



Knowledge assets in services across industries and across time



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ABSTRACT

This paper explores the question of whether knowledge assets are more developed in services industries than in non-services. The concept of the “knowledge economy” has always gone hand-in-hand with growth in the percentage of the economy represented by services. Two multi-year, multi-industry datasets are used to directly compare the knowledge asset levels in service industry firms against those in non-service industry firms. Service industries do, indeed, reflect higher levels of intellectual capital in recent years, but did not do so a decade ago. Further, there is considerable evidence of changes in specific service and non-service industries over the time period, adding details to the finding that knowledge development is not static but does vary over time and circumstance. These results open up a number of promising research directions that could lead to a better understanding of the nature of these differing circumstances and how better strategic choices might be made regarding investments in knowledge management.

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Los activos de conocimiento en diversas industrias de servicios a lo largo del tiempo

RESUMEN

Este artículo analiza la cuestión de si los activos de conocimiento están más desarrollados en las industrias de servicios que en las de no servicios. El concepto de “economía del conocimiento” siempre ha ido de la mano del crecimiento de la economía representada por el sector servicios. Se utilizan dos conjuntos de datos plurianuales y multisectoriales para comparar de manera directa los niveles de activos de conocimientos en las empresas de servicios con las empresas que no son de servicios. Las empresas de servicios sí muestran niveles más altos de capital intelectual durante los últimos años, si bien esto no era así hace una década. Asimismo, existen numerosas pruebas de cambios en industrias concretas de servicios y de no servicios durante el período de tiempo analizado, que incorporan matices al hallazgo de que el desarrollo de conocimiento no es estático, sino que varía en función del tiempo y las circunstancias. Estos resultados abren una serie de prometedoras vías de investigación que podrían dar lugar a un mejor entendimiento de la naturaleza de estas diversas circunstancias y a cómo podría llevarse a cabo una mejor selección estratégica en lo que respecta a las inversiones en gestión del conocimiento.

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1. Background

The growth of interest in the knowledge economy in recent years has, in part, been driven by the increasing dominance of services in many large economies. An implicit assumption exists that services will require more skills and knowledge from employees. While manufacturing does have some similar requirements,

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many processes can be systematized and improved with tools and equipment, often then lowering the knowledge required from the employee. As a result, many services have been thought to require more expertise and know-how from providers, especially modern services driven by information technology and associated data. If so, evidence should exist of increased knowledge assets in the firms populating contemporary developed economies.

This paper draws on a number of disciplines to assess the relative level of knowledge assets in service and non-service industries. Moreover, by utilizing earlier work, a comparison can also be drawn to how knowledge asset levels, the intellectual capital of firms, have changed over time. By demonstrating the potential of this sort of analysis, a new tool can be provided for managers to evaluate their own intellectual capital levels, including over time, as well as a means to judge relative standing against an appropriate industry metric. The metrics in this paper are generally available public financial records, allowing use of this methodology/tool by anyone who wants to perform this type of analysis.

Further, in understanding the wax and wane of knowledge-intensive industries, and dominant companies within them, an understanding can develop concerning the importance of knowledge in given circumstances. If service-oriented industries do, indeed, seem to require more knowledge assets in order for a resident firm to be competitive, we have an initial piece of evidence of what factors (here, services) contribute to differences in circumstances. If non-services industries require less knowledge assets and, hence, less knowledge management investment, that's also important to know from a strategic management point of view. An understanding is growing within the knowledge management community that the same approach does not work for all firms. Studies such as this start to make the case as to how and why approaches might differ.

Knowledge management (KM) grew out of an increasing understanding that competitive advantage might come from more than basic labor and capital. Schumpeter's (1934) focus on innovation led to study of knowledge combination as a potential source of competitive advantage. Penrose (1959) advocated the importance of knowledge stores in an organization, and Nelson and Winter (1982) took the concept a step further by showing how organizational routines could grow those knowledge stocks.

A natural follow-on from this base was the idea that better management of these intangible knowledge assets could lead to sustainable competitive advantage and superior financial performance (Winter, 1987). Knowledge as a unique competitive resource fell neatly into the developing theory around the resource-based view of the firm (Wernerfelt, 1984). Indeed, an offshoot, the knowledge-based view of the firm grew in the literature (DeCarolis & Deeds, 1999; Grant, 1996; Gupta & Govindarajan, 2000a; Zack, 1999a). With this acceptance of the idea that knowledge in the heads of employees could grant competitive advantage, the logical next question was whether knowledge could be explicitly managed so as to grow the asset and achieve such advantage.

In better managing knowledge assets, the just-noted distinction between stocks and flows has been important in the literature (Dierickx & Cool, 1989). Knowledge management as a discipline focuses on growing the stocks deliberately rather than letting it happen by serendipity (Teece, 1998). In order to do that effectively, it helps to have a good understanding of the level of the stocks and that tends to happen through measurement. So intellectual capital (IC) as a discipline has centered on definition, categorization, and metrics (Davenport & Prusak, 1997; Edvinsson & Malone, 1997; Stewart, 1997). As this paper will detail, a variety of methods have been developed to measure IC, knowledge assets, including such well-known techniques as the Balanced Scorecard (Kaplan & Norton, 1992).

In developing these metrics, IC scholars and practitioners delved more deeply into the nature of the knowledge assets, generally defining intellectual capital as being a mix of human capital, structural capital, and relational capital (Bontis, 1999; Edvinsson & Sullivan, 1996). Human capital has to do with individual, usually job-specific know-how. Structural capital includes more established, organization-wide knowledge such as corporate culture, organizational structure, and related matters. Relational capital attaches to knowledge about relations with external entities, including but not limited to customers. Competitive capital (Rothberg & Erickson, 2002), knowledge concerning competitors, is sometimes brought into the discussion as well.

Knowledge management, meanwhile, has focused on means to increase these stocks. In doing so, scholars and practitioners looked to better understand knowledge itself, circumstances that make it easier or harder to grow, and appropriate techniques for the circumstances. Probably the most important distinction is between tacit and explicit knowledge (Polanyi, 1967), developed in a KM context by Nonaka and Takeuchi (1995), who also provided the SECI or "ba" model to guide knowledge exchange according to type (e.g. tacit to tacit). Tacit knowledge is more personal, hard to express, and thus often hard to transfer between individuals. Explicit knowledge is codifiable and easier to capture and transfer through IT systems and other such means. Over the years, techniques have been adopted to fit the type of knowledge, so that we have specific tools for tacit exchanges, such as communities of practice and storytelling (Boisot, 1995; Choi & Lee, 2003; Schulz & Jobe, 2001), as well as for explicit exchanges, which are more systems-oriented, based on IT and a knowledge market structure (Matson, Patiath, & Shavers, 2003; Thomas, Kellogg, & Erickson, 2001).

Further extensions include differences in knowledge beyond tacit/explicit, including complexity and specificity (Kogut & Zander, 1992; Zander and Kogut, 1995), as well as differences in organizational circumstances such as social capital, social networks, and absorptive capacity (Cohen & Levinthal, 1990; Liebowitz, 2005; Nahapiet & Ghoshal, 1998). Much of the work done has been firm-specific or case studies, seeking out examples of best practice for managing knowledge (Davenport, DeLong, & Beers, 1998; Gupta & Govindarajan, 2000b; Hansen, Nohria, & Tierney, 1999; McEvily & Chakravarthy, 2002; Zack, 1999b). Work in intellectual capital has also been largely based on the study of single firms or small groups of firms (e.g. Mouritsen, Larsen, & Bukh, 2002).

As a result, the IC and KM disciplines have developed a fairly good understanding of how to assess knowledge assets and how to attempt to manage them effectively (successful implementation, of course, can still be a challenge). What can still be a puzzle are cross-firm or cross-industry comparisons that can help firms evaluate their knowledge management efforts versus competitors or against unrelated companies. Scholars also lack an understanding of how the nature of knowledge and effectiveness of management varies across industries, where different circumstances may call for different KM priorities.

2. Strategy and knowledge assets

These types of questions become even more important when extending the discussion. Initially, what managers consider to be a valuable knowledge asset has expanded in recent years. Intellectual property has always been considered an asset, and, as discussed, intellectual capital and softer knowledge assets have been added to the list in recent decades. More recently, cloud computing, big data, business analytics and other such concepts have brought raw data and information into the mix as well. KM has generally considered data and information to be potential precursors to valuable knowledge, not items of value in and of themselves (Zack, 1999a;

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