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Intermezzo

Valuation of information assets on the balance sheet

The recognition and approaches to the valuation of intangible assets

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‘Twenty years ago there was an emerging interest in recognizing and valuing marketing assets, but today there is a growing interest in information-related intangible assets.’

Abstract

The perspective taken in this article reflects two particular angles: it adopts an international focus rather than a UK focus – especially with regard to regulatory issues influencing the inclusion of information assets in financial reports; and it recognizes that there are reasons other than meeting statutory/regulatory requirements which support the recognition (if not always the valuation) of information assets in the management of organizations – commercial and otherwise. The article proceeds by considering the recognition and approaches to the valuation of intangible assets in general, following which it homes in on information assets as a particular category of intangible assets, and concludes with a discussion of the attributes of information that give rise to its value as an asset.

Keywords: accounting for intangible assets, asset valuation, information assets

Intangible assets

The Financial Accounting Standards Board (FASB) framework (which was published in July 1989) [1], as noted by Alexander & Britton [2], defines assets as: probable future economic benefits obtained or controlled by a particular entity as a result of past transactions or events. (p. 137)

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International Accounting Standards (IAS) Generally Accepted Accounting Principles (GAAP) [3] define an intangible asset as an:

identifiable non-monetary asset without physical substance held for use in the production or supply of goods or services.

For recognition purposes, an intangible asset must:

1. be identifiable;
2. promise probable future economic benefits;
3. be under the entity's control (covering both the right to obtain the future benefits and to restrict access to them by others); and
4. it must be possible to measure the cost of the asset reliably.

These criteria of asset recognition (at least in principle) allow for both acquired (that is purchased) and internally-created intangible assets to be recognized.

Interest in demonstrating the value of knowledge, information and organizational capabilities (defined as the collective skills, abilities and expertise of an organization, Ulrich and Smallwood, p. 119) [4] has developed within the context of a growing understanding of the role of intangible assets in driving organizational performance. Twenty years ago there was an emerging interest in recognizing and valuing marketing assets [5], but today there is a growing interest in information-related intangible assets.

Canibano et al. (p. 107) [6] point out that a wide range of elements are currently regarded as intangible determinants of the value of companies but do not fit the above definition of intangibles. They identify a fundamental question: 'if they are sources of future economic profits, why are they not reported by all corporations?' The explanation offered by Canibano is two pronged: first, the lack of skills in the accounting profession to develop a 'generally accepted set of guidelines for the identification and measurement of all intangibles' and, second, 'the emphasis placed by most accounting standard setting bodies on the reliability of financial statements rather than their relevance'. Kaplan and Norton (p. 54) [7] argue that, from a managerial perspective, 'measuring the value of intangible assets is really about estimating how closely aligned those assets are to the company's strategy', which emphasizes relevance over reliability.

As Powell (p. 797) [8] has observed, accounting for intangible assets is one of the least developed areas of accounting: entities investing in intangible assets have difficulty in communicating relevant financial information to external parties. However, it would be inappropriate and myopic to overlook the need for intangible assets (including information) to be recognized and valued for internal managerial purposes.

A Department of Trade & Industry (DTI) report on intangibles, published in 2001 [9], was followed up in 2004 by a self-assessment tool focusing on *Creating Value from your Intangibles* [10]. This is similar to *The Value Explorer* toolkit [11].

Many writers have pointed out that the increasing importance of intangibles in contemporary business highlights the limits of a traditional approach to the recognition and valuation of assets (which is based on transactions reflecting historical cost) [12] [13] [14] [15].

The value-in-use of intangibles is not limited to historical cost or to transactions but to '... their current and future role in the production-organization nexus, and to their idiosyncratic connections with other organizations' tangible and intangible factors' (p. 598) [15].

If intangible assets are acquired individually via an arm's length transaction in the normal course of business (for example commissioning a study of potential new markets), they are recognized in the company's balance sheet at their historic cost of acquisition – subject to the usual asset recognition criteria (*International Accounting Standard 38*) [3] which, as noted earlier, include reliable measurement and the prospect of likely future economic benefits.

However, internally-created intangible assets give rise to difficulties of recognition if future economic benefits are uncertain, or if the costs of creating the asset cannot be reliably measured. Under a *fair value* approach, an identifiable intangible asset (whether internally-created or not) can be recognized by an entity once the future economic benefits become probable. Under *Financial Reporting Standard 10* (para. 14) [16], internally-created intangible assets must have a readily ascertainable market value if they are to be recognized.

Within the context of market research, Tanner explores the importance of seeing investments in market research information as generating a return – hence creating value [17]. She argues that CEOs are much happier to approve expenditure on market research projects when the *bottom line* value of those

projects is presented to them (as opposed to an expense budget with no projected pay-off being presented for approval).

The accounting rules regarding intangible assets mean that many internally-created intangible assets are not recognized at all in an entity's balance sheet. This means that investors and other interested parties do not receive relevant information about that entity's financial position.

The Institute of Chartered Accountants in England and Wales' (ICAEW's) interest in looking into new reporting models for business was motivated by, *inter alia*, a perceived need for a framework that reflects the needs of all stakeholders for non-financial and forward-looking information, and the importance of intangibles [18] [19]. This interest has been enthused by the work of such writers as Boulton [20], Blair & Wallman [21], Lev [22], Vance [23] and Zambon [15].

The modern economy has been changed by the rise in importance of intangibles, with economic growth being driven more by investments in intellectual, organizational, institutional, and reputational assets rather than by investments in physical assets. However, there is a conspicuous discrepancy between the importance of intangible assets and our ability to identify, measure and account for them. This inability almost certainly causes a major misallocation of scarce resources that could be corrected if better reporting practices existed. Lev has stated that the poor reporting of intangibles leads to such harmful consequences as [22]:

- an excessively high cost of capital;
- a systematic under-valuation by investors of the shares in intangibles-intensive companies; and
- the continuous deterioration in the usefulness of financial reports.

Guidelines for intangibles

This is a vibrant research area that is constantly progressing. The first issue, identified by Canibano [6], as the lack of a generally accepted set of guidelines, has seen a great deal of progress.

Blair and Wallman have identified three levels of intangible assets (ranked according to the difficulties of valuation) [21]. These are:

- Assets that can be owned and sold – such as intellectual property rights (IPR).
- Assets that can be controlled but not separated out and sold – including reputational assets.
- Intangible assets that may not be wholly controlled by the company – such as human capital.

For the first of these categories it is not too difficult to establish their relevant costs and value. But for the other two categories the assets cannot readily be separated from their organizational context with its interdependencies, hence they are not directly measurable.

Research funded by the European Commission and conducted at City University (p. 7) [24] recommends the creation of new intellectual property rights (IPR) frameworks, which reflect the growing European intangible economy. The ICAEW has published a short discussion paper on valuing intangibles [23]. The Danish Patent Office has also been progressive in developing an evaluation model for patents to help identify untapped business potential [25]. Research projects funded by the European Union (EU) demonstrate the significant advances that have been made in developing a comprehensive approach to intangibles. Three projects, MAGIC, MERITUM and PRISM, demonstrate the level of activity in this area.

MAGIC (1998–2001)

The acronym stands loosely for Measuring and AccountinG for Intellectual Capital. The overall objective of the MAGIC project was the development of a low-cost and pragmatic IT-solution for the measuring of and accounting for Intellectual Capital (IC) in engineering and manufacturing environments.

The partners in the MAGIC project were: QPR Software (Finland), Institute for Human Factors and Technology Management IAT (Germany), Profactor (Austria), CDN (Spain), ISD (Portugal), and Invenio (Germany). In addition, some 40 European companies (including Siemens AG and Volkswagen from Germany, and Sonera from Finland) have participated in the project's Business Interest Group to test and give feedback on the methodology and software technology. The project sought to produce a practical method for the measurement of IC and software to support the implementation of metrics programmes.

The MAGIC project's aims were to develop methods and tools that might enable the quantitative as well as the qualitative evaluation of IC. The main deliverables of the project were essentially:

- A benchmarking study of 'Best Practice' in measuring Intellectual Capital (IC).
- A Knowledge Management (KM) methodology handbook describing the system of methods and tools for the measurement of and accounting for IC.
- An IT-tool for the support of the measurement of and accounting for IC based on standard software solutions.
- A CD containing elaborated road map 'How to evaluate and better manage Intellectual Capital (IC)' [26].

The methods for measuring Intellectual Capital as defined in the MAGIC project can be divided into four categories: Human Capital, Organizational Capital, Market Capital, and Innovation Capital.

Human Capital comprises all the skills, expertise and competencies of the company to react to market demands and customers' needs (including leadership and management issues and capabilities).

Organizational Capital comprises the capabilities of a company, its infrastructure and organizational processes to provide products and services to the market.

Market Capital represents the capabilities of a company to interact with the external interface such as the customer, partners, and suppliers and other stakeholders.

Innovation Capital refers to a company's ability to innovate, improve and develop unutilized potential as well as to generate long-term wealth [27].

In a survey conducted for the project, 83% of industrial respondents believed that measuring intellectual capital is critical to achieving business success [27]. The project seems to have had limited impact but has provided a basis for ongoing work.

MERITUM (1998–2001)

The acronym stands loosely for Measuring Intangibles to Understand and improve innovation Management.

The MERITUM project involved six European countries (Denmark, Finland, France, Norway, Spain and Sweden) in a comparative research project. The broad aims of the project were:

- To develop insights into the process of transforming intangible assets as sources of increased wealth, growth and employment, including research into managing and accounting for intangible assets.
- To develop guidelines for the measurement and disclosure of intangible assets.

Four main activities were undertaken:

- Developing a set of classification schemes for intangibles.
- Investigating the management control implications of intangibles.
- Investigating implications for capital markets (such as respective levels of return on human and other intangible assets).
- Developing guidelines for the measurement and disclosure of intangibles (p. 2) [28].

The MERITUM project report, published in June 2001 [29], proposed a set of dynamic indicators for intangibles which incorporates the following attributes:

- Useful
- Relevant
- Significant
- Understandable
- Reliable (objective and verifiable)
- Feasible
- Comparable (over time and across companies)
- Timely (same frequency as financial reports) (pp. 14–16) [29].

The project report concentrates on traditional intangible assets based in IPR rather than looking at less traditional value drivers within organizations. Importantly, the project does not address fundamental problems such as how to identify critical intangibles in an organization, or how to assign value.

PRISM (2001–3)

This project consisted of a consortium of eight university schools of business or economics in seven EU countries including well-known academics in the field (for example Edward Truch, Director of the Henley Forum). The PRISM acronym encapsulates the main themes of a multi-disciplinary European initiative aimed at gaining a deeper understanding of the issues surrounding the management and measurement of intangibles. These are: Policy-making, Reporting and measurement, Intangibles, Skills developments, and Management. The project not only addressed the development of market practices and new business models for intangibles but also created a set of 15 case studies, 4 of which feature small to medium-sized enterprises (SMEs) (p. 7) [30]. The project report was published in October 2003 [31], and makes widespread policy and reporting recommendations. A classification system for intangibles is proposed, and there is again an emphasis on IPR. Interestingly, the project report calls for an extension of data collection methods for intangibles (p. 8) [31]:

A major barrier to consider is whether users understand how to engage with this information. This shifts the focus from the production of indicators to their consumption and the involvement of the user community in the developmental stage.

This represents one of the key difficulties with intangibles research, that of not engaging with those users in organizations to discover intangibles that are recognized by them as being useful and relevant. The need to engage with senior managers to discover what information assets and attributes are important to them is seen as being a critical step.

A comparison of the MAGIC, MERITUM and PRISM projects is shown in Figure 1.

Intangibles area addressed	MAGIC	MERITUM	PRISM
Benchmarking	✓		
Classification		✓	✓
Software tools	✓		
Measurement and management	✓	✓	✓
User groups			✓
Case studies			✓
Expert groups/forums	✓	✓	

Figure 1 – MAGIC, MERITUM and PRISM compared

As can be seen in Figure 1, the PRISM project shows a clear movement towards more user-oriented approaches that were lacking in the earlier MAGIC and MERITUM work. It is yet to be seen whether this approach will prove worthwhile.

Accounting regulators

The second area identified by Canibano and others as being critical to the development of intangible assets is the work of accounting regulatory bodies [6].

In June 2002, the UK Accounting Standards Board (ASB) published proposals for updating the *Operating and Financial Review* (OFR) which made recommendations to company directors on which items to include in annual reports. The proposals included a new recommendation [32], which suggests that directors discuss the strengths and resources of a business, such as its brands and product research. It is noteworthy that discussing performance in the context of business objectives is recommended. This suggested that a discussion of future performance related to people management and customer support may become much more common.

The OFR was in line with the book edited by Carey and Sancto [33], which stemmed from an ICAEW conference on *The 21st Century Annual Report*. At this event the then ICAEW president, Chris Swanson, observed that ‘... the assets and risks not measured by historical cost accounts appear to be becoming more important as determinants of a business’s future success. Neither human capital nor intellectual capital is valued in historical cost accounts’.

Boulton et al. argued [20] – under the banner of *Value Dynamics* – that companies should be more transparent and user-driven in their disclosures. This is especially important in relation to the disclosure of the current values of all their assets, including intangible assets, which are not currently recognized in financial reports. The OFR promised much in this regard.

The OFR narrative reporting regulations became law in the UK in March 2005, requiring disclosure from April 2006 of, amongst other things, current and future trends, strategies, performance indicators, risk assessments, and resources. However, the then Chancellor of the Exchequer (Gordon Brown) announced in November 2005 in a speech to a conference of the Confederation of British Industry (CBI) that this

forward-looking, 'big picture' reporting requirement for listed PLCs was to be abolished as a gesture towards reducing red tape, leaving it as a voluntary code.

The OFR is a good example of a *supplementary disclosure*, and Benston et al. discuss whether it is preferable for such disclosures to be mandatory or voluntary [34].

The OFR's worthy aims included:

- greater transparency;
- help to investors in making informed decisions.

A listed company's market capitalization (that is its listed share price multiplied by the number of shares in issue) is the sum of two components:

Net asset value + Value of other information (including intangibles).

The OFR would have provided a review of the value of intangibles – including information as an asset.

In the directors' annual report to shareholders there is usually some reference (at least in the case of a listed company) to the difference between market capitalization and the book value of net assets – as shown in the balance sheet. This difference represents the present value of supra-normal profits that are the benefits arising from assets (such as intangibles) that are not recognized in the balance sheet – whether '... purchased or created internally, either separate or embedded in another asset to which they lend value' [34].

Despite the progress promised by the OFR, research by Fincham and Roslender (p. ix) [35] on the implications of intellectual capital management for business reporting highlights the need for the UK accounting profession to 'become better acquainted with the expanding stock of developments in accounting for intellectual capital'. They are careful to differentiate intellectual capital from traditional intangible assets. They argue that intellectual capital refers to a much wider range of assets than those traditionally recognized (for example goodwill, brands, company reputation). The role of 'knowledge-based intangible assets' in value creation is central and these authors argue that this approach will be far more successful than the more traditional valuation realization approach to intangibles advocated by the MERITUM report (p. 15) [35].

The research project undertaken by Fincham and Roslender involved a series of interviews with a variety

of managers in 6 companies and with 12 experts. They found that managers did recognize key knowledge-based assets such as people, customers and knowledge networks. Managers did not, however, recognize the term 'intellectual capital'. This did not mean that they were unaware of the importance of 'what the intellectual capital concept incorporates, nor that they did not focus sufficient attention on it' (p. viii) [35]. There was, however, a collective lack of understanding about the possibilities for intellectual capital reporting. Indeed, they conclude that 'the process of managing and accounting for aspects of intellectual capital in the UK has just about reached the limits of possibility' (p. ix) [35]. These authors call for the UK accounting community to look at exemplars of intellectual capital reporting from the Nordic countries, arguing that these intellectual capital statements may be used as a basis for a more general business reporting model, which would include intellectual capital. Although progress has been made in recent years in both producing guidelines for the management and measurement of intangible assets and in accounting standard reform, there is still a great deal of work to be done.

Financial Reporting Standard 10 was issued in December 1997 and covers any intangible fixed asset which is [16]:

- controlled by the entity; and
- provides access to future economic benefits.

Internally-generated intangible assets may only be capitalized if there is a readily ascertainable market value for those assets. Once capitalized, such assets should be amortized through the profit and loss account over a maximum useful life of 20 years – or longer (and even indefinitely) if the intangible assets are capable of being continually measured. In these latter circumstances, *FRS 11: Impairment of Assets* becomes applicable [36].

The Accounting Standards Board (ASB) in the UK introduced FRS 11 in 1998 with the aim of ensuring that the book value of fixed assets is not stated at a figure in excess of their *recoverable amount* (that is the higher of net realizable value or value-in-use).

If an asset (or group of assets) is valued in excess of the recoverable amount, then *impairment* is said to exist. This requires that the reported value of the asset (assets) be written down to its (their) recoverable amount, and the charge (that is the difference between the unadjusted reported value and the recoverable amount) shown in the profit and loss account.

FRS 11 specified two approaches to calculating the recoverable amount – the higher of:

- net realizable value, and
- value-in-use.

The choice would typically depend on whether there is a ready market for the asset(s) in question. If not, the value-in-use approach would need to be used to calculate the present value of future cash flows that would be generated from the use of the asset(s) over its (their) anticipated useful life, using a suitable discount rate (such as the company's weighted average cost of capital).

From 1 January 2005 the European Union (including the UK) switched to international financial reporting standards (IFRS), with FRS 11 being replaced by *International Accounting Standard 36* [37]. However, these two standards share many key features relating to recognizing and measuring impairment losses. Alciatore et al. give a comprehensive literature review of asset write-downs [38].

Andrews has shown that large impairment losses have been reported by UK plc's [39], with a significant impact on reported financial performance. Intangible assets are the focus of a large proportion of impairment losses.

Information assets as intangible assets?

The perspective offered by this article is that information as an asset has attributes that make it significant and dynamic. While a quantifiable value for information assets may not be attainable, the management of information assets benefits from attention to value considerations. Value concentrates the mind on those positive aspects of information as an asset that can enhance the effectiveness of an organization (see Figure 2). A resource-based view of information and its definition as an asset is useful as it can perhaps change the perceptions of senior managers towards information, even if it does not result in any financial valuation being made. This is because senior managers are familiar with the concept of traditional assets such as property and plant representing value to a business [40].

A focus on the effects of attributes of information assets is in effect a focus on the long-term future economic benefits to the organization from information

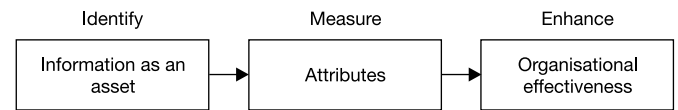


Figure 2 – Information assets and organizational effectiveness

assets. The challenging of traditional attempts at information valuation was critical to the development of this model. The traditional approach was described by senior executives and information managers interviewed for a study by Oppenheim et al. as 'going down a blind alley' [41] [42] [43] [44]. They recommended looking at the ways in which information added value to organizations. This led to a new definition of information assets as:

Information assets comprise resources that are or should be documented and which promise future economic benefits.

This definition also reflects the need to develop a definition of information assets which is acceptable to both accounting and information professionals.

For example, the concept of 'potential value' used in the *Hawley Report* is particularly difficult in financial reporting [40]. Potential value involves predictions based on a subjective interpretation of expected benefits (p. 13) [45]. Such benefits cannot be predicted with any certainty, hence potential value is an unverifiable indicator. Future economic benefits are therefore proposed as an alternative definition that, while it does not resolve the problem of prediction, has a sound basis in accounting theory.

The concept of future economic benefits is already used in the accounting definition of assets [46]. While accounting does not easily accommodate information assets, it is useful to situate information assets within an accounting framework. This is despite the fact that, in accounting, only those items that can be expressed in terms of money are recorded. Information assets are usually recorded as costs, and so they appear in a company's accounts as expenses rather than as assets, thereby colouring the perceptions of senior managers. To be accepted as an asset in financial reporting terms, information assets would have to fulfil recognition and definition requirements under accounting rules. As we have seen, a key requirement for recognition as an asset is future economic benefits. An asset can be recognized in accounting terms if it gives:

rights or other access to future economic benefits [46].

This definition accommodates the increasing recognition of intangible assets in accounting standards. Licensing and patenting agreements mean that organizations do not have to own assets to gain benefits from them (p. 97) [47]. An organization that has no information assets cannot generate future economic benefits from them, but information assets, when leveraged, can point the way to commercial opportunities. Information assets can thus be recognized as accounting assets in that they give rights and provide access to future economic benefits.

Marchand provides a framework of strategic information alignment (developed at IMD, Lausanne) that focuses on four fundamental ways in which information might be used to leverage business value [48]. These are:

- Adding value, mainly through using information to improve customer relationship management (CRM).
- Creating a new reality by using information to facilitate innovation.
- Managing risk by developing information associated with financial, legal, market, and operational risks.
- Reducing costs by using information to focus on improving business processes.

To the extent that information helps in any of these tasks it can be seen to be valuable, and this is one aspect of thinking of information as an asset [49], and seeking to make the invisible visible [50].

The defining of information as an asset is a separate issue to that of recognition. Here the control and separability of the information asset is critical. Control in the context of the definition of an asset means the ability to obtain future economic benefits and restrict the ability of third parties to gain such benefits. Therefore, 'items that cannot be separately identified from the business as a whole cannot be individually controlled by the entity and hence are not assets' (p. 97) [46]. Given that information is typically diffused through all aspects of the business (p. 79) [51], it is extremely difficult to separate information from the activities it underpins. Selling an information asset would, in many cases, mean selling an entire business. This requirement that an asset must be 'separable' and 'controllable' by the entity, that it be capable of being sold separately from the business, means that, in principle, information cannot always be defined as an asset.

Many traditional and non-traditional assets would also not meet these criteria but, as the market for commercial information (for example customer information details) grows, the boundaries between these assets are becoming blurred. These might be described as 'tomorrow's assets' being knowledge-based and largely intangible as opposed to 'yesterday's' largely physical and tangible assets. It is therefore proposed that information assets should be seen to have a role in creating *future economic benefits*.

Concentration on seeking a value of information or measuring its financial and economic benefits can be a distraction from the very real role which information plays in organizations. This role is most evident in the concept of information as the 'lubricant', which facilitates smooth operations and which binds together organizational activities and supports organizational members in decision-making. While the value of information cannot be readily demonstrated, it is evident in the value that an organization creates in a multiplicity of activities from product development to marketing to customer and employee involvement. Information underpins all of these activities but cannot be said to be the central element of any one of them. Its value lies in enabling these activities and allowing them to work together. Without the lubricating role of information, things would grind to a halt.

Information as an asset

The definition of information as an asset has its origins in a resource-based view of information. Black and Marchand trace the rise of a resource-based view of information from the mid-1970s (p. 205) [52], when the US Government realized that it was in danger of drowning under paperwork and doing so at an unsustainable cost. It set up a Commission on Federal Paperwork, which stated that [52]:

... as a resource, data and information can and must be managed just as we manage human, physical and financial resources. Data and information must be subject to the same budgetary, managerial and audit disciplines as any other resource. (p. 207)

Burk and Horton epitomized the resource-based view of information in their work on identifying key corporate information resources [53]. These were the information resources vital for organizational activities. Their 1988 approach concentrated on harnessing information resources already present in organizations and identifying uses of these resources. Values were assigned

to information resources based on strategic weightings (where the organization's overall business strategy provides criteria for weighting individual information resources in terms of their usefulness for particular strategies). Only when weightings had been assigned were costs considered. An information audit then periodically ensured that 'best value' was attained for costs expended. The approach concentrated on the productivity of information resources in relation to their costs (p. 206) [52]. The link between business strategy and information resources identified by Burk and Horton was a critical one.

The resource-based approach to information was adapted in the 1990s by two highly regarded and well-publicized reports: the Hawley Report [40], and Reuter's *Information as an Asset: The Invisible Goldmine* [54], both of which attempted to identify information as an 'asset'. The Hawley Report was produced by KPMG with the backing of the Confederation of British Industry (CBI). It argued that information is a vital resource and proposed that someone at board level should be responsible for its management. The key finding of this report stated that [40]:

... all significant information in an organisation, regardless of its purpose, should be properly identified, even if not in an accounting sense, for consideration as an asset of the business. The board of directors should address its responsibilities for information assets in the same way as for other assets, e.g. property, plant. (p. 23)

The Hawley Report recommended that information assets should be identified and classified by value and importance, and that skilled resources were needed to manage information assets and harness them. This was to ensure information assets were providing the maximum business benefit. Dr Robert Hawley [55], the chairman of the committee that produced the Hawley Report, pointed out that many intangibles (such as brands, people and intellectual property) had received attention in the business literature. This meant that boards of directors were at least aware of most of them – and aware that attention should be paid to them. In contrast, very few organizations recognized the value of information. The Hawley Report positioned this recognition of the importance of information as being pivotal. If boards of directors were not paying attention to information, then there was, at best [55]:

... a lack of consistency in strategic understanding, planning, budgeting, management and control, and at worst, the very existence of the organisation can be under threat. (p. 237)

The Hawley Committee argued that the first step in benefiting from the information held and used by organizations was a formal process of identification. They found that a number of information types or assets were consistently identified across organizations.

The eight categories of information assets identified by the Hawley Committee were [40]:

Market and customer information e.g. regional utilities have large amounts of data on every household in their regions; trade names and trade marks.

Product information e.g. the depth of knowledge in particular technologies which support particular products such as fluid and thermal dynamics in the aerospace industry. This includes both registered and non-registered intellectual property rights (IPR).

Specialist knowledge and information for operating in a particular area, which is often in people's heads (e.g. retailing know-how amongst managers of grocery supermarkets who find even associated areas of retailing difficult to move into). [Since the publication of the Hawley Report, retailers (e.g. Tesco) in the UK have become very successful in expanding their markets into associated consumer durables. This type of knowledge is also now addressed in part by knowledge management techniques but, at the time of the Hawley Report, knowledge management was not a well-established activity.]

Business process information that underpins the workings of the business within the broader context (e.g. economic, political, share price and other information that financial markets use).

Management information, particularly that on which major policy, competitive decisions or strategic plans will be based (e.g. economic statistics, or cost-base information).

Human resource information (e.g. skills databases) particularly in project-based organizations such as consultants in a technology company who need to be brought together to support a client project. Again, these days knowledge management attempts to address this area.

Supplier information e.g. trading agreements or networks of contacts for services or product development.

Accountability information e.g. legally-required information including shareholder information, health and safety information or environmental pollution evidence. (p. 9–10)

The identification of information as a vital asset for business was further developed by the publication of *Information as an Asset: The Invisible Goldmine* [54],

which reported the results of 500 telephone interviews with senior managers in UK companies. The main conclusions of this report were that one in four UK companies said that information was its most important asset; half thought it was more important than trade names and registered trademarks; and 1 in 10 valued its information more than its staff. However, more than 40 per cent of respondents said their companies had not woken up to the value of their information.

The results showed that companies wanted to capitalize their expenditure on information, yet some 25 per cent of the respondents said they could not capitalize information assets because they found it too hard to identify what the value of the assets was. These reports seemed to indicate that organizations would benefit financially from defining information as an asset and that new ways of identifying, measuring and managing information would eventually emerge.

Despite the wide publicity and high regard with which both the Hawley Committee and Reuter's reports were received, they had in fact little impact on the ways in which organizations addressed the management of their information resources. In a study of 12 high-performing organizations by Owens and Wilson in 1997 [56], it was found that traditional information roles were being taken over by Information Technology (IT) personnel. This put an emphasis on the effective storage and retrieval of information rather than the quality of the information itself (p. 26) [56]. The traditional information specialist was playing a diminishing role in the organizations surveyed. The Information Resource Management (IRM) approach, though not widely applied, was significant, however, because it not only identified the cost of information but also sought to identify its value. It remained focused on cost and productivity and this led to criticism of the approach. In particular, Eaton and Bawden summarized the views of many when they pointed out that 'if information is a resource, it is different in kind from most others' (p. 156) [57]. The value of information debate is central to this criticism and is discussed in the following section.

The value of information

The concepts of value and of information as an economic resource are discussed in this section. Attempts to calculate the value of information assets are outlined and reasons suggested for their lack of success.

Value

The definition of value itself is problematic and provides no basis for a value of information. Boisot states that there is no settled definition of value and traces the development of the concept of value in economic theory from before the 1870s when physiocrats (who believed land was the main generator of value) opposed mercantilists (who believed mineral wealth such as gold and silver was the ultimate source of value) (p. 72) [58].

Others argued that value resided in the transformation that humans wrought upon nature rather than in nature itself. Some viewed human or animal labour as the source of all value. This view was shared by classical economists such as Adam Smith and David Ricardo. Physiocrats, mercantilists and classical economists all took value to be energy-based. In no case did information play any significant role. In the second half of the 19th century, value became relational and contingent, being established through the interplay of the supply and demand conditions for goods. Information was never treated as the central focus in a transaction and hence an object of exchange in its own right. As such, attempts to place a financial value on information were not rooted in sound foundations.

Attempts at information valuation

Badenoch et al. grouped attempts at finding information value into four categories [59]:

1. Econometric approaches (for example economic value added).
2. Organizational management and resource management perspectives (for example IRM).
3. Costing, pricing and evaluation of library and information services (for example performance measurement).
4. The social value of information (for example contribution to social good) (p. 23–62).

If it is argued that the value of information depends on its context and use (p. 163) [57], then its value to users is impossible to determine in advance. Eaton and Bawden argued that identifying information as a resource had become shorthand for 'information is important' [57]. In other words, concentration on

quantifying information detracted from the dynamic role which information played in organizations. Attempts to measure value limited the dynamic nature of information and ultimately destroyed innovation in organizations.

None of the methods gained widespread acceptance and Badenoch et al. conclude that this is because 'we cannot consider the value of information out of context of the activity or decision it supports' (p. 62) [59].

Valuation methods

The following examples of attempts to place a value on information demonstrate some of the difficulties that are often encountered when trying to place an objective value on information.

Griffiths and King focused on estimates of the cost of information to users of in-house information services (for example desk research, online searching) if these were not available (p. 109) [60]. Their approach saw the main factor in valuing information not as the value of the resource itself but as the value of the time and effort spent by users in obtaining information elsewhere. This seems to be an objective measure of the cost of information. However, if we consider that any one user's time may be worth more or less than that of other users and that many users in practice would not be interested in obtaining information from elsewhere, then the measure appears less than objective. It also assumes that the user will apply the information to create value for the organization. The information found may be of no use at all (that is it may have a cost but no value).

Glazer attempted to value transaction-based information and identified two levels of value [61]; the value of information as it is currently being used, and potential ways in which information could be used:

V(a) current actual value

V(p) potential value of information.

Glazer in 1993 undertook a valuation exercise in an electronics company using the above categories of value. This resulted in a figure of US\$25 million for the value of information which could be generated from potential uses of transaction-based information. Glazer's method assumed that all the information held by the organization was valuable. This was by no means certain since, as Orna points out, 'information has no inherent value in itself' (p. 20) [62].

An objective value for information?

Arriving at a value of information is not an objective exercise. Different stakeholders (for example customers, employees, managers, suppliers, society, owners and investors) will employ different methods depending on their various perspectives. Their evaluations will be subjective. Attempts to value information and place it on the balance sheet of an organization does have benefits in that it positions information within an area of financial management with which all senior managers are concerned. However, an objective value of information (and indeed of traditional and non-traditional intangible assets) is not possible. Information value by its very nature is subjective, and is dependent on the interpretation of the individual or team members who employ information in particular situations for particular purposes. In any case, objective measures are often far less reliable than they at first appear. Accounting has been highlighted as an area where organizations such as Enron and Worldcom could present seemingly objective and audited financial statements, which have in fact little to do with their real underlying financial position.

Attributes of information assets

If information assets themselves cannot be valued or recognized as intangible assets, then perhaps their attributes can provide a mechanism whereby users can attempt to gain a more complete picture of them. Capturing these attributes is a tall order and has a long and varied treatment in the literature.

Repo lists the unique attributes that information possesses [63]:

1. Information is human. It exists only through human perception.
2. Information is expandable. The free flow of information maximizes its use.
3. Information is compressible.
4. Information is substitutable. It may save money by substituting the use of other resources.
5. Information is easily transportable by using applications of new information technology.

6. Information is diffusible. It tends to 'leak' even if we try to contain it.
7. Information is shareable: giving it away does not mean losing it. (p. 374)

Burk and Horton argue that it is the role that information plays [53], which defines it as an organizational resource, not its similarities to other resources. Information has value in encouraging innovation and change. Information has identifiable and measurable characteristics (p. 18) [53]. These measurable characteristics can help to define its value and include [53]:

1. Quality of the information itself: degree of accuracy, comprehensiveness, credibility, relevance, simplicity and validity.
2. Utility of information holdings: degree of intellectual and physical accessibility, ease of use, flexibility and presentation.
3. Impact on productivity of organization: contribution to improvements in decision-making, product quality, efficiency of operation, or working conditions, time-saving and promotion of timely action.
4. Impact on effectiveness of organization: contribution to new markets, improved customer satisfaction, meeting targets and objectives and promoting more harmonious relationships.
5. Impact on financial position: contribution to cost reduction or cost saving, substitution for more expensive resource inputs, increased profits and return on investment. (p. 93)

Many of the attributes identified by Repo [63] and Burk and Horton [53] are revisited by Orna [62]:

1. Information must be transformed by human cognition.
2. Where inflows of information necessary to maintain knowledge and support appropriate action are blocked, disaster can follow, either quickly (as in aircraft disasters) or in the form of a gradual run down of competence and chaos.
3. Where information is hoarded for the exclusive use of a limited number of people, it can actually

fail to achieve its full potential value for those who hoard it. If it is exchanged and traded the value resulting from its use increases for all parties to the transaction.

4. Information has no inherent value in itself.
5. Information is a diffused resource that enters into all activities of businesses and forms a component of all products and services that are sold. (p. 20)

The elements identified cover three distinct types of attributes. These are: attributes inherent to information; attributes concerned with the impact of information; and, economic attributes of information.

Inherent attributes

The first two characteristics identified by Burk and Horton [53], quality and utility, can be seen to be inherent in information as an entity in itself. They can be identified and measured according to a set criterion within a particular context or organizational setting. Attributes identified by Repo [63] such as expandable, compressible, storable, transportable and substitutable also fall into this category.

Impact attributes

Impact attributes include productivity and effectiveness. These are not so readily identifiable or measurable. The main difficulty is that information, although useful, is in all likelihood only a tiny factor in any productivity or effectiveness improvements. While information underpins improved productivity and effectiveness, it cannot be easily separated from all the other elements that impact on these areas. To have this impact information must be 'transformed by humans' [62] [63]. Information also has an impact in encouraging innovation and change (p. 93) [53].

Economic attributes

The economic attributes of information are the most interesting. Burk and Horton [53] include an economic category of financial impact. However, it is very difficult to show any financial impact from information, other than cost (which reduces rather than increases profit).

Economic attributes identified by Arrow [64], which emphasize the inappropriability of information, actually exclude it from definition as an economic good. This is because information once transferred becomes the possession of both buyer and seller [64]:

... information is inappropriable because an individual who has some can never lose it by transmitting it. (p. 142)

This means that the same information can benefit both the giver and receiver.

Unlike traditional economic good (for example, a car) information can never really become the sole possession of the receiver. If individual X has an idea and X shares it with individual Y, then not only does Y benefit but also X can still retain and benefit from that idea. Value is added by the sharing of information since both parties are able to use it to enhance their activities. The attributes of information being exchanged and traded – as identified by Orna – are also economic attributes and there is evidence (for example the selling of customer information data) to support their inclusion as economic attributes.

Inherent, impact and economic attributes of information assets are summarized in Figure 3.

All three categories of attributes of information assets may be under-recognized by senior managers because they underpin everyday organizational activities rather than appearing as revenue-generators. Indeed, the attributes described in the literature may not be those relevant to senior managers. While it is very difficult to identify the value of individual attributes, their effects on the strategic activities of organizations, and on their competitiveness and decision-making processes, can be more readily shown. In other words, they can be shown to enhance the effectiveness of organizations.

Conclusion

In this article we have defined and discussed the nature of assets in general and of intangible assets in particular (of which information assets are a specific category). In addition, we have considered the essence of value and a variety of approaches to the valuation of intangible assets in general and of information assets in particular.

One can set about defining assets in a variety of ways – such as the resources available to individuals or organizations to support the pursuit of goals (that is to facilitate purposive behaviour).

Managing assets in an effective manner is important due to their scarcity and value-adding characteristics, and the imperative of operating in an efficient way.

A resource-based view of information as an asset such as that by Black and Marchand [52], sees information as being subject to the same budgetary, managerial and audit disciplines as any other resource – whether human, physical or financial.

The Hawley Report of 1994 [40], and Reuter's *Information as an Asset: The Invisible Goldmine* in 1995 [54] both saw information as an asset that needs to be managed (implying a need for identification, classification and accountability). However, there was little evidence from Hawley, Reuter's, or other studies – such as Oppenheim et al. [41] – to suggest that the valuation of information assets was widely-practised or seen to be necessary. Nevertheless, interest has been expressed in capitalizing expenditure on information (that is treating it as an asset rather than simply as an operating expense).

Attributes of information as an asset (grouped into inherent, impact and economic categories) have been

Inherent attributes	Impact attributes	Economic attributes
Utility/Quality (Burk and Horton [53])	Productivity/Effectiveness (Burk and Horton [53])	Financial position (Burk and Horton [53]) No inherent value (Orna [62])
Expandable/Compressible/ Storable (Repo [63])	Transformed by humans (Orna [62]; Repo [63])	Exchanged and traded (Orna [62])
Transportable/Substitutable (Repo [63])	Encouraging innovation and change (Burk and Horton [53])	Shareable (Arrow [64]; Orna [62]; Repo [63])

Figure 3 – Attributes of information assets

identified by many writers including Arrow [64], Repo [63], Burk and Horton [53] and Orna [62], which are – at least in principle – helpful to the tasks of recognizing, valuing and managing information as an asset.

The notion of *value* implies the appraisal or pricing of some object (or idea). In essence, the value of an asset can be seen in the future economic benefits (net of costs) that one expects to derive from the ownership/right to use the asset in question.

If expenditure for some particular purpose does not result in the acquisition of an asset, this can be seen as an operating expense, whereas expenditure that does result in the acquisition/creation of an asset can be seen as the capitalization of that expenditure. Information can fit into either category, as shown by the range of attributes of information as an asset.

Valuation represents the process of attaching a measure to represent an asset's value – usually (but not exclusively) in monetary terms. For example, the value of a recently-purchased asset might be seen as being the price paid to acquire that asset. This is an example of a historic *entry* valuation, but one can also think of present or future valuations based on replacement or *exit* (for example proceeds of sale of an asset). Other approaches to valuation focus on, for example, deprival value and value-in-use.

Approaches to valuing information such as that by Badenoch et al. [59] can be seen to depend on both its context and use (such as supporting decision-making), hence many problems have been encountered in attempting to place a reasonably objective value on information as an asset.

One can argue with some conviction that what is not shown on an enterprise's balance sheet (for example morale of employees, purchase pre-disposition in the market place, managerial capability, information assets) is of greater importance than that which is shown.

The absence of many intangible assets (including information) from corporate balance sheets is largely due to the accounting profession's failure in coming up with generally accepted guidelines for identifying/recognizing and measuring/valuing intangible assets of all kinds. Reliability tends to override relevance in financial reporting.

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