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A Longitudinal Look at Strategy, Intellectual Capital and Profit Pools

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ABSTRACT: Explores the link between the disparate fields of knowledge management, intellectual capital, competitive intelligence, and strategy. Using an existing profit pool study of the digital economy, looks at the key industry sectors involved and their revenue levels and profit margins. These data include results from both 2002 and 2010. The profit pool observations are then compared with additional data on intangible assets (knowledge and related assets) and competitive intelligence activity in each sector. Explores but generally dismisses the idea that sector revenue and/or profitability might be linked to high levels of intangibles. Similarly, demonstrates that the link between sector revenue and/or profitability and competitive intelligence activity may be generally weak (though pronounced in some specific high-growth circumstances). Alternatively, does provide some guidance for more in-depth study, identifying the knowledge strategies necessary for success across sectors as well as what competitive intelligence attitude may be needed to move from one sector into another.

KEYWORDS: Knowledge management, intellectual capital, competitive intelligence, profit pools, strategy

1. Knowledge Management and Intellectual Capital

With the advent of the "knowledge economy," practitioners and scholars have taken a new interest in the potential for strategically managing intangible assets. Study of the phenomena encompass a number of different fields, overlapping in both content and concepts. This paper builds on several different literatures in order to examine how a better understanding of intangibles can be combined with other strategic planning tools to achieve competitive advantage.

Intangible assets were typically connected to innovation studies early on, including Schumpeter's (1934) work on creative destruction, wherein the new ideas came from knowledge combination and subsequent learning. Evolutionary theory (Nelson & Winter 1982) brought innovation more squarely into the mainstream of economics, suggesting that skills, learning, and similar intangibles were the drivers of competitive advantage and economic growth. Similarly, the resource-based view of the firm (Wernerfelt 1984) sought sources of competitive advantage in unique resources employed by firms, including organizational knowledge or related intangibles. This perspective was further delineated by the knowledge-based view of the firm (Teece 1998; Grant 1996) and some came to consider intangible assets, as incorporated in personal knowledge or related concepts, as the only really differentiated, sustainable, defensible asset held by these organizations.

While early attention in this area focused on innovation and intellectual property, it soon became apparent to both scholars and practitioners that intangible assets might include more than such formalized mechanisms. As just noted, part of the field became focused on the more general concept of knowledge, the know-how, learning, and skills that enhance job performance but don't necessarily lead to formal patents, copyrights or such. Definitions congealed around Ackoff's (1989) DIKW hierarchy suggesting that intangibles progressed from raw data to information, then to knowledge and wisdom. "Intelligence" has often taken the place of wisdom in more contemporary applications. In knowledge management (KM), scholars have often focused on the lower three levels, specifically differentiating between data as observation, information as data in context, and knowledge as data subjected to experience and reflection (Zack 1999b). Classically, the field has explicitly and emphatically designated knowledge as being the only intangible of real value, data and information are only precursors.

The related discipline of intellectual capital (IC) has also gone in this direction, focusing on defining and measuring knowledge assets (Bontis 1999; Edvinsson & Malone 1997; Stewart 1997) though some of its methods, as we shall see, are likely to include a wider range of intangibles in the metrics. Regardless of measure, however, the field generally looks at human capital (individual knowledge), structural capital (organizational knowledge such as culture, routines), and relational capital (knowledge concerning and relationships with external publics, including customers). KM studies deal more with what to do with these knowledge assets, how to apply and grow them. As such, distinctions in the nature of the knowledge and the nature of the organization are important in that they can affect successful development of the intangibles. At the heart of the field is the distinction between tacit and explicit knowledge (Nonaka & Takeuchi 1996; Polanyi 1967) the former being personal and hard to express and the latter more expressable, codifiable, and sharable. Nonaka & Takeuchi went on to frame an approach to different types of exchanges (e.g. tacit to tacit) establishing the inclination in the field to recognize that singular aspects of knowledge called for distinct KM approaches (Choi & Lee 2003; Schulz & Jobe 2001; Boisot 1995). Consequently, both tacit (communities of practice, storytelling) and explicit tools (IT systems) exist for managing knowledge, adaptable to circumstance (Brown & Duguid 1991; Matson, Patiath & Shavers 2003; Thomas, Kellogg & Erickson 2001).

Other knowledge characteristics identified in the literature include complexity and stickiness/specificity ((McEvily & Chakravarthy 2002; Zander & Kogut 1995; Kogut & Zander 1992). Organizational characteristics can also make knowledge easier or harder to manage. These can include absorptive capacity (Cohen & Levinthal 1990), social capital (Nahapiet & Ghoshal 1998), and social networks (Liebowitz 2005). There are strong incentives to better manage knowledge, as it can lead to competitive advantage (Zack 1999a; Grant 1996). But as circumstances vary, there is also a distinct theme in the literature that the appropriate strategy needs to be discerned and employed. There is no one-size-fits-all solution to knowledge development and application.

2. Beyond Knowledge

A more strategic approach can lead in several other directions. Not only should knowledge management initiatives be appropriate to the circumstances, but as we widen our perspective to other intangibles, their presence and relative importance can be evaluated as

well. In some ways, this is a different approach for the knowledge asset community, both KM and IC scholars and practitioners. In other ways, there are indications of the fields already moving in these directions.

Various business disciplines have brought either intelligence, from one end of the DIKW hierarchy, or big data, from the other end, into the conversation. Intelligence can take a number of forms according to the vernacular, from business intelligence to marketing intelligence to competitive intelligence. Andreou, Green & Stankosky (2007), in an attempt to organize the various disciplines, created the List of Operational Knowledge Assets including the various intellectual capital designations and intelligence directions. In general, the disciplines moving from knowledge to intelligence suggest some additional level of insight or understanding. Knowledge, information and/or data subjected to analysis and applied to decision-making can be considered intelligence.

This perspective is perhaps best seen in the field of competitive intelligence (CI), the "intelligence" discipline with the longest practitioner history and most developed scholarship. CI concerns the practice of discerning, anticipating, and reacting to competitor strategies and tactics. This understanding comes from acquiring relevant data, information, and knowledge and applying specific analytical techniques resulting in actionable intelligence (Prescott & Miller 2001; Gilad & Herring 1996; Fuld 1994). Similar to KM and IC, competitive intelligence relies on intangible assets as inputs, though it scans a wider range than simply knowledge. It also improves as operators gain experience (Wright, Picton & Callow 2002; Raouch & Santi 2001). But CI can also differ from the knowledge approaches. High-level practice includes specialized analytical tools and applications (Fleisher & Bensoussan 2002; McGonagle & Vella 2002), drawing actionable insights rarely seen in KM. Intangible assets gathered for analysis are also more likely to be obtained from directed search rather than study of existing knowledge, filling designated information gaps. In this way, they are collected for a purpose, aimed at specific actions (Gilad 2003; Bernhardt 1993). KM can be actionable but is more often concerned with developing the knowledge base and then leveraging it through sharing.

The example of CI also points to the potential importance of intangible assets at the other end of the hierarchy. Intelligence disciplines tend to be not so dismissive of data and information inputs, noting that insights can come from anywhere. Indeed, at its base, most knowledge practitioners and scholars would probably agree that review of data and information can lead to new knowledge, that the former are precursors to higher level knowledge assets (and the even more advanced level of intelligence). The recent trend toward employing big data for business analytics and business intelligence both reinforces this view while also establishing the idea that data and information might have value in and of themselves, especially when we are talking about market valuations or capitalizations.

Big data, business analytics, and related terms all refer to the trend of organizations accumulating huge amounts of data, storing and processing them on increasingly inexpensive systems (often in the cloud), and mining them for insights (Beyer & Laney 2012; Laney 2001). As an extension of how we've thought of intangibles from a knowledge perspective, there are clear connections. Scholars have explicitly made the connection (Bose 2009; Jourdan, Rainer & Marshall 2008). Indeed, a case can be made that the field fits comfortably within the accepted wisdom of the KM/IC framework, with a structure running from data to explicit knowledge to tacit knowledge to the unknowable (Simard 2014; Kurtz & Snowden 2003) with the latter perhaps including the unique insights coming from intelligence or wisdom. In a number of ways, Ackoff's DIKW remains relevant even in this new context.

As alluded to earlier, this is the area where all the fields can come together. The established scholarship and practice found in KM and IC could be enhanced through more attention paid to pre-knowledge inputs such as data and information. Alternatively, there are concepts about the workability of intangible asset management systems (trust, motivation for use, etc.), particularly how humans interact with IT structures that are highly relevant to managing big data operations (Matson, Patiath & Shavers 2003; Thomas, Kellogg & Erickson 2001).

But we aim to take cross-discipline integration even further. The intersection of the knowledge and intelligence fields also begs the question of asset vulnerability, as valuable intangibles spread ever more widely throughout an organization and its extended network can be particularly subject to competitive intelligence efforts. KM, IC, intelligence, and now big data all call for ever increased sharing of valuable proprietary intangible assets throughout companies and even extended partner networks. This wider dispersion can raise vulnerability as competitors seeking these assets have more choice in targets (Liebeskind 1996). At its heart, this is a cost/benefit evaluation, the additional benefits from greater employment of

intangibles vs. the potential costs of losing the intangibles to competitive intelligence or economic espionage. The appropriate levels of intangibles development, protection, and counterintelligence are a matter of strategy, with individual firms evaluating their particular circumstances in their particular industry (Erickson & Rothberg 2012; Liebowitz 2006; Rothberg & Erickson 2005).

But the strategy connection can be pursued more fully. As decision-makers evaluate strategic opportunities, we believe that a deeper understanding of intangibles and the intangible asset standing of a firm can be an aid. In particular, in the strategy literature concerning innovation or growth opportunities across industry sectors, part of the question is the firm's "fit" with circumstances. If intangible assets really are the critical component of competitiveness, then understanding them, and their need in different industry sectors, may be key to correctly identifying strategic opportunities. When combined with tools such as Porter's (1979) Five Forces to assess sector attractiveness, a better understanding of intangibles could provide the explanation for why a sector is appropriate for entry by a specific firm (or not). Similarly, Christensen's (1997) innovator's dilemma posed the question of whether standard metrics such as market share were appropriate for judging success, let alone competitive capabilities. Where standard metrics may not be enough to help with decisions concerning strategic direction, a better understanding of intangibles, particularly knowledge and these related assets, may be the missing piece in the equation.

3. Conceptual Framework and Methodology

This paper combines data on knowledge assets, competitive intelligence, and industry sector attractiveness. We assess the data over time, trying to get some sense of the relationship between intangibles and related capabilities against industry sector success (and potential success in other sectors). In order to do so, we employ profit pool analysis, added to our own databases concerning knowledge asset levels and competitive intelligence activity. Profit pools describe revenue and profits within an industry, specifically in each sector along the industry value chain (Gadiesh & Gilbert 1998a). A profit pool map is sometimes constructed as a visual aid, contrasting horizontal revenue with vertical profit margin, yielding instant comparisons of the size and profitability of designated industry sectors (Gadiesh & Gilberg 1998b). More depth often comes from analysis of sector details such as segmentation and customer buying behaviour, product offerings, distribution channels and geographic options, particularly as similarities are seen across sectors that can be pursued as growth opportunities. Continued tracking of changes in the profit pool over time can add even more dynamism to the analysis.

Here, we use profit pools of the digital economy constructed by Booz consultants (Standridge & Pencavel 2011), showing conditions in both 2002 and 2010. The size and profitability of the industry sectors changes over time, as shown in the following table. This changes the attractiveness of the different sectors, creating new opportunities for cross-sector innovation and/or entry. Standridge & Pencavel note Apple's success, for example, in moving into downstream sectors with potentially higher margins than devices proper and offering higher margin services to go along with the devices it does offer. Similarly, competitors from Google to Microsoft to Amazon.com are all looking for new opportunities in sectors, potentially more profitable, where they haven't traditionally competed.

But sector attractiveness doesn't shed light on organizational capabilities for exploiting such new opportunities. How can a firm assess its own potential for innovation within or across sectors? How can it assess competitors' competencies? We believe the study of intangibles, especially intellectual capital, might lend some insight. If the firm knows what it knows, and it knows what competitors know, it may be better placed to predict, act, and counteract moves across industry sectors.

In this study, we combine our own databases of intellectual capital level and competitive intelligence activity (Erickson & Rothberg 2012) with the Standridge and Pencavel profit pool. In measuring IC, a variety of metrics are available (Tan, Plowman & Hancock 2007; Firer & Williams 2003) though only a few really make sense if evaluating a large number of firms (Sveiby 2010). Consequently, we employ a variation on Tobin's q (Tobin & Brainerd 1977). Tobin's q estimates intangibles by comparing the firm's value with its level of tangible assets, specifically market capitalization to replacement cost of assets. As the latter figure is often hard to obtain, market cap to book value is a commonly used variation. We often take it a step further and use market cap to asset value as well (which removes liabilities, for our purposes the ownership of the assets isn't usually material), though we have yet to see a consistent material difference between the two metrics in various comparisons. Tobin's q has the added advantage of implicitly containing all intangibles, from data and information to knowledge and intelligence.

Our data come from I/B/E/S and include all firms listed on North American exchanges, 2005-2009, with annual revenues over $1 billion. The end result is over 2,000 firms and over 7,000 entries organized by industry (SIC number). An earlier database, also included in this paper, covers over 500 firms from 1993-1996. We drew the market capitalization and asset levels from these databases. Competitive intelligence data is drawn from two different sources. The 2005-2009 period contains data from a benchmarking study conducted by Fuld & Company, a major CI consultancy. Over 1,000 CI practitioners from around the world answered self-reports on the maturity and proficiency of their operation. Then added up by industry and indexed, they provide us with evidence of the level of CI activity in a given industry. Similarly, data from the 1993-1996 group includes membership and activity reported from the then Society of Competitive Intelligence Professionals (SCIP) records. Arranged again by industry, the relative level of activity in each sector can be assessed. Note that the two CI metrics are not directly comparable.

4. Results and Discussion

Table 1 presents the more current data. The first two columns come from the profit pool constructed by Standridge and Pencavel. The latter three come from our database, constructed as detailed above. So the market cap columns show data retrieved from financial reports and the latter from the Fuld & Company database. The index employed for competitive intelligence combines self-reported proficiency with number of industry participants. The very high number for the software sector, for example, is indicative of multiple firms with CI operatives who report a high level of proficiency. For the intellectual capital/intangible asset columns, the global means for the entire database (thousands of observations) are reported for perspective.

Table 1: Digital Industries Profit Pool, Intellectual Capital, Competitive Intelligence 2010

Industry	**Revenue ($billions)**	**EBIT**	**Market Cap/Book (2005/2009)**	**Market Cap/Assets (2005/2009)**	**CI Index (2005/2009)**
Content providers	400	15%			
Broadcast			1.56	0.73	0
Print			2.53	0.74	2
Service providers	2400	20%			
Telecom			1.99	0.54	12
Wireless			3.90	1.02	16
Equipment providers	300	11%			
Networking			2.72	1.74	0
Storage			3.13	1.64	7
Software	150	33%	3.89	2.14	113
Net software and services	150	17%	3.48	2.08	19
Devices	900	8%			
Computer			4.48	1.58	22
Communication			2.73	1.56	17
Total	4300		2.68 (global mean)	1.02 (global mean)	

Table 2 includes similar information, but from the older databases. The first two columns of data again come from Standridge and Pencavel, this time their 2002 numbers. We pair that with our older database, from 1993 to 1996. This is obviously not an ideal match but does provide some basis for comparison between the older and newer data in the two tables. While our older data doesn't exactly match the S&P time period and is more limited than our more recent database (in terms of number of firms), it does again provide multiple years of observations, smoothing the data somewhat and muting the effect of one-time events that may skew the results of individual firms. What we end up with is a comparison of data from 2010 and preceding years to be compared with 2002 and preceding years, even if the gap is somewhat different. It still provides a basis for analysis of what

happens in a profit pool and its related intangible asset levels.

Table 2: Digital Profit Pool, Intellectual Capital and Competitive Intelligence, 2002

Industry	**Revenue ($billions)**	**EBIT**	**Market Cap/Assets (1993/1996)**	**CI Index (1993/1996)**
Content providers	500	12.5%		
Broadcast			0.94	0.91
Print			1.83	0.63
Service providers	2200	17.5%		
Telecom			1.79	3.23
Wireless			3.11	0.92
Equipment providers	200	3%	2.68	0.82
Networking				
Storage				
Software	100	25%	4.29	0.82
Net software and services	100	-2%	---	---
Devices	700	3%		
Computer			1.25	1.62
Communication			2.65	1.16
Total	3800		1.76 (global mean)	

Our initial thought in conducting this type of analysis was that more attractive industry sectors (higher margins, though perhaps also higher revenue) would show indications of higher levels of intellectual capital. Essentially, that more knowledge would be needed in high profit sectors. Similarly, we hypothesized that higher levels of competitive intelligence activity would also be found, as competition would be fiercer where high potential existed. In a previous study on healthcare, we noticed some connection with CI but not much evidence of a relationship with intellectual capital.

Here, the exploratory evidence is decidedly mixed. The very highest EBIT sectors show pretty high levels of intellectual capital, but the relationship is not exclusive. There are high IC ratios associated with some very low profit margins as well. In some ways, the details make some sense of the results with wireless, for example, showing high IC in the high margin Service Providers sector while traditional telecom does not—one would imagine that wireless is driving the profitability. Another likely explanation is that fast growing areas with high profit potential might also require heavy investment and/or debt. Either could drive down the IC rating, at least market cap/book. One can see some of the effects of such leverage in the relatively higher market/book vs. market/assets rating in 2010 in the wireless and print sectors.

One really interesting result is the virtually uniform increase in profitability across sectors during the profit pool analysis period. At the same time, cap/asset ratio has gone down everywhere except computer devices (and the previously non-existent internet category). Given the pattern, it seems much more likely that something appreciable has changed across all sectors (increased productivity, decreased labor, increased outsourcing, etc.) as opposed to any general insights about intangibles we might draw. The only real conclusion to be made is that software was and remains highly profitable while requiring substantial knowledge assets. At the same time, telecom seems a low-profit commodity with few and declining required knowledge assets, something seen to a lesser degree with content providers. Equipment providers are in the unattractive situation of requiring extensive knowledge assets but with relatively low (though now growing) profitability.

In terms of the competitive intelligence results, telecom and devices showed the highest level of CI activity in the early time period. These sectors remain relatively active, but have been eclipsed by software. While it was relatively docile in the mid-nineties, it is now way above other sectors and is, in fact, one of the absolutely busiest industries in our entire dataset. Net software and services have shown similar growth. This might be tied to the high levels of profitability seen in the sectors. As competitors noticed the margins to be had in these industries, it seems quite likely that they attracted increasing CI

investment and attention. The possibility of correlation between high margins and CI is more pronounced than that seen between margins and intangible assets.

There is certainly more to be studied in the general results, but our inclination now is that the more valuable insights may come from more in-depth studies of selected sectors. As we've found in other areas, the application of both KM and CI tend to be strategic. In some cases, it makes sense to invest in developing knowledge assets, in others not. It depends on the nature of the assets (tacit, explicit, human capital, relational capital, sticky, specific, etc.) and how effective and profitable KM techniques might be. Similarly, in some cases CI activity and/or protection make sense. Investment in an aggressive CI operation may make sense when circumstances are right (again, the nature of the knowledge or other variables such as product life cycle stage or position on the industry value chain). In others, it may make little sense. In some circumstances, substantial counterintelligence may be right, in others, it may be a waste of money. The answers will be found in deeper understandings of the nature of knowledge and CI in the industry sectors. Where is the valuable knowledge and what is its nature? How transferable might it be?

The answers to those questions will also bring us back then to profit pools. By understanding the knowledge development and competitive intelligence imperatives in different industry sectors, individual firms will have a better idea about whether their capabilities and competencies would help them in a different environment. If a highly profitable sector demands extensive explicit knowledge, big data, and an advanced KM system like software, for example, then a firm looking to come from a different sector without such tendencies (content?) might think twice or look to buy the required competencies as an entry method. Similarly, if the CI activity is fierce and focused on a particular type of knowledge or activity (again, software), then once again a firm with no experience with such competitive conditions (broadcast, networking equipment) might again give pause before entering. Finally, these metrics can provide deeper insight as the conditions change over time. When we see profitability and/or revenues change dramatically over time (as in net software and services), a fuller understanding of knowledge and CI details can provide interested firms with deeper insights as to the how, why, and what to do questions that naturally arise.

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