

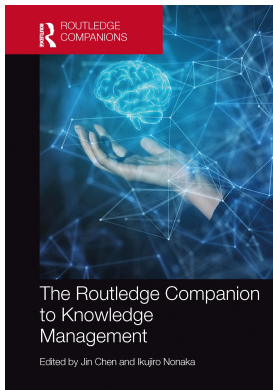
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## The Routledge Companion to Knowledge Management

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### Retaining Knowledge

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# 3

## RETAINING KNOWLEDGE

### Human and Intellectual Capital

*Rongbin WB Lee and Vivien WY Shek*

#### **Background**

According to Andriessen (2007), the first appearance of the term “Intellectual Capital” (IC) in press appeared in Thomas Stewart’s article called “Brainpower” in 1991. Four years later, the first meeting in IC management took place to boost the thinking on IC management and knowledge management (KM). Leif Edvinsson, who is a leading expert on IC, was the world’s first corporate director of IC at Skandia AFS. Edvinsson (1997) first coined the term “intellectual capital management” and explains IC as “knowledge convertible into value”, highlighting that the main objective of IC management is to create and leverage intellectual assets (IA) and to improve the value-creating capabilities of an organization from a strategic perspective.

Since then, there is a worldwide interest in the adoption of IC management. In 2004, the European Commission (EC) had set up a high-level expert group to stimulate the reporting of IC in research-intensive small and medium-sized enterprises (SMEs), government subsidized R& D organizations and universities. In Germany, companies are recommended to include IC in their management report. In Denmark, IC is a requirement to be included in the management reports of all companies. In Austria, IC Reporting has become mandatory for all universities. In Australia, following a mandate from the government, a guiding principle is being developed by the Society of Knowledge Economics aimed at the development and reporting and management of IC. The Ministry of Economy, Trade and Industry of Japan is actively pursuing the voluntary participation of SMEs in intellectual asset-based management.

According to the study of Ocean Tomo (2020) between 1995 and 2015, the share of market value of intangible assets increased from 68% to 84%. COVID-19 has increased this trend by over 90% in companies listed in the Standard & Poor’s 500 (S&P 500).

#### ***Definition of Intellectual Capital***

A new perspective on knowledge assets in value creation emerged in the mid-nineties, namely IC, which is recognized as the foundation of individual, organizational and national competitiveness in the 21st century (Stewart, 1991; Edvinsson and Sullivan, 1996; Edvinsson, 1997; Edvinsson and Malone, 1997a, Wiig, 1997; Ehin, 2000; Nemeč Rudež, 2004; Bounfour and Edvinsson, 2005).

Table 3.1 A Summary of Intellectual Capital Definition

<i>Scholar</i>	<i>Definition of Intellectual Capital (IC)</i>
Klein and Prusak (1994)	Intellectual material that has been formalized, captured and leveraged to produce a higher-valued asset.
Bontis (1996)	Intellectual capital that has been defined as the difference between a firm's market value and cost of replacing its assets.
OECD (1996)	Intellectual capital as a value-creation process.
Stewart (1997)	Intellectual capital referred to as the combination of enterprise, comparative advantage and individual knowledge; those, which can be used to create wealth, such as IC and experience, are referred to as intellectual material.
Edvinsson and Malone (1997a)	Intellectual capital can control knowledge, practical experience, organizing technology, customer relationship and professional skill. These can give an enterprise competitive advantage in the market.
Bell (1997)	Intellectual capital is knowledge resource to an organization. It encompasses the model, strategies, unique approaches and mental methodologies organizations use to create, compete, understand, problem-solve and replicate.
Bassi (1997)	A firm's IC, employees' brainpower, know-how, knowledge and processes, are always a source of competitive advantage.
Roos et al. (1997)	An enterprise's IC is the sum of staff knowledge, which can be transformed into an object, such as a trade mark, a registry or a process. All the resources within the organization that can create value but cannot be seen are called IC.
German Federal Ministry of Economics and Labour (2004)	Intellectual capital is the existing knowledge of an organization that is critical to success.

According to Chatzkel (1998), IC is the non-financial resource of an organization. It has been identified as a set of intangibles, including both human and non-human resources or capabilities, that drive organizational performance and value creation (Edvinsson, 1997; Roos and Roos, 1997, Bontis, 1998; Bontis et al., 2000; Ehin, 2000). IC is not only about the people, their knowledge and skills, but also about organizational processes, competences and relationships with customers. Table 3.1 summarizes some of the definitions of IC by different scholars.

Although there is no widely accepted definition of IC, the literature revision shows that IC is essentially related to the knowledge that can be converted into value (Edvinsson and Sullivan, 1996). One widely accepted notion is that IA and intellectual property (IP) are regarded as the subsets of IC. Figure 3.1 shows the relationships between IC, IA and IP.

Sullivan (1998) suggests that IA are created whenever the human capital commits to media any bit of knowledge, know-how or learning. Once "written", the knowledge is codified and defined. IA refers to the codified knowledge that can be used to create value. Examples of IA include plans, procedure, memos, sketches, drawings, blueprints and computer programs. Any items in this list that are legally protected are called IP. IP covers several types of legally recognized rights to intangible things such as ideas (copyrights) or practical implementation (patents). In today's legal systems, IP typically includes at least copyrights, trademarks, patents and trade secrets (Miller and Davis, 1990; Hildreth, 1998).

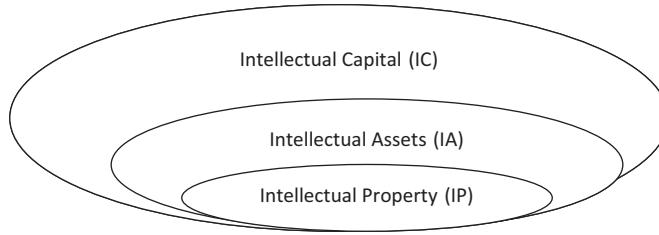


Figure 3.1 Relationships between IC, IA and IP

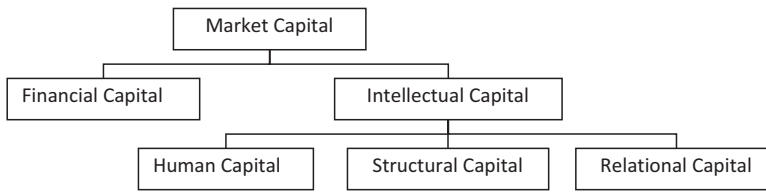


Figure 3.2 A Classification Scheme for IC (Edvinsson and Malone, 1997a)

On the other hand, from other scholars' points of view, IC can be classified into several essential elements, namely, human capital, structural capital and relational capital (Saint-Onge, 1996; Sveiby, 1997; Bontis, 1998; German Federal Ministry of Economics and Labour, 2004). These elements combine and interact with each other and with financial capital (physical things and monetary elements) in ways unique to individual companies to create value which becomes the market capital. Figure 3.2 shows the classification schemes of these three capital elements.

### ***Human Capital***

Human interaction is regarded as the critical source of intangible value (O'Donnell et al., 2003). As a result, human capital becomes the primary component of IC (Bontis, 1998; Choo and Bontis, 2002; Edvinsson and Malone, 1997a; Stewart, 1997). According to Hudson (1993), human capital is defined as a combination of four elements, which are genetic inheritances, education, experience and attitudes about life and business. On the organizational level, human capital refers to the source of innovation and strategic renewal (Bontis, 1998). Bontis et al. (2002) further define human capital as simply representing the individual knowledge stock of an organization.

### ***Structural Capital***

Roos et al. (1997) indicate that structural capital is what remains in the company when employees go home for the night. According to Cabrita and Vaz (2006), structural capital represents the organization's capabilities to meet its internal and external challenges. It includes infrastructures, information systems, procedures and organizational culture. In other words, structural capital includes all the non-human stockpiles of knowledge and ability in organizations, which include the databases, organizational charts, process manuals, strategies, routines and anything that has a value higher than its material value.

### Relational Capital

Relational capital is the knowledge embedded in the relationships with any stakeholder that influences the organization’s life (Cabrita and Vaz, 2006). It refers to the external relations with customers, suppliers, partners, networks, regulators and the public. This capital of relationships with stakeholders allows the organization to access critical and complementary resources for building, maintaining and renewing its resources, structures and processes.

The most popularized classification scheme of IC is probably due to the Swedish assurance group Skandia, and its former Director of Intellectual Capital, Leif Edvinsson. Intellectual capital is defined as the possession of knowledge, applied experience, organizational technology, customer relationships and professional skills that provide the company with a competitive edge in the market (Skandia, 1994). Figure 3.3 shows the Skandia classification scheme with two dimensions of knowledge, which are human capital and structural capital (Edvinsson and Malone, 1997b).

Skandia’s Intellectual Capital scheme presents a distinction between human capital (implicit) and structural capital (explicit). Human capital refers to the combined knowledge, skill, innovativeness, attitude and ability of the company’s individual employees to meet tasks at hand. However, such capital cannot be owned by the company.

On the other hand, structural capital is mainly related to the organization, including the hardware, software, databases, information channels, organizational structure, patents, trademarks, culture, company’s values and philosophy as well as everything else of organizational capability that supports those employees’ productivity. Structural capital is usually owned or directly controlled by the company, and thus continues working after the employees are gone. Structural capital also includes customer capital, the knowledge embedded in the marketing channels and customer relationships. Saint-Onge (1996) defines customer capital as the value of its franchise, its ongoing relationships with the people or organizations to which it sells. It is obviously valuable, and relatively easy to track its indicators such as market share and customer retention. Prahalad and Ramaswamy (2000) suggest that customers become a new source of competence for the organization. According to Kaplan and Norton (1996, 2004), there is evidence of how employees’ satisfaction, motivation and commitment have a positive influence on customer satisfaction, loyalty and retention, leading to a firm’s higher productivity. Such a relationship with customers helps reduce costs and increase assurance of supply for the company. Another subset of structural capital is organizational capital, which

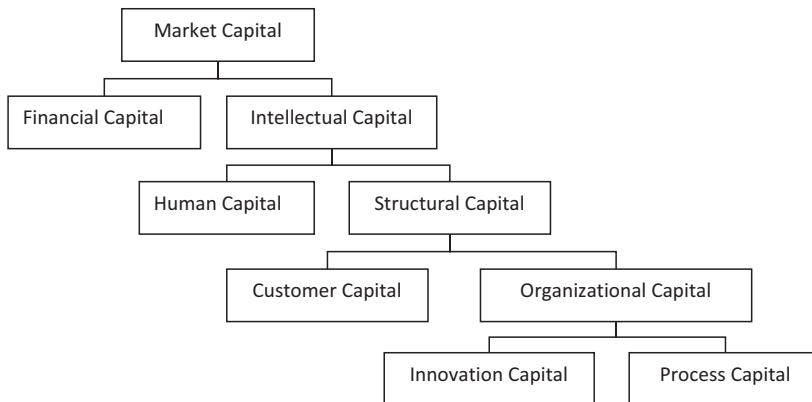


Figure 3.3 Skandia Classification Scheme of Intellectual Capital (Skandia, 1994)

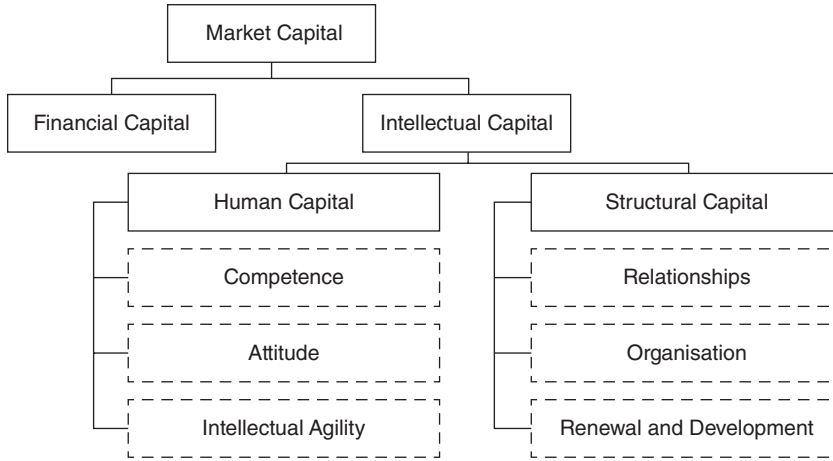


Figure 3.4 The Intellectual Capital Distinction Tree (Roos et al., 1997)

again is divided into innovation capital and process capital. Unlike human capital, structural capital can be owned and therefore traded.

Human capital is the source of innovation and renewal, but smart people alone are not sufficient. In order to make human capital productive structural assets are needed that facilitate the development and exchange of knowledge. From a management perspective, structural capital is more important than human capital because it is the management’s responsibility to build organizational assets.

Roos et al. (1997) have different ideas about the classification into human and structural capital, initially suggested by Skandia (1994). They suggest a further division of these two groups into three subcategories as shown in Figure 3.4. Human capital is composed of competence, which is based on knowledge and skills, attitude which is based on motivation, behavior and conduct as well as intellectual agility, which is based on innovation, imitation, adaptation and packaging. Structural capital, in turn, consists of relationships including customers, suppliers, alliance partners, shareholders and other stakeholders, organizations including infrastructure, processes and culture as well as renewal and development.

Compared with the various focuses and content of what is to be found out in a knowledge audit (KA), the IC framework is more comprehensive and covers basically all the elements of the intellectual resources from the soft and invisible (such as culture) to the more visible and codified parts such as IP and know-how database.

### Assessment and Measurement of Intellectual Capital

The traditional accounting approach aims to quantify intangible assets of a company in financial terms by using the cost, market or income approach. This monetary approach lacks the ability to identify the strengths and weaknesses of intellectual resources as well as pathways to the creation of future value crucial to managing a firm’s IC. Concerning this limitation, different models for IC assessment have been developed.

A taxonomy of existing methods for IC assessment from the European Commission (2005) to reporting IC to augment research, development and innovation in SMEs is shown in Figure 3.5. This chart classifies methods along the x-axis ranging from the “classical” valuation of “intellectual assets”, such as IP items, toward “modern” value determinations that

Taxonomy of methods relevant for IC Reporting (Following K. Alwert, 2005)

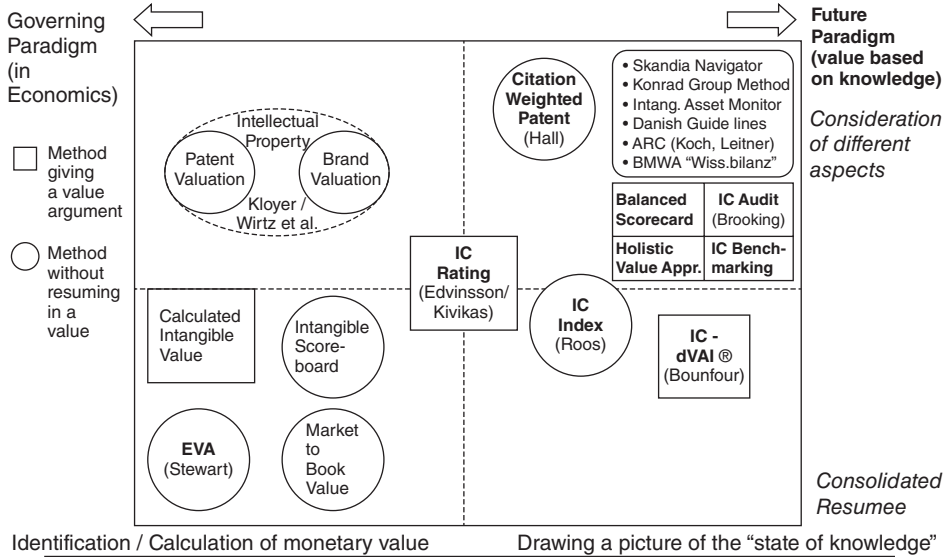


Figure 3.5 A Taxonomy of Existing Methods for IC Assessment (European Commission, 2005).

include financial and non-financial values. The right end of the *x*-dimension represents future knowledge economics concepts. Along the *y*-axis, the methods are positioned using the criterion of whether a method provides calculated summary values or whether it produces a group of IC statement indicators, leaving the end result open for interpretation.

It is noted that that most of the methods are positioned in the upper right quarter. These methods are intended to disclose which factors and elements make an organization use its knowledge to achieve competitive advantage. In contrast, methods positioned at the left side conform to the traditional understanding of knowledge economics, mainly in terms of IP that can be traded or dealt with as economic objects.

Skandia Navigator, Intangible Asset Monitor, IC Rating<sup>TM</sup> and Balanced Scorecard are the most commonly used methods for IC assessment. Their characteristics are introduced below.

Edvinsson and Sveiby, who are the leading practitioners in the field of IC, developed two different models for IC assessment, which are “Skandia Navigator” (Edvinsson and Malone, 1997a) and “Intangible Asset Monitor” (Sveiby, 1997), respectively aiming to measure the components of IC by using qualitative and quantitative indicators. The Skandia Navigator is established as a widely spread structure model. It facilitates a holistic understanding of the organization and its value creation along five focus areas including, financial, customer, process, human as well as renewal and development (Edvinsson and Malone, 1997a). The Intangible Asset Monitor is a method for measuring intangible assets. It indicates the change and knowledge flows measuring four areas (i.e. growth, renewal/innovation, efficiency and risk/ stability). The indicators correlate with the growth of the asset, its renewal rate, the efficiency at utilizing it and the risk of losing it (Sveiby, 1997).

Another way of measuring IC is IC Rating<sup>TM</sup> which is a proprietary tool of the company Intellectual Capital Sweden AB (Hofman-Bang and Martin, 2005). IC Rating<sup>TM</sup> measures and describes the non-financial assets from three different perspectives, namely effectiveness, risk and renewal. It looks at the current effectiveness of the organization, the efforts and

abilities to renew and develop itself as well as the risk as the current effectiveness declines. It also tries to benchmark companies as well as units within a company.

Kaplan and Norton (1996) propose the “Balanced Scorecard” as a strategic approach for performance measurement by the use of both financial and non-financial indicators. It considers four perspectives including financial, customer, business process as well as learning and growth. It tries to identify gaps between strategy/high-level financial performance indicators and operational measures for local activities.

### Management of Knowledge Assets

The rise of the knowledge-driven economy highlights the fact that the growth and value created in an organization depend on its knowledge rather than on its physical assets. The term “assets” means something that is valuable and in economic terms carries an opportunity cost to acquire and/or to sell. According to Baldrige Glossary HD, the terms knowledge assets, intangibles and intellectual asset or IC are used interchangeably by some researchers as virtual synonyms depending on the disciplines of the authors using them. Knowledge assets are usually used by economists. Intangibles are used predominantly in the accounting field, whereas IC is used by many disciplines in the management literature. While intangibles denote that part of the organizational assets that are recognized by the accounting profession such as IP rights, franchises, licenses and users rights, which are legally protected, IC embraces now a much broader sphere. The term knowledge assets has both a pragmatic meaning, such as when it is used to denote the part of intellectual or intangible assets that can be captured and codified in some form, or has a broader meaning as discussed below.

### Definition of Knowledge Assets

According to Baldrige Glossary HD, knowledge assets refer to the accumulated intellectual resources possessed by an organization and its employees in the form of information, policies, ideas, learning, understanding, memory, insights, cognitive and technical skills and capabilities. Building and managing these knowledge assets can help an organization create value for its stakeholders and sustain competitive advantage. Nonaka et al. (2000) define knowledge assets as the inputs, outputs and moderators of the knowledge-creating process, which are the “firm-specific” resources creating values for the firm.

Schiuma and Marr (2001) proposed a Knowledge Asset Map for the structure of a firm’s knowledge assets, as shown in Figure 3.6. This map is based on an interpretation of a firm’s knowledge assets as being the sum of two organizational resources, namely stakeholder resources and structural resources. Stakeholder resources refer to both internal and external

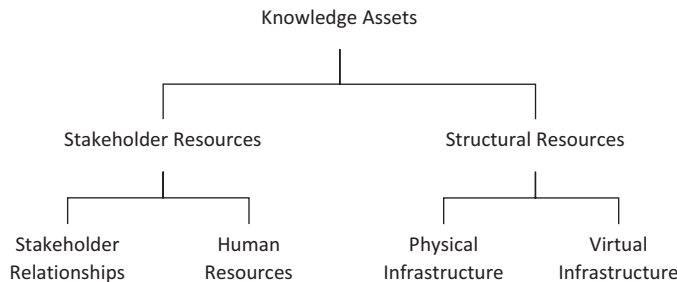


Figure 3.6 Knowledge Asset Map (Schiuma and Marr, 2001)



factors in the organization, including stakeholder relationships and human resources. On the other hand, structural resources are regarded as the constituent elements forming the basis of the organization's processes, including its physical and virtual infrastructure such as culture, routine and practices, as well as IP.

### Mapping of Knowledge Assets

Boisot (1987) proposed a classification of knowledge assets by the degree of codification and diffusion, namely the C-D Theory (Figure 3.7). Codification and diffusion define a two-dimensional Culture Space (C-Space) in which the existing social distribution of knowledge and individual communication strategies interact in specifiable ways. Under the two dimensions, codified knowledge refers to that which can easily be set out on paper for transmission while diffused knowledge refers to that which is readily shared.

Under the dichotomized version of codification and diffusion, a 2x2 matrix for typology of knowledge can be produced as shown in Figure 3.8. These are public knowledge, proprietary knowledge, personal knowledge and common sense.

Public knowledge is codified and diffused. It is generally available and subject to checking from many sources giving it a self-correcting character. Textbooks and newspapers, publications and financial records are some examples of public knowledge. Proprietary knowledge is codified, but not yet diffused. It has scarcity value over and above its reproduction costs for which people will pay. Examples are monthly financial reports, mathematical formulae and patentable technical knowledge.

Personal knowledge is an individual's perceptions, insights or intuitions that have not been given a structure. It is neither codified nor diffused. It cannot be stored, examined or evaluated either by its possessor or those around him to whom it is made manifest. Others

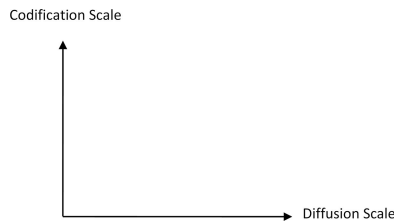


Figure 3.7 Boisot's C-Space

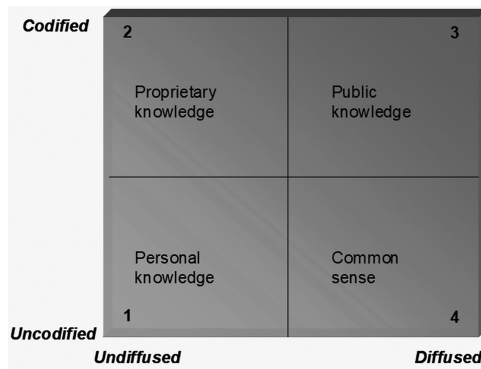


Figure 3.8 Typology of Knowledge in the C-Space (After Boisot, 1998)

can be invited to share the experiences that give rise to personal knowledge, but different intuitions and perceptions will then result. The ability to recognize somebody who has not been seen for many years is one typical example of personal knowledge. Last but not the least, codified and diffused knowledge is common sense. It is built up very slowly through a process of socialization and diffused by osmosis. For instance, we shake hands to express our goodwill when we first see a new friend.

### Boisot's I-Space Model

Based on the C-D Theory, Boisot (1998) further proposed the I-Space model which illustrates that knowledge assets can be located within a three-dimensional space representing three different aspects of information (Figure 3.9)

Figure 3.10 shows the representation of three different spaces in the I-Space model. First, the epistemological dimension (the E-space) maps the extent to which information is coded or uncoded and concrete or abstract. Second, the utility dimension (the U-Space) links

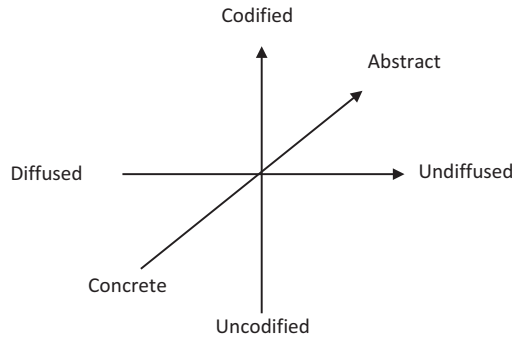


Figure 3.9 Boisot's I-Space Model

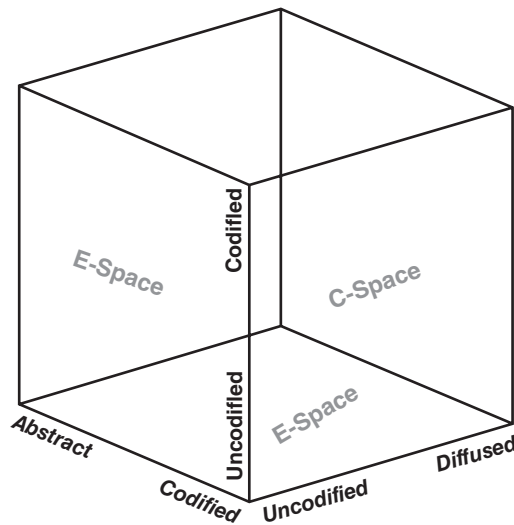


Figure 3.10 Three Spaces in the I-Space Model (After Boisot, 1998)

the diffusibility of a message to its degree of abstraction. Third, the culture dimension (or C-space), which is discussed in the previous section, represents different kinds of knowledge through linking the degree of codification and diffusion of a message.

The dynamic evolution of knowledge in the I-Space is illustrated in Figure 3.11. That in region A of the space is highly personal knowledge of particular events, which, with successive efforts at structuring it, comes to gain in generality. It then becomes sharable and usable by others. If it is controlled in the case of patents or copyright, it then becomes proprietary and can be traded for a position in region B. Over time, proprietary knowledge falling into the public domain becomes diffusible. It moves into region C as public or textbook knowledge. When knowledge is used and applied in a variety of different circumstances, it gets internalized in region D and integrated into people's common sense view of world. After that, individuals possess and convert the shared common-sense world back into personal and cognitive experiences and thus the evolution cycle continues.

The creation and diffusion of new knowledge effectively activate all three dimensions of the I-Space model. Boisot (1998) suggests that they do so in a particular sequence in a "Social Learning Cycle" (SLC) through the six phases of knowledge flow as shown in Figure 3.12:

- 1 Scanning: insights are gained from generally available (diffused) data.
- 2 Problem-solving: problems are solved giving structure and coherence to these insights. Knowledge becomes "codified".
- 3 Abstraction: newly codified insights are generalized to a wide range of situations. Knowledge becomes more "abstract".
- 4 Diffusion: new insights are shared with a target population in a codified and abstract form. Knowledge becomes "diffused".
- 5 Absorption: newly codified insights are applied to a variety of situations producing new learning experiences. Knowledge is absorbed and produces learnt behavior and so becomes "uncodified".
- 6 Impacting: abstract knowledge becomes embedded in concrete practices, rules or behavior patterns. Knowledge becomes "concrete".

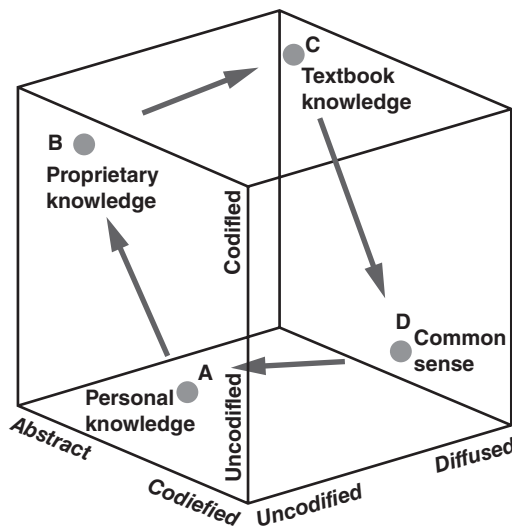


Figure 3.11 The Movement of Knowledge in the I-Space (After Boisot, 1998)

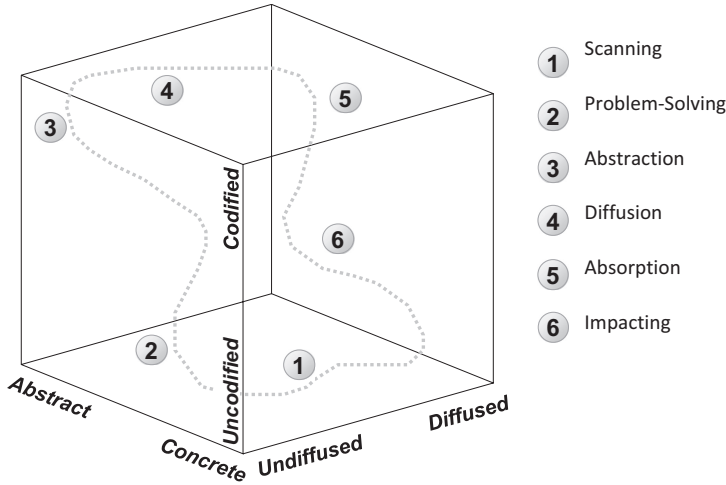


Figure 3.12 Social Learning Cycle of I-Space (After Boisot, 1998)

The dynamics of the SLC reflect the dynamic nature of knowledge. Data is filtered and processed in order to produce meaningful information and this information is then abstracted and codified to produce useful knowledge. The knowledge is then applied in diverse situations creating new experiences in an uncodified form that produces the data for a new cycle of knowledge creation. This is the continual lifecycle of knowledge innovation and application. In other words, knowledge moves through the organizational learning cycle to a new phase at different times in the changing business environment. This results in a change in KM strategies in organizations.

### Relationship between Intellectual Capital and Knowledge Management

What is the difference between KM and IC management? Knowledge management should be the first competency that the organization develops for IC management. Meanwhile, IC management and KM not only differ from each other, but also complement one another. Due to the similarities and complementariness, Zhou and Fink (2003) claimed IC management and KM should be linked to achieve added value and must be integrated by combining KM activities with IC elements to maximize the effectiveness.

Wiig (1997) identified that IC management should focus at the strategic and top management levels. Moreover, Edvinsson (1997) and Wiig (1997) also mentioned that ICM focuses on value creation and extraction. However, KM focuses on tactical and operational implementation of knowledge-related activities. In general, KM is concerned with knowledge creation, capture, transformation and use with an ultimate goal of an effectively performing intelligent organization by creating and maximizing IC.

Zhou and Fink (2003) provided an example which explains the relationship between KM and IC as shown in Figure 3.13. In order to maximize relational capital, an organization might decide to develop an outstanding relationship with its customers, which is achieved by superior products and services. Therefore, the organization needs to keep ahead in the market by maintaining a program of continued discovery and innovation. Hence, the organization might focus on developing a knowledge-friendly culture to enable effective

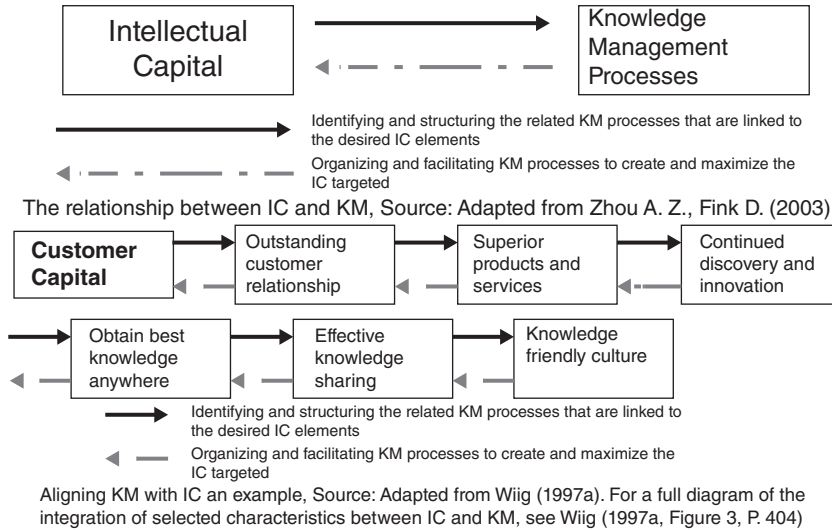


Figure 3.13 Relationship between KM and IC: an Example (Zhou and Fink, 2003)

knowledge sharing as well as develop the best knowledge. By developing the linkages, KM can be applied to contribute to the IC of organizations.

By linking value creation to KM, the objective of maximizing IC can be achieved if knowledge activities are managed systematically and intensely to create value in effective ways. Roos et al. (1997) mentioned that the systematic approach requires management and measurement, so that organizations should be measured as what they want to manage as a part of the management agenda. Hence, Iazzolino and Pietrantonio (2005) recommended the knowledge audit (KA), which can be effectively supporting organizations in managing their own knowledge, consequently achieving targeted objectives, as well as favoring the value creation of an organization in terms of IC valuing. The KA should focus on both the stock nature of knowledge, as it relates to the KM activities within the business processes.

The relation between IC and KM has been further elaborated in a three-dimensional model by Lee et al. (2007a). Such a model relates KM and IC in three main value-added activities in KM, namely (a) to preserve knowledge by accumulating its structural capital through IT and computing systems, (b) to create and acquire new knowledge by nourishing and digging into its human capital and (c) to share its knowledge by building its relational capital through knowledge flow among its employees, partners and customers to get understanding, loyalty, trust and so on. Figure 3.14 shows the intrinsic relationship between KM and IC as well as the value-added process through knowledge conversion, information technology and systems and organizational networks. Despite a lot of research in IC and KM, there have been few research attempts in relating them. An important thrust is to link up IC assessment with the KA in the key quality management processes.

A KA with the integration of both KA and KM Audit (KMA) approaches, which would provide a systematic investigation and evaluation of the ‘knowledge health’ of an organization, is the first important phase of any KM initiative. Hence, KM would help facilitate and manage knowledge-related activities, to create a knowledge-friendly environment for the aim of IC growth.

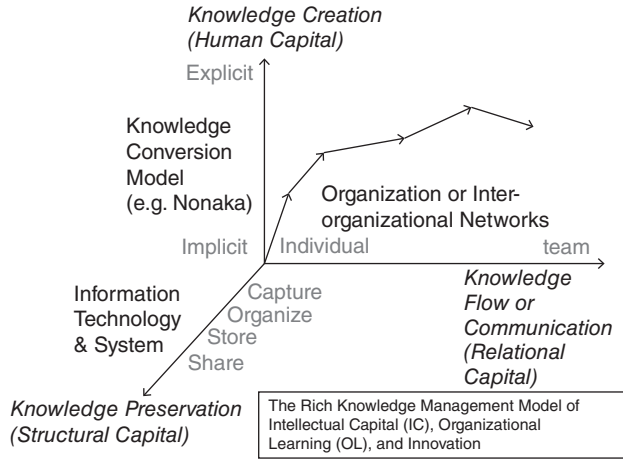


Figure 3.14 The mapping of IC into KM (Lee et al., 2007a)

### Knowledge Audit vs. Knowledge Management Audit

According to Hylton (2002b, 2002c), a KA is a systematic and scientific examination and evaluation of the explicit and implicit knowledge resources, including what knowledge exists and where it is, where and how it is being created and who owns it in the company. It is different from a KMA. Mertins et al. (2003) defines the KMA as an investigation on how an organization applies KM within its business processes. The term “KM audit” is used to achieve the following objectives:

- i Uncovering strengths and weaknesses within the actual management of corporate knowledge. It permits an objective assessment of whether KM activities are integrated successfully in the business processes.
- ii Analyzing circumstances, barriers and enablers for KM in various areas, including corporate culture, leadership, collaboration in team work, human resource management, information technology, process technology, process organization and control.
- iii Increasing awareness of KM within the company through the involvement of employees and the internal communication of a detailed audit report.
- iv Designing a roadmap for future KM measures as it clarifies which measures should be taken and where the starting points should be.
- v Collecting measurable data for the control of KM and measurement of the benefits achieved through KM initiatives.

Based on the definitions, KA is not aiming at the complete range of objectives mentioned above, but focusing on the relevant contents of knowledge assets. In other words, KA refers to the process of identifying and naming the existing, as well as missing, organizational knowledge and its flow in an organization. A KMA, however, refers to how knowledge is managed in an organization in the KM process (i.e. knowledge creation, acquisition, retention, distribution, transfer, sharing and re-usage). Organizational strategy, leadership, collaborative and learning culture as well as technology infrastructure should also be taken into consideration.

### **Reasons for Conducting a Knowledge Audit**

There is no doubt about the benefits of KM to an organization. Hylton (2002a, 2002b, 2002c) suggests that most of the KM programs failed because of their failure to identify what knowledge is needed and how it can be managed. Therefore, the importance of KA is seen as the first and critical step prior to the launching of any KM program in organizations (Liebowitz, 1999; Liebowitz et al., 2000; Henczel, 2001; Hylton, 2002a, 2002b, 2002c, 2004; Tiwana, 2002). The reasons for having a KA before implementing any KM strategies are that:

- companies themselves lack knowledge about KM
- they do not know what knowledge they possess and its “health status” in the organization
- they do not know everything that their staff know or how their staff work with each other

Large amounts of valuable explicit and implicit knowledge are embedded in a company. If it does not know what knowledge it already has and what knowledge is important, resources will be wasted on developing tools or policies in unimportant areas. Therefore, KM strategies formulated are not suited to the real situation and resources are spent, but no return is realized. It is a risk for the company to implement KM strategies before conducting any KA. Besides, many cases show that many companies do not know what knowledge their staff have and how their staff work. It is impossible for them to formulate appropriate strategy if they do not really understand the working behavior of their staff.

Knowledge audit and analysis approaches and tools are mostly used by companies to plan where their new KM efforts should be focused. This guides companies toward an informed view of KM. The two reasons that a KA is essential before KM implementation are:

- We need to know what we know and what we do not know
- We need to know what benefits KM can confer

As a result, KAs are indispensable to the success of KM.

### **Capturing of Critical Knowledge in Workplaces**

The effective management of an organization’s knowledge assets has been recognized as being a critical success factor in business performance. A systematic, contextual and action-oriented KA and KMA integrated audit methodology called “STOCKS” (Strategic Tool to Capture Critical Knowledge and Skills) has been hence developed by the Knowledge Management Research Centre of the Hong Kong Polytechnic University. Based on input from both structured questionnaires and interactive workshops, STOCKS (Lee et al., 2007b) can map out the organization’s knowledge assets in an open and participative manner.

Various questionnaires were compiled for respondents to fill in the explicit and tacit knowledge items, the flow and the ratings according to several criteria by staff inside the specific business processes. Workshops were also held for the participants who come from different levels and clustered into one group for consolidating different knowledge items. The follow-up elements used SWOT analysis after KA results to evaluate the KM strategy in terms of the KMA approach.

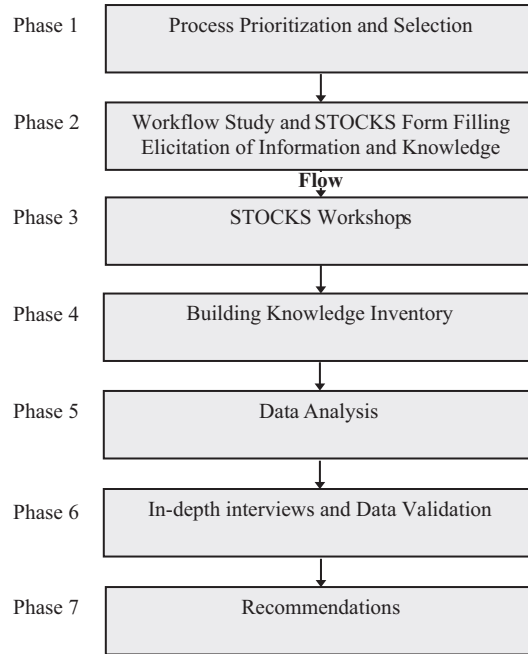


Figure 3.15 The Seven Phases of STOCKS Knowledge Audit Approach (Shek et al., 2007b)

### ***Phases for STOCKS Knowledge Audit***

STOCKS, which is a new systematic knowledge audit methodology (with integration of both KA and KMA approaches), can address the shortcomings of the traditional approach of KAs. Lee et al. (2007b) describe STOCKS composing of seven phases as shown in Figure 3.15.

The first phase involves the selection and prioritization of critical business processes, then a study of the workflow of selected processes and collection of the data through the STOCKS form filling. After holding a STOCKS workshop and building the knowledge inventory, data analysis can be conducted and reported. In-depth interviews and data validation are followed by recommendations of KM strategies. STOCKS is a structured and contextual knowledge-inquiring tool, and the data and information of each task of the completed process is collected through the filling in of eight different designed forms as shown in Table 3.2.

### ***Comparison of STOCKS to Other Knowledge Audit Methods***

Lee et al. (2007b) emphasized that the objective of a workshop is for the internal staff of a business process “to consolidate and validate the data collected from the completed STOCKS forms”. A STOCKS schema should be prepared before conducting the workshop. As shown in Figure 3.16, the schema contains the fields which include a selected business process, the tasks inside the process, industrial technology, documents and tacit knowledge. All workshop participants have to agree on the terminology of the knowledge items and staff names,



Table 3.2 Eight Various Designed STOCKS (Shek, 2007a)

Form No.	Form Name
Form 1	Information Technology Tools and Platforms
Form 2	Document Received/Retrieved
Form 3	Document Sent/Submitted/Forwarded/Uploaded/Produced
Form 4a	People You Usually Consult for Advice on Technical Implicit Knowledge
Form 4b	People You Usually Consult for Advice on Non-Technical Implicit Knowledge
Form 5a	People Who Contact You for Advice on Technical Implicit Knowledge
Form 5b	People Who Contact You for Advice on Non-Technical Implicit Knowledge
Form 6	Document and Implicit Knowledge Owned and Used by You Only
Form 7	Extra Knowledge Possessed by You Related to Your Industry but Not Used in Your Present Post
Form 8	List of Industrial Technologies /Core Competences
Practical Hints for Describing Implicit Knowledge	

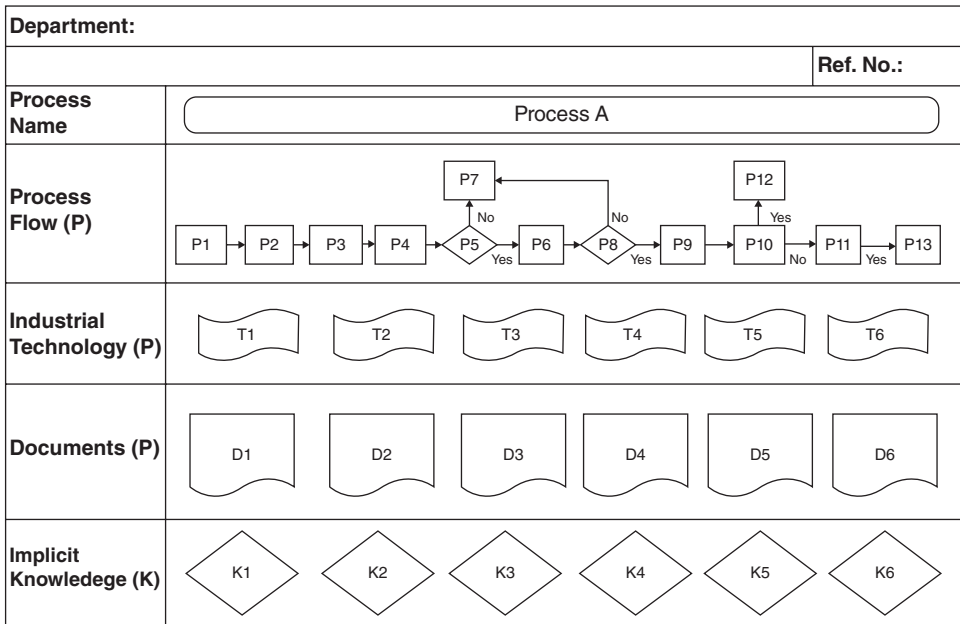


Figure 3.16 Template of STOCKS Workshop Schema (Lee et al., 2007b)

as well as the relationship and hierarchy of such items, in order to control the vocabulary, thesaurus and taxonomy.

After the workshop, explicit and tacit knowledge inventories, stakeholders analysis, identification of critical documents and knowledge workers, distribution of explicit and tacit knowledge in each task and even the mapping of knowledge flows and document flows can be also included in the output from the STOCKS KA methodology.

According to the findings, an in-depth interview with selected staff is conducted for detailed data validation. The analysis and results should be also based on the interview, with

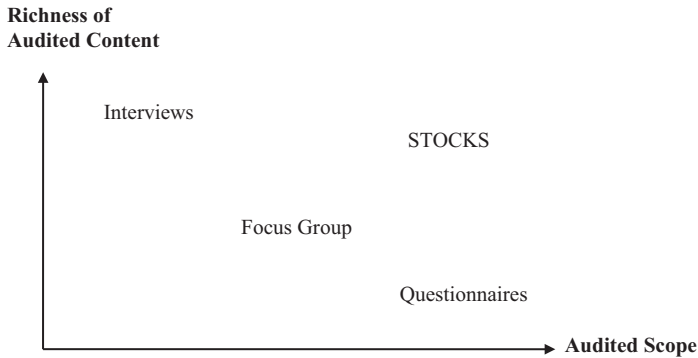


Figure 3.17 Comparison of STOCKS with Traditional Knowledge Audit Methods (Shek, 2007a)

the aim of getting pertinent information and gaining more understanding of the underlying story before giving any recommendations to the organization for implementing KM strategies. Therefore, STOCKS can help management to visualize and externalize the existing knowledge environment in the organization. By adopting the STOCKS KA methodology, information is collected through questionnaire surveys, interviews and a small group workshop. Shek (2007a, 2007b) showed a comparison of STOCKS with traditional KA methods in terms of audited scope and richness of the information collected, which means the breadth and depth of issues that can be explored. Figure 3.17 shows the comparison of STOCKS with traditional KA methods.

Shek (2007b) also stated that STOCKS is an effective way to collect a large amount of information from participants at different levels of the organization. It enables a larger scale of study when compared with interviews, which only cover a limited sample size of participants. Moreover, STOCKS workshops provide a chance to a group of participants to communicate systematically with their peers, so as to share their knowledge of the business process in an interactive manner. It helps to promote team learning and generate innovative ideas among team members. Last but not least, STOCKS's interactive nature enables participants to play different roles. Since STOCKS involves parties from different levels, it enhances the KM awareness in the organization as a whole.

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