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Investigating the current state and impact of the intellectual capital academic discipline

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Abstract

Purpose – The purpose of this paper is to: investigate the current state of intellectual capital (IC) as an academic discipline, and explore the impact of IC on the state of practice.

Design/methodology/approach – The most influential articles published in the *Journal of Intellectual Capital* were identified. Analysis of their cited and citing works was done.

Findings – The IC discipline: first, successfully disseminates its knowledge beyond the English-language world but ignores research published in languages other than English; second, has higher self-citation rates; third, uses books for the development of its theoretical foundation; fourth, successfully converts experiential knowledge into academic knowledge; fifth, exerts a limited yet potentially increasing practical impact; and sixth, is at the theoretical consolidation stage of pre-science and is progressing toward becoming a reference discipline. No anomalies in the development of the IC discipline were observed.

Practical implications – IC researchers should pay more attention to works published in non-English journals. Given the status of IC as a professional discipline, they should continue using non-peer reviewed sources to convert experiential knowledge into academic knowledge. They also need to promote their research far beyond the traditional IC domain.

Originality/value – To the best knowledge of the authors, this is the first empirical analysis of the IC discipline from the reference discipline perspective.

Keywords Intellectual capital, Sciences, Classification

Paper type Research paper

1. Introduction

Intellectual capital (IC) is a relatively young management discipline, albeit with a short yet glorious history (Sullivan, 2000; Pike *et al.*, 2006; Polo, 2007). It is based on the works of many visionaries who identified basic IC principles, ideas, and concepts, which facilitated the introduction and practical application of IC tools in the 1990s. Initially, IC was mostly driven by practitioners who not only launched various IC projects around the world, but also contributed to the establishment of the IC knowledge base by publishing books, writing academic articles, and speaking at academic events. In the beginning of the twenty-first century, IC was officially recognized as a scientific discipline within the management domain.

Every scientific discipline has two primary objectives. The first is to create the body of theoretical knowledge to explain various phenomena and document this knowledge

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in credible sources, such as peer-reviewed journals, books, and conference proceedings. The second purpose is to contribute to the state of practice, translate academic findings into actionable items, and improve the quality of life. Unfortunately, the latter objective is often overlooked because most academics only search for the recognition of their scholarly contribution among their academic peers (Blackmore and Kandiko, 2011). Nevertheless, the level of national economic wealth at least partially depends on the country's scientific output and research impact (Rousseau and Rousseau, 1998; King, 2004). It is for this reason the topic of national IC has attracted global attention (Bontis, 2004; Pawlowsky, 2011).

When a new discipline appears, it usually lacks a clear direction, exhibits disagreements within the research community (Kuhn, 1962), borrows knowledge from other academic fields (Wade *et al.*, 2006), and has limited practical impact. Sometimes, management concepts and research trends turn into scientific fads and quickly vanish. A scientific fad (Abrahamson, 2009), also referred to as a management fad or management fashion (Abrahamson, 1991; Abrahamson and Fairchild, 1999), emerges when a new line of research attracts the attention of the scientific community, becomes dominant, exhibits exponential growth of respective publications, but suddenly collapses because it fails to substantially inform theory and contribute to practice (Starbuck, 2009). Since its establishment, IC has enjoyed continuous, steady growth in the volume of academic publications (Serenko and Bontis, 2004; Grant, 2011). Whereas many studies documented the history of IC as an academic discipline and elaborated on its possible future development (Edvinsson, 2010, 2011, 2013), only a few empirically explored its current state, overall direction, and theoretical or practical impact.

Previously, Petty and Guthrie (2000) analyzed the research literature and identified the key stages of the progression of the IC discipline. Guthrie *et al.* (2012) extended this study to recognize research trends and draw attention to several gaps in IC research. Dumay and Garanina (2013) critically reviewed IC research and recommended IC scholars to break free from the dominating accounting paradigm. Rodríguez-Ruiz and Fernández-Menéndez (2009) analyzed the citation patterns of IC journal articles and concluded that IC is not a scientific fad; it is a collection of evolving ideas in search for its scientific paradigm. Serenko *et al.* (2009) conducted a scientometric analysis of the proceedings of the McMaster World Congress on the Management of Intellectual Capital and Innovation for the 1996-2008 period to describe several characteristics of IC development. More empirical research, however, is needed to further understand IC as an academic discipline. To ensure the progress of any scientific field, it is crucial to periodically pause and understand where we were, where we are, and where we want to be as a discipline (Holsapple, 2008; Hassan, 2011). This study attempts to fill that void.

The rest of this paper is structured as follows. The following section (i.e. Section 2) discusses the evolution of IC and proposes this study's research questions. Section 3 outlines the methodology, and Section 4 presents the results. The last section elaborates on the findings, offers several implications, identifies research limitations, and proposes avenues for future research.

2. IC as a field of science

2.1 IC origin

> Understanding the state of play is a logical first step in strategically orienting the [IC] discipline and establishing paths for future progress (Petty and Guthrie, 2000, p. 156).

The origin and development of the IC movement has been well documented in the contemporary literature (Sullivan, 2000; Marr, 2005; Polo, 2007). Similar to the field of knowledge management (KM) (Lambe, 2011), IC has deep historical roots dating to the beginning of the twentieth century or even earlier (Pike *et al.*, 2006). As early as the seventeenth century, Westerman (1768) observed that the Swedish shipping industry was lagging behind that of its major competitors and argued that the lack of professional knowledge was an underlying cause for this disparity. Paton (1922) defined intangible assets, such as goodwill, and emphasized the importance of tangible assets in the possession of employees. Schumpeter (1912/1934) pioneered the notion of resources bound to firms which are managed by entrepreneurs to adapt to a constantly changing external environment.

Penrose (1959) proposed a relationship between the knowledge of the firm's employees and the firm's ability to use internal resources to their full potential. She also used the term the stock of knowledge advocating that "external changes may also become part of a firm's 'stock of knowledge' and consequently they may change the significance of resources to the firm" (p. 80). Penrose also emphasized the transformation of a firm's knowledge into final products and services because "[…] many developments in technological knowledge become available to firms not simply as new knowledge, but physically embodied in the form of the capital equipment they buy" (p. 80). These ideas were later extended to describe a firm as a collection of resources and gave birth to the resource-based view of the firm (Wernerfelt, 1984), which in turn inspired the development of the knowledge-based view of the firm (Grant, 2002). Polanyi (1958) proposed a new form of knowledge, which he referred to as *tacit* dimension of knowledge by arguing that people know more than they can express in a verbal form. This concept paved the way for the introduction of the theory and practice of learning, which was applied by management and education researchers under the label of experiential and organizational learning (Argyris and Schon, 1978).

The term intellectual capital emphasizes a combination of intellect and capital to convey the importance of knowledge. Perhaps the earliest documented use of this term dates back to the nineteenth century when Senior (1836) mentioned IC as one of the key qualities of the laborer. Kronfeld and Rock (1958) hypothesized that a firm's IC, which is reflected in its price/earnings ratios, is the most important element in stock price appraisals. However, it is unknown whether the latter article had an impact on the development of the IC discipline since it has never been cited after its appearance[1]. Instead, it is likely that the term intellectual capital was popularized after Feiwel's (1975) publication entitled "The intellectual capital of Michal Kalecki."

At approximately the same time, Machlup (1962) presented the concept of the knowledge industry, measured its economic impact by using accounting principles, and introduced the terms stocks of knowledge, flows of knowledge, and brain worker. These ideas inspired many prominent management theorists, including Peter Drucker, who influenced the development of the contemporary organization, management education, and business research. Most importantly, Drucker envisioned the imminence of the knowledge economy and further popularized the notion of the knowledge worker (Drucker, 1969; Drucker, 1993). Tobin (1969) introduced the Tobin's q ratio that eventually gave birth to the IC perspective on the difference between market value and book value of the firm[2].

In the 1970s, human resource accounting researchers started exploring various IC issues, but their interest declined by the early 1980s because they viewed IC primarily

from the general accounting perspective. Currently, this line of research continues under the label of IC accounting (Broadbent and Guthrie, 2008; Guthrie *et al.*, 2012). At the same time, value-added statements emerged as a mechanism allowing organizations of various forms, including private corporations, government bodies, non-profit organizations, and unions, to officially report the overall value created by the activities of an organization and its employees (Hopwood *et al.*, 1994). However, the lack of standardization and common terminology caused uncertainty, confusion, misinterpretation, and possible abuse of value-added statements resulting in their eventual demise. Nevertheless, the impact of human resource accounting and value-added statements cannot be understated because they are considered one of the foundation stones of the contemporary IC movement (Bontis, 2001). As a result of the line of research discussed above, the *Journal of Human Resource Costing & Accounting*, which provides a link between costs and revenues related to human resources, was launched in 1996 (Guthrie and Murthy, 2009).

Despite a declining interest in IC issues among human resource accounting academics, the knowledge-intensive industries required a new form of reporting. In the late 1980s, the executives of Skandia, a Swedish financial services firm, initiated a search for a more holistic and balanced view of the IC possessed by the company (Edvinsson, 1997). In 1991, Skandia established the world's first official IC function managed by the director of IC. In 1994, the first internal document summarizing Skandia's IC was developed based on the "Skandia Navigator" framework, and in 1995 it was officially published under the title "Visualizing intellectual capital." Hundreds of companies around the world followed the lead (Bontis, 1996; Guthrie, 2001; de Pablos, 2005). During that same period, Nonaka and Takeuchi (1995) published their seminal book on the knowledge-creating company and introduced the concept of "ba" as a foundation for knowledge sharing. Edvinsson (2000) continued promoting IC concepts and applying them in practical settings. Other visionaries[3] also worked on the development of IC definitions, concepts, tools, and approaches. Sveiby (1987) formed the foundation for accounting practices for measuring intangible assets, Itami and Roehl (1987) emphasized the role of organizational "invisible assets" including customer base and technical know-how, Saint-Onge (1996) defined and popularized the term "customer capital," and Wiig (1997) differentiated between IC management and KM. Lev and Zarowin (1999) empirically demonstrated deterioration in the usefulness of traditional financial information and linked the value of intangibles to financial performance, and Stewart (1997) drew attention of the key business stakeholders to the value of intangible assets.

As a result of these, and many other revolutionary publications, mainstream academics realized the significance of identifying, measuring, and managing organizational IC from a strategic perspective (Bontis, 1999). Several annual academic conferences focussing of the various aspects of IC were launched, starting with the McMaster World Congress on the Management of IC and Innovation in 1996 (Serenko *et al.*, 2009). As the volume of research increased, the field's first scholarly journal, the *Journal of Intellectual Capital*, was founded in 2000. Four years later, more IC journals were published (i.e. *Intangible Capital*; *International Journal of Learning and Intellectual Capital*), and IC topics became commonplace in various management journals, including *Accounting Auditing and Accountability Journal*, *European Accounting Review*, and *Accounting, Organizations and Society*. At this point, IC has become a legitimate academic discipline.

At the same time, there are views that positing IC as an autonomous discipline is a challenging agenda. Instead, IC may be considered a perspective, which combines and leverages approaches from different (well established) disciplines. According to this categorization, IC ideas should become part of the body of knowledge of many business domains, and IC should not be regarded as an independent field of science. Similar arguments have been made with respect to the other new or niche management disciplines, for example, business ethics and business communication. For example, it was suggested that they publish a small number of journals, have limited presence in academic curricula, and are rarely materialized as stand-alone departments in business or management schools. However, a brief overview of disciplinary development of business ethics and business communication reveals that both of them exhibit signs of independent academic fields, despite their smaller size. In fact, business ethics and business communication offer a variety of university-level courses, deliver a large quantity of excellent research, possess unique disciplinary identity, have relevant academic and professional associations, and employ a multi-disciplinary perspective to solve real-world problems (Enderle, 1996; Reinsch, 1996; Graham, 2006; Cyphert, 2009 ; Rossouw, 2011). In a similar vein, IC also possesses all attributes of a new yet burgeoning academic discipline. It employs a multi-disciplinary perspective by borrowing and expanding ideas from a variety of academic domains, which represents a regular stage of disciplinary development. Thus, in this study, IC is considered an independent field of science.

2.2 State of IC research

> Since we argue that ICAR [Intellectual Capital Accounting Research] is a separate field with its own specific focus, it would be useful for academics and practitioners to be informed of the progress made [by the discipline] (Guthrie *et al.*, 2012, p. 70).

According to Kuhn (1962, 1977), each scientific discipline evolves by following a developmental life cycle. Initially, a discipline is considered pre-science because it is characterized by the lack of consensus, myriads of contradictory theories, conflicting inquiry methods, competing schools of thought, and different paradigms. A paradigm consists of four main components: "1) an exemplar, or piece of work that stands as a model for those who work within the paradigm; 2) an image of the subject matter; 3) theories; [and] 4) methods and instruments" (Ritzer, 1975, p. 157). The level of paradigm development of an academic discipline determines its degree of maturity (Cole, 1983; Pfeffer, 1993). Generally, a pre-science domain is disorganized, fragmented, and diverse. Proponents of each paradigm claim their own expertise and justify the validity of their research approaches. At the same time, despite their best intention and scholarly rigor, they solve problems from a unique perspective which is inconsistent with those of scientist advocating different paradigms. Eventually, agreement is reached and a dominant paradigm emerges. As a result, the discipline gravitates to the state of normal science. Discipline researchers follow the norms of the unifying paradigm and expand their knowledge base by solving practical and theoretical problems[4]. Normal science continues as long as there is consensus within the discipline. However, when a large number of anomalies are observed, which are difficult to explain by following the dominant view, the discipline experiences crisis, and the paradigm shift is required to reconcile contradictory evidence. After the dominant paradigm has been re-examined and adjusted, the field proceeds to the phase of new normal science.

As an academic discipline, IC was founded on the works of numerous visionaries who published independently of each other during the period from the 1950s to the mid-1980s (see Figure 1). This period may be classified as non-science because IC did not yet exist as a distinct field of science. Since the mid-1980s, IC started exhibiting signs of an academic discipline and entered the pre-science era of its historical evolution. The pre-science period of IC progression consists of two stages (Petty and Guthrie, 2000; Tan *et al.*, 2008; Guthrie *et al.*, 2012). During the first stage from the mid-1980s to the mid-1990s, IC researchers tried to systematically define the key concepts, formulate theories, and demonstrate the usefulness of applying IC principles in practical settings to achieve competitive advantage. The objective was to establish the discourse of IC as a field and communicate the value of IC to the key stakeholders. This period may be referred to as the value communication stage, and IC researchers successfully accomplished this mission (García-Ayuso, 2003; Neely *et al.*, 2003).

Since the late 1990s, IC has entered the second stage with the goal to gain external recognition as a distinct academic discipline, formulate further IC principles, empirically demonstrate the practical impact of IC on the state of theory and practice, and define the future development of the discipline. This period may be referred to as the theoretical consolidation stage (Andriessen, 2004a). However, during this stage most IC publications still lacked a solid theoretical foundation, employed inconsistent methodology, discussed issues at a highly abstract level, and lacked a dominant school of thought (Kaufmann and Schneider, 2004).

The evolution of IC as a scientific discipline may be described by looking at the methods of inquiry employed by its researchers (Marr and Chatzkel, 2004; Serenko *et al.*, 2009; Guthrie *et al.*, 2012; Dumay and Garanina, 2013). During the value communication stage, normative, theoretical, and commentary articles were very common. Mostly, non-empirical research was done to develop frameworks, models, approaches, principles, indices, metrics, and tools. As the discipline evolved to the theoretical consolidation phase, the focus has shifted to empirical studies supported

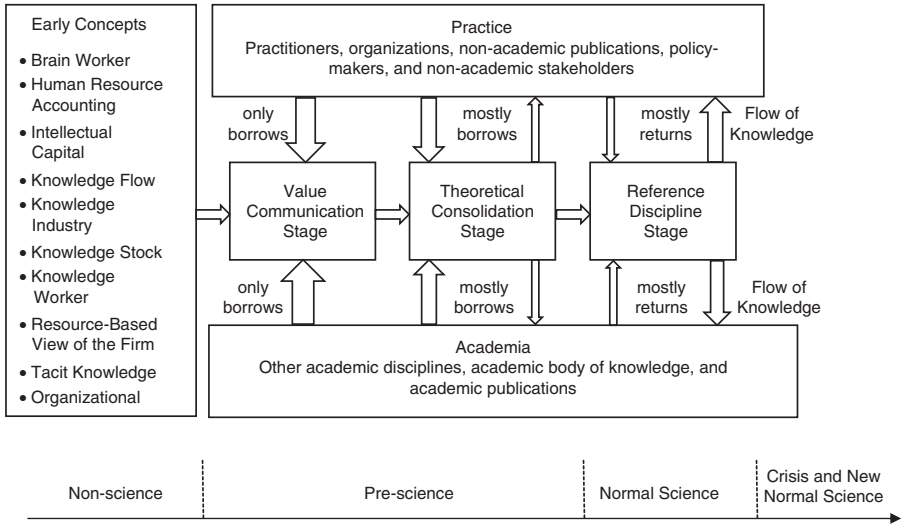

Figure 1.
Historical progression of the IC discipline

by conceptual foundations developed earlier. There was a noticeable increase in case studies, interviews, and the use of secondary data (i.e. empirical studies) and decline in conceptual papers. Instead of developing new frameworks, researchers concentrated on the application and validation of the existing theoretical base. A similar pattern has been observed throughout the consolidation phase of other disciplines (Yadav, 2010). Recently, attempts were made to introduce a common ontology for diverse IC research streams and provide conceptual semantics for modeling context-specific IC initiatives (Vlismas and Venieris, 2011). This indicates that IC has been progressing well toward academic maturity to become a legitimate, entrenched academic discipline.

When an academic discipline is considered normal science, it is characterized by internal consensus, single paradigm, and developed theoretical base. Most importantly, it should exhibit signs of a reference discipline[5]. A reference discipline is a well-established, recognized academic domain that provides theoretical and methodological foundation for other disciplines (Nambisan, 2003). Works published within the reference discipline are cited by other disciplines, which are referred to as receiving disciplines (Wade *et al.*, 2006). To become a reference discipline is the goal of most academic domains.

The notion of using works of previous researchers may be traced back to the seventeenth century when Isaac Newton viewed himself as "standing on the shoulders of the giants who have gone before" (Merton, 1993, p. 8). There are several arguments in favor of employing knowledge from reference disciplines (Goul *et al.*, 1992; Baskerville and Myers, 2002; Avison and Elliot, 2006; Truex *et al.*, 2006). First, the use of prior knowledge accelerates the research process. Second, the application of theories and methods that were previously validated in other disciplines helps scholars ensure the rigor of their own research and avoid documented mistakes. Third, a receiving discipline may combine knowledge from several reference disciplines simultaneously to further enrich its theoretical and methodological core. Fourth, a receiving discipline often attracts well-established scholars from other areas, which fosters inter-disciplinary collaboration.

Another equally important attribute of a reference discipline is its influence on the state of practice which goes far beyond its scholarly recognition and impact. Traditionally, universities and colleges have been considered knowledge dissemination institutions whose mission is not only to create but also to share academic findings beyond academic boundaries (Jagodinski, 2008). Specifically, practical relevance and the impact of academic research are important for management disciplines because their mandate is to focus on the needs of non-academic stakeholders, including practitioners, policy makers, and government officials (Gibbons *et al.*, 1994; Starkey and Madan, 2001). This issue received much attention within the context of business school research (Bennis and O'Toole, 2005). There are suggestions that management researchers should concentrate on topics of interest to non-academics (Benbasat and Zmud, 1999), collaborate with practitioners (Knights and Scarbrough, 2010), adjust their research objectives (Patriotta and Starkey, 2008), keep in mind measurable impacts, such as productivity outcomes and overall effectiveness (Jennex *et al.*, 2009), enrich practitioners' understanding of decision situations (Nicolai and Seidl, 2010), and ensure the success of various business initiatives in practical settings (Jennex and Olfman, 2005, 2006).

A number of studies have already explored the issue of practical relevance and the impact of the IC discipline (Dumay, 2009; Dumay and Roslender, 2013) and its closely related field of KM (Ferguson, 2005; Serenko *et al.*, 2011, 2012).

To ensure further establishment and long-term success of IC, it has to demonstrate the applicability of its scientific findings in practical settings and their impact on organizational performance (Andreeva and Kianto, 2012). In fact, Guthrie *et al.* (2012) argue that the third stage of IC development should be "characterized by research that takes a critical examination of IC in practice" (p. 76). Mouritsen (2006) calls for the development of the novel practical propositions of how IC actually works in organizations. Andriessen (2004b) suggests that IC research should be practiced as both an explanatory science (to describe, explain, and predict) and as a design science (to diagnose, design, and improve). Demartini and Paoloni (2013) demonstrate the fruitfulness of action research to identify a link between intangible assets and value creating capabilities of an organization. However, despite the constantly growing theoretical base of the IC discipline, there are arguments that its practical impact has been somewhat slow. For example, there are claims that IC reporting has not become a widely accepted organizational practice (Andrikopoulos, 2010) and academic IC terminology is rarely employed in practice (Eijkman, 2011).

There are two channels through which academic knowledge reaches practitioners: direct and indirect (Booker *et al.*, 2008, 2012). In terms of the direct channel, practitioners are expected to read academic publications, which mostly appear in peer-reviewed journals, and apply scientific findings to solve managerial problems. With respect to the indirect channel, academic knowledge is delivered to non-academic consumers through various intermediaries that summarize, aggregate, transform, and present academic findings in the format suitable for the non-academic audience. Examples of intermediaries are practitioner journals, trade magazines, e-mail newsgroups, publications of professionals associations, books, and textbooks. Whereas both channels are equally important, the indirect channel is the focus of the present study because its effectiveness is possible to observe by means of citation analysis.

Citation analysis is a useful tool to investigate the state, intellectual core, and impact of an academic discipline in order to understand whether it may be considered a reference discipline (Katerattanakul *et al.*, 2006; Wade *et al.*, 2006; Taneja *et al.*, 2009). Figure 2 offers a visual representation of a reference discipline with respect to the other disciplines and experiential knowledge. It shows that articles published in academic journals within Discipline "A" (i.e. a reference discipline) are cited in articles published in journals within Disciplines "B" and "C" (i.e. receiving disciplines). In addition, these articles are cited in non-academic works, such as practitioner journals, trade magazines, white papers, and newspapers, which are targeted at the non-academic audience. The assumption is that if the reference discipline's publications are cited in the professional literature, this discipline has made an impact on the state of practice.

At the value communication phase, a discipline is immature; it borrows ideas, concepts, and methods from the other disciplines and tries to theorize successful industry practices. At the consolidation stage, it not only borrows but also returns knowledge to the other disciplines and practice. During the reference discipline phase, it returns more knowledge than it borrows. There is evidence to suggest that the IC discipline has successfully completed the value communication phase of development and successfully entered the next, consolidation phase. The discipline development life cycle refers to these stages as pre-science. At the same time, it is unknown whether IC has reached the state of normal science and may be considered a reference discipline

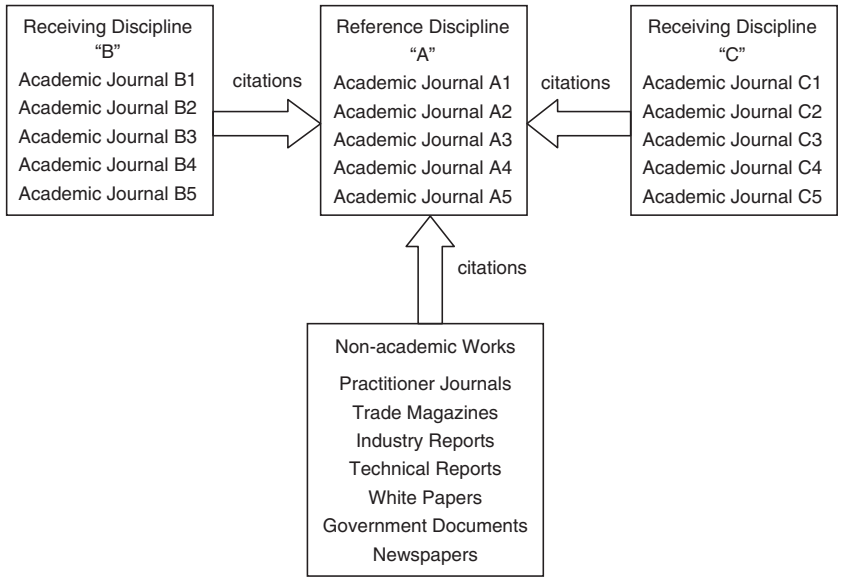

Figure 2.
Reference discipline

that infuses knowledge in other disciplines and influences the state of practice. Thus, the following research questions are proposed:

RQ1. What is the current state of IC as an academic discipline? Does it exhibit signs of a reference discipline?

RQ2. What is the practical impact of the IC academic discipline?

3. Methodology

In this study, a scientometric analysis of the most influential articles published the *Journal of Intellectual Capital* (*JIC*) was done. *JIC* was chosen for the following reasons. First, it is first IC-centric peer-reviewed journal that focusses on the various aspects of intellectual capital issues[6]. Second, *JIC* is a leading (i.e. A+) journal in the field of intellectual capital (Bontis and Serenko, 2009; Serenko and Bontis, 2009; Serenko and Bontis, 2013a). Third, it has a large subscription base. For example, in 2012 its articles were downloaded over 127,000 times[7]. Fourth, *JIC* is well cited. At the year of the study, the h-index of *JIC* was 3.5 and seven times as high as those of the *Journal of Human Resource Costing & Accounting* and *Intangible Capital*, respectively. As the journal name implies, it is the IC-centric journal which focusses on creating, identifying, and measuring intellectual capital in organizations. Therefore, the most influential articles published in *JIC* should reflect the state-of-the-art research within the discipline.

The field of scientometrics considers a set of the most influential articles published in a leading journal a valid sample that may be subjected to citation analysis (Larsen and Levine, 2008; van Zeebroeck *et al.*, 2008) because these are the most important, recognized and ground-breaking publications that determine the direction of the entire discipline and, possibly, other scholarly domains (Yadav, 2010). The most influential

articles are also a basic component of a paradigm and are accepted as a *de facto* standard of quality by those working within a paradigm (Ritzer, 1975). The use of a single outlet to explore the state of an academic discipline has also become a common approach in scientometric research (Palvia *et al.*, 2007; Bornmann *et al.*, 2012; Egghe, 2012; Rigby, 2013) because the findings obtained from one major, representative journal tend to relatively accurately describe the entire scientific domain (Dwivedi and Kuljis, 2008).

From *JIC*, all articles included in its h-index on May 1, 2011 were collected by means of the Harzing's Publish or Perish tool. The h-index states that a journal has index h if h of its Np articles have at least h citations each and the other ($Np - h$) articles have fewer than h citations each (Hirsch, 2005). Therefore, only well-cited articles are included in *JIC*'s h-index, and these are considered the most influential publications that ever appeared in this journal. Google Scholar was chosen as a source of citations because *JIC* was not covered by Thomson Reuters (previously known as Thomson Scientific, the Institute for Scientific Information (ISI)). In addition, Google Scholar is currently considered a leading tool in citation analysis because it provides a comprehensive coverage, indexes all categories of publications, and counts citations from non-peer reviewed works, such as practitioner magazines, government documents, and newspapers (Harzing and van der Wal, 2008).

The following approach was followed to collect and analyze the data:

(1) At the day of the study, *JIC* had the h-index of 40. All articles included in the h-index of *JIC* were downloaded.

(2) Because Google Scholar, as well as the other bibliometric indices, may contain errors (Rossner *et al.*, 2007; Elkins *et al.*, 2010), all downloaded articles were diligently reviewed and several minor adjustments to the h-index were made by eliminating duplicate citations, inconsistent entries, and occasional mistakes.

(3) A list of 3,328 citing (i.e. works that cited the examined *JIC* articles) and 1,442 cited (i.e. references in the examined *JIC* articles) works was created (for a comprehensive definition of citing and cited publications, refer to Taneja *et al.*, 2009).

(4) Language of each citing and cited work was identified and recorded.

(5) In all citing and cited works, the number of author self-citations; journal self-citations; and joint author and journal self-citations was counted.

(6) Categories of citing and cited works (e.g. peer-reviewed journal, peer-reviewed conference proceedings, book, practitioner journal/magazine, government document, etc.) were identified.

(7) The journal's field of research (e.g. accounting, finance, technology & innovation management, etc.) was identified for all citing and cited peer-reviewed journals. For this, the classification list of the Excellence in Research for Australia (ERA) initiative[8] was used.

(8) Topics of the citing and cited works were identified and recorded. For this, from the complete list of citing and cited works, all intellectual capital and IC management journals ranked by Bontis and Serenko (2009) were excluded because these are IC- and IC management-centric outlets. From the remaining

lists, 200 citing and 200 cited works were randomly chosen. Their abstract or full text were analyzed to identify whether the works that pertained to IC or IC management.

4. Results

In all, 80 percent of all citing works appeared in English language, followed by Chinese (7 percent), Portuguese (4 percent), and Spanish (3 percent). At the same time, 99 percent of all cited works were published in English (see Table I).

Table II outlines self-citation patterns. The rate of self-citations is somewhat high when the most influential *JIC* articles were cited in *JIC* (1 percent), and when the authors of the most influential *JIC* articles cited their own previous work (9 percent).

Table III presents categories of citing works. As expected, peer-reviewed articles constitute a major part of all citing sources. Theses, dissertations, and graduate or undergraduate research projects, which are considered indicators of the growth of a scientific discipline, occupy the second place (15 percent). They are followed by conference proceedings (12 percent) and non-peer reviewed works, such as working papers (8 percent) and practitioner journals/magazines (5 percent). A slightly different pattern was observed with respect to cited works (see Table IV). Peer-reviewed journals constitute only 37 percent, followed by books (32 percent), practitioner magazines (9 percent), conference proceedings (6 percent), and websites (5 percent). Overall, non-peer reviewed publications represent 34 and 53 percent of all citing and cited sources, respectively (see Table V).

Table I.
Language of citing and cited works

Language	Number	%
Citing works		
English	2,672	80.29
Chinese	247	7.42
Portuguese	145	4.36
Spanish	108	3.25
German	54	1.62
French	20	0.60
Italian	14	0.42
Russian	14	0.42
Other (Korean, Slovenian, Polish, Swedish, etc.)	54	1.62
Total	3,328	100.00
Cited works		
English	1,424	98.75
Other (German, Dutch, Swedish, etc.)	18	1.25
Total	1,442	100.00

Table II.
Self-citation behavior

	Citing works	Cited works
Author self-citations	185 (5.56%)	124 (8.60%)
Journal self-citations	350 (10.52%)	67 (4.65%)
Joint author and journal self-citations	37 (1.11%)	4 (0.28%)

Category	Number	%
Peer-reviewed journals	1,656	49.76
Theses, dissertations, graduate or undergraduate research projects	515	15.47
Peer-reviewed conference proceedings	383	11.51
Working papers	255	7.66
Practitioner journals/magazines	176	5.29
Book chapters	162	4.87
Books	139	4.18
Technical & business reports	29	0.87
Online multimedia (e.g. news broadcast, presentation, speech)	4	0.12
Case studies	3	0.09
Government documents	3	0.09
Dictionaries	1	0.03
Unpublished manuscripts	1	0.03
Websites	1	0.03
Total	3,328	100.00

Table III.
Categories of citing works

Category	Number	%
Peer-reviewed journals	537	37.24
Books	461	31.97
Practitioner journals/magazines	133	9.22
Peer-reviewed conference proceedings	90	6.24
Websites	73	5.06
Book chapters	49	3.40
Technical & business reports	44	3.05
Working papers	20	1.39
Government documents	15	1.04
Newspapers	13	0.90
Theses, dissertations, graduate or undergraduate research projects	4	0.28
Interviews	2	0.14
Personal communication	1	0.07
Total	1,442	100.00

Table IV.
Categories of cited works

Citing works	Peer-reviewed	66.14%
	Non-peer-reviewed	33.86%
Cited works	Peer-reviewed	46.88%
	Non-peer-reviewed	53.13%

Table V.
Summary of citing and cited works

Tables VI and VII present journal fields for citing and cited works. Table VIII shows topics of citing and cited peer-reviewed articles published in journals from non-IC or non-IC management disciplines.

The findings above were aggregated in a general framework that explicates the current state and practical impact of the IC discipline (see Figure 3).

5. Conclusions

The purpose of this study was to empirically investigate the current state and practical impact of the IC academic discipline. For this, the most influential articles included in

Journal's research field	Number of citations	% of citations
Intellectual Capital and Knowledge Management	718	43.36%
Accounting	223	13.47
General Management	202	12.20
Technology and Innovation Management	77	4.65
Human Resources, Organizational Behavior, Workspace Learning and Workspace Training	55	3.32
Operations Management and Management Science	50	3.02
Management Information Systems	42	2.54
Economics	36	2.17
Multidisciplinary	34	2.05
Tourism, Hospitality and Services Industry Management	32	1.93
Public Policy and Administration	29	1.75
Education	17	1.03
Engineering	16	0.97
Entrepreneurship	16	0.97
Library and Information Science	15	0.91
Artificial Intelligence	13	0.79
Sociology, Philosophy and History	13	0.79
Technology	10	0.60
Marketing	9	0.54
Finance	8	0.48
Business Ethics	7	0.42
International Business	7	0.42
Psychology	6	0.36
Communication and Media Studies	5	0.30
Computer Science, Computer Software and Computer Hardware	5	0.30
Agriculture	4	0.24
Health Care	4	0.24
Architecture	2	0.12
Business Strategy	1	0.06
Total	1,656	100.00

Table VI.
Journal fields for citing peer-reviewed journals

the h-index of *JIC* were subjected to several citation analysis techniques. A number of interesting findings were discovered that warrant further elaboration. The results are also compared with those reported by Serenko and Bontis (2013b) who investigated the current state and impact of the KM discipline. In their study, Serenko and Bontis (2013b) followed the same methodology as employed in the present investigation by analyzing a set of the most influential articles published in the *Journal of Knowledge Management* (*JKM*).

5.1 Implications and recommendations

Implication 1: The IC discipline successfully disseminates its knowledge beyond the English-speaking world, but it ignores research published in languages other than English.

In all, 20 percent of all works citing the most influential *JIC* articles were published in non-English languages. This encouraging fact reveals a world-wide recognition and impact of IC research. Most pioneering IC initiatives that gave birth to the discipline were launched in non-English speaking countries, such as Japan, Sweden, Denmark, and Austria. Moreover, empirical evidence suggests that many non-English speaking

Journal's research field	Number of citations	% of citations
Accounting	133	24.77
General Management	122	22.72
Intellectual Capital and Knowledge Management	80	14.90
Business Strategy	50	9.31
Technology and Innovation Management	35	6.52
Operations Management and Management Science	31	5.77
Marketing	27	5.03
Economics	15	2.79
Finance	12	2.23
Human Resources, Organizational Behavior, Workspace Learning and Workspace Training	7	1.30
Management Information Systems	7	1.30
Sociology, Philosophy and History	4	0.74
Engineering	3	0.56
Multidisciplinary	3	0.56
Business Ethics	2	0.37
International Business	2	0.37
Artificial Intelligence	1	0.19
Health Care	1	0.19
Psychology	1	0.19
Public Policy and Administration	1	0.19
Total	537	100.00

Table VII.
Journal fields for cited peer-reviewed journals

Topics of citing articles	IC and IC Management	80%
	Non-IC and IC Management	20%
Topics of cited articles	IC and IC Management	48%
	Non-IC and IC Management	52%

Table VIII.
Topics of citing and cited peer-reviewed journal articles (excluding IC and IC management journals)

countries generate a major proportion of IC publications (Serenko *et al.*, 2010; Curado *et al.*, 2011; Dwivedi *et al.*, 2011), which also appear in their native languages. Missing this body of knowledge may slow down the progress of the entire IC domain. In the KM discipline, researchers also ignore non-English language works. However, only 12 percent of works citing the most influential KM articles appeared in non-English languages (Serenko and Bontis, 2013b). This demonstrates that the IC discipline is relatively more successful at promoting its findings at the international research arena.

Implication 2: The rate of self-citations within IC is high, but it is unlikely to pose a threat to the health of the discipline.

Compared to the KM discipline, the rate of self-citations within IC is higher. In particular, 11 percent of all citations to the most influential *JIC* articles came from the subsequent *JIC* publications (vs 5 percent for *JKM*), and 9 percent of all cited works were author self-citations (vs 6 percent for *JKM*). This, however, is a discipline-specific phenomenon rather than an anomaly. First, compared to the KM discipline, the number of IC-centric and IC-relevant journals is much smaller. Therefore, IC researchers have fewer outlets available at their disposal. Second, the IC research community is also smaller with fewer works published. The authors of IC articles often develop their own

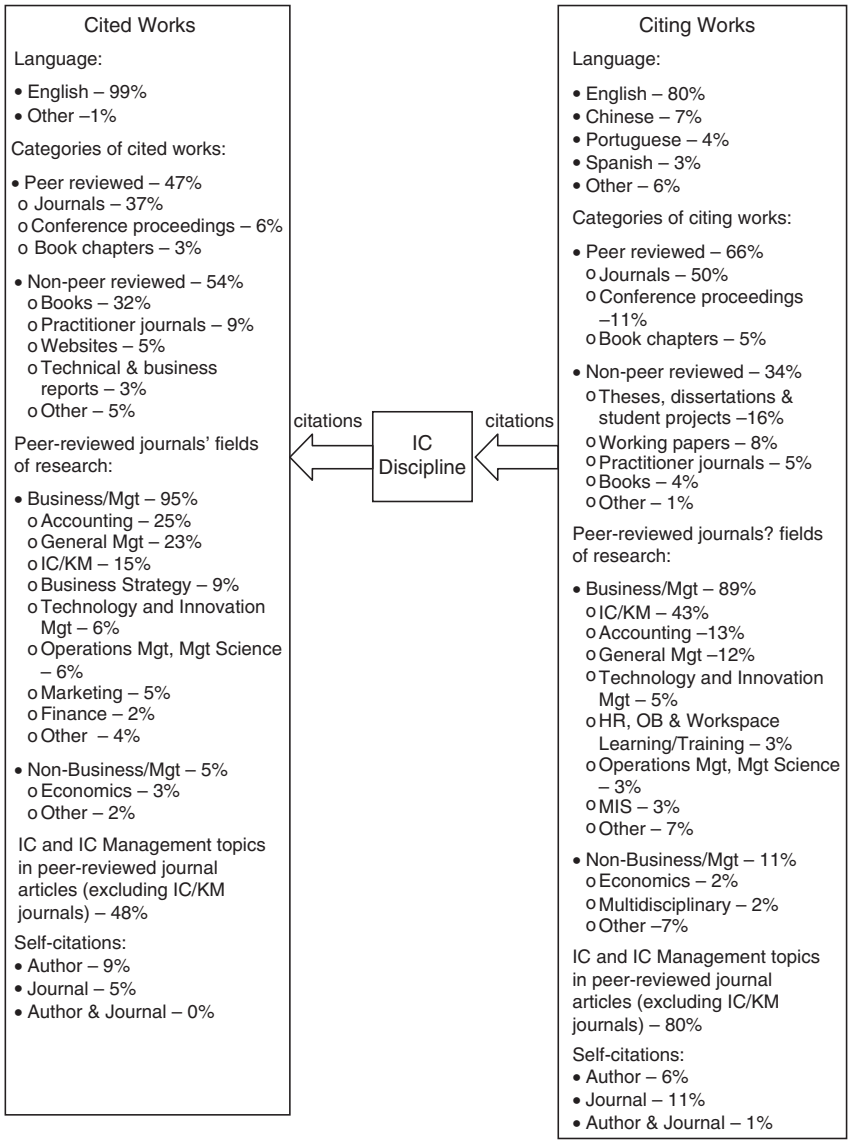

Figure 3.
The current state and impact of the IC discipline

lines of research and, as a result, cite their previous publications more often. It is expected that as more IC journals appear and more scholars join the IC discipline, the rate of self-citations will gradually decline. Third, the self-citation rate of 11 percent in *JIC* is still within an acceptable range, compared with a self-citation rate of over 40 percent in some journals, resulting from editorial abuse by means of forced citations, manipulations, and arbitrary paper acceptance decisions (Bjørn-Andersen and Sarker, 2009; Metze, 2010).

Implication 3: Books provide strong theoretical foundation for the development of the IC discipline.

Books constitute 32 percent of works cited by the most influential *JIC* publications. A similar phenomenon was also observed in the KM discipline that emphasizes the role of books as a source of knowledge, ideas and inspiration for the development of IC and KM theory. As discussed in the literature review section, many initial IC and KM ideas that determined the future of the discipline first appeared in books. In a similar vein, Serenko *et al.* (2012) empirically demonstrated that the major source of references in IC and KM books are other books. Moreover, the most frequently cited works in the history of IC and KM are the books by Nonaka and Takeuchi (1995) (entitled *The knowledge-creating company*) and Davenport and Prusak (1998) (entitled *Working knowledge*) (Croasdell *et al.*, 2003; Serenko and Bontis, 2004; Jennex and Croasdell, 2005; Timonen and Paloheimo, 2008; Ma and Yu, 2010).

Implication 4: The IC discipline converts experiential knowledge into academic knowledge.

The two types of knowledge observed in this study are academic and experiential knowledge. Academic knowledge is created in a formal research environment, acquired through school training, and documented in peer-reviewed publications. In contrast, experiential knowledge, also referred to as informal knowledge, is accumulated during direct interactions with the phenomenon, derived from prior experience, stored in the wisdom of practitioners, and documented in non-peer reviewed sources (March and Augier, 2007). It was found that non-peer reviewed works constitute 34 and 53 percent of citing and cited works, respectively. Particularly, professional journals, trade magazines, online information, and technical & business reports play an important role as a source of citations.

Overall, the IC discipline uses experiential knowledge as a key input for the development of academic knowledge. This finding is not surprising since the first stage of the evolution of the IC discipline (Figure 1) was driven by practitioners who engaged in scholarly research and inspired mainstream academics to join them in their endeavor. A similar phenomenon was observed in the KM domain.

Implication 5: The IC discipline has a limited, yet growing impact on the state of practice.

In this study, it was found that citations from the practitioner-oriented content, such as professional journals, trade magazines, business reports, online multimedia, case studies, and government documents constitute only a minor fraction of all citing works (i.e. 7 percent). The same number was observed for the KM discipline. On the one hand, this reveals a small impact of academic IC research on practice. On the other hand, this observation is encouraging. First, academic publications are mostly written for other academics; they contain jargon, formulas, definitions, and statistical methods to allow future researchers to duplicate or expand the study. Recall that the indirect knowledge dissemination approach assumes that the knowledge documented in peer-reviewed publications should be transformed into the format that may be easily digested by busy practitioners. This study reveals that at least some of the academic IC knowledge was delivered to industry professionals by means of the indirect knowledge distribution channel. Second, as the overall number of citations to IC papers is expected to increase, so should the overall number of citations from non-peer reviewed works. Therefore, the cumulative practical impact of academic IC research is also likely to grow.

Implication 6: The IC discipline is at the theoretical consolidation stage and is progressing toward becoming a reference discipline.

The IC discipline has successfully passed the value communication stage and entered the theoretical consolidation period, which may be characterized as

non-science. As a long-term goal, IC is expected to reach the state of normal science and become recognized as a reference discipline, which provides theoretical and methodological foundation for other disciplines and has relevance for practice. It was observed that non-IC and non-IC management articles published non-IC and non-IC management journals constitute 20 and 52 percent of all citing and cited works, respectively. The IC discipline borrows 2.6 times more knowledge from the other (i.e. non-IC and non-IC management) domains than infuses back. In terms of its progression, the IC discipline is slightly behind KM that has a corresponding ratio of 1.4. According to Table VII, IC researchers borrow knowledge from articles published in accounting, general management, strategy, technology and innovation management, operations management, marketing, economics, and finance journals. They combine knowledge from reference disciplines with experiential knowledge to further develop and validate IC concepts, theories, and empirical methods. At the same time, it is encouraging that 20 percent of all IC citations originate outside of the IC domain. Tables VI and show that IC concepts are used in non-IC articles appearing in accounting, general management, technology & innovation management, human resources, organizational behavior, operations management, management information systems, and economics journals. Thus, IC not only borrows but also injects knowledge into other disciplines.

IC research is also expected to expand in the future. Recall that 15 percent of all citing works came from theses, dissertations, and graduate or undergraduate research projects, which reflect future growth of a scientific field. Grant (2011) came to the same decision based on a bibliometric analysis of IC works in the ProQuest database. Overall, it is concluded that even though IC is not a reference discipline yet, it follows a regular developmental life cycle toward the state of normal science to become a reference discipline and generate relevant, practical research findings. This supports the observation of Rodríguez-Ruiz and Fernández-Menéndez (2009) who argue that IC is not a scientific fad; instead, it is a cluster of developing ideas in search of a unified paradigm.

5.2 Limitations and future research directions

No scientific endeavor is without limitations, and this study is not an exception. First, articles from only one academic journal were analyzed. Even though *JIC* is considered a premier academic journal in the field, there are other IC-relevant outlets, such as the *Journal of Human Resource Costing & Accounting* (Emerald), and *Intangible Capital* (Omnia Science), which also publish influential IC articles. Second, as a bibliometric approach, citation analysis has several limitations. For example, negative citations that critique cited work are still included in citation count. In some cases, citations to retracted articles still appear in bibliometric databases (Liu, 2007). The role of cited work also differs; whereas some works provide theoretical or methodological foundation for the study, others are used to merely beef-up the opening section or are cited to support trivial arguments. Moreover, in many cases the researcher's ideas may become widely accepted and used, yet the respective papers attract very few citations. For example, in 1921 Albert Einstein was awarded the Nobel Prize for his discovery of the law of the photoelectric effect. However, the paper documenting his findings has been cited at the rate of only seven citations per year (Metze, 2012). Third, other approaches exist to empirically investigate the state and impact of a scientific discipline. For instance, Pfeffer (1993) identified 14 indicators of the level of paradigm development that may be objectively measured. It is recommended that future researchers consider these issues in their study design.

This study empirically investigated the state and practical impact of IC as an academic discipline. It was concluded that IC is still at the theoretical consolidation stage and it has a limited impact on the state of practice. It, however, follows a regular path of disciplinary evolution with no apparent anomalies. Its volume of academic body of knowledge, theoretical influence, and practical contribution are expected to grow. The authors hope that the stakeholders of the IC discipline, such as researchers, journal editors, reviewers, granting agencies, students, and practitioners, will benefit from the findings presented above to further promote the healthy development of IC as a field of science.

Notes

1. A comprehensive search of Google Scholar was conducted on October 19, 2012. No articles citing Kronfeld and Rock (1958) were identified. However, the authors acknowledge that the absence of citations does not guarantee that this work has been ignored.
2. To the best knowledge of the authors, Tobin did not explicitly use the term intellectual capital in this work.
3. The authors are aware of many other pioneers of the IC movement and their contribution to the field. Unfortunately, the space allotted in this section does not allow mentioning them all.
4. Kuhn acknowledges that in some cases more than one paradigm may exist during normal science.
5. It is also possible yet unlikely that a scientific field exhibits signs of a reference discipline at the pre-science stage.
6. The *Journal of Human Resource Costing & Accounting* was launched before *JIC*. However, the coverage of the latter is more inclusive and comprehensive.
7. Personal communication with Rory Chase, *JIC* Editor.
8. For more information on the ERA initiative, see www.arc.gov.au/era/default.htm. In this study, the list as of March 2010 was used for analysis.

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