-run value equations and used to estimate the capability-value consequences of alternative expense-budgeting strategies not only in defence, but also in government, commercial and other enterprises. This will be discussed later in the paper as an extension of the DOD framework.

7. Capability-asset accounting: the double-entry recording process

It was not proposed that the financial accounting recording process would be dramatically changed for the recording of assets, liabilities, revenue or expenses in a strategic sense. If an asset is considered a “cash generating tangible asset” (such as say, investments) then it was to be recorded as currently under GAAP. However, if the asset is purchased to enhance a defence capability, then the DOD research team argued that it must be recorded as such. As Figs. 1–3 illustrate, this capability is not only the tangible asset cost (e.g. the purchase cost of a strike aircraft) but also the crew, maintenance staff etc. that need to combine to provide the “strike capability”. Thus, the “value” of this strike capability comes from two or more transaction categories, i.e. the purchase cost of the tangible assets, and the support costs (expenses) of the intangible assets, and often the combination of such.

The following is a simple example of the types of AEW&C transactions to be recorded in the books to derive an overall capability value (CEVITATM).

¹¹ The expenditure required to maintain a capability is well demonstrated in the case of the B-52 bomber still used in the U.S. air force. Due to constant expenditure on upgrading of its equipment, and training of its crew, this 50-year-old aircraft’s strike capability has been maintained and even enhanced.

Let us assume the opening strategic balance sheet of the DOD is as follows:

Opening balance sheet (in \$millions)		
Strategic balance sheet		
Investment		
Cash generating assets (including cash)		50,000
Capability-enhancing assets		
Tangible	350,000	
Intangible	<u>100, 000</u>	<u>450, 000</u>
		<u>500, 000</u>
Financing		
Accumulated surplus		200,000
Capability capital		<u>300, 000</u>
		<u>500, 000</u>

7.1. Transaction No. 1: purchase of specialised military equipment by DOD (e.g. an aircraft)

Dr. Specialised military equipment asset a/c

Cr. Cash a/c

–With the purchase cost.

Transaction one: purchase of strike aircraft for \$5000m		
Strategic balance sheet		
Investment		
Cash generating assets (including cash)		45,000
Capability-enhancing assets		
Tangible	355,000	
Intangible	<u>100, 000</u>	<u>455, 000</u>
		<u>500, 000</u>
Financing		
Accumulated surplus		200,000
Capability capital		<u>300, 000</u>
		<u>500, 000</u>

7.2. Transaction No. 2: transfer of specialised military equipment to the strategic military (e.g. AEW&C) unit

Dr. Operations asset procurements expenditure a/c

Cr. Specialised military equipment asset a/c

–With the purchase cost (the asset will essentially be written off the books as a tangible asset at this stage—this entry is similar to depreciating the asset 100% in year of purchase).

In the case of the DOD, this accounting entry will affect its calculation of the “capital utilisation charge (CUC)” during some changeover period, as “depreciation” from previously purchased tangible assets will be written-off at the same time as the 100% write-off of this new tangible asset. However, in the long-run, it is expected that the “asset procurement expenditure” in a particular year will be similar in value to the previously calculated “net-depreciation” of a whole host of assets purchased over a number of years. This will also avoid the problem of continuing to depreciate assets that have a “written-down value” in the books, but have no capability value in reality.

Transaction two: transfer of strike aircraft to SMU as an expense (i.e. 100% write-off)			
Strategic balance sheet			
Investment			
Cash generating assets (including cash)			45,000
Capability-enhancing assets			
Tangible	350,000		
Intangible	<u>100, 000</u>		<u>450, 000</u>
			<u>495, 000</u>
Financing			
Accumulated surplus			195,000
Capability capital			<u>300, 000</u>
			<u>495, 000</u>

A related issue is the *physical security* of the tangible asset. It could be argued that if one does “write-off” 100% of the asset value in the year of purchase, there will be no record of its value in the Assets Register, and hence it could be subject to theft and pilferage. However, an Assets Register can be maintained independent of the financial accounting system with units rather than values, and anyway, the defence forces have an enviable history of ensuring the “physical custody” of tangible assets (with armed guards).

7.3. Transaction No. 3: recording of specialised military equipment as an AEW&C capability

Dr. Capability-enhancing tangible assets a/c (investment side of strategic balance sheet)

Cr. Capability renewal organisational capital a/c (financing side of strategic balance sheet)

–With the CEVITA™ value (if the asset, in fact, does have a capability). Thus, the asset is essentially brought back onto the books as a capability value. Note that at the point of purchase the strategic capability value of a tangible asset will, in most cases, be the purchase cost as competitors may also have access to such assets, and thus they do not provide an organisation a competitive advantage (at the point in time). However, in the case of military hardware with restricted access and also if the organisation has better trained personnel already existing to operate the hardware, the capability value may well exceed the purchase cost.

Transaction three: recording of strike aircraft as an SMU capability using net-ELVI based Capability Value of \$10,000m		
Strategic balance sheet		
Investment		
Cash generating assets (including cash)		45,000
Capability-enhancing assets		
Tangible	360,000	
Intangible	<u>100,000</u>	<u>460,000</u>
		<u>505,000</u>
Financing		
Accumulated surplus		195,000
Capability capital		<u>310,000</u>
		<u>505,000</u>
Net-ELVI workings	dS/dt	\$10,000
	<i>E</i>	\$5000
	<i>r</i>	\$2
	δ	\$0.05
	<i>S</i>	–
	<i>M</i>	\$50,000

7.4. Transaction No. 4: training of specialised military aircraft crew (and similar capability-related expenses)

Dr. Competency based training a/c (expense)

Cr. Cash a/c

–With the cost of training.

Transaction four: further training of strike aircraft pilots at a total expense of \$10m		
Strategic balance sheet		
Investment		
Cash generating assets (including cash)		44,990
Capability-enhancing assets		
Tangible	360,000	
Intangible	<u>100,000</u>	<u>460,000</u>
		<u>504,990</u>
Financing		
Accumulated surplus		194,990
Capability capital		<u>310,000</u>
		<u>504,990</u>

7.5. Transaction No. 5: recording of the training of specialised military aircraft crew as a capability

Dr. Capability-enhancing human resource assets a/c (an intangible asset on the investment side of the strategic balance sheet)

Cr. Human workforce capital a/c (financing side of the strategic balance sheet)

–With the CEVITA™ value which will be derived by leveraging the expenses using the net-ELVI™ value, for which the mathematics were demonstrated earlier in the paper. Note that this net-ELVI™ could be greater than one, a fraction, or even negative (the expense will therefore essentially be shown in the books as a capability value—see Figs. 3 and 4).

Transaction five: recording the net-capability enhancement by training the strike aircraft pilots, i.e. a net-ELVI based Capability Value of \$4m		
Strategic balance sheet		
Investment		
Cash generating assets (including cash)		44,990
Capability-enhancing assets		
Tangible	360,000	
Intangible	<u>100,004</u>	<u>460,004</u>
		<u>504,994</u>
Financing		
Accumulated surplus		194,990
Capability capital		<u>310,004</u>
		<u>504,994</u>
Net-ELVI workings	dS/dt	\$4
	<i>E</i>	\$10
	<i>r</i>	\$4
	δ	\$0.05
	<i>S</i>	\$400
	<i>M</i>	\$1000

7.6. Transaction No. 6: revaluation of specialised military equipment in the AEW&C capability profile

Dr. Capability-enhancing tangible assets a/c (Investment side of strategic balance sheet)

Cr. Capability renewal organisational capital a/c (financing side of strategic balance sheet)

–With the revised CEVITA™ value based on a consensus value. Most often, in the case of tangible asset capabilities, the revaluation will be a negative-asset, as it is expected that capability will be diminished as the equipment ages. Unless, as in the case of the B-52 bomber, expenses have been deployed to maintain/enhance its capability.

Transaction six: recording the enhanced net-capability of the strike aircraft due to the further training of the pilots (as per Transaction 5), i.e. a net-ELVI based Capability Value of \$24m		
Strategic balance sheet		
Investment		
Cash generating assets (including cash)		44,990
Capability-enhancing assets:		
Tangible	360,024	
Intangible	<u>100,004</u>	<u>460,028</u>
		<u>505,018</u>
Financing		
Accumulated surplus		194,990
Capability capital		<u>310,028</u>
		<u>505,018</u>
Net-ELVI workings:	dS/dt	\$24
	E	\$10
	r	\$28
	δ	\$0.02
	S	\$10,000
	M	\$50,000

Transactions 5 and 6 would ideally be recorded as a combined journal entry, which encompasses the joint-capability components of the tangible and intangible assets working in tandem. Thus, if the AEW&C loses all of its trained pilots in combat, then the capability component of its strike aircraft will also have their capability value reduced to zero.

8. Extention of the CEVITA™ model to the commercial world

In this section of the paper we will explore the possibility of extending the CEVITA™ model to the valuation of commercial capabilities. Two questions must first be asked, however. The first is if there is a *need* for such a model in the commercial world (Nash, 1998), and the second is if a model developed specifically for the valuation of defence capabilities is *valid* elsewhere.

With regards to the first question, Keller (2003) along with many others has made the observation that business owners want to do more than just report historical financial transactions (Porter, 1980; Porter and Miller, 1985); they are looking for advice that will help them better manage their business and at ways to measure their performance against additional, non-financial criteria and standards in order to show a more complete picture of their value. Keller (2003) states that the current reporting model is too focused on things that have happened and cannot be changed and ignores the future events that a company can work to change in order to create value. For a number of years, a growing number of

organisations and thought leaders have issued challenges to the current model (Garten Task Force's Report, 2001). PricewaterhouseCoopers (2002) reported that top executives at multinational companies consider non-financial performance measures, such as product and service quality and customer satisfaction and loyalty, more important than current financial results in creating long-term shareholder value.

With regards to the question of the *validity* of extending the model, we have already pointed out that some of the theories used as the starting point of the DOD valuation approach for defence capabilities originated from the commercial world; therefore such an extension could be considered more evolutionary than revolutionary. In fact, many valuation measures that were of limited use for defence capabilities can be (and are) more applicable in the commercial environment, e.g. *cash flow measures* and *market-based measures*. Therefore, a framework for a commercial version of the DOD's *strategic balance sheet* could be developed by combining information from many sources.¹² A major influence in this line of thinking is the *Intellectual Capital Report* issued alongside its traditional financial accounts by the Swedish insurance company Skandia in 1996. Skandia divided the company's capital into financial capital (realisable assets, close to book value) and the rest, which counted as intellectual capital. It then divided intellectual capital into human capital (the quality of the workforce) and structural capital, which meant the remaining value in the company after account had been taken of its people. Structural capital was then divided into customer capital (the company's relationships with its customers) and organisational capital—the knowledge and routines that allow the company to innovate and process its work. Innovation capital was divided into intellectual property like patents and copyrights and other intangible assets. Skandia has developed an extensive list of measures that should allow it to measure these different kinds of capital. It also employed a *Navigator system* akin to the Balanced Scorecard to undertake some valuations (Edvinsson and Malone, 1997).

Measurements of intellectual capital tend to explain the gap between a firm's market value and accountant's valuation of the assets (Rossett, 1998; Stewart, 1997; Standfield, 1998). The stock and flow model of Bukh et al. (2000) and concepts in prior studies (see MERITUM, 2002) have a monotonic non-decreasing behaviour for the attributes. Bukh et al. (2000) describes a paradox where the intellectual capital of firms decreases in economic terms even if no change in knowledge assets has occurred. The value increasing and value decreasing components in the CEVITA™ measurement of strategic Capabilities opens up a possibility of handling this non-monotonic behaviour with respect to attributes.

Yet another influence is the *Intellectual Capital Index* developed to provide an intellectual capital tree, which divides the intellectual capital of a business into human capital, organisational capital and customer relationships. A company's organisational capital can then be further divided into business renewal and business process capital (Roos et al., 1997). The process of drawing up such a balance sheet often forces companies to focus on the intangible assets and competences which most matter to them.

The DOD research study¹³ detailed in this paper could be used as a third influence. The study confirmed that organisations generally focus on five main components of intangible *capability-enhancing* assets, i.e. *innovation assets*, *human resource assets*, *organisational image assets*, *external relationship assets* and *internal infrastructure assets*.

In addition to the above strategic capability-enhancing intangible assets, the DOD study found that it is the highly *context-dependent* combinations of tangible and intangible assets that make-up an organisation's

¹² See Fig. 2, which in addition to common account classifications within the DOD, include some additional commercial components in "italics-parentheses".

¹³ As discussed earlier the DOD obtained these from numerous research studies of the commercial environment (see Ratnatunga, 2002; Leadbeater, 2000; Litman, 2000; Barskey and Marchant, 2000).

capability. In many commercial organisations; these are the combinations that are hard to be imitated by competitors. Such organisations leverage these assets to create capability-related market values. Some of these assets can be related to cash flow generation. However, a substantial amount of sub-categories cannot fully be captured on a cash basis, but still provide a value leverage to an organisation.

In many cases these unique assets enhance the capability of an organisation to deliver its products and services, but do not fit neatly into the cash flow models of asset valuation such as DCF and real options (see Damodaran, 2002). However, the supporters of the *cash flow measures* approach believe that these “other intangible asset values” could also be captured in cash flow terms using a “market consensus” approach, using probabilities, and brought into the total business value computation via a DCF analysis. This approach has the advantage of adhering to the principles of financial economics. Practically, however, this approach is fraught with problems as seen by the DOD Team’s rejection of such. Even in the commercial world, estimating the product-market free cash flows (FCFs) generated by real assets and options over a planning period is difficult enough; thus, obtaining a “market consensus” either from analysts (external) or managers (internal) over a similar planning period, then converting these opinions to probabilities and FCFs and finally discounting these FCFs, could become an exercise in precision rather than accuracy.

We believe, therefore, that the approach taken by the DOD team, where asset values are brought directly into the strategic balance sheet via a single-period valuation process using net-ELVITM (which is very similar to the revaluation of a non-current asset in traditional financial accounting) would also be useful for commercial applications in a practical sense, in the attempt of each organisation to value their strategic capabilities.

As discussed earlier, the *cash generating (or operating) assets* of the organization are mostly “Tradable” in that one can find a market (or market appraisals) for such assets, be they the traditional tangible assets like PPE, working capital and investments, or even some intangible asset resources like brands, patents and R&D options. DCF/real options techniques can be utilized to obtain the strategic value for most of these resources, and if not, then reliable market appraisals can be obtained (which mostly use DCF techniques anyway). In contrast, while an organisation’s *capability-enhancing assets* can also be tangible or intangible, this category of intangible assets is mostly “Non-Tradable”, and encompasses categories such as *external relationship assets* and *internal infrastructure assets*. Here, like in the DOD case, a market consensus approach based on the achievement of certain benchmarked KPIs, or based on managers’ or analysts’ opinions needs to be taken to leverage (up or down) the economic value of these intangible assets.

There are many pitfalls, however, in this new CEVITATM measurement and the associated valuation process. The strategic balance sheet framework seems to endorse the idea that asset capability values are fairly stable and thus can be tied down and measured. However, the reality is that intangible assets are highly complex and fluid and their value is volatile and their combinations with tangible assets are highly context-dependent. Further, the key ELVITM in an organization could prove to be costly and cumbersome to calculate, or be too slow to adapt to fast-moving markets. One test of their effectiveness would be to apply them retrospectively. Had the Skandia (Swedish insurance) company’s *Intellectual Capital Report* been applied to IBM in the mid-1980s it would probably have shown a highly efficient, well-resourced company with lots of innovative ideas, bright people and happy customers. If this were the only key ELVITM IBM used, it would not have highlighted the way IBM’s position was being eroded by fast-moving competitors with radical ideas and operating at the margins of IBM’s mainstream markets (Leadbeater, 2000). Therefore, a combination of ELVITM that move company valuations both positively and negatively is required to properly arrive at the CEVITATM value of an enterprise. The capability-value enhancing (r) and capability-value decay constants (δ) capture this aspect in an equation provided above.

Also it can be argued that although “investments in knowledge/learning/training” has been used as an indicator to value organisational capabilities, in much the same way as R&D activities are, some further caution is required in using the ELVITM indexes and the resultant CEVITATM measure. The ELVITM indexes are not capable of revealing the informal or on the job learning that also contributes to the constant evolving of skills needed for the new types of jobs being created.¹⁴ Lave and Wenger (1991) state that onsite contextualised training has been studied under a framework that focuses more on social and peer-to-peer dimensions of the learning experience than on the delivery of specific contents. To bridge the gap between student and expert perspectives, the use of “Algorithm Visualisation” (AV) software as visual aids in lectures was suggested. An area of future research would therefore be to extend this AV software to incorporate both an employee and manager perspective in arriving at market consensus values for the value increasing (r) and value decay (δ) constants used in the ELVITM metric.

9. Implementing the strategic financial statements in practice

Bukh et al. (2000) state that intellectual capital reports should comprise narratives, visualisations, and digital indicators, and introduce a framework for analysing intellectual capital statements by taking competence theory as its point of departure. They show how intellectual capital statements report on firms’ competence and resource-based strategies and how firms can use intellectual capital statements to disclose issues related to their resource portfolio management, improvement activities and productivity in the area of the management of the firm’s resource base.

The DOD team considered three approaches as suggested by Leadbeater (2000) to integrate the above measures in organisational reports to stakeholders. The DOD is currently considering whether to go down the capability valuation path using one of these approaches, but is yet to make a decision. These approaches are the fully integrated approach, the supplementary approach and the hybrid approach.

The *fully integrated approach* takes the view that the traditional financial accounts will remain the focal point of organisational reporting for some time, and therefore it is appropriate that the new measures detailed above are incorporated in these statements to help investors value organisational capabilities. In the DOD, this approach would involve accounting procedures routinely used in organisational acquisitions to value intangibles as well as KPI-based ELVITM used in leveraging internally acquired tangible and intangible asset values in the books as capability values. This approach would require “market consensus valuations” based on non-financial measures that are relevant, relatively easy to collect and have a proven relationship to capability value.

In the *supplementary approach*, separate strategic financial statements are prepared, to sit alongside the traditional statements prepared as per GAAP. These will incorporate traditional financial information as a measure of success and as a resource for investment, but the focus will mainly be on measuring the capability-enhancing tangible and intangible assets, and the corresponding CEVITATM value.

The *hybrid approach* is a compromise approach where the incorporation of tangible and intangible capability assets as CEVITATM values is a gradual process. The hybrid approach is designed to allow organisations gradually to combine traditional and novel ways of valuing asset capabilities. It would permit them to deal more effectively with volatility and uncertainty by providing *half-way-houses* and

¹⁴ The European Commission (2001) report indicates that 80% of new jobs created have been in “high education” areas (managers, professionals, technicians, etc.).

revisable rolling accounts. Industry standards for disclosing relevant non-financial information about intangibles would allow more robust links to be made between investment in intangibles and market valuations, if appropriate. Traditional financial accounts would become more relevant and responsive by becoming more flexible and adjustable to suit specific circumstances.

The concept of *half-way-houses* is when the DOD “quarantines” its tangible and intangible capability values before allowing them to migrate to the balance sheet. Capabilities are valued as economic assets without putting them on the actual balance sheet until their value is more established. This would allow the DOD to adopt a more flexible approach by stating possible ranges for capability-asset values.

A similar concept is that of the *revisable rolling accounts*. For example, it might not be wise to capitalise the R&D of a high-risk new technology based capabilities at an early stage of development because the future benefits would be so uncertain. However, at some point, when the technology and the market have become *less* volatile, capitalisation may become more realistic. It might then be worth restating past accounts to show how they would have looked if the R&D had been capitalised. The justification for this approach is that the accounts are the financial history of a company and like most histories they should be revised in the light of new information.

Two associated issues arise with regards to implementation: one is the technological challenge of managing the complexity that will arise in tracking the measures, and the other is the challenge of making the strategic financial statements *readable* at the three stakeholder levels of executive, staff and society. Thus, care must be taken to manage the twin pressures of complexity and readability, i.e. the activity of reporting on capacity effects and the changes that capacity in a reader relevant manner.

Similar to the concerns raised in activity based costing, where concern is expressed in tracking too many cost drivers, or in the Balanced Scorecards tracking too many KPIs, the “informational value” of *strategic financial statements* can only be realised if the activity of accounting goes beyond the production of sophisticated ELVITM inventories to the production of statements that provide a background for policies at the executive, staff and societal levels.

Whatever approach to implementation that is adopted, it will be necessary to initially estimate the current capability value of all tangible and intangible defence assets, and have an “*Opening Strategic Balance Sheet as at a particular date*” after which the double-entry accounting approach outlined above could be carried out.

10. Conclusions

There should be no controversy within the field of accounting and financial reporting that issuers of financial statement should provide the readers of financial statements with all material information that is both relevant and reliable. The relevance of organisational capabilities (especially via its intangibles) has not usually been questioned, but the reliability of valuations of intangibles has often been questioned. This paper illustrates a technique that will not only make these valuations more relevant, but also show how tangible and intangible asset combinations provide true capability values. The approach is basically to calculate the capability economic value of intangible and tangible assets of an organisation by utilising the many measurement approaches available, and in situations where these cannot be used, to leverage its capability-enhancing expenses to economic values by using specific Expense Leveraged Value Indexes.

We have demonstrated how the CEVITATM of an organisation measures value beyond its financial performance, and therefore that it helps managers integrate processes and resources into the organisation’s

overall success—an essential step toward competing in a knowledge-based environment. By highlighting the strategic importance of non-traditional capital, this model lets managers focus on accumulating and managing the people and processes that drive an organisation's strategic objectives, and ultimately its value. Just as traditional accounting tools help managers accumulate and allocate an organisation's financial resources, CEVITA™ provides the conceptual framework for managing its capabilities, including its intellectual capital.

Intellectual capital measurement is a fast-growing part of the knowledge management market. It has many attractions, at least in theory. The process of drawing up a strategic balance sheet focuses managers on the capabilities enhanced by such intellectual capital. It also helps managers and investors to visualise the role tangible and intangible assets play in combination in creating organisational value. Whilst there are many new measurement systems using measures of human capital, customer relationships and brand values; there are significant downsides in such measurements. Many of these new systems appear elegant but would require large investments in data collection. Many measure “assets” which have no obvious bearing on strategic values. In contrast the CEVITA™ measure, presented via strategic financial statements, provides a very useful and practical way to visualise and value the intangible capability assets of an organisation.

This measure also overlaps with new performance measurement systems such as the Balanced Scorecard, especially in the leveraging of expenses to derive *capability-enhancing asset values*.

Many of these measures are internally generated, and the management accountant should play a key role in the provision of the measures required. As they stand, however, the CEVITA™ measure will be less useful in putting a reliable valuation on capability assets for outside investors who lack the knowledge to generate the required ELVI™. For a non-commercial organization like the DOD, this was certainly strength, as confidentiality and secrecy can be maintained. In a commercial environment this lack of external validity may be seen as a weakness. However, even if business analysts using his or her own ELVI™ attempts an externally generated valuation, the resultant CEVITA™ measure would provide a more comprehensive approach to the valuation of all an organisation's assets than the measures currently available, as it incorporates all of the key strengths of many of those numerous valuation measures.

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