Knowledge Assets: Governmental Measurement Standards

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Abstract

The academic and practitioner literature is replete with definitions of the concepts of intellectual capital, knowledge assets, and their measurement. What is missing is the connectivity among them in the public sector (government and not-for-profit) context. This paper presents an overview of the definitions, reviews the research efforts to develop appropriate metrics for knowledge assets in public sector organizations, and then suggests directions for future research.

Introduction

Here follows an overview of the definitions of the concepts of intellectual capital, knowledge assets, and their measurement, needed to set the stage for ideas reviewed in this paper.

Intellectual Capital

Review of the literature shows a preponderance of instances where intellectual capital (IC) is defined in terms of intangible or invisible assets. Observe however, that many of these definitions are placed in the context of a "company" rather than a public sector or not-for-profit "organization".

For example, the Organization for Economic Cooperation and Development (OECD) (1999)[1] describes *intellectual capital* (IC) as the economic value of two categories of intangible assets of a company: (1) organizational (or structural) capital, and (2) human capital. The OECD paper goes on to say that structural capital includes artifacts such as proprietary software systems, distribution networks, and supply chains; human capital includes human resources inside the organization (employees) and outside the organization (customers, suppliers, stakeholders).

In the professional arena, the Society of Managements of Canada (1998)[2] also defines IC in terms of assets, as: those knowledge based items that a company owns, which will provide a future stream of benefits for the company. This can include technology, management and consulting processes, and patented intellectual property.

In other examples, as noted by Bontis, Dragonetti, Jacobsen, and Roos (1999)[3], leading practitioners such as Skandia, Dow Chemical, and Canadian Imperial Bank of Commerce have defined IC as the collection of intangible assets and their flows. (For this paper, intangible assets are defined as any intangible factor that creates value for the controlling organization.) And as a final example of practitioner definition, Thomas Stewart (1994)[4] in Fortune magazine quotes Larry Prusak, a principal at Ernst & Young's Center for Business Innovation in Boston. He defines IC as "intellectual material that has been formalized, captured, and leveraged, to produce higher-valued assets."

Knowledge Assets

Holsapple and Joshi (1999)[5] classify *knowledge resources* as content resources and schematic resources. Content resources include knowledge as artifacts (e.g., files, memos, videos, manuals, patents, and products) available from participants (such as employees, customers, suppliers, computer systems and other agents able to process the knowledge artifacts). Schematic resources are defined as infrastructure, culture, purpose, strategy, and other factors that influence the processing of the knowledge artifacts by the participants.

The Financial Accounting Standards Board (FASB) (1980)[6] gave us the now well-established definition of an *asset* in three parts: (1) probable future economic benefits [in the form of added cash inflows or the avoidance of future cash outflows] (2) obtained or controlled by an organization (3) as a result of a past transaction or event.

Combining the Holsapple and Joshi with the FASB definitions, this paper defines a *knowledge asset* (KA) as a knowledge resource expected to provide a future economic benefit for the controlling organization.

For example, the Organization for Economic Cooperation and Development (OECD) (1999)[7] describes *intellectual capital* (IC) as the economic value of two categories of intangible assets of a company: (1) organizational (or structural) capital, and (2) human capital. The OECD paper goes on to say that structural capital includes artifacts such as proprietary software systems, distribution networks, and supply chains; human capital includes

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Industry vs. Government

Consider the question of context! Do definitions of intellectual capital and knowledge assets change according to the organizational context? Certainly, on the surface, it does not appear so. The brief review of concepts thus far does not distinguish between public service and private enterprise. Becerra-Fernandez and Sabherwal (2001)[7] propose that context influences the suitability of a knowledge management process. Similarly, this paper argues that KA metrics and related standards should change with context, although basic definitions do not.

Current Measurement Standards for Knowledge Assets

The literature review suggests a number of approaches to develop standards. Wilkins, van Wegen, and de Hoog (1997)[8] evaluate the use of various "proxies" for knowledge assets (KA) such as human resource accounting, organizational learning, intellectual property, and American GAAP (generally accepted accounting principles). They also review practitioner methods developed "in the field" by: various corporations (notably Skandia) to report KA; venture capitalists to evaluate potential KA-based investments, and commercial lending institutions, also to evaluate potential financing of KA investments. Finally, they propose a "framework" of metrics to define, value, and estimate the economic life of KA.

Bontis, Dragonetti, Jacobsen, and Roos (1999)[3] review four measurement "systems", also popular among practitioners: (1) human resource accounting, (2) economic value added, (3) balanced scorecard, and (4) intellectual capital.
Sveiby (2001)[9] summarizes methods for measuring IC, using four classifications:

1. Direct Intellectual Capital (DIC) Methods – to estimate the value of IC by identifying various components, then evaluating them directly, either individually, or using an aggregated coefficient of some kind.
2. Market Capitalization (MCM) Methods – to calculate the difference between a company's market capitalization (market value of outstanding shares) and its stockholders' equity (book value of outstanding shares), as the value of its IC.
3. Return on Assets (ROA) Methods – to calculate average pre-tax earnings of a company for a period divided by the average (for the same period) tangible assets of the company. Excess of ROA over industry average derives a value for IC.
4. Scorecard (SC) Methods – to identify various non-financial components of IC, and report these in scorecard or graphic form.

Sveiby's classification suggests that the DIC and SC methods would work best for public sector (governmental and not-for-profit) organizations, because the non-financial metrics are more appropriate for environmental, social, and public service purposes.

These proposed metrics are all helpful in the quest for standards in the public sector. However, there is a problem for accountants and auditors, those primarily responsible for measuring, recording and reporting on the assets, including the KAs. Notably, Housel and Kanevsky[10], Walsh (1998)[11], and others have explored the idea of measuring KA by applying a business process audit to measure KA based on how efficiently an organization creates [knowledge asset] value from information.

Defining Knowledge Asset Metrics in the Governmental Context

Keith Bradley (1997)[12] provides some insight to how IC creates wealth at a corporate level, but suggests there are lessons to be learned by governmental organizations, for creating wealth on a national basis. These include setting appropriate incentives to (1) allow individual "owners" of IC to benefit, (2) encourage research and development necessary to create new KA, (3) provide appropriate education and training needed to transfer KA, and by so doing increase its value.

Liebowitz and Wright (1999)[13] define knowledge as information with a process applied to it to give 'value-added'. Denham Grey (circa 1998)[14] expands the notion of knowledge as both an object and a process. Brailsford (2001)[15] contributes the concept of a time dimension to knowledge, from the "knowing what you know", to "learning as you go".

In a governmental or other not-for-profit setting, these ideas seem to connect best with the human resource accounting idea of valuing KA based on a future value or replacement value. In the public sector, especially the US federal government, this need to evaluate our knowledge resources has received increasing attention in recent years, most notably from the Social Security Administration[16], and the General Accounting Office (GAO)[17]. The GAO has issued more than 75 reports to Congress since 1995, expressing concern that various other federal agencies have not adequately addressed the "graying of government" and "do more with less" issues that will, sooner or later, result in a flight of human capital and a severe loss of the human component of KA, throughout the federal government. For example GAO report GAO/T-NSIAD-00-133[18], with respect to NASA's space shuttle program, concludes that NASA's downsizing since 1995 "jeopardizes the program's ability to hand off leadership roles to the next generation".

In such an environment, the human resource accounting concept of valuing KA in terms of future recruitment, salary and training costs to replace essential staff, seems most appropriate. But beyond these immediate costs of replacing the KA, there is a lost opportunity cost caused by the departure of senior staff, a lost opportunity that is almost irreplaceable unless adequate preparation has been made to transfer the tacit knowledge from the exiting employee to the organization.

Expressed in a different way, we may conceptualize this transfer of tacit knowledge as a transfer of the lessons learned by the senior employees, based on their professional and organizational experiences. Weber, Aha, and Becerra-Fernandez (2001)[19] explore this idea in a variety of cases in a range of settings within the US federal government. Their conclusions include an idea similar to the one proposed here, that the methods for institutionalizing these lessons learned are poorly defined, and the reuse component of the knowledge assets is limited (another way of saying that lost opportunity costs are high).

Further Research Opportunities

The literature review for this paper supports the initial impression that most of the research in this area has focused on the private sector. Perhaps this is not so surprising, because many of the KA valuation metrics and methods have been developed by or in consultation with practitioners in the corporate arena. However, there appears to be growing interest in applying the intellectual capital, and knowledge management ideas in the not-for-profit sector. This is true particularly in larger organizations where knowledge resources (artifacts, participants, and repositories) may be scattered, and the schematic resources may not be clearly defined. There are some suggestions that are appropriate for the not-for profit and government environment.

Liebowitz and Suen (2000)[20] recommend some new metrics, some of which would also be appropriate in the public service sector:
Number of new colleague-to-colleague relationships
Rate of reuse of knowledge objects
Number of new ideas for innovative services
Other suggested metrics include:
Incidence of online capture of key expertise (Becerra-Fernandez, 2000)[21]
Petty and Guthrie (2000)[22] also suggest the need to identify new measures, new reporting standards, and new users/managers for KA resources.

David Skyrme (1997)[23] describes some guidelines for success in achieving visible business benefits through the measurement of IC. However (again), these are guidelines for private sector rather than not-for-profit/government organizations. Nevertheless, the suggestions can be easily transported into the public sector context. (1) Develop a greater awareness and understanding of the role of knowledge and nature of intellectual capital in government and not-for-profit organizations. (2) Create a common language for organizational use; for example, "intellectual capital", "knowledge asset", etc. (3) Identify appropriate indicators and criteria for measurement. (4) Develop a measurement model to provide an appropriate context for measurement. (5) Introduce measurement and incentive systems to guide and reward managers

Further research opportunities exist for academics and practitioners to follow up with public service organizations to develop a better conceptual understanding of knowledge value and knowledge management peculiar to the public sector, identify and develop KA measurement standards based on personnel experience, uniqueness of the service, quality, innovation, and other non-financial metrics more suited to that environment. Also, research is needed in the areas of design, development, and implementation of systems to capture the knowledge and disseminate the lessons learned.

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