

A NEW PERSPECTIVE ON THE KNOWLEDGE VALUE CHAIN

By Clark Eustace¹

***Abstract:** The paper presents an interpretation of some major changes affecting the competitive behaviour of firms today. The underlying postulate is a shift from tangible to intangible factors of competitive advantage - from natural resources, machinery and financial capital, now regarded as commodities, to non-price factors of competition. The accelerating pace of value-chain erosion is driving a relentless search for new factors of differentiation and market leverage, with the result that firms are trying to create, maintain or invade monopolies founded on intangibles. This has led to some subtle, but highly significant, shifts in the economy, which have gone largely undetected. Accordingly, the paper argues the case for transparency, and calls for much richer disclosure of the real asset base of firms and public enterprises.*

In developing these ideas, the paper presents a new perspective on the knowledge value chain, and concludes by examining some of the challenges for the European policy community, based on the preliminary results of the PRISM research initiative.

Introduction

In October 2000, the European High-Level Expert Group on the Intangible Economy presented new evidence on the influence of business intangibles on economic performance and productivity². Following on from this, a 2-year programme of socio-economic and policy research was launched under the auspices of the European Commission IST programme to bring together leading experts from the business, academic and policy communities working in this field. The initiative, known as PRISM, involves eight academic institutions in seven European countries³ and is supported by an advisory council of experts from the business community.

Key Conclusions

(i) *How does the modern knowledge economy differ from what we had before?*

In the past, competitive advantage was attributed to the successful exploitation of scale economies underpinned by a unique technology or dominance of a geographical market or supply-chain. This was always an over-simplification, and it is now widely accepted that winning strategies are more often grounded in the accumulation and creative exploitation of intangibles. The empirical evidence suggests that successful players in competitive markets are those that have access to a corpus of unique - or at least difficult-to-replicate - capabilities and competences. It is these that provide the mainspring of competitive advantage. As the value model in this paper shows, they are exploited systematically, first internally (via monopoly rent and scale effects) and then externally through licensing arrangements (scope effects), eventually ending up in the pool of commodity assets open to easy replication by competitors and new low-cost entrants.

Our first contention is that while the global economies are undoubtedly experiencing as rapid an era of change as at any time in history, the economic fundamentals remain in place. There is, however, an overwhelming weight of evidence to support the view that the advanced economies have undergone a significant but largely undetected shift in the mode of wealth creation over the past few decades.

¹ Based on a presentation given on 25 November 2002 at the Autonomous University of Madrid. The author is Director of the PRISM initiative, and an Honorary Visiting Fellow of Cass Business School, London.

² See HLEG (2000) and European Commissioner Erkki Liikanen's March 2000 address to the European Forum "Entrepreneurship for the Future" in V xj, Sweden

³ As currently constituted, PRISM comprises a coalition of eight academic institutions: Cass Business School (UK), Copenhagen Business School (Denmark), Ferrara University (Italy), Henley Management Centre (UK), IESE (Spain), KTH Royal Institute (Sweden), TSM (Netherlands) and UCC (Ireland). A collection of research papers is available at www.euintangibles.net

The much-vaunted, loose generalization that this can be ascribed to globalization - or in some way to the ubiquitous spread of digital technologies and services across the economy - is again too simplistic a synthesis. It is also ambiguous and too non-discriminatory to be of practical use, and is masking deeper transformations that are at work in the modern economy. For example, it is now clear that the economic characteristics of knowledge - often termed economics of content - are very different from those prevailing in the manufacturing era. Issues that will have significant and far-reaching implications for the academic and policy communities include the non-exhaustion/ non-rivalry/ complementarity characteristics of intangibles and the predominance of the pre/ non-manufacturing elements of the value chain.

One important outcome of the explosion of computing power and connectivity in the last quarter of the 20th century is that it has redefined the role and economic importance of intangibles. Adding to this, key intangible assets, such as know-how and leading-edge business practices (and indeed entire business models) now migrate rapidly around the world on the touch of a button⁴. It has also served to destabilize the old-world value-delivery model and create a wholesale disaggregation of the corporate value system. Value chains always had a limited life in competitive markets, but are now eroding much faster than in the past. Hence the critical importance of an effective innovation machine to keep one step ahead. Continuous evolution and renewal of this capability is the main preoccupation of corporate strategy today⁵.

Equally important is the recognition that the mature market economies are in surplus, in the sense that consumers basic needs are essentially satisfied. Faced with increasing global competition, Europe's mature industries have been struggling to get to grips with the exhaustion of the old mass production model at the same time as being forced to respond to demands for mass-customization by consumers whose basic demands are now commoditized. As a result, the modern economy is characterized by mature markets for goods and services. As markets have become increasingly mature (commoditized), so firms have to compete harder for monopoly profits or comparative advantage. This forces firms to intensify their search for new factors of differentiation and market leverage, not only in the new economy sectors but in the mature industries struggling to keep their business models evolving at least at the pace of the market.

Consequently, corporate strategy is increasingly focused on non-price factors of competition - hence the critical importance of quality reputation and branding, and lock-on strategies aimed at creating or stretching the market window (monopoly rent). Typical responses include raising switching costs through the deployment of proprietary platform technologies and the creative use of intellectual property rights. They are also trying to create, maintain or invade monopolies founded on intangibles.

A new market model is emerging - where sustainable value-creation is geared less to economies of scale than the exploitation of innovation, arbitrage and scope effects. Subtly, and incrementally over several decades, this has resulted in a fundamental shift in the corporate value system, away from physical and financial assets (now commoditised) towards the creative exploitation of a nexus of intangible assets, quasi-assets and competences - mainly in the form of distinctive capabilities deriving from knowledge intangibles - that have become essential ingredients of the economic production process. Notwithstanding the huge research effort on both sides of the Atlantic, their value-generating mechanisms are, as yet, poorly understood.

In terms of policy orientation, these considerations serve to shift the debate firmly towards the measurement domain. They also change the role and perception of IPR, especially for the business services sector as it shifts from selling time to selling assets (institutionalized and codified know-how).

(ii) Issues for the Interest Groups

Despite many years of debate among academia, economists and statisticians, our economic and statistical models (and the management systems used by firms internally), have not kept pace with these market

⁴ *What Castells calls timeless time*

⁵ *According to Don Tapscott It used to be that competitive strategy was all about the internal challenge of either creating differentiated products or services or having lower costs. The key to strategy now is architecting capability, while according to John Browne of BP The strategy is now the organization.*

developments. Partly this is because the processes and causal links are complex and slow to yield to analysis, but the business and academic research pioneers have also been frustrated by the cognitive and data comparability problems in the established macro and micro information systems, which are unable to produce routine, systematic information on the stocks and flows of the modern economy⁶. Instead, we have to rely on ad hoc studies for glimpses of what is happening:

- Investment in knowledge intangibles is now a substantial budgetary outlay for national economies, firms and individuals. Hill and Youngman⁷ estimate that intangible investment in the order of 10% of the GDP of the developed economies goes unrecorded as such, and observe that the mis-classification of sums of this magnitude distorts our picture and understanding of economic realities
- Intangible investment in the major OECD economies is running at between 50-100% of their outlays on acquiring and building physical assets. It also shows significant country variations across the EU⁸. Not only has this transformed the economic landscape, but it acts as a social catalyst to promote changes in work and leisure patterns
- Nakamura⁹ estimates that in 2000, US corporate investment in intangibles was US\$ 1 trillion - comparable to investment by the US business sector in property, plant and equipment. Half of this relates to R&D and software, the balance going to brands, human resources and organizational processes
- Creative occupations in the U.S. rose from 1.9% of the total in 1950 to 5.8% in 2000 (Nakamura)
- Knowledge workers are the fastest growing segment of the OECD s labour force, with an average annual growth rate of 3% during the 1990s
- The proportion of the Australian labour force engaged in the production of intangible capital rose from 16% in 1971 to 31% in 1996 (Webster)
- 70-90% of the value generated by the corporate sector is attributable to intangibles and lies outside the scope of our existing measurement and tracking systems¹⁰. By 1998 only 15% of the S&P500 s market value was attributed to tangible assets, compared to 62% in 1982 (notwithstanding a 3-year bear run, it still stands in at around 40%).

(iii) *The Emerging Corporate Asset Base*

Set out below is a provisional schema of the knowledge value-chain that attempts to integrate the perspectives of the various interest groups, adapting pre-existing models.

Conceptually, Michael Porter s classic model¹¹ addresses the physical supply chain and the value-building process from the context of a logistical materials flow. His value system traces products from the original producer to the ultimate consumer. The value system described here offers a parallel perspective by tracing the essential knowledge flows of the modern business organization. In so doing, we present a taxonomy of the new, emerging corporate asset base. In common with Porter s system, the model is heuristic rather than causal.

Our starting point is that successful players in today s hyper-competitive markets must have access to a corpus of unique, or at least difficult-to-replicate, capabilities, competences and quasi-assets in order to stay ahead of the game. Our research suggests that these key value-drivers can be conceptualized in terms of four asset groupings:

⁶ Hill & Youngman: *PRISM interim report, September 2002*

⁷ Youngman (2003)

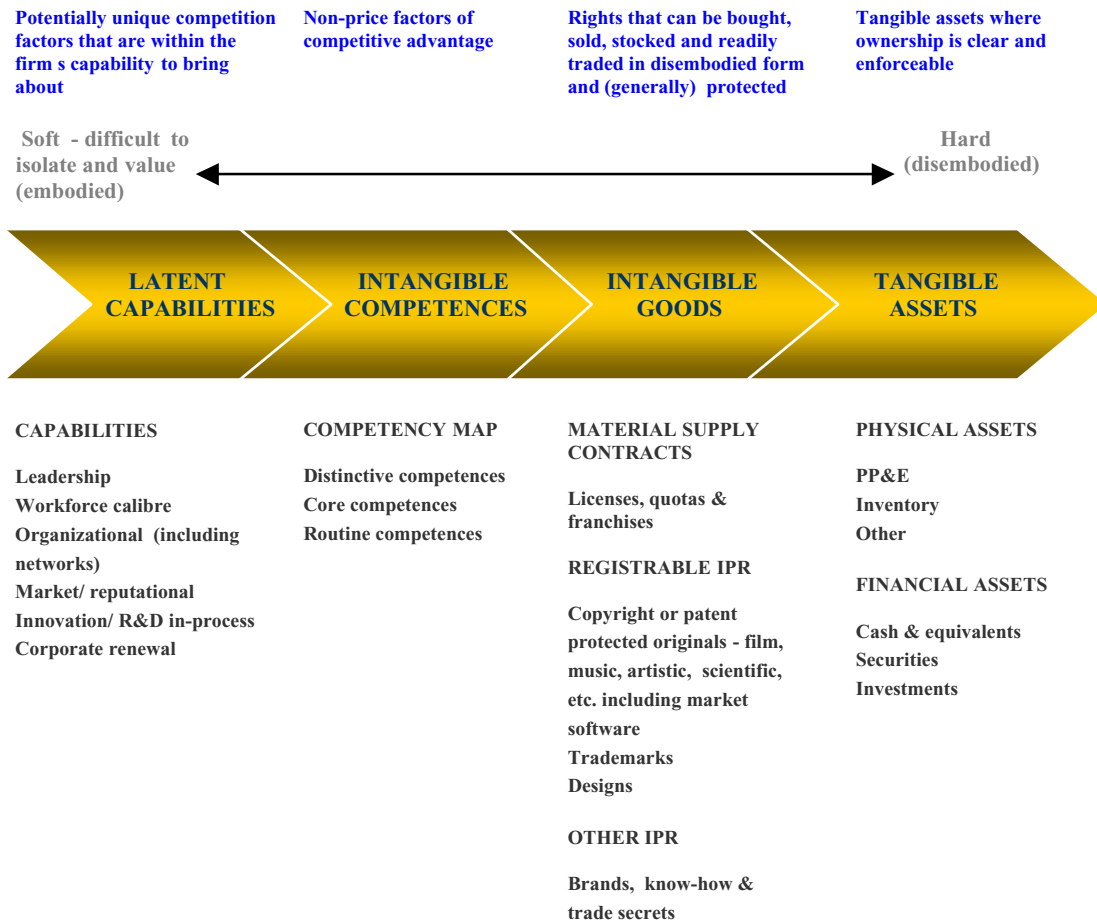
⁸ Hill & Youngman, *ibid*

⁹ Nakamura (2001)

¹⁰ Youngman, *ibid*

¹¹ Porter (1985)

Figure 1: A new perspective on the knowledge value chain



' Eustace & Youngman (2003)

The schema presents a holistic view of the various capabilities, competences, legal rights, physical and financial assets that constitute the extended value base of a modern enterprise. Some lie within its physical and legal boundaries while others are to be found outside within its network of influence. They also lie on a spectrum. At the one end, we find the soft intangibles that are difficult to isolate and value - often termed *embodied* intangibles, whose economic value depends heavily on complementarities with other assets. At the other end lie the hard *disembodied*¹² intangibles, which generally take the form of legal instruments created by force of law, or by contractual relationships agreed between institutional or economic units.

The left-hand segments focus on competences and capabilities while the right-hand segments show those assets over which ownership rights can, at least in principle, be appropriated. The first - latent capabilities - represents a reservoir of potential talent and innovation that provides a main source of future competitive advantage and earnings. Collectively, these attributes provide a leading indicator of the organization's ability to respond to market threats and opportunities that are as yet unknown, and often unknowable. Latent capabilities are what investors, in particular venture capitalists, are interested in. Flushing out, exploiting and renewing these is what distinguishes good corporate leadership.

The second group, intangible competences, are more-or-less codified (but still proprietary) capabilities now widely deployed as key factors of non-price competition. They often rely heavily on the ICT infrastructure and, as such, their substance and form can be migrated rapidly around the world via digital networks. Following Vollmann, we divide these into distinctive, core and routine competences:

¹² OECD (1998)

- *Distinctive competences:* *Key factors of differentiation that are difficult or costly to replicate*
- *Core competences:* *Competitive necessities — what you must have to compete*
- *Routine competences:* *Routine activities you must do, or outsource, in order to stay in the game.*

However important intangible competencies are in underpinning the business value chain, these are much more difficult to measure and value consistently across organizations. The value drivers are generally bundled together and interdependent to such an extent that they are difficult (but not impossible) to isolate and value. So it can be concluded that the primary thrust of research and development of intangibles measurement should be devoted to the intangible goods segment of Fig. 1.

The right-hand segments show those assets over which ownership rights can, at least in principle, be appropriated and values assigned by reference to open-market transactions or future cashflows. For the purpose of the schema, the first of these - intangible goods - is made up of two main sub-classes: intangible commodities and intellectual property:

- a) Intangible commodities are essentially contractual rights, including publishing and reproduction rights, commercial databases and other marketable software with associated long-term royalty annuities. Their defining characteristic is that they can be bought, sold, stocked, leased and otherwise traded
- b) Intellectual property includes those assets whose characteristics are derived from the legal system, e.g. patents, copyrights, registered designs, trade secrets and proprietary technology. In this case, the cost and time of legal searches can be significant and rises dramatically where multiple legal jurisdictions are involved (Rivette and Klein, 2000).

The last category, tangible assets, consists of physical assets (land and buildings, plant, machinery and equipment) and financial assets (cash, receivables and securities). These constitute the main components of the current reporting model, and the collateral basis for allocating capital and credit and a range of debt security instruments.

The essential market dynamics are reflected in the model. The flow is left to right (only exceptionally the other way) - towards codification, commoditization and disclosure.

A Preliminary Policy Response

Since the fall of 2001 the United States has witnessed market failure at its most extreme. It is far too simplistic to dismiss this merely as an American corporate governance failure. There is a deeper, longer-term and more international problem - we are running today's knowledge-based economies with tools inherited from a 19th century manufacturing era. Knowledge is now a fundamental component of our value-delivery systems, but our predictive models are, at best, immature.

In this regard, there are a number of issues that require a response from the policy makers:

1. There is an overriding need for much more transparency in the operation of the EU's capital and product markets and the activities of their intermediaries. We need to build a level playing field on disclosure in order to rebuild market confidence
2. Regardless of whether there is a case for direct policy intervention at this stage, a common thread is required to address some of the current 'black holes' for policy analysis - in the shape of 'meso' information systems to complement the various macro and micro systems already in place. In addition, at the corporate level we urgently need a European version of the U.S. SEC's Edgar information system. The big question is how the system should be approached politically, since the hardest part is getting agreement between countries

and regulators. In Europe there are only limited calls for increased disclosure, like that of the U.S. Sarbanes-Oxley Act of 2002

3. Given the weight and influence of knowledge-intensive services across the economy, the EU should take steps to build a better understanding of their fragmented (and generally hidden) productive processes. This is an acute problem requiring a response from the policy and statistical communities. Given that two-thirds of our GDP now comes from services, an EU-wide framework for tracing productivity trends and their different value-generating mechanisms should be brought centre-stage on the political agenda

4. Policy action is also required in respect of the long-overdue reform of measurement protocols for R&D investment in services. A particular concern is the issue of capturing reliable R&D information from the business and financial services industries. Its resolution will be an important plank in achieving the Lisbon objectives and the drive to raise R&D investment from 1.9% to 3% by 2010

Conclusion

The insights and policy issues outlined in this paper will impact on a broad range of EU institutions. There is an urgent need for high-level EU support for explicit funding under the 6th framework programme to foster interdisciplinary research and extend the adoption of existing good practice, and promote further work on the questions that still have to be answered. This will require a radical shift of mindset, away from the deterministic thinking that dominated the old-world era of equilibrium economics, towards a better understanding of the real drivers of competitive advantage and value in the context of active, imperfect markets that are rife with connectivity and where the arbitrage opportunities are endless.

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The PRISM Project



Report of Research Findings and Policy Recommendations

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