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# **Intellectual capital of knowledge-based companies as a key driver in creating value for their shareholders.**

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*“Not everything that counts can be counted, and not everything that can be counted counts.”*

**Albert Einstein**

*This paper is based on the Aleksandra Grajkowska dissertation submitted in part fulfilment of the regulations for BA Honours Degree at Oxford Brookes University in 2008*

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# Abstract

The aim of this conceptual study is to develop a road map for Value Creation at Knowledge-Based Companies. Although the understanding is that IC drives value, many elements of IC itself are still under the discussion of thinkers and practitioners in the field. Four aspects of IC/ KM are presented.

First, the concepts of a knowledge-based company and intellectual capital (IC) are presented based on a review of recent literature.

Second, the most commonly used methods of measuring and valuing IC are discussed. The top-down method calculating IC as a difference between Market Value and Book Value is analysed and adjustments proposed. Bottom-up approach or sum of parts of IC elements is described, highlighting the difficulties in attaching accurate value to some of these, such as soft parts of human capital.

Third, an important contribution of the study is offering guidelines on how organizational, customer, relational and human capital could drive company value. Intellectual capital is only a potential that has to be transformed into intellectual assets, intangible assets or intellectual property in order to assure the company will make profits from it.

Finally, practical guidelines for transferring knowledge within nine channels between the individual, internal and external structure are discussed and best-case practices recommended. Key findings and conclusions are drawn for each of the four parts.

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## **Chapter 1: CONCEPT OF INTELLECTUAL CAPITAL LITERATURE REVIEW**

### **1.1. The knowledge-based company**

Knowledge-based or knowledge-intensive companies are ones that derive value mainly from knowledge and intellectual capital (Chong *et al.*, 2000). “Knowledge is what we buy, sell and do” (Stewart, 1997, p.5). As a result, measuring and managing it has become the most important economic task for entrepreneurs, companies and nations (Stewart, 1997). This explains why the value proposition is to build on benefits in particular: professional services, information technology, and proprietary intellectual assets such as patents or trademarks (Teece, 1998; Nahapiet and Ghoshal, 1998).

What differentiates knowledge-based companies from others is that knowledge has highest value among other assets and plays the strategic role (McGaughey, 2002). The important attributes of knowledge that make it possible to bring increasing returns (Teece *et al.*, 1997) are characteristics of inexhaustibility, multi – usability and non-linearity (Toffler and Toffler, 1980). Inexhaustibility means that knowledge value does not decrease with repeated and lengthy use. The greater the use of fixed assets, the less they are worth, whereas intellectual assets are worth more with greater use. Multi-usability means that, conversely to tangible assets, many people can use knowledge simultaneously, in different locations. Non-linearity means that a linear relation between amount of knowledge in the organisation and financial benefits deriving from it does not exist. Enlarging the library of knowledge components does not proportionally increase revenue levels.

The new knowledge-based business model requires a different organizational structure. Previously popular hierarchical organizations, with a small “brain” on top managing a large body gave way to of a company with a disseminated brain, without a fat body (Drucker, 1993).

Drucker (1993) compared the new organization to a large symphony orchestra that has no middle management but plays perfectly because of a precisely set and communicated, excellent strategy. Internal culture must be transformed to convert a hierarchical company into a KBC, from the Sparta type (strong commander and many dutiful executors) to Socrates type (creative, knowledge sharing, cooperative, highly motivated teams of professionals) (Jashpara, 2004).

### **1.2. What is Intellectual Capital?**

Intellectual capital was introduced in the 1980s as a concept for addressing intangibles in the light of value creation and performance (Edvinsson and Malone, 1997; Roos and Roos, 1997; Stewart, 1997; Sveiby, 1997). Intellectual capital is all non-monetary and non-financial resources fully or partially owned by an organization, ways of operating and relationships with stakeholders that are used to create value (Roos *et al.*, 2005). In the literature we find a wide spectrum of descriptions and definitions of intellectual capital: “knowledge and knowing capability of a social collective” (Nahapiet and Ghoshal, 1998), “packaged useful knowledge” (Stewart, 1997), “knowledge that can be converted into value” (Edvinsson and Sullivan, 1996) and “intellectual capital = intellectual assets – intellectual liabilities” (Bradley, 1997). It is also common to divide

intellectual capital into different categories such as human capital, organizational capital and relational (customer and partners) capital due to risk and ownership of different components (Joia, 2000).

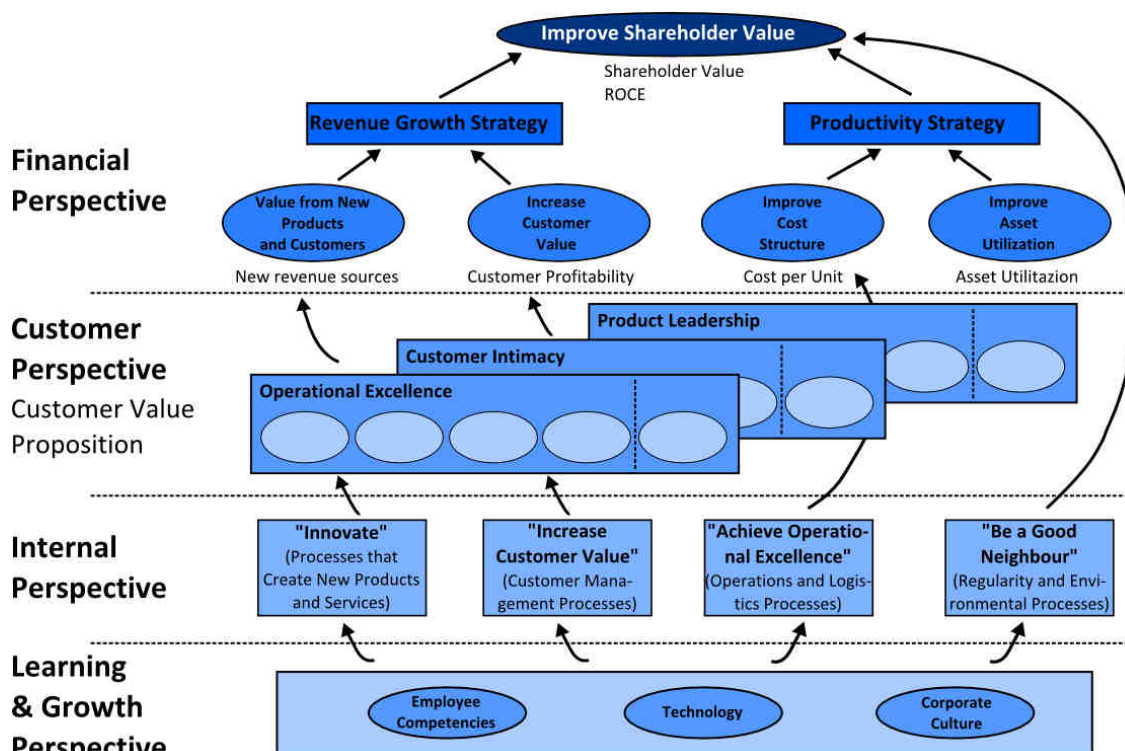


Figure 1. Strategy map  
Source: Kaplan and Norton (2000)

Balanced Scorecard (BSC) and IC are often presented as largely similar concepts. More precisely, BSC may be a technique helping bring forth intellectual capital (see Appendix 3) (Kaplan and Norton, 2004; Olve *et al.*, 1999). Both go beyond the financial accounting system's logic of double entry bookkeeping, with its closed system of costs, profits, assets and liabilities; they refer to intellectual assets (Wu, 2005). For example, the BSC learning and growth perspective was used to measure knowledge within an organization's human capital (Mouritsen *et al.*, 2005).

### 1.3. What type of Assets can IC generate?

The combined market value of IC and conventional financial capital reflects given company value, determined by its cash flows generated by all assets: financial, tangible, as well as intangible and other intellectual assets (Zambon, 2003). Conversely to an intellectual asset, an intangible asset can be precisely pointed out, described, separately valued and even sold as independent items, irrespective of whether recorded in books or not (Sullivan and Sullivan, 2000).

The value of different assets depends on their strategic alignment and ownership type, with Intellectual Property having the highest value (Carroll and Tansey, 2000).

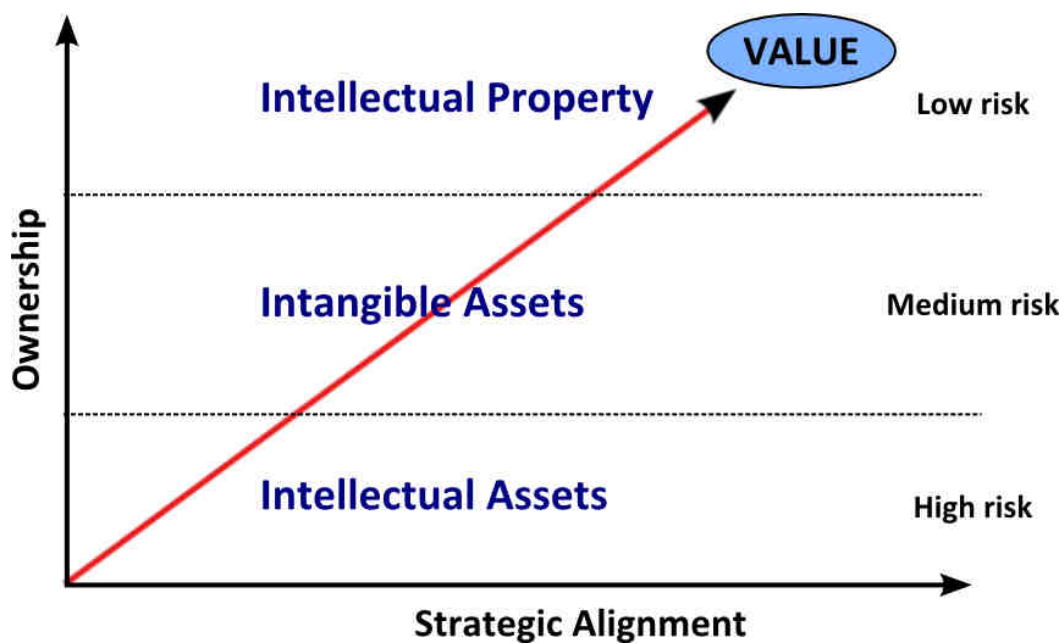


Figure 2. Intellectual capital in the new Internet economy  
 Source: Adopted from Carroll and Tansey (2000)

The International Accounting Standards IAS38 definition of intangible asset describes it as “separately identifiable, non-monetary asset without physical substance held for use in the production or supply of goods or services, to rent to others or for administrative purposes” (Brennan and Connell, 2000, p.208). Intangible assets differ from intellectual assets because of a lack of attributes which are well defined in IAS38: being identifiable, manner of acquisition (a tradable asset), expected benefit period and being separable from the entire enterprise (Brennan and Connell, 2000). According to that rule, pharmaceutical researcher’s notes could be an intellectual asset when describing a new drug, whereas the intangible asset could be an easily sellable, proven drug recipe. On the other hand, good reputation could only be classified as an intellectual asset because it cannot be sold separately from a brand. Another factor differentiating both asset types is value volatility. Assuming an internally developed knowledge database is an intellectual asset and supports a given company business model, it is only valuable to the company when the organization is a going concern. In case of liquidation, the mentioned asset will be worthless (Bullen and Cafini, 2006).

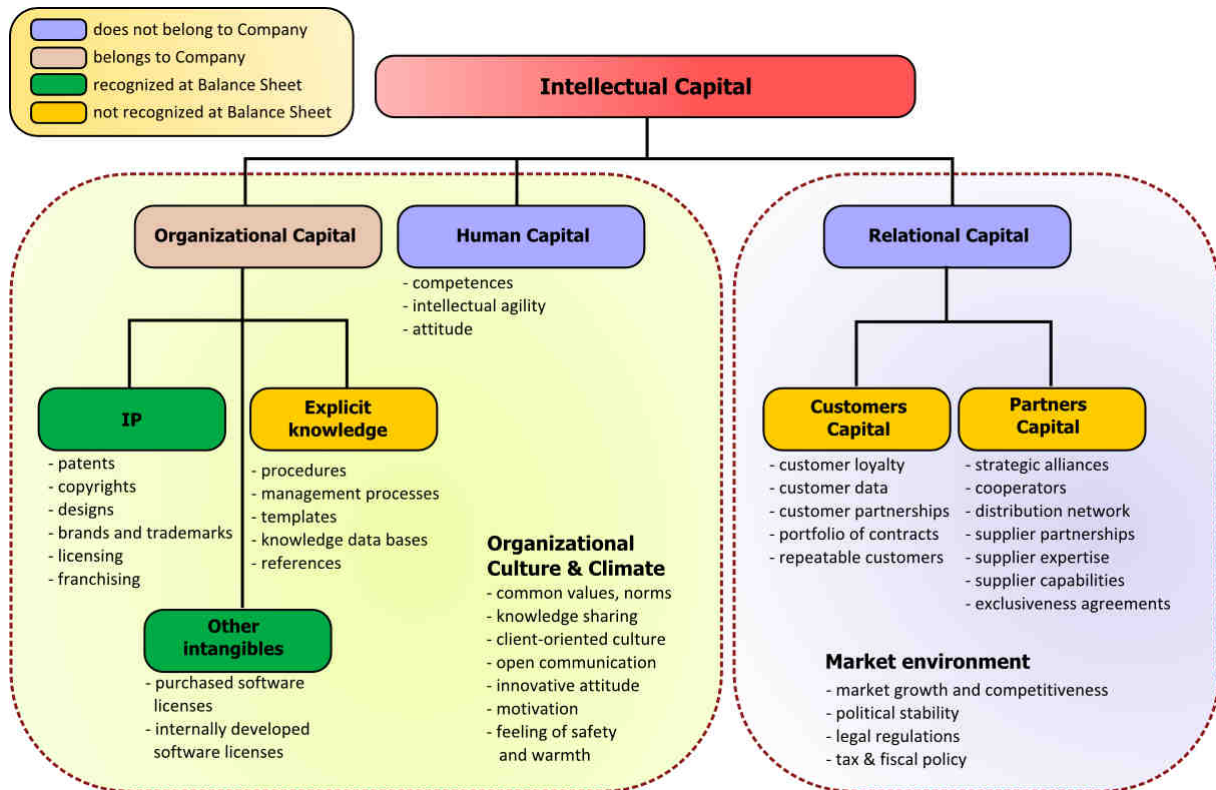
If intangible assets protected by law become intellectual property, (that Hall (1989) defines as assets to which an organization has property rights, such as patents, trademarks, registered designs and copyrights), they will afford legal protection.

However, some publications use the terms intellectual capital and intellectual assets interchangeably and the later is often not differentiated from intangible assets or not used properly (e.g. Figure 8). The difference between all these terms lies in risk allocated and valuation.

## Chapter 2: IC AS THE VALUE DRIVER OF KNOWLEDGE-BASED COMPANIES

### 2.1. Components constituting intellectual capital and how they drive the value of the knowledge-based company

Intellectual capital runs alongside financial capital in providing potential growth for companies (Marr, 2005). However both are not always converted into cash generating assets. Monetary capital could be wrongly invested or simply lost in bad acquisitions. IC will not add value when employees are unable to invent marketable products/services or what they invent is not accepted by customers or is not competitive enough to win the market. Similarly, brand can easily lose value. The case of Arthur Andersen losing good reputation or significant impairment of Saatchi&Saatchi intellectual assets after the dismissal of Maurice Saatchi are good examples of reduction of IC value and final market capitalization of respective companies (Stewart, 1997).



**Figure 3. Intellectual Capital taxonomy**

The process of developing KBC value should include measuring and managing all IC components, strategy development for conversion into intellectual assets, preferably intangible assets, or intellectual properties as components held by company (Daum, 2003).

IC comprises four components: human capital, organizational capital and relational capital, with the later further divisible into customer capital and partners capital (Tayles *et al.*, 2005). Human capital value does not belong to the company, as opposed to organizational and relational capital. However, it is human capital that builds

organizational and relational capital, that often transfer into intangible assets or intellectual properties (Becker *et al.*, 1997).

## 2.2. Organizational Capital

Organizational capital is the knowledge embedded within processes, procedures, systems, mechanisms, routines, techniques, methodologies, methods and databases of the organization (Choo and Bontis, 2002). In other words it is the way an organization works or it “represents all forms of knowledge deposits that are not supported by the human being” (Ordoñez de Pablos, 2004, p.629). Organizational capital is knowledge that remains in the company when employees go home. The more unique is organizational capital, the more beneficial it is to the company (Choo and Bontis, 2002).

All accounted components of organizational capital directly impact the value of KBC (Sullivan, 2000). In company sale or acquisition processes, all organizational capital components and value remain within the company, reflected in valuation appraisals (Bryer and Simensky, 2002).

### 2.2.1. Organizational Capital – intangible assets and intellectual property

Typical organizational capital components, such as **licenses** and propriety software source codes, can be sold repeatedly, with value and profitability increasing with repeat sales. This business model was perfectly adopted by software companies such as Microsoft, SAP and ORACLE.

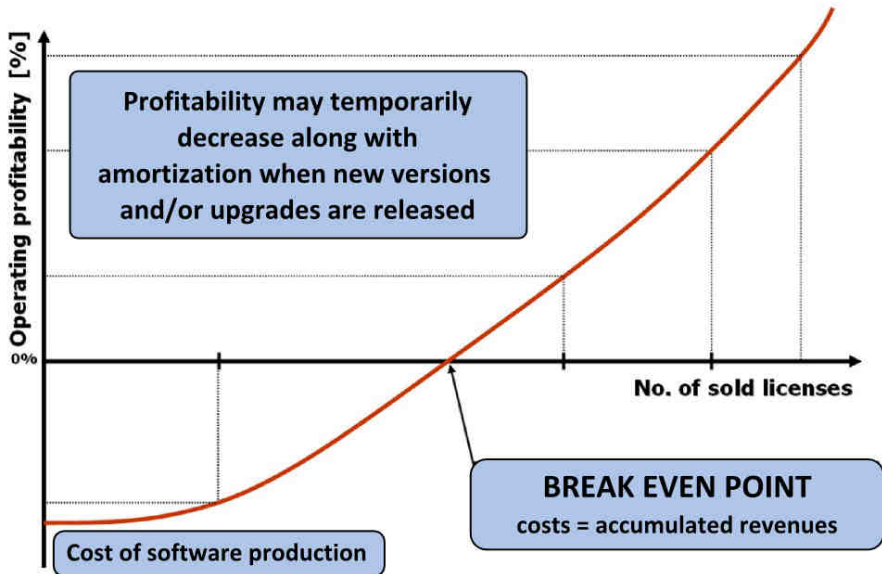


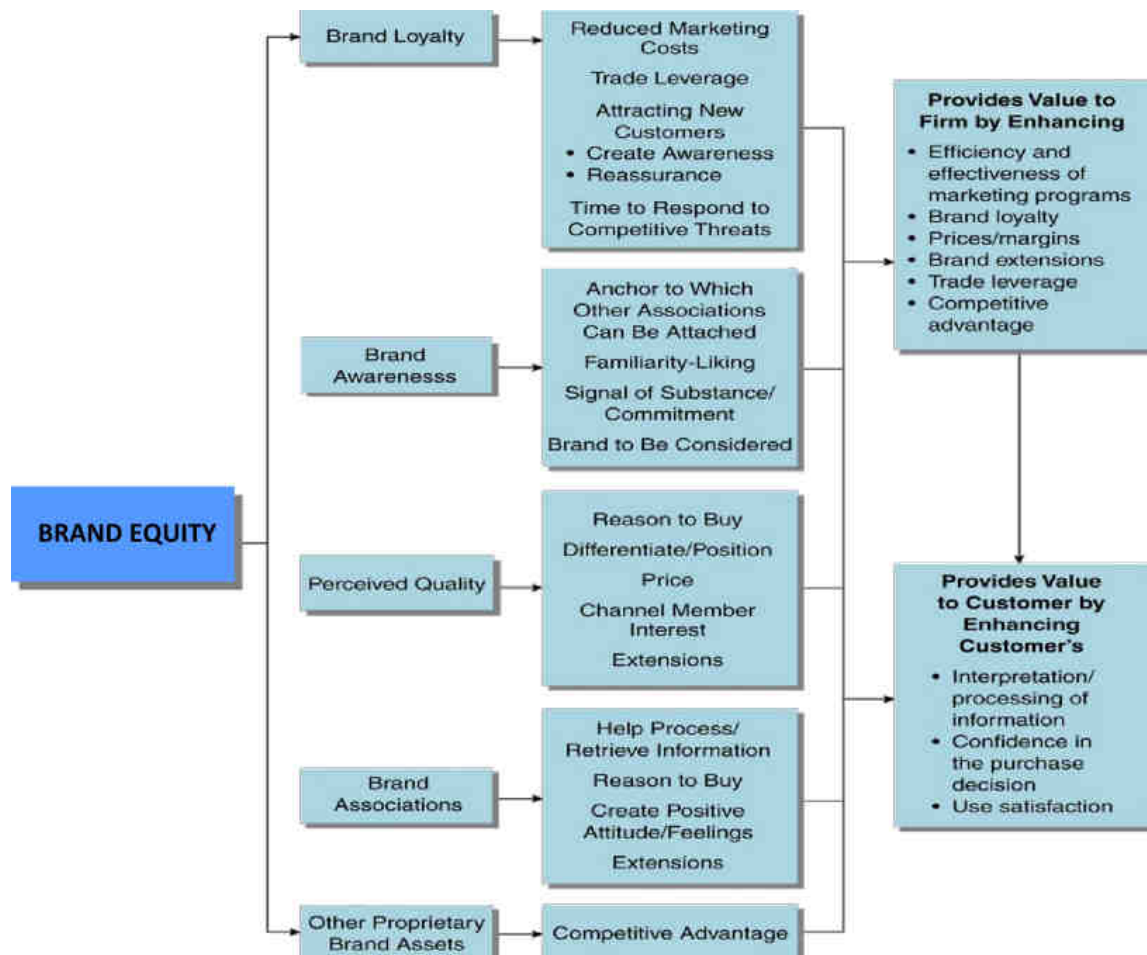
Figure 4. Profitability of software as knowledge component increases along with multiple sales

Another intangible asset type is **royalty agreements** that generate incremental income for many years. Other types of intellectual assets are: **training manuals** and related educational materials and courses including eLearning (SkillSoft, 2007), content creating great value for KBC shareholders. **Patents** and patent applications, both for products and processes are valuable due to being legally protected Intellectual Property (Smith and Hansen, 2002). Patents provide owners with exclusive right to use an idea and prevent competitors from unauthorized use. Revenues coming from patented ideas

may come in several ways: direct sales, licensing rights, joint ventures or strategic alliances for production of patented product or service (Sullivan, 2000).

### 2.2.2. Organizational Capital - brand related elements

Brands, logos and trademarks are used to distinguish company products and services from competitors (Low and Kalafut, 2002). For buyers, brands represent a certain quality and image, therefore a popular brand is one of the most valuable assets not only for retail but also for professional services companies (Sullivan, 2000). It is not enough to develop a high level of spontaneous and supported **brand recognition**. Additionally, **good reputation** and positive connotation of the given brand assure customer loyalty translating into repeatable sales and may reduce marketing per sale costs (Nelson, 2003). A value based KBC strategy should include a focus on other related brand components such as company **logo** and **trademarks** (De Bonis *et al.*, 2002). This leads to customers willing to pay premium prices and buy any product carrying the trademark (Sullivan, 2000).



**Figure 5. Brand Equity**  
Source: Aaker (1991)

According to Aaker (1991), the main value drivers of brand equity are brand loyalty and awareness, plus customers' given brand perception, what quality is associated with the brand and what emotions it arouses.

Depending on brand quality, the level of fees rates (price per day) acceptable to customers translates directly into attractive margins and finally into company value which grows along with achieved brand premium. The higher brand unit premium (defined as price that is effectively accepted by the market, exceeding street price for similar, comparable non-branded products or services) is multiplied by sales volume, higher brand equity and finally shareholder wealth (Doyle, 2000).

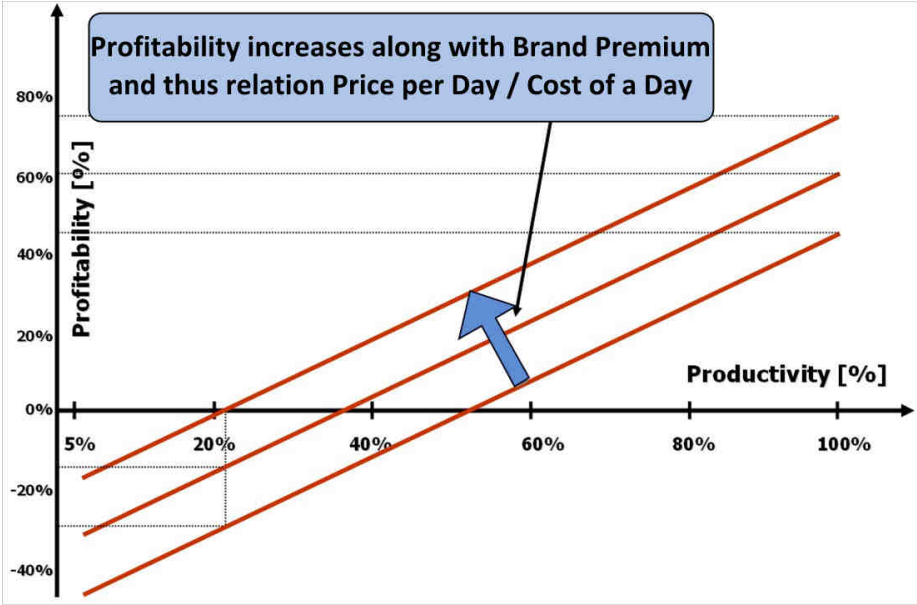


Figure 6. Developing of the Brand Premium as profitability maximizing strategy

Company brand or trademark, whether marketing expenditures created or acquired from the market, are value drivers for shareholders which can be measured and managed (Low and Kalafut, 2002). Investing in brands has at least two main goals: increasing sales volume and/or achieving brand premium. Assuming selection of the former, brand value ( $BV_{PV}$ ) could be estimated by the discounting formula inspired by Doyle (2000):

$$BV_{PV} = I + \sum_1^n \frac{ABV_n}{(1 + d)^n}$$

where:

- I** - initial investment into brand development or cost of brand/trademark acquisition
- ABV<sub>n</sub>** - Annual Brand Value = BPI - ABRC
- BPI** (Brand Premium Income) = Brand Premium x Sales Volume
- ABRC** (Annual Brand Revitalization Costs)
- d** (discount factor reflecting risk level)

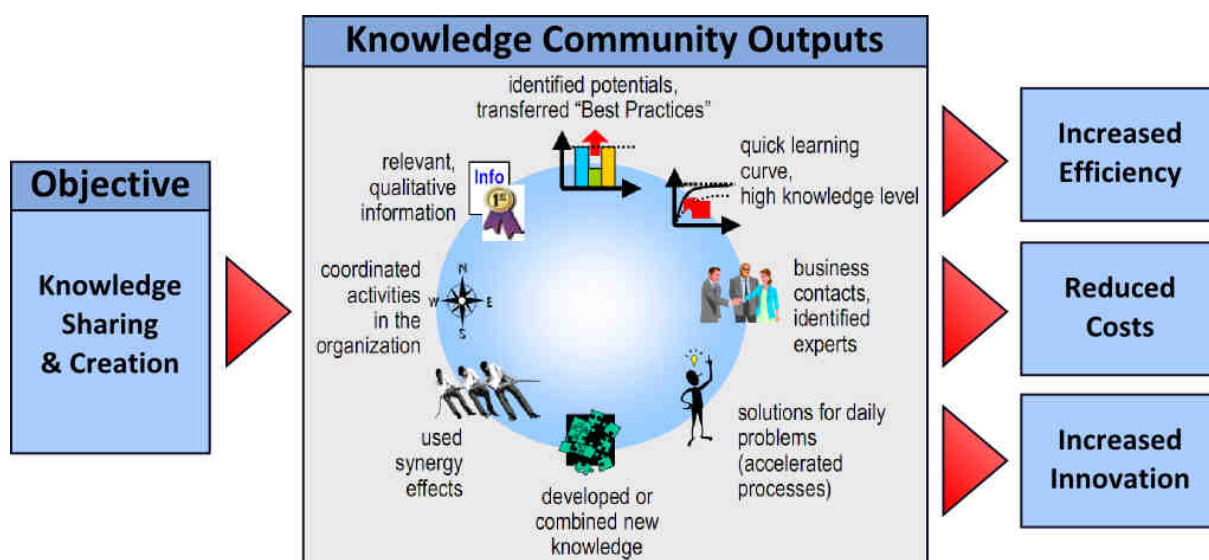
Additionally, respectable brand significantly assists the new contract acquisition process and in converting existing customers into repeatable ones (De Bonis *et al.*, 2002).

### 2.2.3. Organizational Capital – proprietary product and services related elements

Important value generating assets of KBC are **proprietary products**. Usually innovative, unique and simultaneously targeted at mass customers creating a large-scale market niche (for example iPod) (Kim and Mauborgne, 2005). The same class of value drivers as above includes proprietary technologies, formulations, know-how as well as technical documentation, blueprints or engineering drawings. All the mentioned intellectual assets components mean billions for IT, biotechnology or pharmaceutical companies (Ulwick, 2005).

### 2.2.4. Organizational Capital – Knowledge Management System and Data Base

Information technology plays a supportive and enabling role, helping users to find and segregate information when flooded by countless amounts (Dilnutt, 2006). IT systems are used to facilitate internal and external communication and employee learning, group work, workflow and process improvement (Iyer *et al.*, 2006).



**Figure 7. Communities of practice – modified Siemens Corp.**  
**Source: Canadian Institute of Knowledge Management (2005)**

The five most important functions of Knowledge Management Systems (KMS) are: knowledge creation, knowledge capture, knowledge sharing and transfer, knowledge retention and its leverage (Awad and Ghaziri, 2004). Knowledge creation means discovering and generating new knowledge through various means including experimentation, observation, training, research, innovative thinking and interaction within knowledge communities of practice (Canadian Institute of Knowledge Management, 2003). Knowledge capture concerns identifying who has knowledge (especially 'know-how' and 'know-who'), codifying and storing it, as well as transferring it to other people. Once stored, knowledge can be used in decision-making. Since the rise of the Internet, knowledge sharing has become faster and cheaper, but the human factor is still the most important (Pollitt, 2006).

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### 2.2.5. Organizational Capital - codified knowledge into internal structure

At knowledge-based companies, knowledge components such as software codes are developed and later sold to clients. This means IC creates an intellectual asset generating cash flow to the business (Rodov and Leliaert, 2002). That codified knowledge, software components for instance, is no longer owned by employees but becomes an intellectual asset of the given company and its shareholders (Haldin-Harrgard, 2000). It is crucial for improving company profitability to build libraries of all developed software codes, establish procedures forcing programmers to comply with same input and output standards allowing components to be easily joined together into one integrated system and used in multiple ways in many projects.

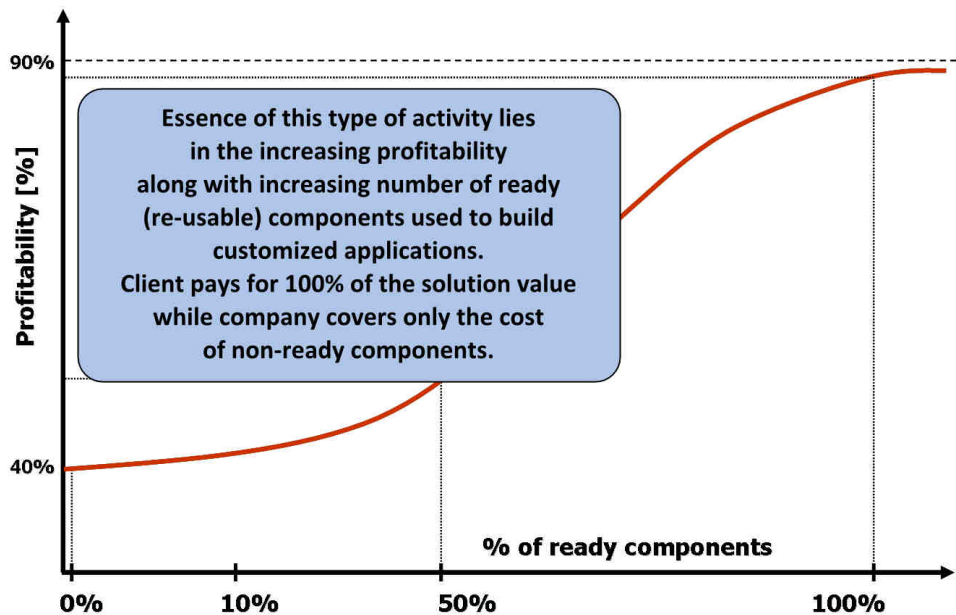


Figure 8. Relation between percentage of reusable knowledge components and Project profitability

A final conclusion is that project profitability increases along with percentage repeated use and sale of library re-usable knowledge components.

### 2.2.6. Organizational Capital - employee related

Average **seniority** of employees in the organization can be an indicator of employee experience, while degrees or **certificates** of training can indicate what knowledge is captured by human capital (Combs and Falletta, 2000).

Loss of human capital monitored by **employee retention** should be kept to a minimum and just a few newcomers will allow new ideas to be brought to an organization. To assure employees stay with the organisation, human resources management should address employee training and reward or recognition programmes (Berger and Berger, 1999). Overall, it is irrelevant how many employees leave, the importance is of how crucial they were and who is left behind. Special attention must be paid to retaining key personnel, who are at the core of KBC. We must also remember how much it costs to replace lost talent and relational capital lost when knowledge about company strengths and weaknesses is used whilst working for the competition

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(Stovel and Bontis, 2002). Additionally, employee turnover means lower productivity as newcomers learn about their jobs and the organization (Stovel and Bontis, 2002).

### 2.2.7. Organizational Capital - organization related elements

There are two organisation related elements which hold potential for driving value in knowledge-based companies: **corporate culture** and **environment for innovativeness**. Both have dualistic form, related simultaneously to organizational and human capital, and are shaped by people, but at the same time people are shaped by the culture (McElroy, 2003).

People lease time to organizations and companies simultaneously provide **corporate culture** and leadership within which employees operate (Al-Hawamdeh, 2003). Davenport and Prusak (2000) state that culture is very important in creating an organization where knowledge is a main revenue source. Both culture and employees can strongly influence each other, positively or negatively. Positive influence is associated with motivation, inspiration, creativity, collaboration, freedom and responsibility and this increases individual performance (Csikszentmihalyi, 1997). Negative influence will hinder performance through centralized power, hierarchy, bureaucracy, old habits and unfairness (Mayo, 2001).

Recapitulating, a positive organisational culture has to be built to create an environment where intellectual and professional skills are developed and it is natural to share knowledge with other employees, as well as the internal and external structures.

To build on accumulated knowledge, a friendly **environment for innovativeness** should be created (Carlson and Wilmot, 2006). Studies show that in order to be innovative individuals need challenging jobs providing open-ended tasks (Ahmed, 1998). Organisations must provide human capital with time to try, fail, learn and try again in order to succeed (Choo and Bontis, 2002). An employee should be allowed to spend some time on creative thinking each working day (DeMarco, 2002). A culture supporting innovation and creative design processes will be based on levels of challenge and involvement, freedom, trust and openness, job security and long-term focus (Saleh and Wang, 1993). Moreover, employees encouraged to take risks should be rewarded for developing new ideas and included in participative decision-making nurturing creativity (Chandler *et al.* 2000). Herbig and Dunphy (1998) state that organizational **culture that values creativity** will have more and better quality innovations. An example of a company valuing and encouraging innovation and creativity is 3M (Brand, 1998). Conclusively, Ahmed (1998, p.31) states: "culture is a primary determinant of innovation", therefore aspects of innovative culture such as sharing, openness, learning and collaboration are crucial (Amidon, 1998).

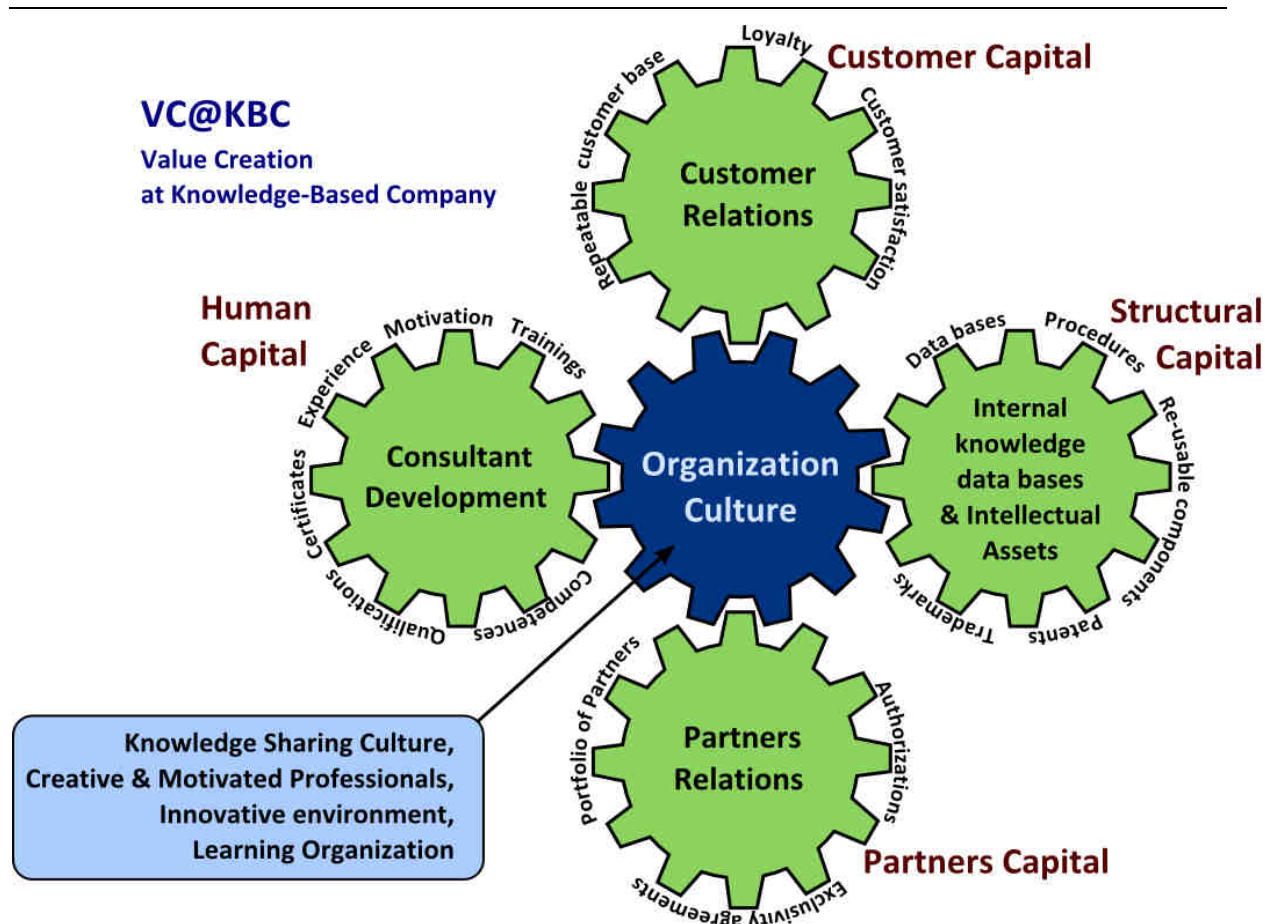


Figure 9. Key Value Drivers for Consulting Firms: an example of a KBC

Davenport (2005) states that it is crucial for KBC to attract talented professionals, continuously invest in their skills, leverage employees knowledge by giving them access to the reusable components that are codified into organizational capital, as well as learning from external knowledge sources such as partnership networks or strategic suppliers, finally using this knowledge to sell solutions to clients.

### 2.3. Customer Capital

Customer capital reflects company potential to generate revenue and eventually profits from various client groups. Customer value is the “total of the discounted lifetime values of all the firm’s customers” (Rust *et al.*, 2001).

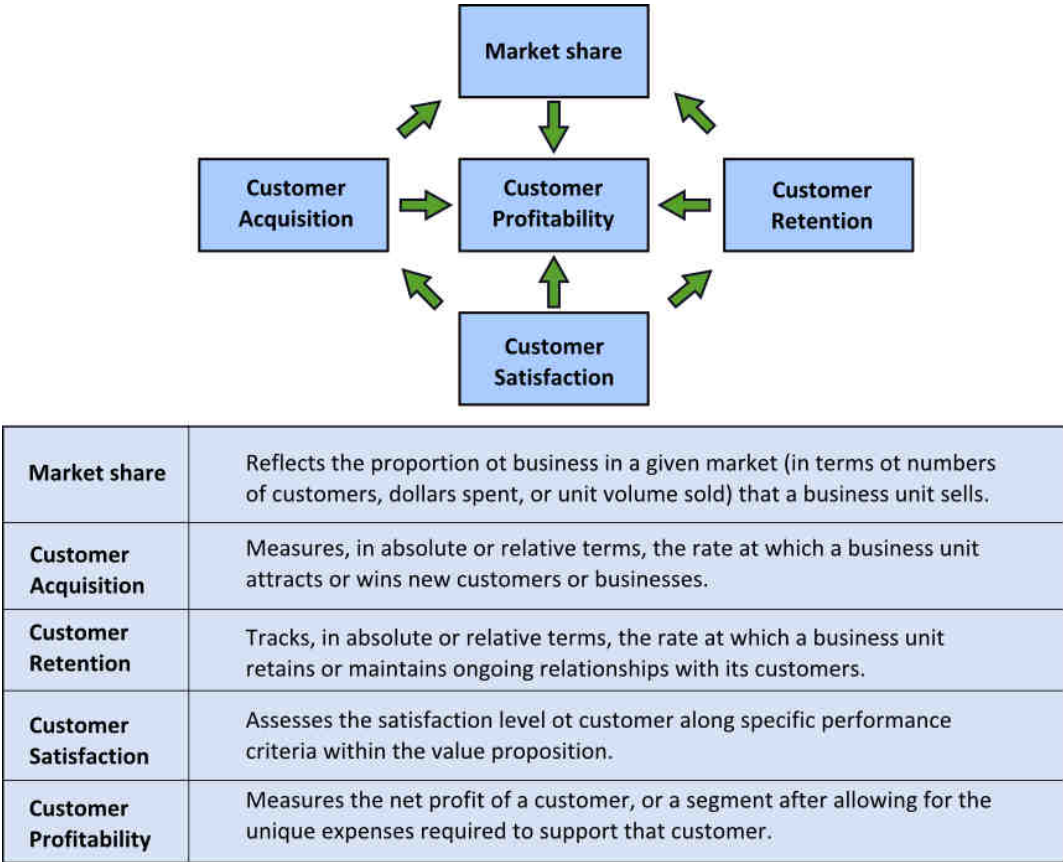
The one-time client has no customer capital, because of no assurance the client will return with another order. Conversely, capital of repeatable customers is high and depends on loyalty level, average volume, value and frequency of single purchase. Companies have to manage and maximize customer equity in order to increase lifetime value of individual customers (Hogan *et al.*, 2002). The highest customer capital is generated by long-term, irrevocable contracts fixing revenue streams from clients for many years. A good example of this is outsourcing contracts, business process outsourcing in particular, described by Service Level Agreement (SLA) or Project Financing contract types, such as building highways when future cash flows are well defined and easy forecasted (Quinn *et al.*, 2000; Finnerty, 1996). Such contracts and customer capital generated can be valued precisely, e.g. by DCF method. Customer capital adds value by reducing new contract acquisition costs, raises numbers of

repeated and long-term sales or maintains higher margins as negotiating prices with old clients is not performed under such strong competitive pressure as in open tender (Chang and Tseng, 2005).

Various publications propose different sets of customer capital measurements, such as market share, customer acquisition, customer retention, customer satisfaction, and customer profitability (Kaplan and Norton, 1996), or customer type, customer duration, customer role, customer support, and customer success (Edvinsson and Malone, 1997).

Many companies enhance client loyalty and thus customer capital value implementing customer relationship management (CRM) systems that help find a high match between demand and supply (PWC, 1999). Client knowledge is important for shareholders, as it gives an idea of future revenues (Ambler, 2005).

The study conclusion is that customers should be seen as a resource to be managed similarly to financial resources. However, building profitable customer capital does not come overnight; organizations must



**Figure 10. Core measurement group of the customer perspective (BSC)**  
 Source: Kaplan and Norton (1996)

Many companies enhance client loyalty and thus customer capital value implementing customer relationship management (CRM) systems that help find a high match between demand and supply (PWC, 1999). Client knowledge is important for shareholders, as it gives an idea of future revenues (Ambler, 2005).

The study conclusion is that customers should be seen as a resource to be managed similarly to financial resources. However, building profitable customer capital does not come overnight; organizations must put time, effort and resources into building relationships (Chang and Tseng, 2005).

## 2.4. Partners Capital

Partners Capital includes all forms of **business partnership** such as **strategic alliances**, trade associations, supplier contracts (particularly favourable if long-term), distribution channels/networks, **franchising agreements**, as well as unconventional measures such as attractively priced share purchase options for partner companies (Das *et al.*, 2003).

What would be the Partners Value of a company receiving exclusive Coca-Cola distribution rights in the United Kingdom? Even if not recorded in a conventional company balance sheet, Partners Capital unquestionably seems to be an intellectual asset.

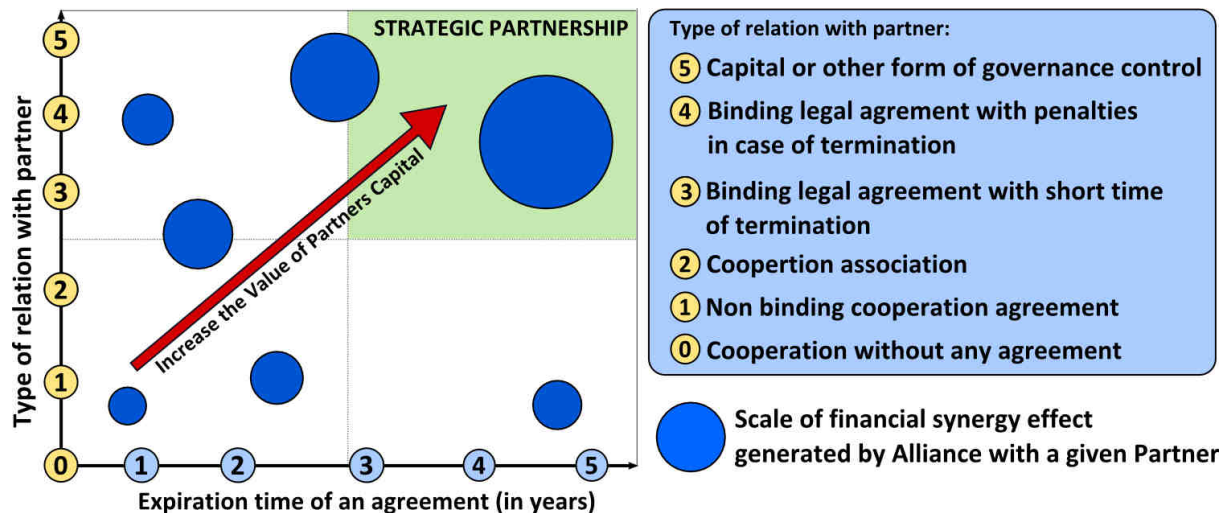


Figure 11. Value Matrix of Partners Capital and strategic partnership

There is evidence that strategic alliances contribute to building IC through collaboration with other firms on the market (Das *et al.*, 2003). Reasons for organizations creating alliances are that they lack scarce resources, want to try and learn new skills, gain particular knowledge or enter a new market, or else wish to plan new product/service launches but cannot do so sufficiently quickly (Pfeffer and Salancik, 1978). Companies achieve synergy and higher revenues through sharing distribution channels, technological know-how, engineering, customer service, advertising, sales forces, manufacturing, joint marketing and promotion, licensing agreements and cross selling of products (Porter, 1985).

IC payoffs differ on type and time of strategic alliance engagement and, further, value created is not shared equally between participating companies (Das *et al.*, 2003). Big organizations often contribute through brand names, capital, reputation and credibility, while small companies offer a new technology or new business model, groundbreaking ideas, creativity, innovativeness and fresh talents (Low and Kalafut, 2002).

Nowadays value could be created by setting up alliances with any market player, even competitors, joint initiatives establishing market standards, industry regulations or joining investments in manufacturing resources to share scale economy benefits.

“Unfortunately, few managers are prepared for a world in which the boundaries between collaboration and competition are unclear” (Doz and Hamel, 1998, p. XV).

## 2.5. Human Capital

Human Capital is a tacit knowledge that exists only in employees' brains and that is an essential component in the value of knowledge based companies, but does not belong to a company or company shareholders (Das *et al.*, 2003). Today, managers face the dilemma of no longer being able to control the most valuable resource being human knowledge (Mouritsen and Fagstad, 2004). Employees contribute significantly to company value but only as long as they decide to stay with the firm. The company rents human resources on contractual basis, similar to leasing of other assets. The more knowledgeable employees are, the better their output (Nerdrum and Erikson, 2001). Therefore companies have to change their view from employees being costs to being assets. As with other asset types, they must also create value.

Human capital is important to extent that employees are given stock options as rewards for performance and input. Stock options are employee rights to buy the organisation's shares at preferred price lower than market value, and become worth even more when he/she becomes willing to sell (O'Donnell *et al.*, 2003).

Concluding, organizations provide salaries, bonuses and other benefit types to employees, but most people look for something more rewarding, such as challenging and interesting work, interesting colleagues, status, personal growth or career development as main motivators to stay within the company.

Resource	Resource components	Importance to value creation?	Unique / rare?	Costly / difficult to imitate?	Leveraged by the firm?	Competitiv implication?
Competence	<ul style="list-style-type: none"> <li>. Technical skills</li> <li>. Facilitation skills</li> <li>. Business skills</li> <li>. Selling skills</li> </ul>	High	Yes	Yes	Yes	Resources and transformations are core in nature
Intellectual agility	<ul style="list-style-type: none"> <li>. Ability to innovate</li> <li>. Ability to convert theory and ideas into practice</li> <li>. Ability to "think on your feet"</li> <li>. Versatility</li> </ul>	High	Moderately rare	Yes (if not impossible)	Yes	
Attitude	<ul style="list-style-type: none"> <li>. Cultural adaptability</li> <li>. Team working capabilities</li> <li>. Willingness to share</li> <li>. Desire to learn and develop as persons</li> <li>. Creativity</li> <li>. Openness and willingness to try new things in unknown territory</li> </ul>	High	Moderately rare	Yes	Yes	

Figure 12. Main components of Human Capital

Source: Gupta and Roos (2001)

Every employee brings a different capability and skill set to the organization that stands for whole company human capital (Mayo, 2001). Main components of Human Capital are employee competence, intellectual agility and attitude (Gupta and Roos, 2001).

### 2.5.1. Human Capital - competence

Human capital depends on investing in employees through acquiring various human capital goods like **professional education**, courses or training impacting on

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organization performance together with experience, **vocational qualification** skills, creativity and individual characteristics (Nerdrum and Erikson, 2001). Obtaining interdisciplinary education is crucial for creating knowledge and must be followed by continuous learning, as knowledge easily becomes outdated (Al-Hawamdeh, 2003). The better the education base, the more can be built on it and the more fruitful and insightful on-the-job training will be, leading to higher productivity increases (Fitz-enz, 2000). The real value is to have employees with unique knowledge and know how to use it.

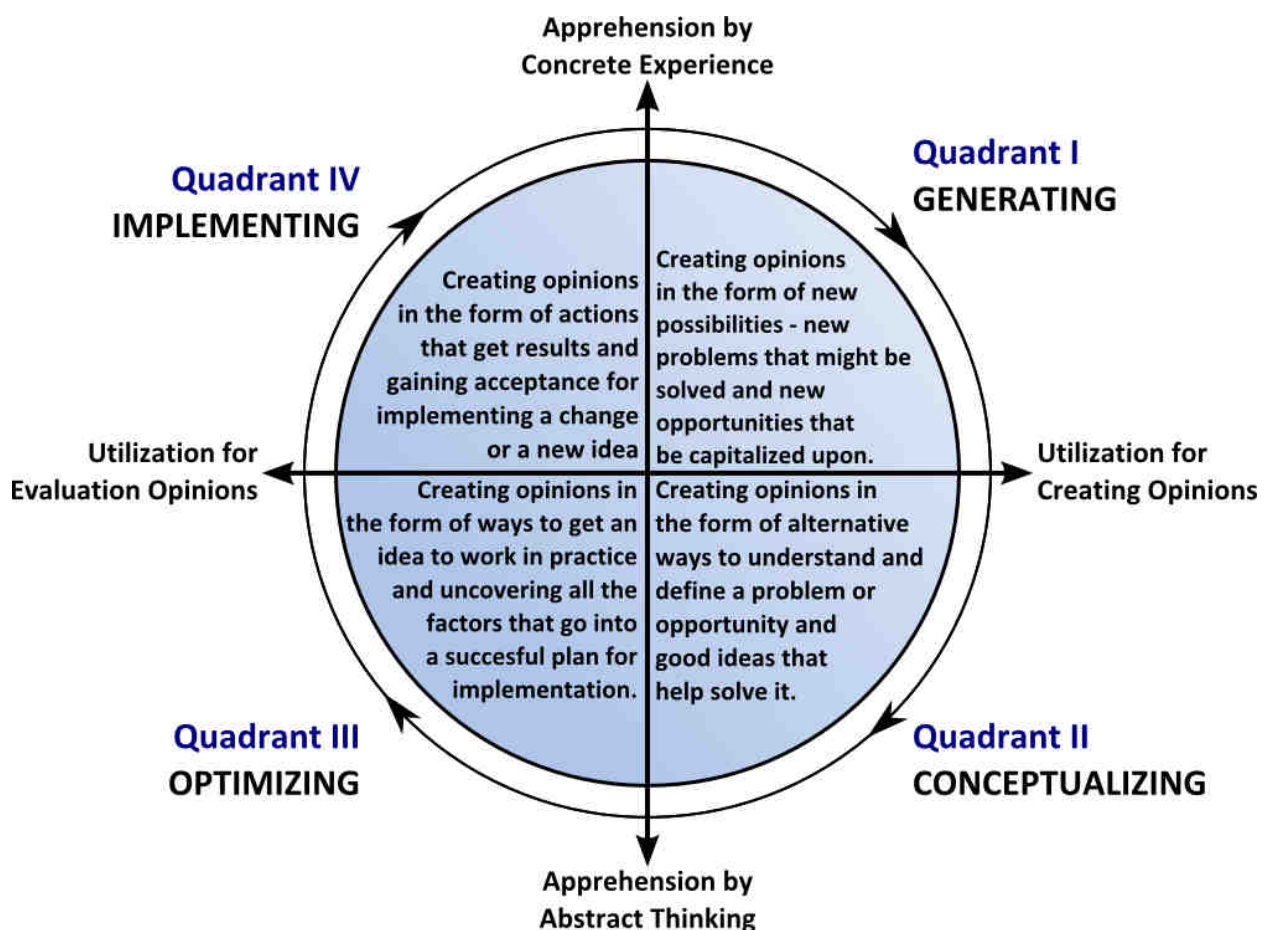
People working in business need appropriate **business skill** sets, in particular problem solving, because of frequent necessity to perform with limited information in a relatively short time (Skandia, 1998). Employees should be able to spot missing information, have the ability to identify errors and reach correct conclusions (Stewart, 2001). Other important business skills are organising work to give time to complete operational tasks, find time for strategic thinking and simultaneously have opportunities to fulfil personal ambitions (Pollitt, 2006).

Any job-specific **technical skills** must be internalised to support everyday work. This will enable employees to have superior application knowledge and good communications skills when dealing with technical problems together with co-workers (Razgaitis, 2003).

**Selling skills** enable employees to sell company products (Bosworth, 2005). They need product/service specific knowledge, credibility, listening and communication ability, and great motivation to add value for the customer (Zoltners *et al.*, 2001). The view of the client relationship has changed from a one-time closing sale to a life-long mutual relationship where the salesperson tries to help customers satisfy their needs (Landale, 2004). Employees should master selling skills allowing them to understand customers, see their needs and even go beyond them.

### **2.5.2. Human Capital - intellectual agility**

“**Innovation** must be in the head, heart and hands of every participant in the system” highlights Amidon (1998 p. 29). Intrinsic and external motivation is essential to innovation (Pollitt, 2006). Employees are encouraged daily to take their initiatives, come up with and try suggestions and ideas. Independence is highly encouraged. Drucker (1986) states that truly innovative individuals are often hard to manage.



**Figure 13. Innovative thinking**  
 Source: Basadur and Gelade (2006)

Employees good in generating innovations usually come up with and solve problems, but usually do not like to go into details. Organizations should respect their ambiguity and try not to pin them down too hard. The conceptualizing phase should be directed towards people who can understand new ideas through abstract thinking and can create respective theoretical models. Ability to optimize innovations is typical of employees who rely on mentally testing ideas rather than practical experiments, enabling them to find optimum solutions. Finally, to succeed, it is necessary to take innovation further into the Implementation phase, where Implementers turn innovation plans into action and use different approaches to make things work (Basadur and Gelade, 2006).

It is not enough to encourage employee creativity and innovativeness. What actually generates value is **ability to convert theory and ideas into practice**, finally deliver new products and services, and successfully introduce them onto the market (Govindarajan and Trimble, 2005).

Employees should have the **ability to “think on their feet”**, foresee most consequences and take responsibility for decisions on both economic and social matters. They should understand why their decisions have the consequences they do, see how others experience their actions, and how they affect other people (Fernández-Giménez, *et al.* 2005).

In today’s business, where changes and speed dictate how the business is run, employers seek employee versatility (Rastogi, 2003). A new ideal employee of a

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knowledge-based company has to grow and change with the company (Rastogi, 2003). Today, it is open-minded people of high intellectual agility, with high personal and professional versatility, that are required (Csikszentmihalyi, 1997). Versatility means being smart, flexible, readily learning, problem solvers (Sloane, 2006). Flexibility enables employees to modify skills and approach, move between different jobs, and perform most tasks (Oldham and Cummings, 1996). Especially employees with diverse experience, with many courses and on-the-job training, have better versatility potential. As John Grumbar, the Chairman and CEO of Egon Zehnder International (2006, p.7) said: "their ability to move easily within and between different spheres seems far better suited to our increasingly complex world than conventional specialisation in a single profession". As companies employ international workforces as with globalisation, versatility is the characteristic individuals must possess to deal with people from different backgrounds, handle competently different types of people and new situations.

### 2.5.3. Human Capital - attitude

**Team working capabilities** allow people to collaborate well, creating synergy in turn, enhancing knowledge creation and increasing problem solving efficiency (Davenport, 2005). Teams create special environments making participants richer in experience and allowing them to see problems from different perspectives by providing different viewpoints, yielding more balanced and creative results (Staniforth, 1996). Working together over a period of time enables individuals in a team to build trust which exerts a positive impact on self-esteem and self-actualisation (DeMarco and Lister, 1999).

**Willingness to share knowledge among employees** will facilitate organization growth. There are many reasons why people do not share knowledge, e.g. they do not want to, do not know how to, or they want and can but lack the time to do so because of commitment to day-to-day work (O'Dell *et al.*, 1998). People do not want to share knowledge because they believe that if they are the only ones with certain information only they can provide it and thus have power and control over something valuable. Further, employees do not trust others not to misuse knowledge or take unjust credit for it (Serenko *et al.*, 2007). The second reason is that they do not know what they know and are simply unable to codify it, so they only share explicit but not tacit knowledge. Another possibility is that differences between employees are too great (age, gender, education, experience), making sharing difficult or impossible (Serenko *et al.*, 2007). The third reason is that employees do not have time, being too busy reaching clients and dealing with everyday tasks to fit more into their schedules (Neef, 1999).

Employees potentially able to build human capital must first grow themselves, through actively searching for new knowledge powered by the **desire to learn and develop as persons** (Gupta and Roos, 2001). What is more, employees should learn from mistakes, seek out what can be improved with each experience to stand out amongst the competition (Mellander, 2001). Individuals can develop themselves and get wider perspectives by making new contacts outside already established relationships. Learning improves company innovation level, speed and adaptability, which creates wealth for shareholders in the long run (Economist Intelligence Unit and IBM Consulting Group, 1996; Kogut and Zander, 1992)

Often called thinking outside the box, **creativity** is a mindset where people use new, better ways of doing things and create better and more useful solutions (Oldham and Cummings, 1996). Creative employees always provide suggestions on how to take

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business further and almost always take on tasks and seek out things to do (Pollitt, 2007). People need to be inspired and empowered to take risks and know there is no punishment in case of failure (Sloane, 2006). However, companies usually do not award and recognise employees for creative work. Thus, to change potential into useful ideas this should be linked to appraisal and reward systems. Finally, creativity allows employees to develop confidence and have higher work satisfaction (DeMarco and Lister, 1999).

The level of consensus amongst authors regarding the components of IC as described in Chapter 4 varies and many aspects are still in question and dispute. The unknown area is Human Capital, in particular its soft part related to leadership, culture and motivation. The real challenge is to develop key performance indicators for people-related components of IC, finally making them measurable (Liebowitz, 1999; Martin and Petty, 2000).

## Chapter 3: VALUE CREATION AT KNOWLEDGE-BASED COMPANIES THROUGH KNOWLEDGE DEVELOPMENT AND TRANSFERS

### 3.1. Knowledge and its transfers between individual, internal and external structure and how this improves company efficiency

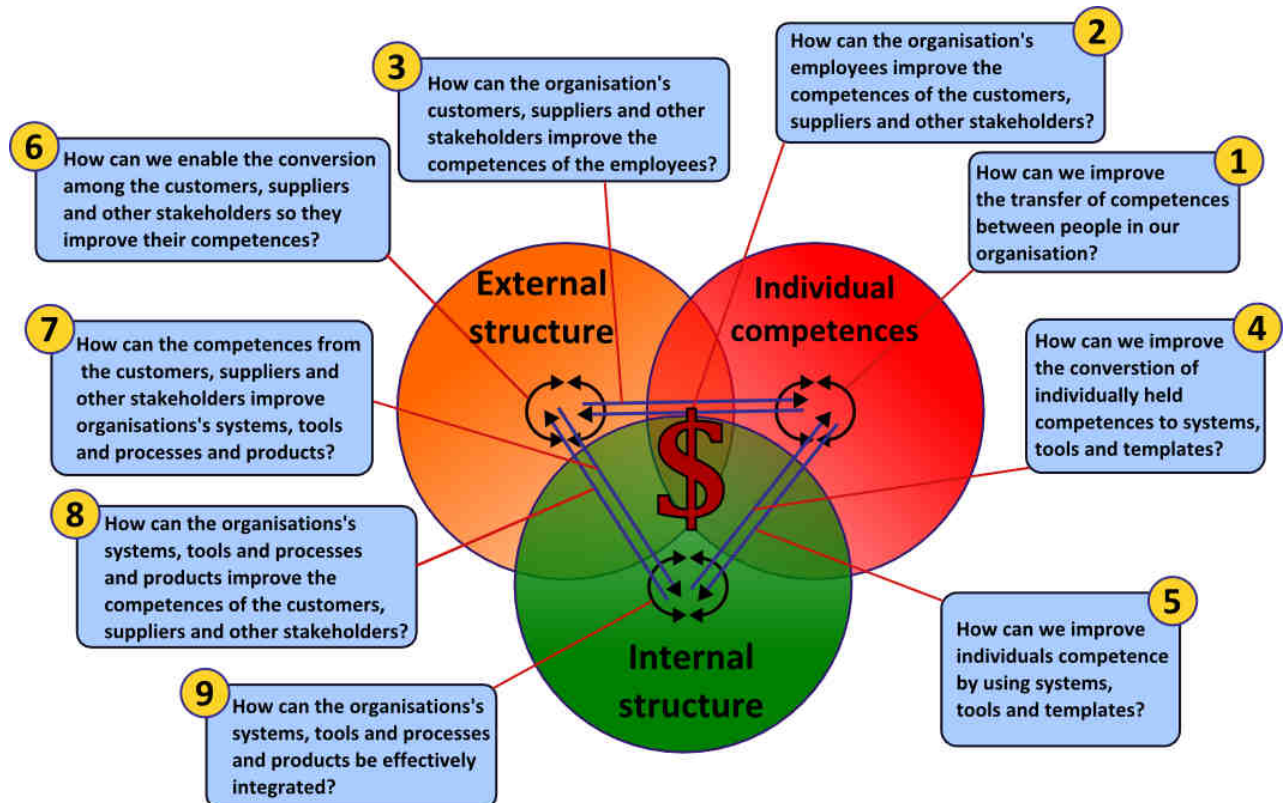


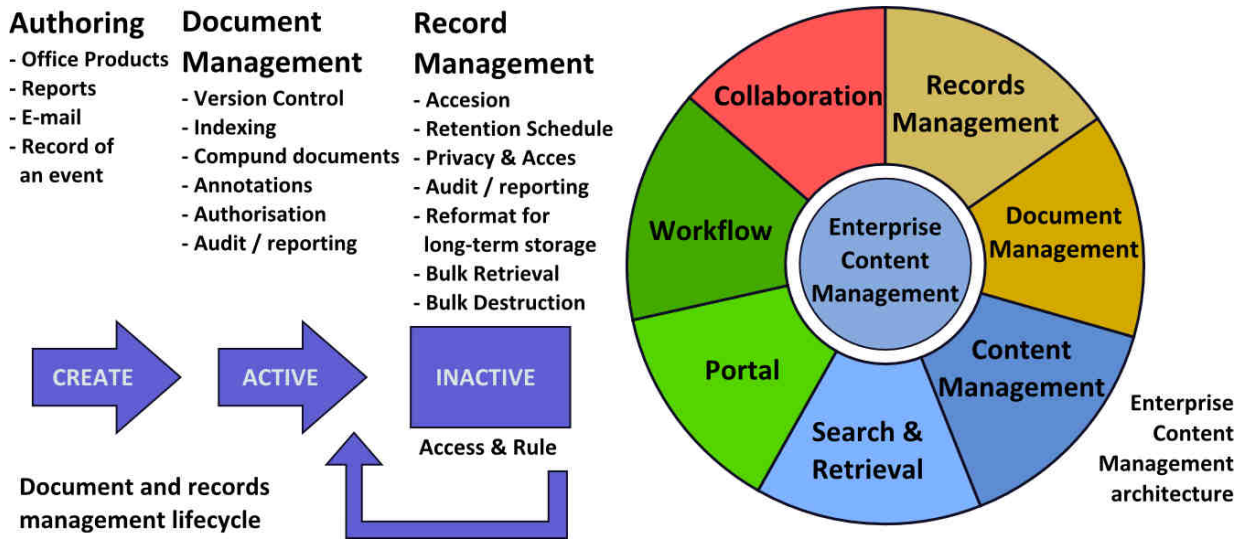
Figure 14. Nine key questions about knowledge strategy  
Source: Sveiby (2001)

Nonaka and Takeuchi (1995) highlight that knowledge creation and transfer is a continuous, unceasing process. They stress that knowledge cannot exist without context and environment, because it is not absolute. That space, named as 'Ba' by Nonaka, is a mental rather than physical space (Stewart, 2001). The difference between Eastern and Western concepts of knowledge must be considered when discussing differences between tacit and explicit knowledge transfer. In Western society, knowledge is treated as a "thing or substance" while in the East it is a living process (Andriessen and Van den Boom, 2007). In the East it is believed that explicit knowledge comes from an outside source, and is bigger than the human who possesses the knowledge, whereas tacit knowledge comes from within, therefore individuals are not capable of separating knowledge from themselves (Andriessen and Van den Boom, 2007).

### 3.2. Knowledge transfers between individuals

Tacit and explicit knowledge transfer is conducted between individuals through more or less formalized interpersonal contacts. Knowledge can be transferred through observation, experimentation, dialogue, or by use of dedicated computer programmes

such as: chat rooms, document management, content management or corporate portals (Dillnutt 2006; Haldin-Harrgard, 2000).

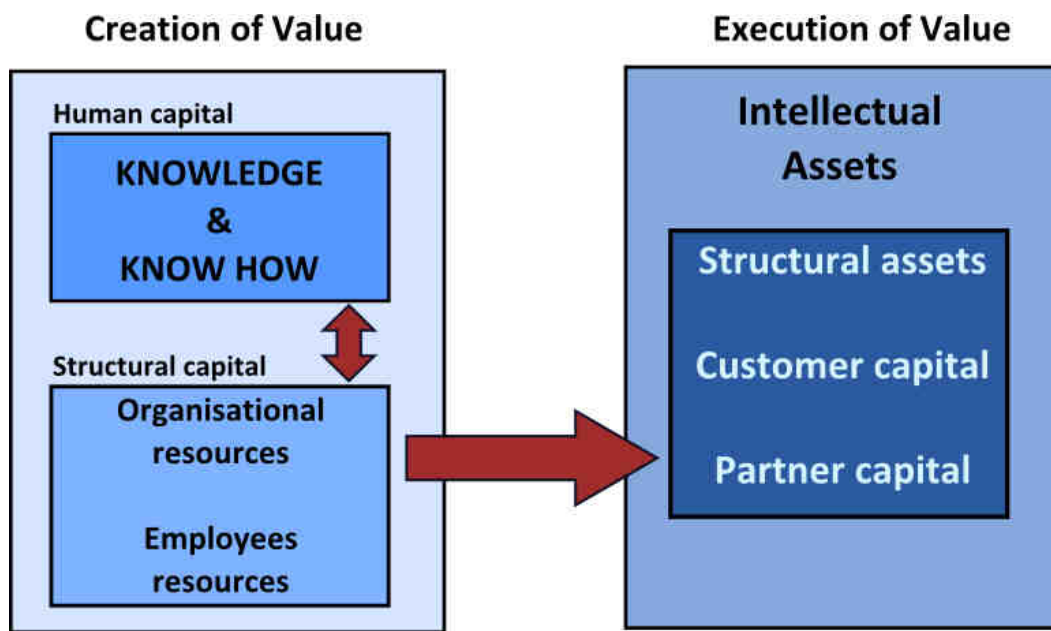


**Figure 15. Enterprise content management**  
Source: Dillnutt (2006)

Other methods include coaching, mentoring and corporate university. The first, coaching, is a technique stimulating employee professional development through individual teaching by “the coach”, who helps articulate goals and provides tools and information allowing achievement of these goals. The coach does not share his knowledge with the employee, but enables an employee to gain knowledge (Browell, 2000). The second method is mentoring a technique which stimulates employee professional development through individual teaching by a mentor being a person higher in the organisational hierarchy with greater knowledge and experience (Hansen *et al.*, 1999). The last method is corporate university, a compulsory, personalized and multilevel training programme for firm employees where an optimised amount of knowledge is presented (Prince and Stewart, 2002).

### 3.3. Knowledge transfers from individual to external structure

The essence of the KBC business model lies in transferring knowledge from the individual to customers and receiving monetary compensation in reverse. Knowledge can be sold directly as standard consulting services or indirectly by selling an intellectual asset in which employee knowledge has been capitalized during the investment phase of the given asset (Sullivan, 2001).



**Figure 16. From creation to execution of Value**  
**Source: Sullivan (2001)**

Human Capital encompasses the entire knowledge, know-how, experiences and professional competence of individuals employed at a company, but might be worth nothing if it creates no value for customers over foreseeable time period (Nerdrum and Erikson, 2001; Fitz-enz, 2000). The condition for associating value with human capital is converting individual knowledge supported by organizational capital into intellectual assets such as intellectual property. This generates a repetitive source of revenue from customers and unique partnerships, both of which grant real competitive advantage to the company (McGaughey, 2002). The ability to transform human capital into marketable IA distinguishes the efficient KBC from a group of wise intellectuals with high potential but no practical output (Sullivan, 2001).

### **3.4. Information transfer from external sources to individuals**

Understanding customers can make or break any company. Customers have potential to improve employee learning and ideas and help a company gain new customers and prestige through referrals (Gibbert *et al.*, 2001). Knowing that, professional employees, sales forces in particular, gather as much client knowledge as possible to use while introducing new products/services to market. These products or services thereby perfectly match both customer expectations and needs. To achieve this, use is made of tools such as market surveys, focusing on client perceptions, target group market research and monitoring of customer satisfaction factors (Prahalad and Ramaswamy, 2000). The disadvantage of traditional survey methods is long lag between research and the final report. For selected sectors like retail, where quick responses to market needs determine sales levels, a new method of transferring knowledge from external sources to individuals is Sales Force Automation systems (Evans, 2007). SFA arms merchandisers with mobile devices to collect market data from countrywide locations and instantly transfer it to the decision centre. Market knowledge is transferred by software supported decision engines and helps sales managers make fast and accurate decisions about pricing, special promotions or distribution actions. This

way of linking decision-making individuals with information input from external sources, customers in particular, is typical for Real Time Enterprises (Malhotra, 2005).

### 3.5. Knowledge transfer from individual competence to internal structure

It is especially important to codify explicit knowledge and transfer human and relational capital into company structures, so that external relationships are not significantly upset in the case of key employee losses (Ordoññez de Pablos, 2004). However, it is not possible to codify all tacit knowledge and personal relationships, so losing employees will always have negative impact that can be minimised through codifying employee knowledge (Krogh *et al.*, 2000).

Organisational learning occurs on three levels: individual, group and organisational. The first level in organisational learning is intensifying the process of individual knowledge acquisition but even this will not guarantee learning on the organisational level (Cangelosi and Dill, 1965; Senge, 1990). To move it to group learning, best practices and knowledge should be transferred through dialogue, observation and experience sharing within groups or teams (Nonaka and Takeuchi, 1995). When specific groups achieve better performance by specific knowledge or methods, or processes, the organization will codify and store knowledge as organization memory and use it as the organization standard and common practice (Liebowitz, 2001).

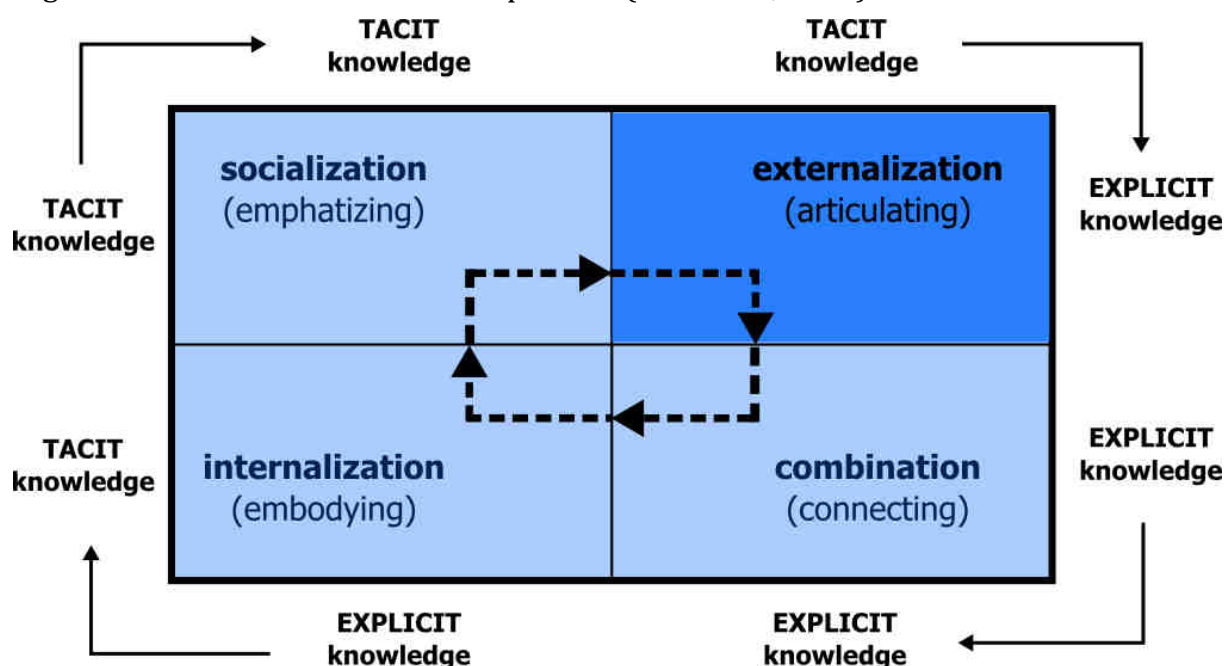


Figure 17. The SECI model  
Source: Nonaka and Takeuchi (1995)

Codifying individual knowledge into internal structure requires an organisational culture supporting knowledge sharing (Krogh *et al.*, 2000). The solution proposed for enhancing **knowledge externalisation** is to build an internal network that includes employees from various departments and different levels, with open forums for knowledge sharing. Communities of practice serve the same purpose but on a smaller, branch scale, as people must meet in person (Abou-Zeid, 2007). By nature, people are resistant to sharing knowledge, treating it as a power source, tending to keep it to themselves, therefore they should be enhanced and supported, with encouraging systems in force (Al-Hawamdeh, 2003). The conclusion drawn during the internship at

Deloitte Business Consulting was that in order to succeed it is important to focus on motivation and rewards systems assuring people put effort into codifying knowledge, as well as sharing more detailed knowledge every time someone asks a question or seeks an explanation.

**3.6. Knowledge transfers from internal structure to individual competence**

Employees learn something new every time they face new tasks. They also have to find necessary information in their internal databases. Therefore, the more user-friendly a database containing all necessary information, the more knowledgeable will company workers be in the long run (Edvinsson and Malone, 1997).



Figure 18. Relation between Human Capital and Organizational Capital  
Source: Edvinsson and Malone (1997)

An example of Knowledge Data Base (KDB) functions was observed during the internship at PriceWaterhouseCoopers (PWC). The KDB at PWC operates on the global scale, integrating enormous numbers of experts, projects and reports provided for all employees. Another way of learning from internal resources is e-learning programmes – electronic courses where people can go through material at their own pace, with tests on much they have learnt, all this information later going into the system, allowing managers to track employee progress, helping in appraisals and rewards (SkillSoft, 2007). The database of Best Case Practices is the last method helping employees in the process of **knowledge internalisation**, enabling geographically dispersed employees to find the most reliable and proven solutions (Davenport and Probst, 2002).

**3.7. Knowledge transfers within external structure**

External Structures – Customers and Partners may benefit by exchanging knowledge (Chang and Tseng, 2005). The role of a KBC is not only to control that process, but initiate it and play an active moderator role. Operating as a gateway for knowledge transfers within external structure creates opportunity to learn about customer preferences, needs, fears, and satisfaction levels from product/services (De Bonis *et al.*, 2002). Some companies create Customer Clubs where clients can meet physically or virtually on a dedicated web page and continuously exchange views and experiences (Chang and Tseng, 2005). There are no better valuers, testers, designers

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of products than users – it is wise to listen to their voice (De Bonis *et al.*, 2002). Cisco is an example of a company giving customers access to resources, information and knowledge base, enabling continuing dialogue between firm and customers, and customers themselves whilst helping others solve problems (Prahalad and Ramaswamy, 2000).

Web 2.0 is an increasingly popular form of knowledge transfer between customers or wider groups of joint interest. New generation portals differ from old ones, as content is not provided by the portal owner but by Internet users, for example Subaru car fans and clients (Burgman *et al.*, 2005). These portal types, when moderated, could be unique sources of valuable information and unconventional ways of influencing target group opinions.

### **3.8. Knowledge transfers from external to internal structure**

The market has become a forum in which customers play an active role in creating and competing for value. The distinguishing feature of this new marketplace is that customers become a new source of competence for the corporation. Customers can now initiate the dialogue; they have moved out of the audience and onto the stage (Prahalad and Ramaswamy, 2000, p. 80).

The most frequently underutilised channel of information is gathering knowledge from external structures: business partners and customers (Byus and Lomerson, 2004). Developing every knowledge component internally generates costs, and it is not reasonable to make expenditure when opportunity exists to get respective knowledge from a partner network, and benefit from cooperation agreements (Das *et al.*, 2003; Chang, and Tseng, 2005). In the information era, when knowledge is developed globally, joining online business communities active in the company core business area is a highly recommended strategy (Abou-Zeid, 2007). The Knowledge Manager's responsibility is to establish and maintain effective channels for know-how transfers, updated manuals, codified knowledge and technology description whilst creating the environment for networked solutions and innovation (Sveiby, 2001).

Nowadays, even big corporations open gates of transfer knowledge from the external world to internal structure. An example might be the Procter&Gamble (2007) initiative to outsource new products and associated features such as marketing, packaging or engineering invention to everybody willing and able to offer new ideas. The letter from the Chief Technology Officer of P&G is self-explanatory and worth noting. This seems to be a new paradigm for modern global economy companies.

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**Times have changed, and the world is more connected. In the areas in which we do business, there are millions of scientists, engineers and other companies globally. Why not collaborate with them?**

*Gil Cloyd*  
- Gil Cloyd  
Chief Technology Officer  
The Procter & Gamble Company

**Figure 19. What is Connect + Develop? An example of knowledge transfer from customers to internal structure**  
Source: Procter & Gamble (2007)

### 3.9. Knowledge transfers from internal to external structure

As shown in Figure 24, Friend, Advocate and especially Partner are the most valuable customers (Ruskin-Brown, 2005). All of them are repeatable customers involved in a partnership with suppliers. Good partnership means strong business connections, trust and allowing the customer direct access to valuable company databases (Ulwick, 1999). This could be done by creating a dedicated call centre, with a dispatcher function for hotline customers connecting to requested centres of competence to solve problems or simply get advice (Quinn *et al.*, 2000). Customers should feel access is easy and user-friendly. More knowledgeable customers will have higher satisfaction, increasing customer retention and helping to win market share and maintain high customer profitability (Byus and Lomerson, 2004).

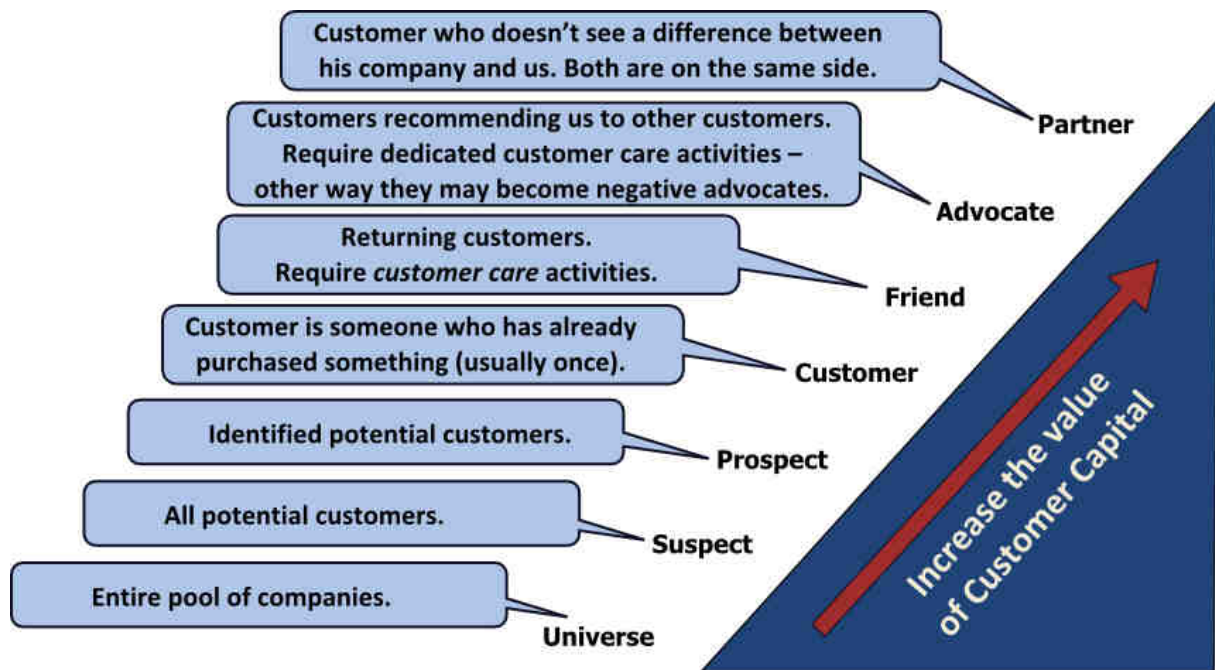


Figure 20. Ladder of customers' loyalty  
Source: Ruskin-Brown (2005)

The next step in enhancing customer partnership is linking information systems with supplier Help Desk systems, thus giving opportunities for customers to search for help, answer questions and solve problems themselves (Quinn *et al.*, 2000). Many business-to-business consultancy companies offer clients direct links to their knowledge databases and this channel of transferring knowledge is becoming popular in the business-to-customer sector – an example could be McKinsey or the Danfoss portal, where customers can gain access to extensive product databases, technical parameters including CAD graphs, installation guides, service manuals and other useful knowledge. This increases customer confidence in the company and products and assures repeatable purchases (McKinsey, 2007).

### 3.10. Knowledge transfers within internal structure

There is a lot of information stored in the company internal structure. When knowledge components are distributed companywide and not accessed by all authorised employees through integrated systems for repeatable use, human resource time is wasted. Integrated Information Systems should therefore be implemented to increase organisation efficiency and lower internal structure costs (Tiwana, 2002).

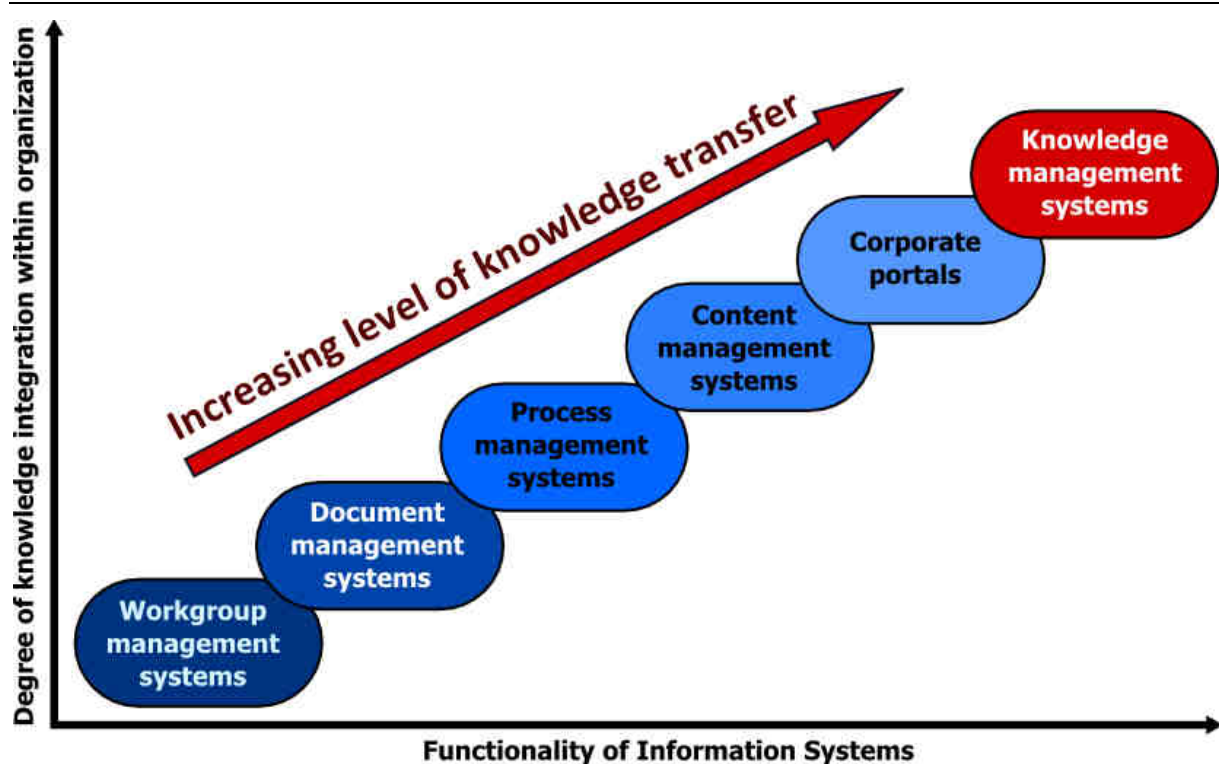


Figure 21. Degree of knowledge integration at various information systems

Some system examples are Corporate Portals offering an efficient workplace with access to every needed piece of information, Data Warehouses with context browsers and flexible reporting tools, as well as Workgroup, Document and Process Management Flow systems providing communicators, chat rooms or networked calendar all in one place (Groff and Jones, 2003). The most advanced are Knowledge Management Systems and next generation solutions such as self learning enquiry databases capable of automatically generating answers and answering questions, or business intelligence solutions such as expert rules engines (McNurlin and Sprague, 2004).

Some companies still believe that an IT system supporting knowledge management will do all the work and will change the way a company creates and leverages its knowledge, but despite huge amounts of software, very popular after the year 2000, this has diminished as organizations have realized that systems are just supporting tools, while people and what motivates them lies at the heart of knowledge management (Practitioners and Experts Evaluate KM Solutions, 2005).

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## **Chapter 4: CONCLUSIONS AND RECOMMENDATIONS**

Nonaka and Takeuchi (1995), state that the strategic impact of IC on company value is never in question. However, the questions do arise as to how it drives KBC value and how it can itself be valued. This study was intended to answer these questions by meeting the four stated objectives, finally allowing for conclusions to be formulated.

The first study objective was to explain what KBC are. KBC derive most of their value from knowledge and IC which differentiates them from conventional ones. Nevertheless, nowadays almost all companies include a KM/IC component. KBC require a new model of the company where hierarchy and bureaucracy should be given up in favour of organization whereby teams of professionals are empowered to make decisions (a Sparta model).

Second, different concepts presented by various thinkers concerning IC have been discussed and the question of how it can be valued was answered by presenting the top-down and bottom-up methods. The bottom-up method of measuring IC through adding the sum of all parts also generates difficulties, as not all parts are precisely defined and valued. The methods of valuation of some parts such as software codes, patents and other intellectual property, and even the value of customer contracts, are well described and widely employed (Razgaitis, 2003). However ways in which to measure the soft elements of human capital such as leadership, culture and innovation are still under discussion and present the most recent challenge for people engaged in this area of the study.

The study reveals that both sides of double entry bookkeeping are still not well balanced. On one side there is intellectual capital and on the other some thinkers advocate adding intellectual liabilities to make this complete. Moreover, a clear definition of intellectual assets and how they differ from intangible assets is still not widely agreed and these terms are used interchangeably or even incorrectly.

The third objective was to explain the elements comprising IC and to show how to transform identified components of IC into cash generating assets. IC and KM are new areas of study, so in contrast to most commonly used management techniques such as Value Based Management, Economic Value Added or Balanced Scorecard, which are well defined and widely used, the theory of IC and KM is still at the vibrant discussion stage, aimed at converting various concepts into one generally accepted theory. Evidently the unknown area of IC envelops human related elements such as leadership, corporate culture and employee motivation, and it is these that require careful analysis as they are important drivers for KBC value.

Finally, the study is unequivocal in showing that it is not enough to create, capture and store knowledge components to benefit from them. Undoubtedly the challenge is to create a knowledge sharing culture and to enhance and utilise the nine channels of knowledge transfer between individual, internal and external structures. Establishing efficient transfers of valuable content through these channels is positively correlated with improvement of KBC operation and financial performance, ultimately adding value for shareholders.

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## Appendix 1: Top KM/IC publications ranked by NCII

No.	Paper	Author(s)	Year	NCII
1	The Knowledge Creating Company	Nonaka, I. and Takeuchi, H.	1995	15.25
2	Working Knowledge	Davenport T. H. and Prusak. L.	1998	11.60
3	Intellectual Capital	Stewart T. A.	1997	9.17
4	Assessing knowledge assets	Bontis N.	2001	9.00
5	The New Organizational Wealth	Sveiby. K. E.	1997	8.33
6	Intellectual Capital	Edvinsson, L. and Malone, M. S.	1997	6.67
7	What's your strategy for managing knowledge	Hansen, M. T., Nohria, N. <i>et al.</i>	1999	5.50
8	Intellectual Capital	Roos, G., Roos, J. <i>et al.</i>	1998	5.40
9	A dynamic theory of organizational knowledge...	Nonaka, I.	1994	5.11
10	Reengineering the Corporation	Hammer, M. and Champy, J.	1993	3.90
11	Intellectual capital	Bontis, N.	1998	3.80
12	Managing organizational knowledge by. . .	Bontis, N.	1999	3.75
13	The Knowledge Creating Company	Nonaka, I.	1991	3.67
14	The concept of Ba: building a foundation. . .	Nonaka, I. and Konno, N.	1998	3.40
15	Wellsprings of Knowledge	Leonard, D.	1995	3.38
16	The Fifth Discipline	Senge, P.	1990	3.23
17	Process Innovation	Davenport, T. H.	1993	3.20
18	Care in knowledge creation	Krogh, G.	1998	3.00
19	Toward a knowledge-based theory of the firm	Grant, R.	1996	2.86
20	Organization learning and communities of practice	Brown, J. S., and Duguid, P.	1991	2.67
21	Dynamic capabilities and strategic management	Teece, D., Pisano, G. and Shuen, A.	1997	2.50
22	Knowledge of the firm, combinative capabilities...	Kogut, B. and Zander, U.	1992	2.36
23	The core competence of the corporation	Hamel, G. and Prahalad. C. K.	1990	2.31
24	Firm resources and sustained competitive advantage	Barney, J.	1991	2.25
25	Improving knowledge work processes	Davenport, T., Jarvenpaa, S. <i>et al.</i>	1996	2.14
26	Post Capitalist Society	Drucker, P.	1993	2.10
27	Competing for the Future	Hamel, G. and Prahalad, C. K.	1994	1.89
28	Absorptive capacity	Cohen W. M. and Levinthal D. A.	1990	1.85
29	Exploration and exploitation in organizational...	March, J.	1991	1.33
30	An Evolutionary Theory of Economic Change	Nelson, R. R. and Winter, S. G.	1982	1.24
31	Organizational Learning	Argyris. C. and Schon D.	1978	1.00
32	Knowledge and competence as strategic assets	Winter, S. G.	1987	0.94
33	The Tacit Dimension	Polanyi, M.	1966	0.86
34	Personal Knowledge	Polanyi, M.	1958	0.62

Source: Serenko and Bontis (2004)

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## Appendix 2: Most frequently cited KM/IC authors ranked by straight count

No.	Author	Score
1	Nonaka, I.	306
2	Davenport, T. H.	218
3	Bontis, N.	128
3	Takeuchi, H.	128
5	Edvinsson, L.	98
6	Sveiby, K. E.	96
7	Prusak, L.	89
8	Roos, J.	81
8	Stewart, T. A.	81
10	Hamel, G.	80
11	Grant, R. M.	78
11	Krogh, G.	78
13	Hammer, M.	74
14	Drucker, P. F.	71
14	Prahalad, C. K.	71
16	Porter, M.	70
17	March, J.	69
18	Senge, P.	68
19	Wiig, K. M.	63
20	Teece, D. J.	61
21	Polanyi, M.	59
22	Roos, G.	56
23	Brown, J. S.	55
24	Leonard-Barton, D.	54
25	Barney, J. B.	51
25	Winter, S. G.	51
25	Guthrie, J.	51
25	Malone, M. S.	51
25	Weick, K. E.	51
30	Argyris, C.	49
31	Levinthal, D. A.	41
32	Nelson, R.	40
32	Petty, R.	40

Source: Serenko and Bontis (2004)

### Appendix 3: Intangibles assets measurement

Classification	Quantification	Historical vs future performance	Usability for benchmarking
<i>Invisible balance-sheet</i> Individual cap, Structural cap	Relative	Historical costs	No
<i>Intangible asset monitor</i> External view, Internal view, People's competence, Tangible assets	Qualitative	Both	No
<i>Balanced score-card</i> Financial view, Customer view, Process view, Innovation and learning view	Qualitative	Both	No
<i>Economic value added</i> Financial planning, Budgeting, Goal setting, Compensation	Yes	Historical costs	Internal only
<i>JC index</i> Strategy, financial and non-financial measures	Single index	Value-creating potential	Limited
<i>Technology broker</i> Market assets, Human assets, Intell. property, Infrastructure assets	From qualitative to quantitative values	Both (cost/market/income approach)	Limited
<i>Return on assets</i> Overall earnings performance over assets	Single figure	Historical costs	Yes
<i>Market capitalization method</i> Difference between market and book value	Single figure	Historical costs	Yes
<i>Direct JC method</i> Market, Intell. property, Technology, Human structural assets	Quantified	Components of market assets	Yes
<i>Skandia business navigator</i> Financial, Customer, Process, Human, Development KPI	Relative	Both	No
<i>FIMIAM</i> Human, Customer, structural capital and their cross-sections	Quantified	Market price	Yes

Source: Rodov and Leliaert (2002)