
Managing organizational knowledge by diagnosing intellectual capital: framing and advancing the state of the field

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Abstract: Since organizational knowledge is at the crux of sustainable competitive advantage, the burgeoning field of intellectual capital is an exciting area for both researchers and practitioners. Intellectual capital is conceptualized from numerous disciplines making the field a mosaic of perspectives. Accountants are interested in how to measure it on the balance sheet, information technologists want to codify it on systems, sociologists want to balance power with it, psychologists want to develop minds because of it, human resource managers want to calculate an ROI on it, and training and development officers want to make sure that they can build it. The following article represents a comprehensive literature review from a variety of managerial disciplines. In addition to highlighting the research to date, avenues for future pursuit are also offered.

Keywords: Intellectual capital; organizational knowledge; human capital; structural capital; knowledge management.

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1 Introduction

He that hath knowledge spareth words; and a man of understanding is of an excellent spirit.

Bible, Proverbs 17:27

Management academics strive to conduct rigorous research from which knowledge can be transferred to future generations of managers. Thus, their role is twofold: one of theorist as well as educator. This logic has some inherent implications. First, rigorous research is required to clear the publication hurdle. This generally leads to newer academics pursuing the path of least resistance. Typically, these paths are described as having voluminous amounts of researchers and even more voluminous amounts of past research to draw on. The second implication lies in the notion that something out there exists to be examined. The debate of whether academics lead or lag the real world has been argued for centuries. The answer, of course, rests with which group you associate. Finally, academics must teach relevant conceptualizations in the classroom. With rising tuition costs and increasing alternatives, students are in a position to scrutinize carefully where their hard earned money will go. Within the context of the aforementioned implications, this paper's objective is to frame and advance the field of intellectual capital. In attempting to conceptualize the phenomenon from a variety of perspectives and for different audiences, the intellectual capital field can take stalk of where it has been and where it is going. This is necessary in order for it to continue its trajectory.

As the third millennium approaches, how has the burgeoning field of intellectual capital developed? A variety of perspectives will be used to answer this question. First, the field of intellectual capital initially started appearing in the popular press in the early 1990s (Stewart [1,2]) Intellectual capital was described by Stewart as a "brand new tennis ball – fuzzy, but with a lot of bounce". However, this statement acts as a detriment for the survival of this field in academia. Most 'bouncy' topics that are researched extensively (e.g., reengineering, quality circles, management by objectives) are sometimes frowned upon in academic circles because they are considered nothing more than popular fads. Due to their temporal shortcomings, they are deemed not worthy of serious study. On the other hand, the 'fuzzy' aspect of intellectual capital captures the curious interest of practitioners who are always on the prowl for finding solutions to difficult challenges. Hence, the popularity of this topic during its genesis has been sponsored by business practitioners. It is for this audience that the conceptualization of intellectual capital resonates most.

Academics wishing to study this phenomenon face tremendous challenges. A so-called 'hot topic' is just that. It has no legacy, no world-renowned researchers, and no publication trajectory to follow. This becomes a very risky proposition for developing a publication portfolio. The academic state of this field is in its embryonic stage. It is being pursued by those academics who have a very strong managerial focus and a strong appetite for a field devoid of shape or direction.

The study of the field of intellectual capital is akin to the pursuit of the 'elusive intangible'. Academics and practitioners alike recognize and appreciate the tacit nature of organizational knowledge. Furthermore, intellectual capital is typically conceptualized as a set of sub-phenomena. The real problem with intellectual capital lies in its measurement. Unfortunately, an invisible conceptualization – regardless of its underlying simplicity – becomes an abyss for the academic researcher. To make matters worse, intellectual capital

is conceptualized from numerous disciplines making the field a mosaic of perspectives. Accountants are interested in how to measure it on the balance sheet, information technologists want to codify it on systems, sociologists want to balance power with it, psychologists want to develop minds because of it, human resource managers want to calculate an ROI on it, and training and development officers want to make sure that they can build it. This field may be growing at a fantastic rate, but does anyone know where it is heading? Academics may want to ask their customers.

Students have spent decades learning how to manage scarce resources. The traditional economic model rests on the tenets of the scarcity assumption which states that supply and demand determine market price. As all introductory economic students have learned, if supply goes down, then price goes up (assuming demand is constant) However, knowledge as a resource does not comply with the scarcity assumption. The more knowledge is supplied (or shared) the more highly it is valued. Furthermore, when was the last time the demand for knowledge went down? In fact, scientific folklore in the early 1900s stated that all the information in the world doubled every 30 years. As the 1970s approached, that number was reduced to seven years. Prognosticators have pushed this notion further and state that by the year 2010 all the information in the world will double every 11 hours. Do we need a better reason to appreciate the importance of educating our management students within the intellectual capital framework?

Most, if not all premier business schools around the world, continue or are planning to redesign their programs. A quick scan through most course outlines yields a standard offering of functional courses with integrative modules using a variety of pedagogical techniques. One of the key issues that is being addressed is how to reflect in the classroom the onslaught of new initiatives such as intellectual capital, organizational learning, knowledge management and other 'knowledge era' initiatives. Professors continue to publish new texts to help fill the void in this new burgeoning market of course redesign. In the USA, "discussions with colleagues around the country led [professors] to conclude that [they] were not the only ones struggling to find an appropriate text for teaching the business strategy course" Besanko, Dranove and Shanley [3]. Similarly in Canada, "the primary stimulus for [revising] the book was [the program's] ongoing need for new material" Beamish and Woodcock [4]. Business schools that can tap into the need for managerial training that is reflective of the knowledge era will be well positioned to ride the current wave of intellectual capital interest as well.

2 Intellectual Capital is an Organizational Resource

It seems that every month a new management technique emerges which CEOs, hungry for new ways to improve the performance of their business, readily devour. Companies are rightsizing, downsizing, and reengineering. They are promoting a culture of leaders and followers. They are striving to be 'learning organizations' and promoting team building and self-empowerment. The options are overwhelming. But all these techniques have one thing in common; they are seeking to discover better ways of utilizing organizational resources.

In our present economy, more and more businesses are evolving whose value is not based on their tangible resources but on their intangible resources [5]. Tangible resources are those typically found on the balance sheet of a company such as cash, buildings, and

machinery. The other category comprises intangible resources: people and their expertise, business processes and market assets such as customer loyalty, repeat business, reputation, and so forth. The annual reports of companies like Skandia [6,7,8,9,10,11] are working towards a new balance sheet that makes more sense in today's marketplace. This new balance sheet highlights the difference between visible (explicit) accounting and invisible (implicit) accounting. Traditional annual reports have concentrated on reporting what can be explicitly calculated such as receivables, fixed assets and so forth. Skandia has made an effort to report on their invisible assets such as intellectual capital which provides the company with much of its market value-added. Examples of other organizations which are following Skandia's lead can be found in the service sector and any enterprise where businesses, such as software development start-ups, management consultants, high-technology ventures, life sciences and health care, media and entertainment and law firms, rely primarily on people [12].

Although intangible assets may represent competitive advantage, organizations do not understand their nature and value [13]. Managers do not know the value of their own intellectual capital. They do not know if they have the people, resources or business processes in place to make a success of a new strategy. They do not understand what know-how, management potential or creativity they have access to with their employees. Because they are devoid of such information, they are rightsizing, downsizing and reengineering in a vacuum.

That organizations are operating in a vacuum is not surprising, as they do not have any methods or tools to use which would enable them to analyse their intellectual capital stocks and organizational learning flows. To that end, a methodology and valuation system is required which will enable managers to identify, document and value their knowledge management. This will enable them to make information-rich decisions when they are planning to invest in the protection of their various intellectual properties.

In this paper, the management of organizational knowledge encompasses two distinct but related phenomena: organizational learning flows and intellectual capital stocks. Knowledge stocks and flows are interrelated because organizations that have a higher capacity to absorb knowledge will also have a higher propensity to utilize and circulate it [14]. The question of whether or not organizations are efficient purveyors of knowledge [15] ignores the complex cognitive and behavioural changes that must occur before learning can take place. It is important to study how knowledge travels and changes in organizations [16].

As mentioned earlier, intellectual capital research has primarily evolved from the desires of practitioners such as Bassi and Van Buren [17]; Bontis [12]; Darling [18]; Edvinsson and Sullivan [19] and Saint-Onge [20]. Consequently, recent developments have come largely in the form of popular press articles in business magazines and national newspapers. The challenge for academics is to frame the phenomenon using extant theories in order to develop a more rigorous conceptualization. This paper coalesces many perspectives from numerous fields of study in an attempt to raise the understanding and importance of this phenomenon. The objective here is to conceptualize and frame the existing literature on intellectual capital as a foundation for further study.

Knowledge creation by business organizations has been virtually neglected in management studies even though Nonaka and Takeuchi [21] are convinced that this process has been the most important source of international competitiveness for some time. Even management guru Peter Drucker [22] heralds the arrival of a new economy, referred to as the 'knowledge society'. He claims that in this society, knowledge is not just

another resource alongside the traditional factors of production – labour, capital, and land – but the only meaningful resource today.

Until recently there has been little attempt to identify, and give structure to, the nature and role of intangible resources in the strategic management of a business. This is partly due to the fact that it is often very difficult for accountants and economists to allocate an orthodox valuation to intangibles as they rarely have an exchange value. In consequence, they usually lie outside the province of the commodity-based models of economics and accountancy [23]. Johnson and Kaplan state that:

“A company’s economic value is not merely the sum of the values of its tangible assets, whether measurable at historic cost, replacement cost, or current market value prices. It also includes the value of intangible assets: the stock of innovative products, the knowledge of flexible and high-quality production processes, employee talent, and morals, customer loyalty and product awareness, reliable suppliers, efficient distribution networks and the like. Reported earnings cannot show the company’s decline in value when it depletes its stock of intangible resources. Recent overemphasis on achieving superior long-term earnings performance is occurring just at the time when such performance has become a far less valid indicator of changes in the company’s long-term competitive position” [24].

Charles Handy [25] suggests that the intellectual assets of a corporation are usually three or four times tangible book value. He warns that no executive would leave his cash or factory space idle, yet if CEOs are asked how much of the knowledge in their companies is used, they typically say only about 20%. The importance of this topic is also reflected in the growth of the professional services industry and the many new knowledge-based firms that have fuelled our economy. Top MBA recruits no longer find as many positions in manufacturing companies as they did in the 1950s and ‘60s. Nowadays, the Career Services offices of many business schools report that most new graduates secure positions with management consultants, accounting firms, investment banks, law firms, software developers and information brokers. The common element found in each of these organizations is the abundance of intellectual capital.

To grasp the importance of why it is necessary to measure intellectual capital, we must understand the concept of ‘Tobin’s q ’ from the accounting and finance literature. This ratio measures the relationship between a company’s market value and its replacement value (i.e., the cost of replacing its assets) The ratio was developed by the Nobel Prize-winning economist James Tobin [26]. In the long run, this ratio will tend toward 1.00, but evidence shows that it can differ significantly from 1.00 for very long periods of time [27]. For example, companies in the software industry, where intellectual capital is abundant tend to have a Tobin’s q ratio of 7.00, whereas firms in the steel industry, noted for their large capital assets, have a Tobin’s q ratio of nearly 1.00.

Having discussed the importance of the intellectual capital field from multiple perspectives, we now turn to a review of the literature in order to understand the genesis of its conceptualization.

3 Review of the literature

Although the importance of knowledge can be traced back to the ancient Greeks, the first evidence of codification of knowledge may have its roots in scientific management. Frederick Taylor [28] attempted to formalize workers' experiences and tacit skills into objective rules and formulae. Barnard [29] extended scientific management by also considering 'behavioural knowledge' in management processes. As the two perspectives merged, a new synthesis of knowledge management was born that laid the foundation of organization theory. It was Simon [30] who was influenced by the development of the computer and cognitive science, that recognized the nature of decision making while performing administrative functions. Simon further recognized the limitations of human cognitive capacity and coined the term 'bounded rationality'. Whereas traditional inputs of capital are limited by physical space or monetary constraints, intellectual capital generation may be limited by the collective 'bounded rationality' of the organization.

Schumpeter [31] was primarily concerned with the process of change in the economy as a whole. He attributed the emergence of new products and processes to new 'recombinations' of knowledge. Taking this view further, it was not until Penrose [32] that the organization was considered as a 'knowledge repository'. She pointed out the importance of experience and knowledge accumulated within the firm. Evolutionary theorists Nelson and Winter [33] also viewed the firm as a repository of knowledge. According to Nelson and Winter, knowledge is stored as regular and predictable behavioural patterns or 'routines'.

Today, the nature and performance consequences of the strategies used by organizations to develop, maintain and exploit knowledge for innovation, constitute an important topic in the field of business strategy, but one that has received inadequate treatment in the extant literature [34]. Orthodox economics side-steps the topic completely by assuming that all firms may choose from a set of universally accessible 'production functions' which completely determine production cost structures and therefore do not lead to any knowledge-based performance differences [35,36]. The industrial organization literature on learning by doing is a partial exception (see [37]).

Partly in response to this shortcoming, a number of theories have developed during the past several decades in the field of strategy. Organizational economics and organization theory hold that firm-level differences in knowledge do exist and, moreover, that these differences play a large role in determining economic performance. These approaches include mainstream strategy [38,39], the resource-based view of the firm [32,40,36,41,42,43,44,23], evolutionary theory [33,45] and core competencies [46].

Economic analysis of competitive advantage focuses on how industry structure determines the profitability of firms in an industry. However, firm differences, not industry differences, are thought by many to be at the heart of strategic analysis [35,47]. Furthermore, while most formal economic tools are used to determine optimal product-market activities, the traditional concept of strategy is phrased in terms of the resource position of the firm [48,41]. Generally speaking, the indifferent treatment of knowledge in the neoclassical economics tradition endures. Firms are assumed to have the same fixed knowledge as they are jockeyed around by the invisible hand of the market. This theoretical lens is deficient in describing the phenomenon of knowledge because of two important assumptions. Neoclassical economics assumes that all parties have perfect and complete information and that resources are completely mobile. These two assumptions are in conflict with the notion that individuals have limits to their cognitive abilities [49]

and that some forms of tacit knowledge are impossible to articulate [50]. This form of tacit knowledge that is embedded in the organization can be better explained by the evolutionary theory of the firm.

Polanyi's [50] tacit-explicit distinction was introduced into the literature by Nelson and Winter [33] in their evolutionary theory of the firm. At the crux of Nelson and Winter's evolutionary theory are *organizational routines* that allow firms the special context in which tacit and explicit knowledge interact:

Organizational routines are the organization's genetic material, some explicit in "bureaucratic rules, some implicit in the organization's culture. The interaction between the explicit and the tacit is evolutionary in that the choices made by individuals are selected in or out according to their utility in a specific historical and economic reality, and eventually embedded in organizational routines which then shape and constrain further individual choices" [37, p.134].

Although the evolutionary theory of the firm improves on the deficiencies of the neoclassical economic tradition, it still lacks the contextual implications of a changing business environment. It may be true that organizational knowledge is embedded in routines, but evolutionary theory does not describe persistence or change of routines over time. For example, if explicit rules have been codified at one point in time, one can argue that these routines may not be appropriate at some later point in time when environmental conditions have forced an alternative strategic orientation. Pushing this notion forward, it is argued that organizational routines represent a collection of embedded rules from different times representing different environmental contexts. This internal focus on the firm's rules and resources is the basis for the resource-based view of the firm.

The resource-based view of the firm has been developed in work by Wernerfelt [41], Barney [42], Teece [51] his colleagues Teece, Pisano, and Shuen [52] and Prahalad and Hamel [46], among others, largely as a reaction against the dominant competitive forces analysis of firm strategy. Other important anticipations of and contributions to this theory include Penrose [32] and Chandler [53,54]. The resource-based view of the firm suggests that a business enterprise is best viewed as a collection of sticky and difficult-to-imitate resources and capabilities [32,42,41]. Firm-specific resources can be physical, such as production techniques protected by patents or trade secrets, or intangible, such as brand equity or operating routines.

A confusing issue with the resource-based view begins with definitions [55]. There is an embarrassing profusion of riches in phrases such as *distinctive competence* [56], *strategic firm resources* [57], *invisible assets* [5], *strategic firm-specific assets* [44], *core competencies* [46], *corporate capabilities* [58] *dynamic capabilities* [52], *combinative capabilities* [59] and others just waiting to be published. Although some researchers claim differences in meanings, a few have simply found an opportunity to add their own two cents worth to a growing market of definitions. An alternative route to the nomenclature regurgitation would be to start with a general definition of resources as inputs and then to analyse the circumstances under which they are useful [55].

The resource-based view has other limitations. Given the emphasis on firm resources, it is argued that the only feasible unit of analysis for the resource-based view paradigm is the organization. However, past research has shown that this is somewhat limiting. Empirically, Schmalense [60] discovered that profit differences are attributable mostly to

industry effects, and firm effects are insignificant. Hansen and Wernerfelt [61] found that both industry and firm effects were significant and independent. Later, Kessides [62] discovered significant firm effects but these were dominated by industry effects. In sum, the resource-based view may have too much of an internal focus on the firm. Other researchers have taken the resource-based view further by emphasizing knowledge and learning as the critical resource. Thus, the knowledge-based view of the firm was created as an extension of the resource-based view.

Knowledge management theorists argue that knowledge is the pre-eminent resource of the firm, [63,64,65,66,67]. The knowledge-based view of the firm identifies the primary rationale for the firm as the creation and application of knowledge [68,39,69,64,21,70,63,71,72,73]. The knowledge-based view of the firm

“can yield insights beyond the production-function and resource-based theories of the firm by creating a new view of the firm as a dynamic, evolving, quasi-autonomous system of knowledge production and application” [63].

Viewing the firm as a knowledge system focuses the attention not on the allegedly given resources that the firm must use but, to use Penrose's [32] language, on the services rendered by a firm's resources.

Much of the literature on intellectual capital stems from an accounting and financial perspective. Many of these researchers are interested in answering the following two questions:

- 1 what is causing firms to be worth so much more than their book value? and
- 2 what specifically is in this intangible asset?

Stewart [74] defines intellectual capital as the intellectual material that has been formalized, captured, and leveraged to create wealth by producing a higher-valued asset. Following the work of Bontis [12,75,165], Roos, Roos, Dragonetti and Edvinsson [76], Stewart [1,2,74], Sveiby [77], Edvinsson and Malone [78], Saint-Onge [20], Sullivan and Edvinsson [79] as well as Edvinsson and Sullivan [19] among others, intellectual capital is defined as encompassing:

- 1 human capital;
- 2 structural capital; and
- 3 relational capital.

These sub-phenomena encompass the intelligence found in human beings, organizational routines and network relationships respectively. This field typically looks at organizational knowledge as a static asset in an organization – a so-called stock. This concerns many theorists who are also interested in the flow of knowledge. Furthermore, intellectual capital research does not cater to changes in cognition or behaviour of individuals which is necessary for learning and improvement. The field of organizational learning has an extensive history in dealing with these limitations.

Change is the only constant variable in business today Senge [80]. Kanter [81] notes that organizations attempt to develop structures and systems that are more responsive to change. The field of organizational learning has thrived in this context because managers believe that the more they learn about change and learning itself, the better they will be in

handling it and the better their firms will perform. However, Miller [82] describes the organizational learning literature as maddeningly abstract and vague. Managers have little experience with organizational learning concepts (EUI and IBM [83]. Veilleux [84] surveyed 186 Human Resource executives and found that although 98% of the respondents believed in the concept of organizational learning, only 52% responded that their organization had an average ability to learn. Since the seminal article by Cangelosi and Dill [85], organizational learning has been described at three different levels: individual, group and organization. While many organizational learning theorists have argued for the existence of learning at these levels, some researchers, especially academics in the field of international management, have extended the framework to include learning at the transorganizational level.

Individual learning is a prerequisite for organizational learning [86]. Individual level learning occurs simply by virtue of being human [87]. As Senge puts it, “organizations learn only through individuals who learn. Individual learning does not guarantee organizational learning but without it no organizational learning occurs” [80]. The notion here is that organizational knowledge resides in the minds of employees. Nonaka and Takeuchi also point out that individual level learning is the foundation:

“Knowledge is created only by individuals. An organization cannot create knowledge on its own without individuals. Organizational knowledge creation should be understood as a process that organizationally amplifies the knowledge created by individuals and crystallizes it at the group level through dialogue, discussion, experience sharing, or observation” [21].

For the most part, researchers generally agree that individual learning is a necessary precursor to learning at a higher level [88]. Some theorists support group level learning as an alternative to the limitations of individual learning. Group knowledge is not a mere gathering of individual knowledge. The knowledge of individual members needs to be shared and legitimized through integrating interactions and information technology before it becomes group knowledge [89]. Once organizational teams integrate their own respective learning, learning at the organizational level starts. This level of the IGO (individual-group-organizational) framework highlights the importance of the learning that resides in the organization’s systems, structures, procedures, routines, and so forth [90]. This level of organizational learning requires the conversion of individual and group learning into a systematic base of organizational intellectual capital [91]. Several other theorists concur that learning at the organizational level is an accepted component of learning in organizations [92,93,94,95,96,97,98,99].

Businesses are typically well versed in assessing and valuing tangible assets, such as buildings, machinery, cash and so forth, but such measures do not include the value of the workforce, their knowledge, the way they use computer systems and so on. In an information society, such intangible assets may represent significant competitive advantage. Itami [5] has argued that successful organizations recognize that most activities offer the potential either to enhance, or degrade, their key invisible assets, which they define as including reputation, know-how etc. These businesses expect to accumulate invisible assets, as well as conventional assets, as they complete each turn of the business cycle.

The traditional financial performance measures worked well for the industrial era, but they are out of step with the skills and competencies companies are trying to master today

[100]. Over the last fifteen years management accounting has been redefining itself to accommodate the vast changes that have taken place in the world economy. Management accounting researchers and practitioners alike have acknowledged that many of the ways in which organizations structure and implement their management planning and control systems lack relevance for the new economy. Quinn [101] argues that the new economy is a service-based economy where even manufacturers need to identify their core competencies as those 'services' which they offer that are valued-added and of a 'best-in-the-world' calibre.

Many organizations are still philosophically wedded to outmoded, inward looking management planning and control systems, that use wealth measures based on physical assets and evaluation of performance linked to these. Rather than an organization's physical assets, the new economy will require the valuation of an organization's total assets which includes its intellectual assets. Hence, to be relevant, organizations need to develop planning, control and performance measurement systems which account for (i.e., predict, measure and evaluate) these intellectual assets.

Kaplan and Norton [100] proposed using what they called a 'balanced scorecard' approach to performance measurement. One element of the balanced scorecard is an innovation and learning perspective which tries to assess the way in which the organization can continue to improve and create value. Vitale, *et al.* [102] and Vitale and Mavrinac [103] have also developed a model and a means of evaluating a performance evaluation system on the basis of the organization's strategy which they term 'a strategic performance evaluation' system. The strategic performance evaluation system is very much an outgrowth of Kaplan and Norton's balanced scorecard concept, but it moves beyond it by providing a more direct implementation focus. Although all of these authors acknowledge the importance of learning, none of them provides specific guidance on ways in which to measure and evaluate an organization's intellectual capital stocks or organizational learning flows. Thus, while their recommendations should help organizations to bring their management planning and control systems more in line with the reality of the new economy, they still overlook the significance of knowledge management as a critical success factor of the new economic entity and its key to long-run survival.

To understand the intellectual expertise imbedded in an organization requires organizational members to assess their core competencies; those areas where they can achieve or have achieved 'best-in-the-world' status [46,101]. The intellectual capital of an organization represents the wealth of ideas and ability to innovate which will determine the future of the organization. Why have management accountants and financial analysts avoided this area until recently? The most obvious answer is that intellectual capital is not only difficult to measure but also difficult to evaluate. In the past, accountants have assumed a position which either ignores the problems or writes them off as impossible to solve [104]. It is important to realize that intellectual capital is real and provides value. One need only look at the hackneyed example of Microsoft whose accounting book value is significantly less than its market value based on share price to see that there must be some explanation of this 'excess' market valuation. Arguably this 'excess' is the market valuation of the intellectual capital stocks and organizational learning flows of the company.

Another measurement tool that is finding increased usage among large corporations is Economic Value Added (EVA) [105]. In defining and refining EVA, Stewart [184,185] identified over 120 shortcomings in conventional GAAP accounting to measure real

economic income. However, McConville [106] and Ochsner [107] warn that although EVA makes useful adjustments for decision-making purposes, its exotic allure often leaves top executives with no clear instructions on its implementation. Accounting for such assets was also the aim of Human Resource Accounting back in the 1960s.

As defined earlier, human capital represents the human factor in the organization; the combined intelligence, skills and expertise that gives the organization its distinctive character. The human elements of the organization are those that are capable of learning, changing, innovating and providing the creative thrust which if properly motivated can ensure the long-run survival of the organization. Since Hermanson's [186] classic study in 1964, the topic of how to and whether to value human assets has been debated by accountants and human resource theorists. Indeed, the arguments for and against Human Resource Accounting (HRA) are especially pertinent to the valuation of intellectual assets in the new economy since they involve essentially the same issues.

According to Sackmann, Flamholtz and Bullen [108] the objective of HRA is to "quantify the economic value of people to the organization" to provide input to management and financial decisions. Three types of HRA measurement models have been proposed by researchers:

- 1 COST MODELS, i.e., historical or acquisition cost [109], replacement cost [110] and opportunity cost [111];
- 2 HUMAN RESOURCE VALUE MODELS, i.e., a non-monetary behavioural emphasis model [112] combined non-monetary behavioural and monetary economic value models [113,114]; and
- 3 MONETARY EMPHASIS, i.e., discounted earnings or wages approach [115,116].

Sackmann, Flamholtz and Bullen [108] discuss these models extensively and also summarize the numerous attempts to apply the models in various types of organizations. While none of the experiments in HRA have been long-run successes, it is interesting to note that the majority of systems developed were in service organizations (i.e., CPA firms, banks, insurance and financial services firms) where human capital comprises a significant proportion of organizational value.

HRA has always had its critics. All of the models suffer from subjectivity and uncertainty and lack reliability in that they cannot be audited with any assurance. Both of these are measurement problems. Other criticisms of HRA include whether it is morally acceptable to treat people as assets and whether such measures are too easily manipulated. Although these arguments are salient comments on HRA, they beg the question of whether human assets in organizations do have value. As was said earlier, if intellectual capital does not exist in organizations then why does stock price react to changes in management? Obviously, investors and financial markets attach value to the skills and expertise of CEOs and other top management. Investors value the people, their skills and their potential in such organizations. In fact, the criticisms of HRA arise largely from the fact that such valuations of intellectual capital are 'soft' measures rather than objective auditable numbers. The question thus arises: are auditable valuations of intellectual capital necessary in the conventional sense? The answer is being debated by such bodies as the FASB, CICA, SEC and IASC right now. We shall soon see where the accountants will lead us. In the meantime, we can continue with further development of intellectual capital's conceptualization.

4 Proposed conceptualization

Adopting Kogut and Zander's [59] perspective on higher-order organizing principles, a proposed conceptualization of intellectual capital is put forth (see Figure 1) Intellectual capital is a second order multi-dimensional construct. Its three sub-domains include:

- 1 HUMAN CAPITAL – the tacit knowledge embedded in the minds of the employees;
- 2 STRUCTURAL CAPITAL – the organizational routines of the business, and
- 3 RELATIONAL CAPITAL – the knowledge embedded in the relationships established with the outside environment [12,19].

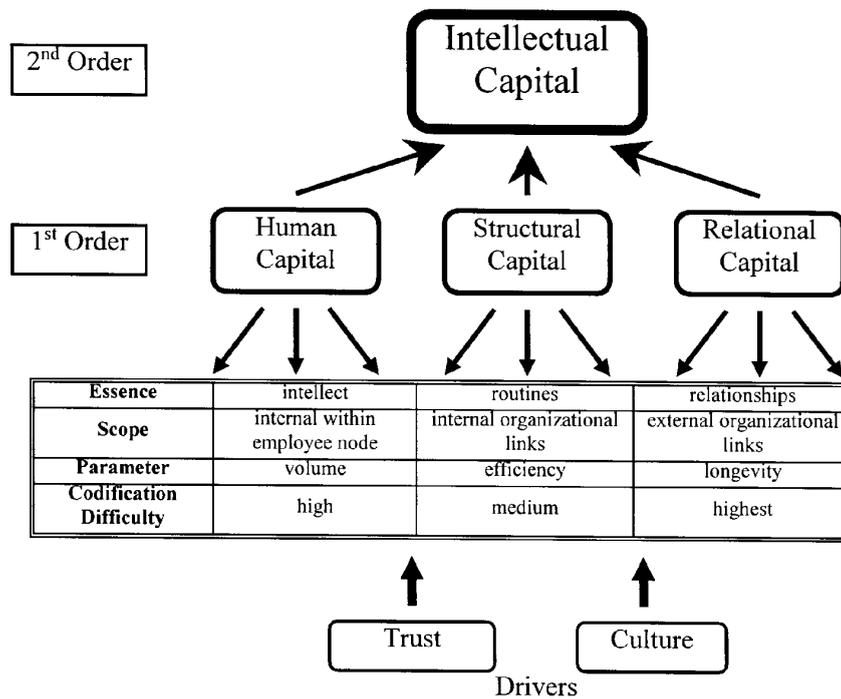
Organizational learning, as described by Chris Argyris at Harvard [117] among others, has been thought of as the flow of knowledge in a firm; it follows then that intellectual capital is the stock of knowledge in the firm. To marry the two concepts, it may be useful to consider intellectual capital as the stock unit of organizational learning. However, intellectual capital cannot necessarily be taught through education and training. The most precious knowledge in an organization often cannot be passed on [118].

Prior to continuing the conceptualization of intellectual capital stocks, it may be helpful to define *what it is not*. Intellectual capital does not include intellectual property. Intellectual property are assets that include copyrights, patents, semiconductor topography rights, and various design rights. They also include trade and service marks. Undertaking an intellectual property audit is not a new idea. However many organizations find that the results of an intellectual property audit are not particularly useful. After all, knowing that you own a patent is not a lot of use if that fact is not accompanied with information concerning its potential. This is evaluated from the various aspects that the patent can be viewed from including: return on investment; commercial potential; competitive advantage, and so on. It is important to note that intellectual property assets are usually considered from their legal perspective, which should mirror that '*raison d'être*'. A patent for its own sake has no point or value. Therefore, intellectual property and intellectual capital are considered mutually exclusive but the former can be considered an output of the latter.

The conceptualization of intellectual capital shall continue with an examination of the 'organizational knowledge' literature. Although theories differ in their terminology and the degree to which they explicitly discuss the attributes of organizational knowledge, they all concur that superior performance, including the procurement of economic profits, results at least in part from the exploitation of distinctive process knowledge that is not articulable and that can be acquired only through experience – in short, knowledge that is 'tacit' in nature [50,45]. Yet, in emphasizing the positive effects of tacit knowledge on economic performance, these theories suffer from a serious shortcoming as well. While they concede that tacit knowledge limits the ability of the organization to compete in a new industrial environment in which a substantially different knowledge base is required for competitive success, they fail to recognize that tacit knowledge also limits the ability of the organization to adapt to the changing competitive requirements of the existing industry within which it already operates.

The phenomenon of intellectual capital can be dissected into three sub-domains. Each will be described in the context of its essence, scope, parameter and codification difficulty (see Figure 1) Subsequent to that description, two drivers – 'trust' and 'culture' – will be evaluated for their impact on intellectual capital development.

Figure 1 Conceptualization of intellectual capital



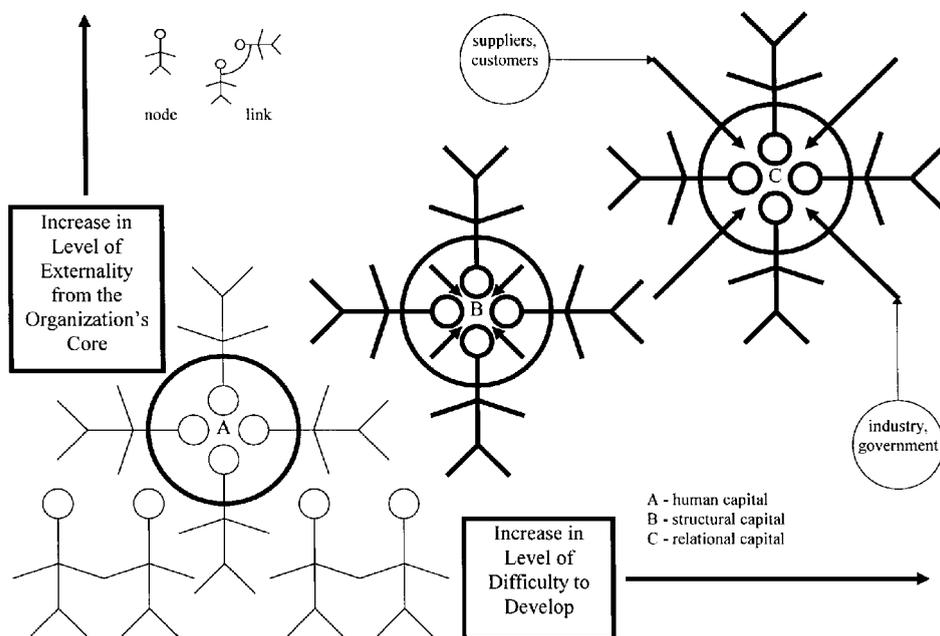
5 Human capital

First, the organization's members possess individual tacit knowledge (i.e., unarticulable skills necessary to perform their functions) [33]. In order to illustrate the degree to which tacit knowledge characterizes the human capital of an organization, it is useful to conceive of the organization as a productive process that receives tangible and informational inputs from the environment, produces tangible and informational outputs that enter the environment, and is characterized internally by a series of flows among a network of nodes and ties or links (see Figure 2).

A node represents the work performed – either pure decision-making, innovative creativity, improvisation [119] or some combination of the three – by a single member of the organization or by parallel, functionally equivalent members who do not interact with one another as part of the productive process (see Figure 2). Thus, individual tacit knowledge, when present, exists at the nodes themselves. A tie or link is directional in

nature and represents a flow of intermediate product or information from a given node. Every node has at least one tie or link originating from it, while multiple ties originating from a single node imply that the task performed at the node includes a decision about where to direct the subsequent flow. Structural tacit knowledge, when present, implies that no member of the organization has an explicit overview of these ties and consequently of the corresponding arrangement of nodes (see subsequent discussion on STRUCTURAL CAPITAL). Accordingly a productive process characterized by a substantial degree of tacit knowledge is arranged as a hodgepodge of nodes lacking any discernible organizational logic.

Figure 2 Discriminating intellectual capital sub-domains



Point A in Figure 2 represents the core of human capital. Multiple nodes (human capital units) attempt to align themselves in some form of recognizable pattern so that intellectual capital becomes more readily interpretable. This point represents the lowest level of difficulty for development as well as the lowest level of externality from the core of the organization.

Human capital has also been defined on an individual level as the combination of these four factors:

- 1 your genetic inheritance;
- 2 your education;
- 3 your experience; and
- 4 your attitudes about life and business [120]

Human capital is important because it is a source of innovation and strategic renewal, whether it is from brainstorming in a research lab, daydreaming at the office, throwing out old files, re-engineering new processes, improving personal skills or developing new leads in a sales rep's little black book. The essence of human capital is the sheer intelligence of the organizational member. The scope of human capital is limited to the knowledge node (i.e., internal to the mind of the employee). It can be measured (although it is difficult) as a function of volume (i.e., a third degree measure encompassing size, location and time). It is also the hardest of the three sub-domains of intellectual capital to codify.

Wright *et al.* [121] working from a resource-based perspective argue that in certain circumstances sustained competitive advantage can accrue from 'a pool of human capital' which is larger than those groups, such as senior managers and other elites, who are traditionally identified as determining organizational success or failure. This is achieved through the human capital adding value, being unique or rare, imperfectly imitable and not substitutable with another resource by competing firms. Storey supports this focus:

"This type of resource [human capital] can embody intangible assets such as unique configurations of complementary skills, and tacit knowledge, painstakingly accumulated, of customer wants and internal processes" [122].

6 Structural capital

The organization itself embodies structural tacit knowledge, which exists in

"the myriad of relationships that enable the organization to function in a coordinated way [but] are reasonably understood by [at most] the participants in the relationship and a few others ... ' This means that 'the organization is ... accomplishing its aims by following rules that are not known as such to most of the participants in the organization" Winter [45].

This construct deals with the mechanisms and structures of the organization that can help support employees in their quest for optimum intellectual performance and therefore overall business performance. An individual can have a high level of intellect, but if the organization has poor systems and procedures by which to track his or her actions, the overall intellectual capital will not reach its fullest potential.

An organization with strong structural capital will have a supportive culture that allows individuals to try things, to fail, to learn, and to try again. If the culture unduly penalizes failure, its success will be minimal. Structuring intellectual assets with information systems can turn individual know-how into group property [123]. It is the concept of structural capital that allows intellectual capital to be measured and developed in an organization. In effect, without structural capital, intellectual capital would just be human capital. This construct therefore contains elements of efficiency, transaction times, procedural innovativeness and access to information for codification into knowledge. It also supports elements of cost minimization and profit maximization per employee. Structural capital is the critical link that allows intellectual capital to be measured at an organizational level.

Point B in Figure 2 illustrates the structural ties or links of human capital nodes that are required to transform human capital into structural capital. The arrows within structural capital represent the focus of intellectual capital development from the nodes into the organization's core. The essence of structural capital is the knowledge embedded within the routines of an organization. Its scope lies internal to the firm but external to the human capital nodes. It can be measured (although it is difficult) as a function of efficiency (i.e., an output function per some temporal unit) Organizational processes (such as those found in structural capital) can eventually be codified.

Infrastructure assets are those technologies, methodologies and processes that enable the organization to function. Examples include methodologies for assessing risk, methods of managing a sales force, databases of information on the market or customers, communication systems such as email and teleconferencing systems. Basically, the elements that make up the way the organization works. Such elements are peculiar to each business, and their value to the organization can only be attained by survey within the target organization. Sadly the acquisition of infrastructure assets is frequently as a result of some crisis, positioning them as a necessary evil rather than the structure which makes the organization strong. Marketing the value of infrastructure assets to the individual within the organization is also important, in order to share with them the aspects where infrastructure protects, enhances and coordinates organizational resources.

Structural capital can be further differentiated between its technological component and architectural competencies. The technological component can be defined as the local abilities and knowledge (e.g., tacit knowledge, proprietary design rules, unique modes of working together) that are important to day-to-day technological problem solving. The architectural competencies can be defined as the ability of the firm to integrate the firm's component competencies together in new and flexible ways and to develop new competencies as they are required (e.g., communication channels, information filters and problem-solving strategies that develop between groups, control systems, cultural values, idiosyncratic search routines). Research focusing on the architectural or integrative capabilities of firms can offer "insights into the source of enduring differences in firm performance" [124] and highlights the importance of exploring the sources of structural capital.

7 Relational capital

Knowledge of market channels, customer and supplier relationships, as well as a sound understanding of governmental or industry association impacts, is the main theme of relational capital. Frustrated managers often do not recognize that they can tap into a wealth of knowledge from their own clients and suppliers. After all, understanding what customers want in a product or a service better than anyone else is what makes someone a business leader as opposed to a follower.

Relational capital represents the potential an organization has due to ex-firm intangibles. These intangibles include the knowledge embedded in customers, suppliers, the government or related industry associations. Point C in Figure 2 illustrates that relational capital is the most difficult of the three sub-domains to develop since it is the most external to the organization's core. The arrows represent the knowledge that must flow from external to the organization (i.e., its environment) into the organization's core by way of linked nodes. The essence of relational capital is knowledge embedded in

relationships external to the firm. Its scope lies external to the firm and external to the human capital nodes. It can be measured (although it is difficult) as a function of longevity (i.e., relational capital becomes more valuable as time goes on). Due to its external nature, knowledge embedded in relational capital is the most difficult to codify.

One manifestation of relational capital that can be leveraged from customers is often referred to as 'market orientation'. There is no consensus on a definition of market orientation, but two recent definitions have become widely accepted. The first is from Kohli and Jaworski [125], who define market orientation as the organization-wide generation of market intelligence pertaining to current and future needs of customers, dissemination of intelligence horizontally and vertically within the organization, and organization-wide action or responsiveness to market intelligence. Similar definitions are found in Deng and Dart [126] and Lichtenthal and Wilson [127]. The second is from Narver and Slater [128], who define market orientation as a one-dimension construct consisting of three behavioural components and two decision criteria – customer orientation, competitor orientation, interfunctional coordination, a long-term focus, and a profit objective. With close parallels to Kohli and Jaworski [125], Narver and Slater [128] include the generation and dissemination of market intelligence as well as managerial action. Hulland [129] posits that there exist two dimensions of organizational learning in the marketing context: market orientation (as discussed above) and market learning systems (which, in the context of this particular conceptualization of intellectual capital, will be considered as a function of structural capital).

Kogut and Zander [59] argue that what firms do better than markets is the sharing and transfer of knowledge embedded in the organizing principles of an organization. They have suggested that a firm's innovative capabilities "rest in the organizing principles by which relationships among individuals, within and between groups, and among organizations are structured" [59].

Teece [51] discussed the importance of inter-organizational and intra-organizational relationships and linkages to the development and profitable commercialization of new technology. He argued that as firms have moved from a serial product-delivery process (i.e., a sequential, lock step process through the value chain) to a parallel product-delivery process (i.e., simultaneous development throughout the various functions), the need for cooperative and coordinating capabilities have increased. Pennings and Harianto [130] also presented a theory of innovation which presumes that new technologies emerge from a firm's accumulated stock of skills (i.e., internal innovative capabilities) and their history of technological networking (i.e., external innovative capabilities). Relational capital builds on the intra-organizational relationships [51] and technological networking [130] that is available in the environment.

The organizing principles established in an innovative firm include rules by which work is coordinated and by which information is gathered and communicated. This social knowledge is not easily disseminated because it is embedded in the idiosyncratic firm-specific history and routines of the organization's entire system [131,132]. Companies need intelligence-gathering capabilities to keep up with technology development both inside and outside the industry. This includes not only formal processes and information systems but informal systems based on tacit understanding by employees and senior managers that they have a responsibility to the company to gather and disseminate technological information [133,134]. Effective communication between partners is essential in technology collaboration and can prove difficult to build [135]. However, once

established this communication channel serves as an important source of information about the other interdependent organization.

8 Trust and culture as intellectual capital drivers

As depicted in Figure 1, the conceptualization of intellectual capital includes two supporting drivers for sub-domain development. Trust is a very important [136] element of both inter- and intra-organizational cooperation. Although the importance of trust has always been evident and is widely articulated in the non-academic literature, it has only recently become a topic of major academic concern. Organizational group members need to have mutual confidence that tasks can be delegated (i.e., that others know what to do, are motivated to do it, and are competent to do it) and that monitoring can be fairly casual. The literature on external cooperative relationships suggests that choosing an external partner with complementary technologies and strategies and building a cooperative relationship based on trust and mutual respect can be problematic [135]. Trust, mutual respect, and compatible modes of behaviour cannot be decreed or even adequately specified as an abstract entity. That is why many firms typically begin a relationship by cooperating in less strategically central areas and build up a body of experience in working with a partner over a period of years [137]. Generally, all participants are seen to have an effect on the trust in a relationship [138].

As organizations become flatter, more geographically dispersed, and more prone to reorganization, traditional notions of control are being updated to reflect an increased need to trust individuals and groups to carry out critical organizational tasks without close and frequent supervision [139]. Trust is a belief Lazaric and Lorenz [140] related to likely outcomes, a belief that reflects an actor's cognitive representations of situational contingencies. Since researchers have tended to have difficulty separating antecedents and outcomes of trust [138], this dual role may also be salient in the context of intellectual capital.

Organizations that have a culture that supports and encourages cooperative innovation should attempt to understand what it is about their culture that gives them a competitive advantage and develop and nurture those cultural attributes [42]. Culture constitutes the beliefs, values, and attitudes pervasive in the organization and results in a language, symbols, and habits of behaviour and thought. Increasingly it is recognized as the conscious or unconscious product of the senior management's belief [23]. Barney discussed the potential for organizational culture to serve as a source of sustained competitive advantage. He concluded that:

“firms that do not have the required cultures cannot engage in activities that will modify their cultures and generate sustained superior performance because their modified cultures typically will be neither rare nor imperfectly imitable” [42].

The core of culture is formed by values Hofstede [141] In most organizations that have pursued formalized intellectual capital management initiatives, the common component that drives the program is value alignment. Hall [142] agrees and claims that values are the key to any successful organizational transformation because “values are basically a quality information system that when understood tell about what drives human beings and organizations and causes them to be exceptional”. Another important element of culture within the context of intellectual capital is the important distinction between

‘knowledge hoarding’ *versus* ‘knowledge sharing’. Unfortunately, this conflict is all too common in today’s organizations with the former outdoing the latter.

Belacso and Sayer [143] propose an ‘intellectual capitalism paradigm’ which charts a changing distribution of the power of the ‘tools of production’ from owners to managers and then to the ‘talents of the people’. They assert that the possessors of the intellectual tools of production – organizational employees (or nodes of human capital units) – will come to exercise effective power. Hedlund [144] proposes that a new organizational form called the ‘N-form corporation’ builds on the interplay of tacit knowledge transfer between different levels. This is done through a variety of ways including: temporary constellations of people; lateral communication; a catalytic role for top management, and heterarchical structures.

Agency theorists Jensen and Meckling [145], as well as Eisenhardt [146] have made large inroads in the study of principal-agent relationships. For example, in the context of compensation, agency theory posits that as the proportion of outcome-based compensation (i.e., commission *versus* salary) increases for the agent, so does the effective management of that relationship in that their goals are now more aligned. In other words, the principle can effectively limit the divergent behaviour of the agent if the latter’s compensation more closely matches that of the former. In the knowledge era, real power may lie in the human capital of an organization. If the nodes (employees of an organization) are the genesis of the intellectual capital in a firm, how will principles leverage off its effective utilization? This may, perhaps, become an exciting new research program for agency theorists in the future.

Recognizing that ‘power’ is an important – some might say the most important – dynamic in organizations, it is also concerned with reviewing how knowledge management and power relate and the extent to which maximizing the potential of intellectual capital requires a radical transformation in the generation and distribution of power in organizations.

An increasingly strong case is being made that as organizations respond to environmental turbulence, particularly increased world-wide competitive pressures, and swift technological and social change, they need to pay particular attention to the development and deployment of knowledge, and hence the learning needs of their employees at all levels [147–151].

For example, Kornbluh *et al.* [152] suggest that the pressure of international competition and the failure of the ‘technological solution’ in many enterprises has focused attention on the importance of learning in order to deal with both turbulent environments and the desire of many workers for more challenging jobs. Meyer-Dohm [153] points to the inherent errors and risks in even the most automated technology-based work systems, requiring human intervention and the design of workplaces which permit the individual a higher degree of independence.

Argyris [154] appears to be clear on this issue that knowledgeable employees will reign supreme:

“Twenty-first century corporations will find it hard to survive, let alone flourish, unless they get better work from their employees... employees who’ve learned to take active responsibility for their own behaviour, develop and share first-rate information about their jobs and make good use of genuine empowerment to shape lasting solutions to fundamental problems”.

If these more empowering and involving managerial practices are indeed an imperative for organizational survival and growth, their implementation may lead to the employees concerned feeling more in control of their own work and lives. Being able to play a greater part in organizational decision making and development and being able to cope with increased delegation from people above them in the hierarchy may in fact be a consequence of the increased value of their intellectual capital to the organization. However, it is also possible to hypothesize the existence of counter-forces, especially the response of the dominant managerial coalition, which may resist this power redistribution and, consequently, block the utilization of the full potential of the organization's intellectual capital for innovation. Before investigating these counter-forces in more detail it is important to establish the potential links between intellectual capital and innovation.

The links between learning, innovation and organization survival have been developed by a number of writers (see for example, Bouwen and Fry [155]; Argyris, [117] and Senge [80]). Sadler [156] has highlighted the growth of knowledge- or talent-intensive industries, and the importance of the 'knowledge worker'. The potential of learning and knowledge as the basis of power has been recognized by, amongst others, French and Raven [157]; Zimmerman [158]; Thomas and Velthouse [159]; and Townley [160]. Hence it seems possible to posit a link between intellectual capital, innovation and power.

In his meta-analysis of the determinants of innovation at the organizational level Damanpour [161] reported a positive correlation between innovation and a number of variables that could be said to reflect intellectual capital and its usage, including specialization (i.e., providing a greater knowledge base), professionalization (i.e., increased boundary-spanning activity), technical knowledge resources, and external and internal communications. Centralization of decision-making authority was found to be negatively correlated as Damanpour predicted (based on the work of Thompson [162]) which suggests that a dispersion of power may be necessary for innovation. Damanpour's analysis also recognized the importance of managerial support for innovation, especially in terms of leadership and coordination. Furthermore, leadership in the form of a championing change agent has been reviewed as being an important antecedent to organizational learning [163].

Also of particular interest is the hypothesis by McGill *et al.* [147] that in order to innovate, organizations need to employ 'generative' rather than 'adaptive' learning practices which involve, amongst other things, a move from hierarchical position to knowledge as the dominant power base. There is an obvious need for further research to see if organizational success is related to truly empowering people and preparing and enabling them to become 'highly involved' in Eccles' terms [164].

Empirical research has shown that top executives in large US and Canadian businesses agree that new intellectual capital measures are required to help manage knowledge assets. Stivers *et al.* [187] surveyed 253 companies among the US Fortune 500 and Canadian Post 300 in their study of non-financial measure usage. Results showed that even though 63% of the sample felt that measuring innovation was important, only 14% were actually measuring it, and only 10% were actually using the measures for strategy development. Stivers and her colleagues argue that these results show a significant measurement-use gap. This may be more significant for measures of intellectual capital. To assist managers with this gap, Bontis *et al* [75] have developed a knowledge toolbox that helps practitioners differentiate between a variety of knowledge-based tools including intellectual capital, human resource accounting, economic value added, and the balanced scorecard.

Another empirical research study conducted in this field was a PhD dissertation by Bontis [188]. He used a psychometrically developed survey instrument to measure knowledge stocks and flows in 32 mutual fund companies. By surveying 15 respondents across three levels of management in each organization, Bontis found that knowledge stocks and flows were closely related to business performance. He concluded that although knowledge stocks had a positive association with business performance, the misalignment of knowledge stocks with knowledge flows acted as a detriment to the overall efficiency of the organization's learning system. This research shows the importance of integrating intellectual capital with research in the knowledge management and organizational learning domains.

9 Research to date

Intellectual capital research thus far has been primarily of the anecdotal variety. Most researchers have conducted case-based reviews of organizations who have established intellectual capital initiatives. Other researchers have documented the metrics that have been developed by Skandia and others. What the field needs at this point is a more concentrated focus on rigorous, metric development and quantitative evaluation.

Using survey data, Bontis [165] has already shown a very strong and positive relationship between Likert-type measures of intellectual capital and business performance in a pilot study. The explanatory power of the final specified model was highly significant and substantive ($R^2 = 56.0\%$, $p\text{-value} < 0.001$).

Several other researchers have also supplied evidence of a positive relationship between an organization's financial, as well as organizational performance, and its level of one of the sub-domains of intellectual capital: relational capital. As discussed previously, contained within the conceptualization of relational capital is market orientation. Narver and Slater find that market orientation and business performance (ROA) are strongly related [128]. Jaworski and Kohli [166] report on a study of 222 US business units suggesting that market orientation is an important determinant of performance, regardless of market turbulence, competitive intensity, and technological turbulence. Also Ruekert [167] reports a positive relationship between degree of market orientation and long run financial performance. In the UK, Greenley [168] observed that a group of companies with higher market orientation performed better (ROI) than a group with lower market orientation. Back in 1987, Lusch and Laczniak [169] investigated how a company's increased emphasis on an extended marketing concept, similar to market orientation, is positively associated with financial performance. Not directly related to business performance, but yet in line with intellectual capital, Atuahene-Gima [170] infers from an Australian sample that market orientation is an important contributor to new product success. Biemans and Harmsen [171] have also concluded on the basis of several other studies that having a market orientation in product development has proven to be a highly critical factor for new product success.

Recent trends in organizational structure have seen a move towards 'de-layering', 'lean production', making decisions 'closer to the customer', establishing 'semi-autonomous work-groups' and an emphasis on employee involvement and empowerment (see [172–175]). Again it seems reasonable to hypothesize that, other things being equal, the increased intellectual capital development and thus 'nodal' power generated by

environmental turbulence should be more evenly distributed throughout the organization in these 'leaner', 'flatter' structures.

9 Conclusion

Some critics have argued that intellectual capital is just another organizational fad that will last for three to five more years, and then managers will move on to the next attempt at finding the philosophical silver bullet. In a recent ASAP feature article Rutledge [176] blasts the intellectual capital field and emphatically claims that 'you are a fool if you buy into this'. He warns managers that if by chance they meet people with the word 'knowledge' or 'intellectual capital' on their business cards, they should walk quickly and quietly away. His argument centres around the fact that the driving force behind this field is stakeholders and not shareholders of companies and therefore social agendas, not performance, will drive business decisions. Although he is correct in touting the importance of the 'softer stuff' related to intellectual capital, he cannot argue against its mass appeal. Dozens upon dozens of conferences, workshops and seminars are being offered all over the world on how to measure and value intellectual capital each year. Practitioners are voting with their feet.

Although its popularity is not disputed, it is important to be sceptical when anyone claims that they have found the magical formula or calculation for intellectual capital. It will never be measured in the traditional dollar terms we know. At best, we will see a slow proliferation of customized metrics that will be disclosed in traditional financial statements as addendums. Metrics such as those used by Skandia and others in the financial services industry [177] will continue to be developed and analysed longitudinally. Bassi and Van Buren [17] note that even though the stock market is already providing handsome rewards to companies that successfully leverage their intellectual capital, few firms have formalized a measurement process. The significance and lack of progress on the issue are also clear from a recent survey of 431 organizations in the U.S. and Europe who ranked 'measuring the value and performance of knowledge assets' highest in importance more than any other issue except 'changing people's behaviour' 43 *versus* 54% respectively [178].

If it is a fad, when will it end? The immense proliferation of the Internet as an information-sharing vehicle supports the argument that knowledge management and the development of intellectual capital is most sustainable as an organizational goal [179]. As long as the economic forces embrace new knowledge-intensive industries, the field of intellectual capital will have an important place in the minds of academics and practitioners.

As with the human body's muscles, intellectual capital management may suffer from, 'if you don't use it, you lose it'. There is an increasing emphasis on survival of the fittest in international competitiveness. In order to stay alive, organizations must win the race [180]. Future research in this area may want to tap into comparisons of intellectual capital characteristics by personality type with the use of the Myers-Briggs Type Indicator [181]. Also, researchers could correlate intellectual capital metrics with cultural diversity and values [182,141].

Finally, all business leaders should be appreciative of the power intellectual capital can have on business performance. The study of intellectual capital stocks and their exponential growth due to organizational learning flows produces a tremendous amount of energy, energy that can take companies far beyond their current vision [183]. It requires

people to rethink their attitudes on this elusive intangible asset and to start recognizing that measuring and strategically managing intellectual capital may in fact become the most important managerial activity as we enter the third millennium.

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