

The evolution of the intellectual capital concept and measurement

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ABSTRACT

This paper presents two dimensions of intellectual capital (IC): the concept itself and the measurement of IC. In the conceptual section, the importance of IC for competitive advantage and its evolution from practice to academia is discussed. The number and diversity of IC models is considered and their points in common are drawn out: namely, three categories, representing the individual, the collectivity and the relationship perspectives. The importance of social capital for the organization's survival in the current economic environment is explained, a related bibliometric analysis is reported and an IC model acknowledging this component is suggested. The advent of new kinds of capital is explored and a perspective for their integration with the IC model is proposed. In the measurement section, the foundations of IC measurement and different metrics are discussed. A list of factors to be considered for the choice of the ideal set of metrics is presented. The Results-Based Management and Accountability Framework is explained and the evaluation of the Canadian Chemical, Biological, Radiological and Nuclear Research and Technology knowledge management initiative is given as an example. Recommendations to the reader on how to build their own assessment strategy are made and, in conclusion, future research venues are suggested.

Keywords: Intellectual capital. Intellectual capital models. Intellectual capital bibliometrics. Google trends. Intellectual capital metrics. Results-based management and accountability framework. Logic model.

A evolução do conceito capital intelectual e de sua mensuração

RESUMO

Apresenta duas perspectivas sobre o capital intelectual: uma sobre o conceito e outra sobre sua mensuração. Na exploração do conceito são discutidos a importância do capital intelectual para a obtenção de vantagem competitiva bem como o nascimento do conceito em âmbitos práticos e sua posterior adoção pela comunidade acadêmica. O número e diversidade de modelos teóricos de capital intelectual são abordados e seus pontos em comum identificados: a existência de três categorias, representando as dimensões do indivíduo, da coletividade e a perspectiva de relacionamentos. Segue-se a consideração da importância do capital social para a sobrevivência das organizações na atual conjuntura econômica, um estudo bibliométrico sobre o assunto e a exposição de um modelo teórico considerando esse componente do capital intelectual. São exploradas a tendência de identificação de novos tipos de capital e uma forma de integração desses novos elementos ao modelo teórico de base. Na parte em que a mensuração é abordada, os fundamentos e principais ferramentas da análise e avaliação do capital intelectual são apresentados. Uma ferramenta de gestão e prestação de contas focadas em resultados, a Results-Based Management and Accountability Framework, é explicada, e a avaliação da iniciativa de gestão do conhecimento do Departamento de Pesquisa e Tecnologia Química, Biológica, Radiológica e Nuclear do governo canadense é dada como exemplo. São feitas recomendações úteis aos leitores que pretendem criar sua própria iniciativa de mensuração de CI. Para concluir, são sugeridos elementos para pesquisa futura.

Palavras-chave: Capital intelectual. Modelo teórico de capital intelectual. Estudo bibliométrico de capital intelectual. Google trends. Mensuração de capital intelectual. Estrutura de gestão e prestação de contas com foco em resultados. Modelo lógico.

La evolución del concepto capital intelectual y de su mensuración

RESUMEN

Presenta dos perspectivas sobre el capital intelectual: una sobre el concepto y otra sobre su medición. En la exploración del concepto se discute la importancia del capital intelectual para la obtención de ventaja competitiva así como el nacimiento del concepto en ámbitos prácticos y su posterior adopción por la comunidad académica. El número y diversidad de modelos teóricos de capital intelectual son abordados y sus puntos en común identificados: la existencia de tres categorías, representando las dimensiones del individuo, de la colectividad y la perspectiva de relaciones. Se sigue la consideración de la importancia del capital social para la supervivencia de las organizaciones en la actual coyuntura económica, un estudio bibliométrico sobre el tema y la exposición de un modelo teórico considerando ese componente del capital intelectual. Se exploran la tendencia de identificación de nuevos tipos de capital y una forma de integración de estos nuevos elementos al modelo teórico de base. En la parte en que se aborda la medición, se presentan los fundamentos y principales herramientas del análisis y la evaluación del capital intelectual. Se explica una herramienta de gestión y rendición de cuentas enfocada en los resultados, la gestión basada en la base de datos y la gestión del cumplimiento de cuentas, y la evaluación de la iniciativa de gestión del conocimiento del Departamento de Investigación y Tecnología Química, Biológica, Radiológica y Nuclear del gobierno canadiense por ejemplo. Se hacen recomendaciones útiles a los lectores que desean crear su propia iniciativa de medición de CI. Para concluir, se sugieren elementos para la investigación futura.

Palabras clave: Capital intelectual. Modelo teórico de capital intelectual. Estudio bibliométrico de capital intelectual. Google trends. Medición de capital intelectual. Estructura de gestión y rendición de cuentas con foco en resultados. Modelo lógico.

INTRODUCTION

The aim of this paper is to present an overview of intellectual capital, with past, present and future perspectives, both from theory and practice. It is intended both for readers that are beginning to discover the field of intellectual capital and for those who want to better understand the current issues and the future of the field, from the perspectives of academia and management.

THE CONCEPT OF INTELLECTUAL CAPITAL

WHY INTELLECTUAL CAPITAL?

By the end of the 1980s, some practitioners were intrigued by the way companies were being traded for more than their book value (Sullivan, 1998). Book values, that should represent the primary source of information on the value of a company, describe the company in financial terms, meaning investments, options and obligations, and in terms of its tangible assets (buildings, machinery and stocks). Still, some company transactions clearly outlined that tangible and financial aspects were not describing the whole picture. There had been a constant increase in the ratio of the market value to book value since the mid-1980s (Lev, 2005). For instance, in 1985, Microsoft shares were sold for ten times more than its book value (Sveiby, 1997). What could account for this difference? To further the mystery, although some industry sectors presented more discrepancy from book values than in others, this discrepancy could be six times higher in a company than in another of the same industry sector (Sveiby, 1997).

That discrepancy was first credited to *intangible* or *invisible* assets, such as “patents, processes, management skills, technologies, information about customers and suppliers, and old-fashioned experience” (Stewart, 1991). Intangible assets were probably first described by a team led by K. E. Sveiby in Sweden in 1986 (Sullivan, 1998).

These rather abstract elements were regrouped under the term *Intellectual Capital* used at first

with this meaning in a *Fortune* article by T. A. Stewart (Sullivan, 1998). Its elements were shortly after named *assets* (Bontis, 1998). Previously the term conveyed the meaning of “intellect”, “intelligence” or individual knowledge.

Acknowledging intellectual assets demands different measurements, communication, interpretation tools and methods from all kinds of organizations (Lev & Zambon, 2003). A lack of information meant a lack of investments in those assets, resulting in considerable social cost (Lev, 2005). Yet, as mentioned Bontis (2001), to move from “historical understandings of financial value based on accepted assumptions and concepts developed over 500 years to the identification of a new structure of assets is not an easy task” (p. 43). Intellectual Capital (IC) research began in the 1990s (Marr, Gray, & Neely, 2003) to address these demands, with studies that aimed to describe the intellectual assets of an organization, their impact, behavior in different stages of life of the organization, and their interplay. The role of Intellectual Capital fostering knowledge, capabilities and competitive advantage was emphasized (Nahapiet, 2009).

Very soon, a handful of managers gathered in an intellectual capital management group to explore topics such as value creation and extraction as well as Intellectual Capital measurement and reporting (Sullivan, 1998). Today, organizations that foster IC discussions between managers and between managers and academia regroup as many as 700 companies - an example is the American Productivity and Quality Center (APQC, 2011).

Companies now view intellectual capital assets as the foundation for their success (Nahapiet, 2009) and, even though the ratio between book and market value has gone down since March 2000 (Lev, 2005), these assets are and will continue to be vital to organizations (Lev & Zambon, 2003).

As Larsen et al.(1999) have predicted, the intention to impact market value is among the reasons organizations are managing intellectual capital. This strategy can be observed in mergers and acquisitions (“Patrick McKeever on Walmart acquisition”, 2017). Knowledge is and will be the dominant source of competitive advantage and to make knowledge productive, management is central (Drucker, 1994). Intellectual capital statements make knowledge management visible (Larsen, Bukh, & Mouritsen, 1999) and are crucial for management (Lev & Zambon, 2003).

There is nevertheless a lot of research to be done on intellectual capital. Until recently, it was still considered a “poorly understood” matter (Guthrie, Ricceri, & Dumay, 2012, p. 69) and the consideration of intellectual assets in companies’ books was “conservative for some companies, aggressive for others, and erroneous for all” (Lev, 2005, p. 18). Ways of managing, measuring and visualizing intellectual assets still have to be addressed in theoretical and practical terms (Lev & Zambon, 2003).

CHARACTERISTICS OF IC TERMINOLOGY

Intellectual capital management is a field that was born in the practice and only later adopted by academia. This is reflected in the published literature to the present day - insights on the field can be found in blogs, professional magazines and in professional networking platforms and groups. IC has certainly benefited from the increase in literacy levels of people involved in business, which has reduced the distance between academia and business (Fuller, 2012), as intellectual capital research has been conducted in collaboration with practitioners (Larsen et al., 1999; Roos & Roos, 1997). This collaboration has possibly been the first factor of influence to the fluctuation in terminology that has characterized the field since its inception. In addition to that, the multiform nature of intellectual assets demanded the breakdown of traditional disciplinary boundaries (Lev & Zambon, 2003) and the field has presented a strong

level of interdisciplinarity, including such fields as sociology, psychology and economics (Guthrie et al., 2012), which might have accounted for a second factor. For example, “structural capital” was used at least once to refer to the tangible assets of a company, among other assets (Edvinsson & Sullivan, 1996), while most authors consider the same term to refer to a group of intellectual assets, or “knowledge at organizational level” (Ordóñez de Pablos, 2004, p. 636), in a much more intangible perspective.

The very name of the field causes confusion. Indeed, while “intellectual capital” aims to express the idea that knowledge can provide profits (Sullivan, 1998) or be converted into value (Edvinsson & Sullivan, 1996), characteristics of capital in the economic sense (Tittenbrun, 2013), its allusion to the accumulation of knowledge dissociates itself from the traditional economic theory (Bourdieu, 1986; Tittenbrun, 2014). Standard economic theory points solely to economic variables to explain all variations in economic outcomes and barely recognizes the potential role of social and cultural factors on economic development; this theory has been criticized on various grounds, mainly because it fails to fully explain economic growth and development outcomes (Bhandari & Yasunobu, 2009).

The use of the term “capital” is inserted in the needs that lead to the conception of metaphors (Eco, 1984). In fact, Bourdieu (1986) claims that the term “capital”, as a concept of accumulation of different sorts of elements, is crucial to “account for the structure and functioning of the social world” (p. 15).

The glossary section of this paper provides definitions of all the essential IC terms.

INTELLECTUAL CAPITAL MODELS

Sveiby (1997) notes that intellectual assets should be divided into three categories: *external structure*, *internal structure* and *employee competence*. External structure regroups relationships with customer and suppliers, the company's reputation, its brand names and its trademarks. The internal structure would include patents, models, and administrative systems, but also the organizational culture. Employee competence would be the human resources that both used and produced the two other types of assets.

Some of the IC models that emerged after Sveiby's enjoyed great popularity. The most cited IC model is probably that of Bontis (1998), which is divided into *human*, *structural* and *customer* capital.

Most models kept a tripartite division. One category of the IC model usually represents the intellectual assets that are more connected with the collectivity that constitutes the organization. This category is often called *organizational* (Roos & Roos, 1997), *structural* (Bontis, 1998) or *corporate* (Al-Ali, 2003) capital and is more or less the equivalent to the Sveiby's (1997) *internal structure*. It encompasses proprietary software systems, distribution networks (Petty & Guthrie, 2000), administrative systems, organizational culture, models and manuals. Of all the intellectual assets, these are expected to be the most formalized, codified and less volatile (Andriessen, 2004). They are also the most difficult to change.

The other very common category found in IC models is the one regrouping intellectual assets at the individual level. This category is often named *individual* (Nahas, 2016; Sveiby, 1997) or *human* (Edvinsson & Sullivan, 1996) capital although, notably, all assets and structures in an organization are the result of human actions (Sveiby, 1997). The assets often included in this category are the formal training, experience, expertise (Edvinsson & Sullivan, 1996), creative potential and commitment of employees.

This kind of intellectual capital is somewhat volatile, once it "walks out the door at the end of the day" (Edvinsson & Sullivan, 1996, p. 356) and is not owned by the organization (Roos, Edvinsson, & Dragonetti, 1997).

The last, but not least, category of IC models is the one that encompasses the relations of both individuals and organizations with the exterior. It is also the category having the highest level of variation in its name: *external structure* (Sveiby, 1997), *customer* (Bontis, 1998); *relational* (Seleim & Bontis, 2013) and *social* (Nahapiet & Ghoshal, 1998) capital.

These three categories of IC components are the basis for understanding the impact of intellectual assets on organizational performance. Dividing intellectual into components, however, is a rather didactic strategy as there is an inherent difficulty in "isolating capital in its various forms due to the convertibility and overlapping nature of different types of capital" (Stringfellow & Shaw, 2009, p. 137). The IC components will be called *descriptive* kinds of capital because they classify intellectual capital assets without considering organizations' intentions or actions. The use of the term intends to differentiate the IC components from other kinds of capital, conceived under a *process* perspective of the organization.

Table 1 – Distribution of assets across components according to different IC models

Author \ Intellectual Assets Categories	Collectivity Level	Individual Level	Relational Perspective
Bontis (1998, 2001)	• Hardware		
	• Software	• Knowledge	
	• Databases	• Skills	• Knowledge of marketing channels and customer relationships
	• Organizational structure	• Innovativeness	
	• Patents	• Ability to meet the task at hand	
	• Trademarks	• Company's values	• Knowledge of customer desires
	• Relationships developed with key customers	• Organizational culture and philosophy	
Edvinsson	• Information systems		
	• Software		
	• Work procedures	• Collective experience	
	• Marketing plans	• Skills	• Not present
	• Company know-how	• General know-how	
	• Costing structures		
	• Supplier relationships		
Sveiby	• Patents		• Relationships with customers and suppliers
	• Concepts	• Capacity to act and create tangible and intangible assets	
	• Models		• Brand names
	• Computer and administrative systems		• Trademarks
			• Company's reputation

Source: The authors, 2017

CURRENT ISSUES ON INTELLECTUAL CAPITAL RESEARCH

THE THIRD IC MODEL COMPONENT

Petty and Guthrie (2000) have identified two stages of the IC scholarship. The first is more concerned with raising awareness about IC reporting and measurement, and identified the stage where models were developed and accepted. The second stage was when researchers started to investigate the impact of investment and measurement of IC - or the use of IC models and measurement strategies - in market values. These stages might have a rather non-linear nature. For instance, scholarship is still concerned about raising awareness related to IC - only in a more specific level. Leal et al. (2014) have pointed out that some degree of consensus has been achieved regarding IC models. However, the research community might not yet have settled for the definite IC model as it has not yet accepted the IC component representing human relations inside and outside of the organization.

Early IC models did not include *social capital* (Petty & Guthrie, 2000) and, until recently, this IC component was largely ignored by the business world (Baker, 2012).

RECOGNIZING SOCIAL CAPITAL AS AN IC MODEL COMPONENT

Social capital can be defined as “the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit” (Nahapiet & Ghoshal, 1998, p. 243). Bhandari and Yasunobu (2009) argue that, even though social capital has entered into academic and policy debates only in 1990s, it is an old concept. Indeed, Lyda Hanifan is said to have first coined the term in 1916, meaning goodwill, fellowship, sympathy, and social interaction (OECD, 2007), but Farr (2004) points to John Dewey as one of the first precursors of the concept, and eventually the term, back in 1897. The social capital of an organization may help it access the intellectual capital of other

organizations (Baker, 2012; Viedma Marti, 2004) and is central to the understanding of institutional dynamics, innovation, and value creation (Tamer, Dereli, & Sağlam, 2014). Privileged access to information and opportunities, social status, and reputation (Nahapiet & Ghoshal, 1998) are some of the assets that should be included in this IC component.

Some of the intellectual assets nowadays recognized as part of social capital, such as relationships with clients or suppliers (Tsai & Ghoshal, 1998), have been previously acknowledged as part of structural capital or equivalent (Bontis, 1998; Edvinsson & Sullivan, 1996; Sveiby, 1997) or suggested to be part of human capital (Larsen et al., 1999). One of the elements of social capital, reputation, however, was even further ignored. It has been classified as a sub-product of intellectual assets, and not even an intellectual asset itself (Coleman, 1988; Petty & Guthrie, 2000), suggesting that it should not or could not be measured or nurtured by organizations. In fact, one of the largest debates about social capital inquires if it is just a by-product of other activities or if it can be deliberately developed (Nahapiet, 2009). It has to be observed that a by-product would not, by definition, be actively used to attract more customers, and would even less be at the center of a business model. The former occurs in one advertising piece claiming that the company’s clients would “swipe it to the right” (“EBOX - internet haute vitesse / High Speed internet”, 2017), making a reference to the appreciation gesture used in a popular dating platform. Another example is the online version of an ad that repeatedly mentions that the product is the most recommended by dermatologists, showing the number of readers that have recommended the product and offering a quick way for the reader to also recommend the product in their turn (Procter & Gamble, 2017). The latter is verified in some healthy and five-decade-old businesses that are based on referral networks (Baker, 2012). Social capital can and should be deliberately developed (Bourdieu, 1986).

REDEFINING IC MODEL COMPONENTS

IC model components have great influence over each other. Sveiby (2001) characterizes the interdependence of the three IC model components by stating nine kinds of knowledge transfer, three for each IC model component, representing the knowledge exchange inside the IC model component in question and from the IC model component to the other two. Seleim and Bontis (2013) argue that relational capital cannot exist or operate without human capital. The relationships an organization has with another organization (what would be part of social capital) are greatly influenced by the human-to-human relationships. If there is a human involved, there is human capital involved. On the other hand, a good part of knowledge management resides in converting tacit knowledge into explicit (Nonaka & Takeuchi, 1995). The codified knowledge becomes part of the structural capital, or what the organization possesses and controls, if the employee is bound to transfer intellectual property of what they produce to the organization, as it is current practice. Because structural capital contains codified knowledge artifacts, it is considered the “ying’ to human capital’s tacit ‘yang’” (Seleim & Bontis, 2013, p. 133).

To further the argument, the development of human capital is considered by Baker (2012) to be “obviously not an individual process but a social process” (p. 216), suggesting that social capital has an impact over the development of human capital. The value of intellectual assets regrouped under structural capital may also depend on social capital. For instance, Baker (2012) mentions an incident with Coca-Cola to explain that, although the company legally owns full rights to its brand, it has “no control—only influence—over the subjective value millions of customers place upon it” (Baker, 2012, p. 225).

Considering that IC model components are so closely related, acknowledging social capital and the intellectual assets that are part of it implies rearranging assets across other IC components. The following table intends to shed light on the intellectual capital model of an organization considering social capital as one of its components.

Table 2 – Distribution of assets across components considering Social capital an IC model component

IC Model Component	Organizational Capital	Individual Capital	Social capital
Intellectual Assets	<ul style="list-style-type: none"> • Codified information • Captured knowledge • Software • Databases • Organizational structure • Patents • Trademarks • Codified work procedures • Innovation pipelines 	<ul style="list-style-type: none"> • Tacit knowledge • Skills • Ability to meet the task at hand • Innovativeness 	<ul style="list-style-type: none"> • Organization’s reputation • Relationships with customers, suppliers, partners and shareholders • Relationship attractiveness • Reliability • Commitment potential • Individual’s reputation

Source: The authors, 2017

THE GROWING INTEREST ON SOCIAL CAPITAL

Although social capital has only recently been given attention by practitioners and academia, this attention has been increasing. To illustrate this, a quick bibliometric analysis¹ of the field was carried out using the Web of Science scientific indexing platform and Google Trends, a service that outlines how search terms were used in Google.

The number of published papers mentioning one of the components of IC has increased progressively over the years (Clarivate Analytics, 2017b), while Google searches on intellectual capital have remained stable for the past five years (Google, 2017a), revealing a sustained interest both from academia and practitioners. About half of the papers discussing the components of intellectual capital mention a topic related to social capital (Clarivate Analytics, 2017d, 2017b), although only a little under 35% of these papers use the term “social capital” (Clarivate Analytics, 2017d, 2017c), reaffirming the notion that the concept of social capital is often discussed without the actual use of the term (Farr, 2004). This disparity also suggests that, while the assets that compose social capital are being acknowledged, the IC component label is still far from reaching consensus. Papers mentioning topics related to either human capital or social capital account for 95% of the papers mentioning at least one of the components of intellectual capital (Clarivate Analytics, 2017a, 2017b). The same figure accounts for the searches for human capital or social capital, denoting that most current IC academic activities and practitioner interests surround those components. The interest in those topics go beyond North-America, a trend that would be most praised by Bontis (2001) and Nahapiet (2008). These authors have acknowledged the English-speaker bias and suggested research settings outside North America to reduce it.

¹ While bibliometric analysis may be powerful to indicate the direction to where a knowledge domain is heading, it certainly has its limitations, such as not accounting for homonyms and the non-disclosure of the methods for the translation of terms used by the platforms that offer the data.

Not all countries display the same interest between those topics, though. While human capital is most searched in North America, Australia, India and South Africa, social capital is most searched in Mexico and Brazil (Google, 2017b). Indeed, if the report is narrowed to Brazil only, the number of searches for social capital in Google is so high that searches on organizational and human capital become negligible (Google, 2017c), possibly indicating a local need or potential felt by Brazilian practitioners. The increased interest in human and social capital indicate that these components and their mutual relationship are currently at the center of the debate on intellectual capital. However, social capital, or at least its intellectual assets, has always been a part of organizations’ life. Why the recent increased interest on the topic?

Janine Nahapiet, one of the first researchers to recognize the importance of social capital, explains that changes in the competitive environments of the United States, Europe and Japan, ranging from “deregulation to environmental concerns to changing customer expectations to technological discontinuities” and “post-9/11 political uncertainties, changing demographics and turbulence in financial markets” have transformed the way competitive advantage is seen (Nahapiet, 2009, p. 206). This change “puts connectedness, interdependence and collaborative advantage centre stage” (Nahapiet, 2009, p. 207). Organizations face an environment where continuous innovation may be the only chance to survive. In a nutshell, innovation is a driving force to build competitive advantage, which in turn becomes the key objective for an organization to thrive in the market. Very often, the organization’s internal knowledge is not enough to foster innovation in a level that makes the organization achieve its objectives. The same organization, however, when open to external input or, in other words, managing its social capital, may thrive in the same environment.

Nahapiet’s vision of social capital is built on a resource-based perspective (Nahapiet, 2009) and in a knowledge-based theory of the firm (Nahapiet & Ghoshal, 1998). A resource-based perspective explores

“how a firm’s resources and capabilities can affect its performance” (Barney, 1996, p. 469). This perspective retains Nonaka and Takeuchi’s (1995) idea that only an individual can know. The knowledge-based theory of the firm, resulting from a resource-based perspective (Barney, 1996) or at its essence (Conner & Prahalad, 1996) sees the organization as an organism that, as such, can recombine and apply knowledge (Sveiby, 2001), and learn (Kogut & Zander, 1992). Although somewhat recent, the theory hosts concepts that are four decades old and originated from organizational learning, such as the double-loop learning (Argyris, 1976, 1977, 2002). In this theory, organizations’ “ability to attain and keep profitable market positions depends on its ability to gain and defend advantageous positions in underlying resources important to production and distribution” (Conner, 1991, p. 121) and are not only shaped by knowledge, but also shape knowledge and its application by their existence and actions (Conner & Prahalad, 1996). These perspectives and theories lay grounds to understand different ways in which the organization interacts with its own and exterior agents.

Considering the organization as an organism that is capable of creating, developing and maintaining relationships in addition to fostering an environment for human-to-human interactions is essential to understanding the new competitive dynamics worldwide. As Drucker (2001) explains, the different kinds of alliances between organizations will be the new normal in a few years’ time.

MANAGING SOCIAL CAPITAL

Of the three components of the IC model, social capital is probably the most difficult to develop and maintain. Collaborating with potential competitors demand careful delineation of collaboration limits. It takes great commitment of employees, which is increasingly incompatible with the traditional model of the firm, the one having communication flows only from management to operational staff, where clearly defined frontiers among departments display scarce or no knowledge of the whole production process. Finding organizations to collaborate with demands great conscience of the organization’s market

position and its strengths, weaknesses, opportunities and threats. Good competitive intelligence is also necessary to identify organizations that have potential as partners. For Nahapiet (2009), harnessing the power of social capital implies a change in the way strategy is conceived and put to practice.

To Sveiby (2001), it is just a matter of management directing the effort of their teams outwards. In any case, businesses have a long tradition of ownership and with labor exploration, while cultivating relationships as a means of obtaining competitive advantage is a new phenomenon. Relationships suffer the influence of an enormous number of variables and relying on them is seemingly a risky bet. Social capital is also extremely situational: what is effective in one context might not be in another; it can have detrimental as well as positive implications for knowledge, learning and ultimately performance (Nahapiet, 2009).

Social capital can, however, disclose and increase the potential of individual capital that would otherwise remain encapsulated and incapable of generating value. It is the fabric that allows knowledge to be consistently diffused, therefore reducing the risk of knowledge loss. It can provide access to resources that are essential to the organization but are outside its boundaries (Nahapiet, 2009). It may be the only possible strategy to grant the survival or the existence of the organization.

NEW KINDS OF CAPITAL

Intellectual capital assets impact in many ways the performance of an organization. In the effort of elucidating how this impact is manifested, many authors have identified different kinds of capital: innovation, entrepreneurial, participatory and competitive capital, among others. These kinds of capital illustrate how the basic IC model components interact in different processes; therefore, we name them process capital, as opposed to descriptive capital that are the three components of the IC model. Each process capital regroups a number of assets from one or more descriptive capital and helps understand how each component of the IC model contributes to organizational performance.

The discussion around new kinds of capital has been the target of harsh critique, specially from defenders of standard economic theories, such as Tittenbrun (2013). It is important to keep in mind, however, that the IC movement held in its origins the commitment to recognize that elements that were neither visible nor measurable had their value - and this value often exceeded physical assets'. Intellectual capital research and practice has in its core the premise of being open and able to recognize value in new types of business endeavors. The recognition of new kinds of capital might - for the very least - shed light in the management of intellectual capital. It can also create even more value for the organization, as the different kinds of capital not only sum their impact, but also engage in a kind of synergy that allows for value to be better sustained over time.

ENTREPRENEURIAL CAPITAL

Stringfellow and Shaw (2009) define entrepreneurial capital as the access to economic, human, social, cultural and symbolic capital, drawing on Bourdieu's (1986) conception of capital. Erikson (2002) enumerates seven factors that compose entrepreneurial competence: entrepreneurial creativity, ability to enterprise, entrepreneurial self-efficacy, perceived behavioral control, conviction, perceived feasibility, and resource acquisition self-efficacy.

Entrepreneurial capital seems to be deeply rooted in human capital.

INNOVATION CAPITAL

Some authors connect a organization's potential for innovation with its social capital (McElroy, 2002). Others credit human capital as having the potential for innovation (Bontis, 1998). Innovation pipelines, however, are considered a matter of company or unit management (Cooper, 1990), suggesting that innovation capital is also connected to organizational capital. Maybe the most accurate picture of innovation capital is portrayed by those that place it in the crossroads of the descriptive IC model components (Chen, Zhu, & Xie, 2004).

PARTICIPATORY CAPITAL

The notion of participatory capital is discussed in community studies. It refers to the engagement of the surrounding community in helping build solutions and competitive advantage. Participatory capital is accumulated when individuals get involved in political and voluntary organizations and activities. It can help governmental organizations to address the needs and concerns of its population.

Participatory capital can also be defined as the ability one has to have people and organizations acknowledge, assess and recommend one's statements and actions. Online and mobile applications are progressively providing features that include clients and citizens opinions. These channels help to improve service-delivery and inform clients about the quality of a service or product. They also give organizations the opportunity to understand clients' needs and desires. For example, Amazon.com allows clients to review the products they have purchased. The outcome is valuable information that can help to improve products and innovate.

While social capital is probably the moving force behind participatory capital, the sharing of clients' and citizens' opinions and ideas is often only made possible due to the existence of a technological platform or, in other words, organizational capital.

THE MEASUREMENT OF INTELLECTUAL CAPITAL

The practice aspect of the intellectual capital field has been concerned with the assessment and reporting of intellectual capital assets and the evaluation of knowledge management (KM) initiatives. Although there are no standards for assessing the value of intangible assets (Dalkir & McIntyre, 2011), there is a good amount of lessons learned regarding IC assessment.

KNOWLEDGE MANAGEMENT EVALUATION PLAN

The Knowledge Management Evaluation Plan encompasses a description of the initiative and its objectives, its main stakeholders and their expectations towards the initiative, the steps to be taken in the evaluation approach and the metrics and indicators to be used. It is both an outline of means for the measurement as a guide for the analysis of the results of the measurement (Dalkir et al., 2007). It is developed in a pre-evaluation phase and, according to Bose (2004), it helps allocate resources to the evaluation process, considering how the results may be used and acted upon. In fact, the potential for action is one of the guiding principles of the evaluation. Without it, there is no need to evaluate (Griffiths & King, 1991).

Dalkir (2011) enumerates some questions around the evaluation process: Why is the evaluation being carried out? For whom? When? What will be measured? How should the measurement be done? How should the analysis be made and the results presented? These questions should start being answered in the pre-evaluation phase even though some of them will be further explored in subsequent steps.

IDENTIFYING MAIN STAKEHOLDERS AND THEIR EXPECTATIONS

Most of the Knowledge Management Evaluation Plan depends on the definition of the audience and their expectations regarding the initiative (Dalkir et al., 2007). Identifying the main stakeholders and meeting them individually or in groups to clarify their need for information on the initiative should be one of the first steps of the evaluation effort (Keyes, 2006). Meeting stakeholders may also help understand the reason why the initiative exists and what are the problems it should help solving (McLaughlin & Jordan, 1999).

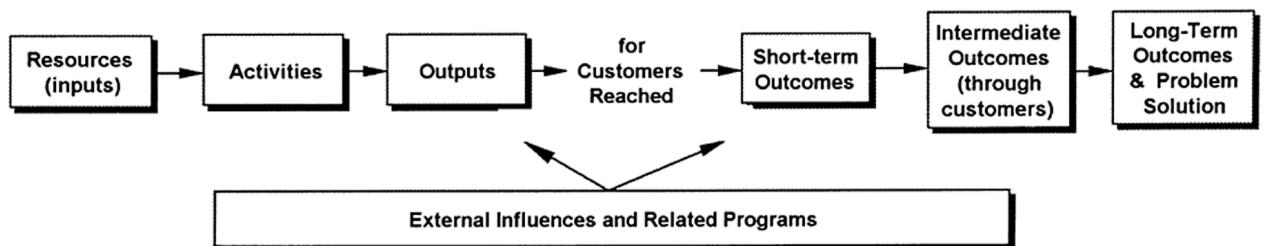
DESCRIBING THE INITIATIVE: BUILDING THE LOGIC MODEL

McLaughlin and Jordan (1999) explain that the “Logic Model is the basis for a convincing story of the program’s expected performance” (p.66). They contain three core components: the activities, outputs and outcomes of the initiative (Dalkir et al., 2007).

Dalkir and McIntyre’s (2013) introduction to logic models gives a good overview of their usefulness:

“The logic model graphically identifies and maps the logical connections between the activities of an initiative and the achievement of their possible outcomes. It shows the chain of results between the activities and the final outcomes and identifies the steps in between that must occur for the achievement of the final outcomes” (p.5).

Figure 1 – The Logical Model structure



Source: McLaughlin and Jordan (1999)

The logic model is built from stakeholders' interviews and an audit of internal documentation (Dalkir et al., 2007). It helps building a common understanding among stakeholders; place the initiative in the organization or problem hierarchy and help balance the key performance indicators (McLaughlin & Jordan, 1999).

IDENTIFYING KEY PERFORMANCE INDICATORS

Identifying performance indicators that are both meaningful and effectively measurable is not an easy task. The perfect indicator would have great impact with stakeholders - the reason why they are called "key" - and would already be measured or have the measurement easy to implement.

Stakeholder information needs could be used to conceive indicators. However, some degree of adaptation should be expected. Practitioners have identified that there is a gap between what should be measured and what can actually be measured (Dalkir & McIntyre, 2011).

Inspiration for key performance indicators (KPI) can come from research. Bose (2004) and Hunter et al. (2005) enumerate a good amount of indicators that could cover KM initiatives in different settings. It could come from other projects in the same organization (Kitimbo, 2016), or from the goals of the KM initiative (Dalkir & McIntyre, 2013).

QUANTITATIVE MEASUREMENT

Quantitative measurement involves capturing numerical variables (Powell, 2006) and provides hard data to evaluate performance in time; they are therefore helpful to identify trends (Smith et al., 2001).

QUALITATIVE MEASUREMENT

Qualitative measurement is appropriate when the phenomenon being observed does not lend itself to quantification (Powell, 2006), which is the case of many aspects of KM initiatives, where quantifiable measures, such as use statistics, do not convey the value of the service (Martin, 2004).

ANECDOTAL MEASUREMENT

Anecdotes are "individuals' narratives about work-related processes [that refer to] (...) short, succinct, 'success stories' about how to improve program management, processes or operations" (Smith et al., 2001, p. 73).

CREATING A RELIABLE MEASUREMENT STRATEGY

A combination of quantitative, qualitative and anecdotal measures must be included (Dalkir & McIntyre, 2011) in the Knowledge Management Evaluation Plan (KMEP), otherwise there is a risk of not reliably representing the success and value of a KM initiative (Dalkir et al., 2007).

MAJOR APPROACHES TO MEASURE AND REPORT IC

As the measures should speak to the stakeholder and chances are a number of very different stakeholders have interest in the initiative, a mix of metrics might be necessary (Keyes, 2006). Another reason for the use of more than one set of metrics is the fact that causality cannot be rigorously demonstrated in KM initiatives; an additional valuation method would then serve to strengthen the validity and reliability of the results obtained (Dalkir & McIntyre, 2011).

Different metrics apply to different settings. For example, Dalkir and McIntyre (2011) have found that financial models may be difficult to apply to government context.

Some evaluation frameworks used for IC have been extensively discussed, vulgarized and applied in different settings. It is the case of the Balanced Scorecard (Biazzo & Garengo, 2012; Hannabarger, Buchman, & Economy, 2007; Jordan & Mortensen, 1997; Kaplan & Norton, 1996; Nair, 2004; Niven, 2005, 2008; Wu, 2012). Others have known less popularity, such as the IC-Index (Bose, 2004).

CHOOSING AN EVALUATION FRAMEWORK

The most meaningful framework should be selected. The choice of the framework should be consequence of a balance in the following factors, among others:

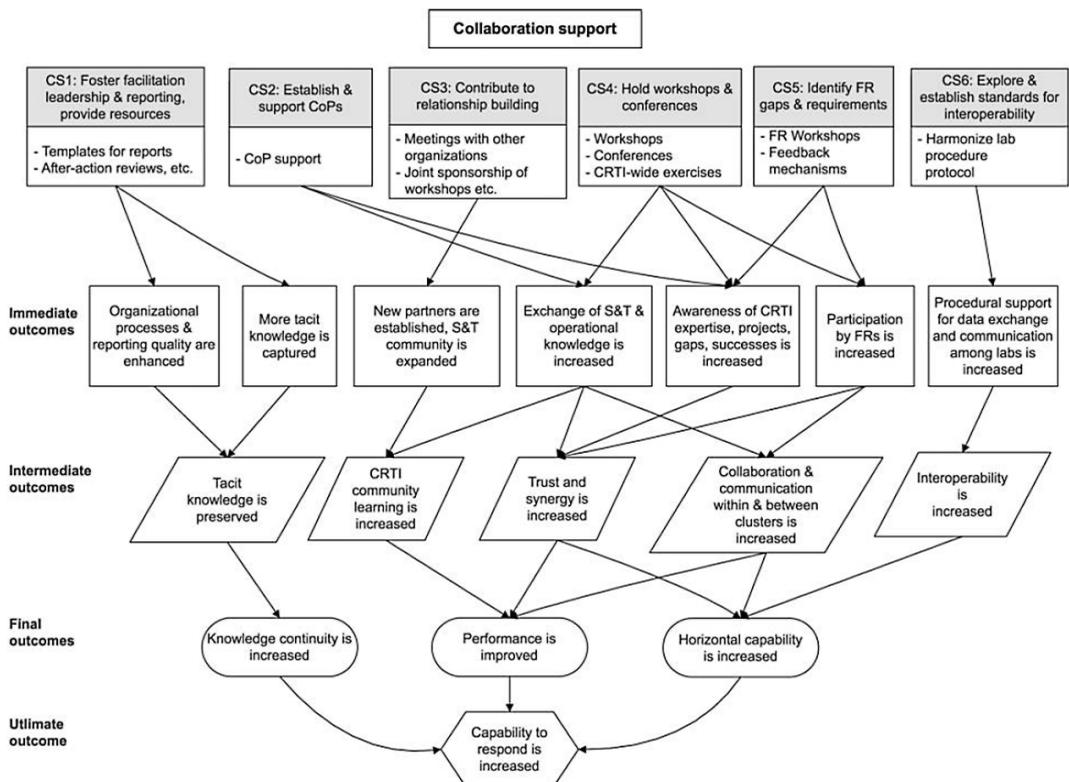
- Familiarity of stakeholders with the framework
- Familiarity of evaluator with the framework
- Ease of implementation
- Ability of framework to host performance indicators adapted to the organization and project

In the assessment of a KM initiative in the Canadian Chemical, Biological, Radiological and Nuclear (CBRN) Research and Technology (CRTI), Dalkir et al.(2007) have chosen the Results-Based Management and Accountability Framework (RMAF) as an evaluation tool. The RMAF had been widely used in the Canadian government.

Chances are then that a portion of the project stakeholders had already been exposed to the framework. RMAF needs little improvement from the Logic Model, so evaluators tend to find a lot of familiarity in the tool. The closeness of the tool with the Logic Model also helps increase its easiness of implementation. Finally, there are guidelines for the choice and use of performance indicators with the tool (Treasury Board Secretariat, 2001), but no limitations regarding their form or scope whatsoever.

The RMAF offers a graphical way of presenting the activities, outputs, immediate, intermediate and final outcomes that have been identified by the Logical Model, as shown in figure 2.

Figure 2 – CRTI’s RMAF diagram



Source: Dalkir et al. (2007)

THE RESULTS-BASED MANAGEMENT AND ACCOUNTABILITY FRAMEWORK

The guiding principles of a RMAF are: utility, shared ownership, transparency, decision- and action-oriented, credibility and flexibility (Treasury Board Secretariat, 2001).

Dalkir et al. (2007) have articulated the eight stages in the development and implementation of a RMAF:

- “program profile, logic model creation and clarification, identification of strategic outcomes and key evaluation goals;
- identifying performance measures;
- establishing appropriate data gathering strategies and tools;
- gathering the data;
- reporting of performance results;
- reviewing, assessing and modifying the initiative and/or activities;
- formative evaluation of management issues; and
- summative evaluation of fundamental initiative issues” (p.1503).

These steps aim to conceive the five elements of the framework: the profile; the logic model and the ongoing performance measurement, evaluation and reporting strategies

RMAF is an interesting departure point, but as evaluation frameworks are highly dependent on context (Dalkir & McIntyre, 2011), it should be adapted to meet the organization’s needs (Dalkir, 2016; Treasury Board Secretariat, 2001).

RECOMMENDATIONS TO BUILD YOUR APPROACH TO IC MEASUREMENT

IMPORTANCE OF A BASELINE

If the performance of the KM initiative has not been assessed before, it is important to run a first measurement in the pre-evaluation phase. This first measurement would provide a baseline, a “starting point against which subsequent changes may be measured and compared” (Dalkir, 2011, p. 343), even though key performance indicators might suffer alterations from their pre-evaluation phase conception as the evaluation process evolves.

IMPORTANCE OF A FRAMEWORK OVER A LIST OF INDICATORS

Finding a way for indicators in a framework is better than measuring indicators on their own, even if they are adapted for the organization. Frameworks have more impact in portraying the KM initiative, as they show the “effects and relationships between specific KM activities” (Dalkir & McIntyre, 2011, p. 163). Frameworks usually have a visual diagram that is suggested for presentation, such as flow diagrams, matrices or causal diagrams (Dalkir & McIntyre, 2011). These diagrams help explain the exponential progress of the impact of the KM initiative.

NOT ENOUGH AND TOO MUCH

Enough performance indicators should be used to convey the progress of the KM initiative. However, too many indicators demand performance measurement systems to be interpreted (Kucukaltan, Irani, & Aktas, 2016; Rodriguez, Saiz, & Bas, 2009). Indicators should be presented in a number that helps the different stakeholders understand the success of the KM initiative.

CONCLUSION

Intellectual capital has evolved to encompass new theories, new practices as well as new types of capital. The measurement of the value of intangible organizational assets will continue to play a pivotal role in the sustainable competitive advantage of any organization. Of the major types of intellectual capital, social capital in all its diverse forms appears to be critical. Not only is social capital an important component of intellectual capital but it also adds value or amplifies the existing value of the other types of intellectual capital. The future of intellectual capital clearly appears to lie with the increasing awareness of the importance of social capital as well as recognizing new forms of social capital such as entrepreneurial capital, which is connected to innovation and creativity, as well as participatory capital, where citizens are empowered to play a greater role in government policy and decision making. In parallel, the measurement of intellectual capital must continue to remain an open process that is flexible enough to accommodate the assessment of the value added by all types of intellectual capital.

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APPENDIX

GLOSSARY

Term	Definition
Book Value	Accounting term that refers to the value of the assets that a company possesses. The total book value is equal to its total assets minus its intangible assets and liabilities (Weygandt, Kimmel, Kieso, & Elias, 2010)
Competitive Advantage	A characteristic that helps and organization to surpass another organization's performance.
Knowledge Management	"Knowledge management represents a deliberate and systematic approach to ensure the full utilization of the organization's knowledge base, coupled with the potential of individual skills, competencies, thoughts, innovations, and ideas to create a more efficient and effective organization" (Dalkir, 2011, p. 3)
Market Value	Monetary quantity a given asset can be sold for in a given market
Relationship Attractiveness	The perceived potential of an organization to provide positive outcomes to another organization. High relationship attractiveness joined with high business impact and limited supplier market competitiveness predict successful relationships (Hartmann, 2013)
Social capital	"The sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit"(Nahapiet & Ghoshal, 1998, p.243)
Participatory Capital	Engagement of the surrounding community to help build solutions and competitive advantage.