

# Toward a Deeper Understanding of Competitive Knowledge Assets

G. Scott Erickson<sup>1</sup> and Helen N. Rothberg<sup>2</sup>

<sup>1</sup>Ithaca College, Ithaca, USA

<sup>2</sup>Marist College, Poughkeepsie, USA

[gerickson@ithaca.edu](mailto:gerickson@ithaca.edu)

[hnrothberg@aol.com](mailto:hnrothberg@aol.com)

**Abstract:** Knowledge management (KM) is founded on an underlying assumption that better management of knowledge assets will lead to more competitive success, including better financial performance. Demonstrating that relationship has always been a core concern of the discipline. KM scholarship has demonstrated that differences exist in knowledge assets, requiring different approaches for successfully exploiting them. With the growth of use of other intangibles such as big data systems and business analytics/intelligence, the strategic choices have become even more complex. Everything from expensive information technology-based KM systems to communities of practice, from data monitoring to predictive analytics might be appropriate in a given scenario. Metrics have developed to assess these different competitive situations, giving us a general idea of the levels of data, explicit knowledge, tacit knowledge, and intelligence in any given industry. The methodology and results have been extensively covered in other work and so will not be repeated here. But this paper starts from those established quantitative metrics. Thus, we know that industries such as pharmaceuticals require competence in managing all intangibles. Others, such as financial services, seem to develop very little knowledge even though big data and intelligence levels are very high. Alternatively, branded consumer goods often have high levels of knowledge but little intelligence. We can speculate on where particularly high intangible asset development, specifically in which particular areas (e.g. operations, marketing relationships, R&D). What we don't have is empirical evidence to back up such speculation. If the key competitive requirement, leading to better financial performance, is highly developed knowledge in operations, can we provide some data to support that conclusion? This paper will explore some additional metrics (key personnel, brand equity, social media sentiment), seeking to add to our more specific explanations about how and where intangibles matter. The point is to develop some more precise, more objective metrics allowing a deeper look inside organizations. If so, we can gain a better understanding how intangible assets, especially knowledge, contribute to competitiveness.

**Keywords:** knowledge, big data, intangible assets, intelligence, social media, brand equity

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## 1. Introduction

In order to provide more guidance to practitioners concerning investment in and use of intangible assets, a more strategic perspective is necessary. Not all intangible assets are the same. Options range from data and information (including big data) to knowledge (explicit and tacit) to creative insights or intelligence. Not all are important in all circumstances. Further, industries and firm differ. As a result, where and how the intangible assets are employed as well as how effective they might be may also be quite different for different decision makers.

So how do we determine the right strategic intangibles approach for any given decision-maker? What kind of data might help guide the decisions? This paper explores those issues, starting with available empirical data on differences between industries in terms of intangible assets. But if those data are to be really helpful in making effective decisions in firms, we need more granular data on what is actually happening within the firm, across its competitors, and how and why better management of intangibles can confer effective competitive advantage. We can't get there from typical cross-firm metrics employed in knowledge management and related fields.

This paper uses an exploratory research design, qualitative and not statistically reliable, to review alternative measures with the potential to shed more light on firm-specific circumstances relative to an industry. As an exploratory study, we are looking for insight as opposed to formal hypothesis testing and the analysis necessarily requires some speculative, subjective assessment. But data are reported showing the possibilities of applying available metrics such as brand value, sentiment analysis, customer satisfaction, and others. As a result of experimentation with some alternative metrics, we will have a clearer roadmap for more rigorous future studies that might take a deeper look at strategic decision-making based on intangibles metrics.

The discussion revolves around the full range of intangible assets (data, information, knowledge, intelligence) and includes some definitions of the original and more current views of intangibles. When discussing knowledge and knowledge management, in particular, the terms knowledge assets and intellectual capital (IC) are used somewhat interchangeably. The authors recognize the differences between the fields of KM and IC but knowledge assets are at the foundation of both. Finally, the term intelligence is used for more creative, insightful revelations, stretching from innovation to competitive intelligence, from marketing to business intelligence. The key connector is the pursuit of new insights from given data, information, or knowledge, essentially the “eureka” moments even more personal and even harder to share than tacit knowledge.

## **2. Literature Review**

Research in knowledge management (KM) and intellectual capital is slowly making its way toward a more strategic perspective in terms of both level of decision-making and how to adapt solutions to unique conditions. Early work in KM did focus on the right tool in the right place, especially given Nonaka & Takeuchi’s (1995) emphasis on explicit vs. tacit knowledge and the SECI framework. Depending on the nature of the knowledge involved, KM solutions vary. Those designed to manage tacit knowledge generally apply person-to-person techniques such as communities of practice, mentoring, or storytelling (Brown & Duguid, 1991). Alternatively, for explicit knowledge management, more information technology (IT) approaches are applied (Matson, Patiath and Shavers, 2003).

Those perspectives still exist but have not necessarily transferred to decision-making at the highest levels and/or other strategic decisions based on circumstances. Not only knowledge but the wider range of intangible assets (data/information, insight/intelligence) has clarified that different industries, and different firms within industries, face disparate competitive realities (Rothberg and Erickson, 2017). In some cases, big data and explicit knowledge management capabilities are more important success drivers. In other cases, tacit knowledge management and/or generating innovative intelligence insights may be more vital. In some industries, all intangible assets are important. In others, spending heavily to develop any kind of intangible asset may not be worth the investment.

The wider view of intangibles is also not especially new, though the contemporary interest in big data and business analytics/intelligence has reframed and reinvigorated the discussion. Ackoff (1989) and others suggested a DIKW (data, information, knowledge, wisdom) hierarchy to explain the progressive differences running from raw data at one extreme to more creative, reflective wisdom at the other. The DIKW hierarchy predates KM but proved useful in early definitions of the field, with most knowledge asset scholars focusing on the knowledge part, for obvious reasons, but dismissing data and information as mere precursors while treating wisdom as another field entirely (more akin to innovation). More recent discussions on the nature of intangible assets have reformulated the structure, more visibly illustrating the importance of big data and business intelligence at the extremes while also starting to eliminate the assumption of a ranking. Knowledge is different from data but not necessarily better, it depends on the situation.

Kurtz & Snowden (2006) initiated this thread by identifying different scenarios with varying types of intangibles and varying applications. Specifically, the Cynefin sensemaking framework differentiates between the structure of the intangible asset and its transferability (either captured by the center and/or shared across the periphery of a network). When further defined, we have a more useful description of the range of intangibles used in modern business, ranging from data and information (big data) to explicit knowledge, then to tacit knowledge and eventually to intelligence/insight (Simard, 2014; Rothberg and Erickson, 2017). Such an approach makes clear the increasing degree of personalization, difficulty in sharing, and potential new creative insights possible as one moves across the range. Data/information is highly structured and easy to share through IT systems, explicit knowledge a bit less so. Tacit knowledge starts to get somewhat unstructured while intelligence insights may come from a process that an individual can’t even explain, making it very difficult to teach or share.

Consequently, when we look at the range of intangible assets available to an enterprise, the continuum now shows basic data/information, explicit knowledge, tacit knowledge, and intelligence. Individual firms may develop any or all of these intangibles, and they may be more or less effective in a given competitive situation. A strategic approach to developing competencies in any of these areas would involve looking at firm

capabilities and competitor capabilities to get a sense of where investments in developing big data, knowledge, or intelligence may make a difference.

And, as alluded to, previous research has established that industries do differ markedly in the importance of different types of intangibles found along this continuum (Erickson and Rothberg, 2017b). Metrics can be used to assess the intangibles, by industry. A substantial number of metrics exist for measuring knowledge holdings, ranging from firm-specific techniques such as the Balanced Scorecard to those that can be employed across multiple firms, such as Tobin's q (Sveiby, 2010). Big data use can also be estimated in a variety of ways, including by data holdings or IT spending. Specific purpose metrics can be added for harder to define intangibles such as intelligence. Put together, they provide a picture of the level of intangibles in industry sectors. And, again, a specific industry may show evidence of needing a lot of any single one of these intangible assets (data, knowledge, intelligence), all of them, none of them, or some unique combination.

In some industries, such as pharmaceuticals and software, all intangibles are high according to the metrics, and firms need to be able to manage the full range. Competitors have troves of big data and use them while also investing in new products and innovation. Firms must have similar capabilities in order to compete. In other industries, such as utilities and transportation, some big data may be present but other intangibles are not visible and presumably are less critical to competitiveness.

Other scenarios are more complex. Financial services industries, for example, are off the charts in terms of big data holdings, far higher than any other except some entertainment sectors. They also show some evidence of intelligence or creative insight activities but have virtually no knowledge according to standard metrics. Similarly puzzling but in a different way is the standing of companies with lots of knowledge and considerable big data but no evidence of any intelligence.

As the discussion around these results has moved into how to use them for strategic purposes, decision makers would obviously want deeper, more specific explanations about how and why the data are what they are. Looking at strategic moves across industry sectors in an area such as healthcare, for example, can we understand Amazon moving into pharmaceutical distribution, Walmart partnering with Humana and CVS buying Aetna? Are there complimentary intangibles allowing them to have competitive advantage in both sectors, in the both environments? Do the firms have experience with the kind of intangibles that a new venture might require? Or is there a greater chance of failure if the intangibles of the cooperative venture don't match up well?

Part of that question is answered by high-level intangible metrics. Retail sectors tend to have high explicit knowledge and some big data but not a lot of intelligence or even tacit knowledge. Insurers, on the other hand, have tons of big data and creative insights but not much knowledge. And healthcare providers are middling, at best, on all the intangible asset metrics. What are the implications for the strategic initiatives? There has to be some concern about the transference of competencies and how the different capabilities match up. Not all intangible assets are the same and not all contribute equally in different competitive circumstances. What CVS knows about retail, for example, may or may not help Aetna's insurance business.

But if we understood on an even deeper level, the answers might be clearer. For the retailers with high explicit knowledge and relatively high big data, for example, where is the knowledge found? Is it in logistics or operations? Is it in close customer relationships, high brand equity, and the substantial customer data generated by loyalty programs and other programs? If we could collect further metrics on where in the value chain the really valuable intangibles were found in select industries or firms, we could more confidently assess the match or mismatch of those intangibles with market opportunities. We could better predict the success of announced moves and, perhaps, even anticipate some initiatives including those by competitors or potential new competitors.

To begin to answer these types of questions, we need an empirical approach to assessing the nature and level of intangible assets in industries and firms. Broad metrics have already been applied to some of these issues, and this paper won't repeat all the details of that already published work. But in looking for deeper insights, it's helpful to briefly review what we know about measuring knowledge assets, specifically intellectual capital valuation approaches. As also noted earlier, much of the scholarly research has focused on individual firms, with specific aspects of knowledge measured by spending inputs or identifiable outputs. This is often

patterned on well-known approaches such as the Balanced Scorecard, the Skandia Navigator, or similar frameworks. These methodologies have also been adapted at the national and/or regional level, often using national accounts as specific input or output measures.

Sveiby (2010) collected published methodologies for evaluating intellectual capital, including 42 identifiable approaches. He organized these by whether they focused on micro measures (individuals or groups of individuals) or the entire organization vs. whether financial or non-financial metrics were applied. One important conclusion from his representation was that non-financial metrics hard to collect on entire organizations, let alone multiple ones, making cross-firm comparisons difficult, if not impossible to perform in that manner. If a sizable number of firms were evaluated, standardized financial reports are often required.

Similarly, Lev, et. al. (2016) evaluated metrics but focused more on the items to be measured and method than on what “systems” employing them might look like. These scholars broke the metrics down by whether measuring at a macro (national) or micro (firm) level. They then compared input, survey-based, or output measures. Again, an interesting conclusion is their preference for the output-based metric when trying to understand what is happening at multiple firms, specifically more financial-related data based on annual reporting.

As noted earlier, previous research (Erickson and Rothberg, 2012) has taken this approach, evaluating multiple firms in multiple industries by employing financial reports to identify knowledge assets or, more broadly, intangible assets. As also noted, this research, paired with other metrics on information/data and intelligence, has provided broad guidelines as to the nature of intangibles that are prevalent in particular industry sectors (Erickson and Rothberg, 2017b). From such results, we can form a better idea of the nature of intangibles required to compete in these sectors, as can corporate decision-makers. We can also identify intangibles that might not be important, arguing against heavy investment in developing those in given current circumstances.

The question for this paper is whether we can explore these intangibles in even more detail. If we know explicit knowledge is heavily employed in a certain industry sector, can we be more precise about its nature? Consider the Value Chain. Might the explicit knowledge be found in inbound or outbound logistics, leading to greater efficiency? Might the explicit knowledge be found in operations, enhancing quality, efficiency, or cost-effective flexibility? Might the explicit knowledge be found in customer relationships? Or in support activities such as technology development or infrastructure? Or even in all of the above? Similar questions could be asked about tacit knowledge as well as other intangible assets. In order to answer it, we need to consider some other metrics.

### **3. Expanded Metrics for Intangibles**

This paper is an exploratory study of what expanded metrics might be available for taking a deeper look at the nature of intangible assets in specific industries and firms. In order to uncover insights related to assessing a firm’s competitive standing, we examine what some other readily available metrics show concerning agreement with the broader intangible measures and what we know about the core competencies of some key firms. The results provide guidance in how we might conduct more rigorous studies using some of these metrics in the future.

Such specific metrics would not necessarily be available in financial reports. But once the broad conclusions about industry sectors have been determined from such reports, more precise measures can be applied within a sector or to a group of firms to help explain the broad conclusions. The standing of financial services (huge data, low knowledge) or branded consumer goods (above-average knowledge, limited intelligence), for example, are readily apparent but within that standing, deeper analysis can be conducted on individual investment banks or beverage producers. Although firm-specific analysis is routinely done by some organizations, such internal results don’t reflect relative position vs. competitors and may not be directly comparable even if such assessments were available. Such studies, common in the field, do not scale well to include multiple firms. The trick is to be able to compare firms across an industry and provide detail. Fortunately, other options do exist.

In expanding analysis beyond knowledge, for example, available information on data holdings per firm by industry are available and can provide a guide to where big data is present (Erickson and Rothberg, 2012,

Manyika, et. al., 2011). Similarly, evidence on competitive intelligence activities and capabilities can be obtained by firm and industry by monitoring information such as professional society memberships and/or surveys of participants in such roles (Erickson and Rothberg, 2012). So, as noted, it's entirely possible to apply cross-industry metrics to multiple firms, getting a sense of the level of big data, knowledge (explicit and tacit), and intelligence in each sector. Further, sector can be compared to sector by means of the same metrics. But what's going on within the sectors? When we note high or low levels of a particular intangible asset, where in the firm's/industry's competencies is that actually found?

In exploring these questions, it's probably most useful to start with the standard breakdown of intellectual capital (IC): human capital, structural capital, and relational capital. Within a firm, human capital is often evaluated in terms of education, hours of training, years of experience, and similar available metrics. In an age of digital media and individuals self-reporting on themselves and their interests, however, some of this information is more freely available outside the firm as well and therefore easier to collect on multiple competitors.

LinkedIn, for example, is readily searchable by firm, job title, and similar data points. On a surface level, changes in strategic direction or pursuit of particular human capital competencies can be spotted. Apple's move into self-driving cars, for example, was spotted years ago even though the company didn't acknowledge its interest in the sector. This was done chiefly through monitoring LinkedIn, specifically the hiring of hundreds of employees with direct experience in the automobile industry, including self-driving technologies. Deeper searches can pinpoint particular functions (R&D, operations, marketing) or even get into comparisons of education and years of experience, much like internal assessments do. Similar workplace digital media such as employer-rating site Glassdoor could also be of use, particularly in getting a sense of corporate cultures and job satisfaction. While Glassdoor is known for being skewed to extreme viewpoints, those biases would be similar or constant across any firms being compared and would not preclude the ability to identify inflection points or changes that might impact the competitive environment.

Such tools can be used to assess explicit knowledge available in firms, building more quantitative profiles of the human capital, including job functions and specific skills (e.g. number of R&D scientists employed). They could also be used to do a deeper dive into tacit knowledge capabilities on a more qualitative or person-to-person bases. Competitive intelligence consultants have long built executive profiles of C-suite officers of clients' competitor firms (Fleisher and Bensoussan, 2002). Traditional methods track education, experience, public appearances/presentations, and any other available inputs to create personas, attempting to fully understand key players in competitive organizations. With current digital media tools, assessing the human capital of key executives, R&D personnel, or any other position of interest is, again, fairly straightforward. Such a personal approach to evaluating tacit knowledge in firms could extend to spotting executive acquisitions. R&D talent can also be spotted through longstanding assessment techniques such as patent counts. Although not a perfect indicator, patent counts are a good proxy for the ability to innovate (and the tacit and/or explicit knowledge behind that ability).

Different approaches can be used to evaluate structural capital or relational capital. In some ways, these aspects of IC might be straightforward to identify. On the other hand, teasing out the differences between them (what is structural vs. what is relational?) may pose more of a challenge. Highly developed and documented processes and procedures, indicative of structural capital, should lead to more reliability, more efficiency, and better quality. Those outcomes should then create better customer relationships. And much of relational capital is directly about customer relationships (as well as relationships with other publics of the organization). So single indicators may provide insight into both types of knowledge asset, so further assessment may be necessary. In many practical situations, a formal distinction between structural and relational capital may not even be important, just knowing that operational processes are of high quality and that these delight customers may be enough for understanding competition in an industry. So while we may want to look for more precise techniques, but those readily available are worth some discussion.

Quality metrics are readily available and have been for quite some time. JD Power, for example, tracks quality by firm and by industry not only for automobiles but in a variety of sectors, including finance, technology and media, and retail. Similarly, the American Consumer Satisfaction Index (ACSI) offers years of data, again by firm and by industry for dozens of consumer industries and brands. High rankings for an individual firm,

relative to its competition, can be taken as an indicator of not only a high-quality customer experience (potentially due to structural capital) but also a strong brand (potentially due to relational capital).

Brand equity is also frequently assessed by a number of observers. Perhaps the best known is by market consultancy Interbrand though it is limited to the top 100 international brands (by value). Other options assess up to 500 firms. The importance of branding is that it can be used as a proxy for customer relationships and relational capital (again, at least the part related to customers). Other relationships can also add valuable relational capital, including with suppliers, vendors, regulators, research partners, etc.) and wouldn't necessarily be captured in the brand equity metric. But the customer relational capital certainly could. Valuable brands are constructed when repeated successful interactions with customers create an expectation of similar satisfactory transactions and increasing trust that expectations will be confirmed. Thus, at heart they are about the relationship that develops between organizations and their customers.

But the successful transactions leading to positive brand equity are also based on the organization delivering on the brand promise, going back to efficiency and quality in processes and procedures. So an element of structural capital is again present. Brand valuations are based on customer relationships but at the heart of those relationships are also effective product creation and delivery.

While the brand equity metrics are useful for brands/firms covered by the annual evaluations, they are limited to top brands. But another option is to explore digital media for brand insights, specifically sentiment analysis. A number of providers are available, probably the best known is Salesforce.com's Radian6, and its basic approach is to scrape the web for all mentions of a brand (or firm or even a specific product). This process can and should include not just social media platforms but also blogs, reviews, and, again, any other mention of a brand in a public forum. The results can be sorted by source, sentiment (positive/negative/neutral), influence (number of followers, shares, etc.), and so forth. From these real time results, firms can track how their brand image changes over time, including reactions to news or events.

In a study on relational capital, for example, the number of postings and sentiment levels were compared for several consumer goods or services providers (Erickson and Rothberg, 2017a). Market leaders not only had more "chatter" than trailing firms but also had more stable sentiment. Top firms had noticeably higher "neutral" sentiment results and less comments at the extremes. The positive/negative breakdown wasn't necessarily better for the larger firms but lower, so the variance of the sentiment was noticeably less—whatever the brand image might be, it tended to stick better over time. Given the magnitude of the results, hundreds of thousands of postings over a six-month period, sentiment analysis appears to provide robust metrics on how individual brands fare over time. As a result, we would consider this a very effective metric for relational capital. Additional applications to structural capital may also be possible, given the ability to mine the results for specific comments relating to product quality, reliability, and other such good/service delivery aspects.

In short, a variety of alternatives exist for more deeply exploring differences between companies in terms of their intangibles competencies. While financial or other cross-industry results can give us a broad reading on what intangibles are present or required in a given sector, more concentrated analysis can help determine the more specific nature of those intangibles. As noted above, questions about where in the value chain or what type of intellectual capital is held by the top performing firms can be approached with a variety of available metrics. Such analysis would not only help us understand some of the dynamics of competition in industry sectors but could be useful for strategic planning. Assessing the intangible competencies of ones' own firm vs. those of competitors, those required for success in current sectors, or those required in potential sectors could be valuable to top-level decision makers. Especially in a world where the walls between industry sectors are breaking down and unexpected competitors are entering segments, such an aid to planning could enable better strategic moves and better anticipation of those of competitors.

#### **4. Application**

Such is the logic behind looking more deeply into a firm's intangible asset holdings with alternate metrics, but what does an actual application show us? In particular, given the purpose of this research, do the alternate metrics agree with the broader assessment? And do the alternate metrics agree with what we generally know about how (and how successfully) some specific firms compete?



As an example, consider an application with readily available data. We know from previous studies that retail, virtually all types, and consumer goods such as beverages both have average to above-average knowledge asset metrics according to a modified Tobin's q (market capitalization to asset value) (Erickson and Rothberg, 2012). These data are repeated in Table 1 and, for reference, the global mean for cap/assets across all industries was 1.02. This metric takes the perceived value of the firm (market cap) divided by the value of the tangible assets. The resulting ratio gives an estimate of value created beyond the tangible assets, essentially the value of intangible assets in the firm. Versions of the Tobin's q have often been taken as an indicator of knowledge assets in studies over past decades. From the same research (Erickson and Rothberg, 2012), we also know that intelligence levels are relatively low in these industries while other research shows fairly high levels of data/information (Manyika, et. al., 2011). Going back to the intangibles framework introduced early in this paper, that pattern suggests high big data and high explicit knowledge but lower tacit knowledge and intelligence/insight.

One would always expect, and it is an implicit assumption in much KM/IC scholarship, that pursuit of more knowledge or other intangibles is always for the best. But in cases like this, where some types of knowledge assets (big data, explicit knowledge) are obviously present and competitively important but others are not (tacit knowledge, intelligence/insight), a more nuanced approach comes into play. One wants to understand the underlying interaction of the intangibles and where the value is found in order to better target investments in developing them. A more strategic approach to developing knowledge and other assets is required.

**Table 1:** Intangible Metrics

	Cap/ Assets	Sentiment Analysis				Interbrand (\$B)	BrandZ (\$B)	ACSI (/100)	Patents
		Total Mentions	Negative	Neutral	Positive				
Amazon	4.58	181,660	3.7%	86.0%	10.3%	100.8	279.3	85	20928
Walmart	1.25	8,226	29.0%	54.3%	16.7%	---	30.7	71	1035
Industry	1.33							82/77	
Coca-Cola	3.11	279,597	6.9%	79.8%	13.3%	66.3	75.9	81	2883
Pepsico	2.96	126,596	11.2%	69.4%	22.6%	20.8	11.9	80	890
Industry	0.80							82	
McDonald's	2.05	37,710	11.6%	75.5%	12.9%	43.4	124.9	69	546
Burger King	1.10	9,351	13.1%	72.6%	14.3%	---	6.6	76	382
Industry	1.50							80	
AB Inbev	2.17	16,202	13.4%	69.2%	17.4%	15.6	25.4	85	293
MolsonCoors	0.66	1,881	11.2%	61.9%	26.9%	---		81	1705
Industry	0.80							80	
Global Mean	1.02								

(Erickson and Rothberg, 2017, Interbrand, 2019, KMB/WPP, 2019, ACSI, 2019, USPTO, 2019)

Here, just based on the Cap/Assets metric, we see that the industries are in and around the average for knowledge (1.02), ranging from considerably above in fast food (1.50) and high-volume retail/e-tail (1.33) to a little below (0.80) in beverages. In each industry, we see one of the firms has a decidedly larger ratio than the other (though Coca-Cola and Pepsico are relatively close). We could begin to make some judgements about competition in these industries, including market leadership, but we also know there are other things going on in the data. Amazon, for example, is a much different business model than Walmart and even though both firms now have on-the-ground groceries as well as online operations, Amazon also has its cloud services, content creation and delivery through Prime, and a presence in several other industries that we know demand higher levels of knowledge. Similarly, Coca-Cola is largely a beverage firm while Pepsico's food components balance its beverage operations. In short, the numbers need deeper analysis, including what we can wring out about what Value Chain components are particularly critical for success.

So consider some of the other data in the table, most on brand value and quality. For the retailers, we know that logistics and operational systems are critically important in today's world, areas generating a lot of data and that would be prime areas for process improvements (explicit knowledge). But retail also benefits from loyalty programs and advanced customer relationship management. As indicated in the data, Amazon has the much stronger brand metrics. And quality as well, Amazon's ACSI rating is higher than its industry sector mean (82) and considerably higher than Walmart's, below its own sector mean (77).

But back to the branding and customer relationships, the brand equity of Amazon is considerably higher by both the Interbrand metric (Walmart is not even rated, falling below the \$4B valuations at the bottom of the Top 100) and the BrandZ metric. The digital metric results mirror those we've seen from other strong brands. Amazon has many, many more mentions on social media and related platforms. Moreover, its sentiment ratings are more stable, with less variance to the extremes. While Walmart has a higher percentage of positive comments, it also has a much higher percentage of negative ones. The stability of the comments for Amazon, that customers don't get too high or too low on the brand, reflects a pattern we've seen in other strong consumer offerings. Amazon is much more talked about and without as many extreme sentiments. The difference we see in the overall metrics (cap/assets of 4.85 vs. 1.25 and a mean of 1.33) likely comes partially from data and explicit knowledge that we would term structural capital, and Amazon's systems are more highly developed (though we all know Walmart's on-the-ground supply chain is excellent). But an even bigger part of the difference probably comes from relational capital, and Amazon dominates in that area, having considerably more knowledge about and relationships with its customers. Amazon also has an increasing footprint in other sectors beyond retail, something we'll address shortly.

Food retailing has some similarities to this sector, so consider McDonald's and Burger King next. Again we see an industry with above-average knowledge metrics (1.50 to the global mean of 1.02) and with one prominent competitor (McDonald's, 2.05) with higher metrics than the other (Burger King, 1.10). Given the franchise structure dominating the outlets of both companies, the actual retail operations and their efficiency are only indirectly reflected in financial returns. But they are in there, as are consumer relationships. That being said, supply chain knowledge and customer relationship knowledge are probably less while operational knowledge might be higher (McDonald's, for example, famously uses technological aids to help standardize operations across employees: timers, portion controllers, etc.).

What do the additional metrics show? McDonald's remains one of the highest-valued brands in the world while Burger King just barely registers in the BrandZ metric. The consumer satisfaction rating is surprisingly low for McDonald's (69), relative to both Burger King (76) and the overall category (80). But the social media sentiment is typical of a strong brand, with many more mentions for McDonald's and a pattern centered on neutral rather than the extremes. What it all means is likely a stronger competitive advantage in terms of operational systems and efficiency (structural capital and explicit knowledge) rather than in relation to customer relationships (relational capital and explicit knowledge). McDonald's and its competitors simply don't have the data-driven, individually identifiable customer relationships we see in the case of an Amazon though one would see the growth of loyalty programs in the sector changing that.

The two soft beverage companies, Coca-Cola and Pepsico belong to an industry with some similarities to retail, including evidence of explicit knowledge (the cap/asset ratio a little below the global average, 0.80 to 1.02) but not much apparent tacit knowledge or intelligence insight. As with retail, there are some potentially complex logistics and operations (though not on the same level as Amazon or Walmart), complex distribution, and some strong brands, so these firms have good knowledge of consumer likes/dislikes. There is generally not, however, the more personal CRM approach of an Amazon. Consumers are not identifiable and reachable on an individual level, as is largely the case with the fast food restaurants.

But the additional data in the table show the power of brand building even without access to loyalty programs and memberships. Coke and Pepsi both have considerable social media activity surrounding their brands and demonstrate the previously mentioned characteristic we've seen in powerful brand names: relatively stable sentiments with the vast majority of comments neutral. Coke's brand equity is within a few ranking spots of Amazon's by one metric (Interbrand) and still substantial even if not comparable in the other assessment (BrandZ). Pepsi is somewhat behind but also has considerable brand equity. Both are comparable in the ACSI quality rankings but one should also note they dominate an abbreviated category (only one other player, Dr. Pepper/Seven Up, is represented). So they deliver a solid, quality product but also seem to be indicators of firms with great consumer brands, where much of the intangible value is found in relational capital, their knowledge of what consumers want and expect from their brands. Finally, as with Amazon, Pepsico does include a number of other products and brands, principally in the snacks category. Much of the logistics, operations, and marketing of such consumables will be similar to beverages, however, and Pepsico likely shows the same strengths in both categories. The sentiment analysis, purely around the brand Pepsi, would be unique to its core beverage offerings and not include other beverage brands (Gatorade) or the snacks



though a deeper analysis could further develop the influence of all the brands and product lines with recognized value.

Meanwhile, the alcoholic beverage category includes AB InBev (principally Budweiser in the US but holder of multiple valuable worldwide brands) and MolsonCoors. As with the other beverage companies, AB InBev shows strong explicit knowledge (2.17), well above the industry standard of (0.80) while MolsonCoors is a bit below (0.66). That metric probably shows the strength of AB InBev's volume with attached competencies in supply chain, operations, and distribution efficiencies. The Budweiser brand has some equity value, showing up in both rankings, and AB InBev holds a number of other strong brands with more strength internationally. So there are strong consumer relationships even if, again, not personalized in the manner of Amazon. And both beer companies do well on the ACSI satisfaction index. Social media illustrate the same patterns we've seen elsewhere. The strongest brand/firm has substantially more mentions, and the mentions of much more stable than the higher positives and negatives tied to the other brand/firm.

We didn't conduct a deeper exploration of human capital via LinkedIn and other metrics mentioned earlier in the paper. That would be a major undertaking and could probably be a paper in and of itself. Similarly, the above analysis on brands and quality could also go into more depth with other brands and more competitor comparisons. One thing we did do was take a quick look at patent filings for the eight firms covered here. Amazon had thousands over the last twenty years, Walmart had six. Coca-Cola had more than Pepsico, also reaching into the thousands, a fairly impressive total for a basic consumer product like soda. McDonald's is slightly above Burger King in another industry without a lot of cutting-edge innovation. The one surprise is in the beer industry, where MolsonCoors has considerably more patents than AB InBev. For whatever reason, the follower firm appears more innovative in that category, something that might be explored more deeply in another study. But the overall findings do make a point about innovative capabilities as well as the different businesses that Amazon, in particular, has entered. If any of the firms covered in this short paper have capabilities to move into industry sectors requiring more tacit knowledge and intelligence/insight, it would be Amazon. And the metrics show that with its big data holdings, the much higher cap/asset ratio, and evidence of some of the personal insight needed for the tacit/intelligence competencies usually not represented in retail or consumer goods, Amazon may be poised to play in industries requiring a different sort of knowledge asset or even intelligence. If tracking, one would expect those metrics to continue increasing for Amazon as it pursues new opportunities with Amazon Web Services, content creation and delivery through Amazon Prime, healthcare information systems, and other opportunities expanding its traditional competencies.

## **5. Conclusion**

This paper demonstrates some initial options for more deeply exploring the nature of intangible assets within organizations. While numerous studies have shown how to do this in a single firm or a small number of firms, usually from the bottom-up, less work has been done across a sizable number of firms or an entire industry. To do so, a more top-down approach is needed, as well as available or constructible databases with appropriate indicators.

The paper does show that data are available for this type of approach. Moreover, the paper demonstrates that important distinctions can be identified between industries and between firms by employing some of these metrics. Both the analysis and the conclusions are subjective at this point. But as an exploratory study, these early results can provide a roadmap to more rigorous work in the future.

The ability to do this sort of work can make knowledge management and intellectual capital more useful for strategic decision making. Recognizing differences in knowledge or even the full range of intangible assets, differences in their application, and differences in which firm capabilities they impact can only help deepen our understanding of intangible assets and how they contribute to competitiveness. Top management can make better strategic decisions and, perhaps, better understand and anticipate the decisions to be made by competitors.

Broad metrics to assess the level of development of different intangibles in different industries and firms are valuable. Knowing that the level of big data development in an industry is X while your firm is at some lower point is important to understand. Similarly with any of the other intangibles, explicit knowledge, tacit knowledge, or intelligence. But those conclusions only scratch the surface. They identify, for example,

advanced development of explicit knowledge capabilities across firms, but don't reflect how or where the explicit knowledge is actually used (e.g. where in the value chain?). Nor do they indicate where the knowledge is particularly impactful, where it is a competitive differentiator. We need different metrics but none have really been developed in the literature, at least not on a multi-firm, industry-wide level. This paper is a first step in identifying such alternate metrics and should allow some next steps in terms of more formal and more complete analyses.

The examples here are only a very shallow use of available tools. Analysts would want to collect all available data on firms and brands, as well as from a full range of competitors. Supplementing with qualitative knowledge about how the firms compete would also be important. And although much of the data is sorted by industry sectors, it's probably good to understand that these categories don't necessarily match up exactly with reality. Amazon's identification as a retailer is still accurate but the amount of its revenues coming from that sector is rapidly declining as the firm moves into other competitive spaces. In short, the methods noted here can be valuable for analysis but some common sense in application also needs to be present, something that could be teased out in future studies.

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