



# Athena Alliance

## Knowledge about Knowledge The OECD Project on Knowledge-Based Capital

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Last fall OECD (the Organization for Economic Cooperation and Development) published [\*Supporting Investment in Knowledge Capital, Growth and Innovation\*](#) a book-length report that culminates the first phase of its flagship project on New Sources of Growth: Knowledge-Based Capital. The report exemplifies what makes OECD unique: the ability to cast a wide net and marshal diverse intellectual insights, across the OECD and within a large community of experts in government and academia. For national governments, OECD's analysis can be useful for overcoming path dependent, stovepiped, or politically constrained thinking. But in many cases, including the U.S. government, there is no logical port of entry for a report of this scope—for particular chapters, yes, but not the report as a whole.

The project, which began as New Sources of Growth: Intangible Assets, was launched in Washington in May 2011, hosted by Georgetown University's Center for Business and Public Policy and co-organized by the Athena Alliance, the Conference Board, the Kauffman Foundation, the National Academies-STEP Board. The project later adopted the affirmative vision of *knowledge-based capital*. "Intangible assets" remain primarily a residual of all that it is not tangible but will generate income beyond the current year. By contrast, "knowledge-based capital" evokes [national wealth](#). The report builds on the widely referenced and tested [Corrado-Hulten-Sichel framework \(CHS\)](#) for investments in intangible assets aggregated from firm-level data—including software, which has been capitalized in the System of National Accounts since 1993, and R&D, capitalized since 2013. Now in a second phase, the project

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has been motivated by the dramatic ascendance of investment in intangibles, which now exceeds investment in tangible assets in the U.S. and other advanced economies as shown in this chart from the book:

**Figure 0.1. Business investment in KBC and tangible capital, United States, 1972-2011 (% of adjusted GDP)**



Note: Estimates are for private industries excluding real estate, health and education.

Source: Unpublished update on Corrado, C.A. and C.R. Hulten (2010), “How do you Measure a ‘Technological Revolution?’”, *American Economic Review: Papers & Proceedings 100* (May 2010): 99–104.

OECD worked on intangible assets [in the 1990s](#), and although that work was not very visible in the U.S., the Brookings Institution launched a task force on intangibles in 1998-2000 focused on corporate reporting. Widespread use of the CHS framework by a number of national statistical agencies provided new momentum, as did a successful [OECD project on innovation](#) (2007-2010). The New Sources of Growth vision responds to the Great Recession in part by reframing earlier [OECD work on growth](#) and embracing domains beyond the reach of conventional monetary and fiscal policy. “Knowledge” is not a familiar policy term in the U.S., but it recalls the European Union’s [“Lisbon Agenda”](#) of 2000 that vowed to make the EU “the most competitive and dynamic knowledge-based economy in the world” by 2010.

OECD’s vision of knowledge-based capital (KBC) covers investments in categories with diverse economic characteristics, some of which are difficult to measure. The kind of knowledge represented varies, as does the degree and nature of ownership and control. This diversity enables interaction with a wide range of policies that may ultimately enable or constrain investment in intangibles, but the linkages are less straightforward, more tangled, and decidedly less tangible than the familiar terrain of commodities, real property, and currency. The report is ambitious, connecting what can be quantified with what is emerging or unknown, gathering and developing insights that governments might not make on their own, and providing reference points and benchmarks for sophisticated policymaking.

## CHS Framework

The CHS framework consists of three major categories with subcategories:

1. Computerized Information
  - a. software
  - b. data
2. Innovative Property
  - a. mineral exploration
  - b. scientific R&D
  - c. creative property
  - d. design
3. Economic Competencies
  - a. brand equity
  - b. firm-specific human capital
  - c. organizational structure

Software and data (*computerized information*) together create a largely invisible fabric underlying and connecting the tangible, intangible, and financial sectors. Data is coming into its own, becoming “big, real-time, and moving out from special-purpose silos to become reusable, repurposable, and recombinant.

The *innovative property* category evokes patent-protected R&D results even though the framework is designed to measure investment rather than property rights. The category also covers mineral exploration, creative work, engineering, and design, as well as research results. In some variations, it can include other regulatory rights such as mineral claims, milk quotas, emissions trading rights, taxi medallions, liquor licenses, and assignable contracts—i.e., intangible property-like interests that are not knowledge-based in a meaningful sense.

Intangible assets, intellectual assets, and intellectual property are often used loosely, and “knowledge-based capital” and “innovative property” add additional concepts to the mix. Intellectual property tends to overshadow other concepts by virtue of its familiarity and its embodiment as a discrete set of legal rights. Even so, intellectual property rights vary across jurisdictions, and the term obscures important legal and economic differences among the principal rights regimes.

In popular discourse, intellectual property often connotes copyright because of the challenge digital technology poses to digital content. In the broader economic context, intellectual property often means patents. Patents can be identified, counted, traded, and licensed distinct from their embodiment. They are self-delineating and self-explicating claims against the world, at least within the jurisdiction in which they are issued. Their institutional weight obscures differences in how patents are used in different technological and business contexts. In contrast to copyright, the presence of patents across all sectors of the economy (especially in the U.S.) and their association with innovation gives them a special claim on economic

policy, even though [surveys of R&D managers](#) show that patents are of primary importance only a few industries. There is careful overview of patent issues in the chapter on resource allocation, as well as an overview of markets in the chapter on knowledge networks and markets that notes a remarkable development—the appearance of sovereign (or state-supported) patent funds in France and East Asia.

The last of the three CHS asset categories, *economic competencies*, is the most difficult to delineate, measure, and trade. As the chapter on upgrading in global value chains explains, economic competencies are important for competitive advantage precisely because they are difficult to replicate. Only in some contexts, such as consumer services and advertising, can economic competencies be franchised and scaled.

While advertising expenditures can readily be measured as an investment in brand equity, it is sometimes argued that advertising does not create wealth but only redistributes it (or inspires frivolous consumption). Yet branding is clearly critical for capturing value in global value chains.

Training paid for by the firm can be measured but its value as an asset depends on whether the employee can use it elsewhere, practically and legally. At a national level, human capital is considered owned and controlled by individuals and is measured in terms of educational attainment or years in school. Control of firm-specific human capital can be managed to some degree through employment contracts and noncompete agreements, but at the cost of allocative efficiency. The success of Silicon Valley has been attributed in part to the unenforceability of noncompete agreements in California.

Organizational capital is proxied by counting certain classes of employees. The measure used by OECD diverges from that of the CHS authors, with OECD measuring for managerial tasks within occupations, while CHS measures by occupation. Business relationships and networks are sources of value, but they are shared with and dependent on other firms, including foreign firms.

While the report takes the CHS framework as given, the way four chapters depict the framework deviate from CHS and each other in minor ways (see pp. 23, 56, 183, and 228). The differences include new subcategories such as management consulting, R&D in the social sciences and humanities, new product development in financial services, and market research.

## Organization of the Report

The report does not address knowledge-based capital by category—except for the chapter on big data, a recent phenomenon in which government generated data plays a major role and old policy issues of privacy and security have resurfaced in new ways. There are six topical chapters (including the one on big data, plus three “horizontal” chapters: the overview; resource allocation (chapter 1); and measurement (chapter 4).

The measurement chapter builds most directly off the CHS framework. It expands on measuring the hard-to-measure and gives special attention to organizational capital, advocating longer depreciation periods and, as noted, preferring a task-based approach to counting personnel to the title-based approach used by the CHS authors. While the report does not attempt to systematically refine or regularize CHS, it might be useful to do so as OECD has done for measuring R&D ([Frascati Manual](#)) and innovation ([Oslo Manual](#)).

The chapter on resource allocation examines the correlation between KBC and “structural policies” that bear on entry, exit, and access to capital—e.g., regulation of labor markets, product markets, and bankruptcy. The U.S. has stable, liberal policies in these domains, so we rarely hear about these issues (or even the term “structural policy”).

The six topical chapters do not follow any clear order in the book. However, they could be rearranged to move from very familiar (corporate reporting, competition policy) to politically current (tax, global value chains) to emerging phenomena (big data, knowledge networks and markets). The reordering would look as follows:

1. corporate reporting
2. competition policy
3. taxation
4. global value chains
5. big data
6. knowledge networks and markets

My list begins with corporate reporting because it initially motivated the investigation of intangibles, but progress has been modest despite years of attention. Similarly, competition may be reshaped by intangibles and getting it right may be more important than ever given winner-take-all global-scale markets, but there are no new policy tools nor a clear sense of what tools may be needed. Two areas of heightened current interest follow: taxation and value chains. Finally, there are the emerging areas, where issues are complex and not well-formulated: big data and knowledge networks/markets.

So I see a progression of the vertical chapters as follows:

### [Corporate Reporting](#)

Interest in better corporate reporting spurred early work on intangible assets, including OECD work in the 1990s, on the premise that better informed managers and investors would lead to better decisions, better investment information, and more efficient markets. A proliferation of more or less proprietary approaches did not lead to a meaningful advance in accounting standards, and a table (pp. 312-314) shows a diminished number of new methodologies over the past decade.

### [Competition Policy](#)

Scale economies and network effects tend to concentrate power in digital markets, but market power alone is not actionable under antitrust laws. The chapter acknowledges

that competition in the digital economy is increasingly influenced by large patent portfolios, aggregators, and assertion specialists, but OECD work has lagged behind the Federal Trade Commission's examination of patent practice and markets.

### Taxation

*Base erosion and profit-shifting* (BEPS) is a widely publicized issue that has been prioritized by the G-20. Prominent high-tech firms have avoided taxes by moving intellectual property and associated licensing across borders. The OECD analysis shows how this can effectively leverage the effective tax subsidy for R&D to over 100% while disadvantaging small entities (because they lack foreign affiliates to which intangible assets can be transferred).

### Global Value Chains

Value chains crossing national borders are common for complex products such as digital technology and transportation equipment. The chapter describes four basic knowledge-dependent strategies for upgrading in global value chains: process, products, position within chains, or choice of chains. These strategies are of particular interest to developing and emerging economies open to "new industrial policy." Policy aspects are addressed in an [OECD report](#) with WTO, UNCTAD, and the G-20 on trade in value-added and the need for countries to be open to importing components. Related measurement of trade in value added (TiVA) [has been undertaken with WTO](#) and reveals the insufficiency of bilateral trade data in understanding global trade and the effects of currency fluctuations.

### Big Data

Data has emerged as a resource of rapidly expanding versatility that can be easily and inexpensively collected, combined, reused, repurposed, and exchanged. Longstanding policy concerns about privacy and security, including old OECD guidelines, are recast by the new scale, scope, and uses of data. Much reusable data originates as [public sector information](#), and liberal policies on transfer and use help firms generate additional economic value. OECD has taken this lesson to heart by promising to make its data freely available by 2015.

### Knowledge Networks and Markets

This chapter explores how embodiments of knowledge-based capital, especially patents, are traded and distributed, how knowledge flows untransacted in collaborative networks, and how patent aggregators and specialists operate in secondary markets. It notes the emergence of sovereign or state-supported patent funds, adding a new dimension to an environment where governments already intervene in the creation and administration of patents. The chapter also examines the enforceability of noncompete agreements as a factor affecting the movement and allocation of human capital in innovative industries.

These diverse chapters make the scope of the report impressive, even overwhelming. Yet there are few specific policy recommendations (pp. 18-19) beyond admonitions to monitor developments, reexamine policies, or ensure that existing laws are effectively applied. The more specific recommendations concern areas where OECD has been previously engaged—bankruptcy, regulation of labor markets, tax, and patents. In the U.S. bankruptcy laws are lenient and labor markets are relatively unregulated—and so are not salient issues, as they are in certain European economies. The remarkable nexus between the tax issues (profit-shifting) and patents is most prominent feature of the report, both because of the visibility of the issues and because of the linkage across policy domains.

Patent rights are territorial, but they can be sold across borders to affiliates and third parties, creating opportunities for regulatory arbitrage and expanding secondary markets. A movie version might look something like this:

*R&D subsidized by one government's tax credit leads to filing patents in other countries which are then acquired by nationals of a third country, placed in corporate shells chartered in a fourth country, parked in a fifth country for tax purposes, and then used to attack companies in a country with patent-friendly courts and a large (and therefore valued) market.*

This kind of scenario is particularly troublesome when national patenting standards differ and when the allegedly infringing company has independently developed and implemented the technology. It is even more troublesome when governments assert the patents—for example, the French sovereign patent fund, France Brevets, [\*recently filed suit against LG \(Korea\) and HTC \(Taiwan\) in the U.S.\*](#) (over U.S. patents).

## Knowledge-Challenged Governance

U.S. government oversight of this first phase of the OECD project was under the Council of Economic Advisors (CEA). But CEA members and staff are academics that rotate in and out of government regularly (typically two years for members but only one year for staff). Individual chapters may be read by particular agencies and congressional committee staff, but specialists can go directly to the relevant materials for the different chapters. See the websites linked by chapter titles above, which are normally more complete and current. The report as a whole will fare better in countries with a more coherent or institutionalized approach to innovation policy, but it does not have a ready home in the U.S. government.

In a compartmentalized crisis-driven government, how do policymakers engage with subject matter this complex, heterogeneous, and, indeed, intangible? Issues that sprawl across multiple departments, jurisdictions, and policy domains are easier to ignore than those firmly within the remit of an established bureaucracy and chain of command. The CHS investment categories assets span not only economic differences but vast differences in legal and policy mechanisms. The CHS framework is now an established reference for cross-national and longitudinal measurement—a unique and serviceable starting point.

Yet underlying the structure and completeness of the investment framework is set of messy problems. In particular, these include:

- the changing nature of assets and the relationship between sharing and control;
- the increasing diversity, complexity, and context-dependence of knowledge;
- accelerated change and growing tension between innovation and the cycles and timeframes of established institutions; and,
- the latent differences within knowledge-based capital and the effects of availability bias on public policy.

### The “Asset” Problem

The OECD project does not dwell on the definitional and conceptual issues around “assets.” CHS was designed to measure investments, not the value of recognized assets that resultant from investments such as intellectual property rights. These investments vary greatly in how easily they can be transformed into assets subject to expectations of ownership, control, tradability, and monetization.

Table 0.2 on p. 41 shows, intangible assets can be protected by a variety of intellectual property regimes that overlap CHS categories and subcategories.

**Table 0.2. The protection of knowledge-based capital by intellectual property rights**

Type of investment	Legal forms				
	IPR				Other (trade secrets, contracts, etc.)
	Patents	Copyright	Design rights	Trademark	
Software	X	X	X		
Databases		X			X
Research & development	X		X		
Artistic originals		X	X		
Design	X	X	X		
Market research		X		X	X
Business process	X	X			X
Training					

Source: Clayton, UK Intellectual Property Office (unpublished).

While Table 0.2 suggests considerable differences within CHS-like investment categories, it appears both overinclusive (i.e., copyright protection of business processes?) and underinclusive. Software can be protected by trademark, contract, and trade secret, as well as patents copyright, and design rights. Investments in firm-specific training can be protected to some degree by trade secrets and contracts with non-compete agreements. Some legal regimes vary across nations—such as [utility models](#), software and business method patents, and, in Europe, [sui generis database protection](#). Lawyers typically advise securing protection in as many ways as possible, but it does not follow that protections combine to function optimally at an industry, national, or global level. SMEs in particular may be disadvantaged by high

costs of formal protection, notably patents, and prefer informal means such as secrecy and restricted access.

In practice, intellectual property protection tracks investment unevenly and indeterminately. Patents are especially problematic. A single pharmaceutical patent may correspond directly to both the underlying investment and present market value of a particular molecule. Alternatively, a patent may cover one of tens of thousands of functions implicated in a complex information technology product, which is impossible to trace to any particular investment. Much of what goes into a final product may be protected by less formal means (time to market, complexity, secrecy, complementary assets, or copyright in the case of software). Even where patenting is possible, it is not necessarily used. A recent [study](#) of the [annual R&D 100 awards](#) for innovation from 1977 to 2004 found that overall less than 9% of the award winners were patented.

Nor can rights be aggregated from firm-level to industry-level to national-level, as tangible goods can be aggregated. This is obviously the case for regulatory rights such as taxi medallions, since the market becomes diluted and congested. Patents, unlike other forms of intellectual property, do not permit independent creation and so impose knowledge externalities on others. Every innovator is charged with knowledge of what has already been patented—or, more problematically, is in the process being patented. Again, this is especially problematic for software and other digital technology, where hundreds of thousands of patents may read on a complex product like the smartphone. Even more so when the subject matter is intangible, such as business methods and software.

Much investment in R&D results in [negative knowledge](#)—knowledge about what does not work. In some cases, negative knowledge can be protected as a trade secret, but it also adds to human and organizational capital, and it makes further investments more efficient.

The project's shift from intangible assets to knowledge-based capital is not just packaging. In conventional accounting and statistics, assets are measured or not. They are never negative. (Except in the sense of liabilities, another story entirely.)

Knowledge can be incomplete, context-dependent, or defective, and the need for *knowledge about knowledge* compounds costs and adds dimensions of uncertainty and indeterminacy. Patents may be invalidated by other knowledge, including prior art available only in Chinese. Patents do not confirm that the claimed technology actually functions as represented, so [patents may be granted for fraudulent work](#).

Human and organizational capital are problematic in a different sense, because the control normally required of assets is generally incomplete or shared. Employees are not slaves, and much of organizational lies in relationships, internal or external, that benefit both sides of the relationship and that can be impaired by either side. “Asset” assumes an object—a node rather than a link. As knowledge professionals advance in age and experience, much of their worth lies not in what they know but who they know.

It may be easy to approximate human capital by educational attainment and an associated earnings premium, but it is difficult to measure relationships and contracts. Ironically, information on licensing, sometimes viewed as the lifeblood of the intangible economy because nonexclusive licenses can be executed over and over for the same asset, is remarkably patchy. [Different categories are lumped together and reported differently in different contexts](#). The statistics do not distinguish between exclusive and nonexclusive or whether the licensing is voluntary or not (as when settlements are extracted by patent assertion entities). Cross-licenses, by all accounts the dominant form of licensing ICT, disappear entirely from corporate books, statistics, and tax reporting (except for any balancing payment that may reflect differences in negotiating positions).

## The Complexity of Knowledge

There are more kinds of knowledge than there were in a pre-digital world. Data and software may be new investment categories, but they also evidence fundamental change in the scale, scope, organization, and production of knowledge. Unlike the knowledge embodied in tangible products, the knowledge embodied in software can be moved in and out computers and accessed from anywhere. The knowledge in software can be updated routinely, almost costlessly. Data, once a costly-to-collect, time-specific snapshot of the tangible or financial reality, has become a stream that can be collected, combined, and repurposed in real time on a global scale.

Most significantly, knowledge is now networked, much like human, social, and organizational capital, and this is virtually impossible to capture in an asset framework. Thus, the web reflects and emulates the combinatorial and contextual nature of tacit knowledge. Communications can be organized in an infinite number or many-to-many configurations—unlike the point-to-point telecommunications or open broadcasting. In the other direction, the knowledge object fragment into bits, [function points](#), and internal links, while the value of the fragments is further diluted by the need to assemble and integrate large amounts of data and/or functionality into a coherent and tradable working package. Modules, layers of abstraction, and interface specifications ensure that the package works and can be connected and/or traded. Competition is mediated by a need for global-scale cooperation.

It is confidence in this digital and social infrastructure that enables money to move with such fluidity around the globe. Even where money moves from one currency to another, the sovereign force behind each side leads to hypertrophic markets that overshadow the tangible economy. Foreign exchange volume runs around [\\$5 trillion per day](#)—equivalent to almost the entire annual GDP of the U.S. every three days. 85% of the transactions involved dollars on one side, indicating the importance of the world's reserve currency in enabling fluid exchange.

The digitally enabled fluidity of currency also allows for the rapid movement of value across markets as well as from jurisdiction to jurisdiction. The financial crisis may have originated in the real economy's housing bubble, but the links to securitization, structured investment

vehicles, financial innovation, international interdependencies, and gambling led to effects much larger the real economy in which it was initially rooted. Before the crisis, finance was too commonly seen simply as a lubricant for the real economy—not as a networked economy with its own logic, extending from mortgaged homes to disembodied wagers in naked swaps. But networks of credit are very different from one-off transactions like foreign exchange. They carry obligations for repayment that extend over time and depend on the solvency of chains individuals and institutions as nodes in the system.

Transactions for intangibles are more complex, although they do not necessarily carry future obligations or depend on liquidity or solvency of the nodes. Rather the complexity is from context-dependent nature of knowledge—the overhead in assessing the value of knowledge-based capital.

### **Rate of Change and Spread**

Asset accounting divides the present from the future with a bright line at the one-year mark. Short of the line, current expenses presumptively generate current value; beyond the line, investments generate future value over a predicted period of amortization. Capitalization merely introduces the challenges of resource allocation and matching knowledge with action, now and at different points in the future. Tangibles are tied to the actuarial realities of depreciation and depletion. The variables that make intangibles hard to value in the present are compounded and amplified over an indeterminate future. There are futures markets for commodities but not for knowledge-based capital. Not yet.

In much of finance, the future is defined by dates certain—and discounted by present interest rates. Yet finance has been fueled, lubricated, and propelled to the speed of light by digitization, expanding the spread between the near term and the long term. It was the overnight repo market that brought down Lehman Brothers and triggered a systemic loss of confidence. By pushing against speed of light, high frequency trading resurrects local advantage against the leveling effects of the Internet.

The challenge for policymaking is not just keeping up with a fast trajectory, but in understanding the growing spread in space, time, and in economic activity, including conflict between fast-moving IT-enabled enterprise and slow-moving legal and political institutions. Paradoxically, digital infrastructure helps manage the spread between nanoscale data and the global web. In fast moving fields with short product cycles, current expenditures may dominate capital investments

Obviously this will not be the case for pharmaceuticals, where time-to-market remains dictated by clinical testing and regulatory approval. (Cycles of the patent system remain the same for both: an 18-month blind period before the application is published, the 3-5 years it takes a patent to issue, and a term of 20 years—an eternity for software.)

More generally, the accelerated, expanding flow of data, communications, and transactions contrasts with the slow, measured pace of legacy institutions. Encoded and expressed

knowledge moves fast on the Internet, while knowledge that is private, tacit, proprietary, contingent, complex, unvetted, or transaction-dependent diffuses more slowly, often unpredictably. The spread between fast and slow expands, as does the spread between time frames, expanding possibilities for arbitrage between fast and slow, short-term and long-term. The greater spread and heterogeneity across types of knowledge—and the capacity to absorb and act—enlarges the strategic universe. Greater asymmetries of information, knowledge, and risk face a diverse and inconsistent set of competitive advantages. Rapid scaling, experience, cash reserves compete against agility and focus of startups.

All that is business opportunity. Institutional stove piping and inertia copes poorly with increasing complexity in space and time. Regulatory, legal, or political decision-making in a large and diverse capitalist democracy requires time. Yet time breeds reliance and a sense of entitlement that adds further to momentum, inertia, and path dependence.

The benefit of thinking about assets and current expenses is that it forces a distinction between present and future. The downside is that does so in simplistic terms that convey the impression of progress while assuring that it goes no further.

## **Intangibility in the Real World**

It may be that “what gets measured gets managed,” but much that cannot be measured gets managed nonetheless. And much that gets measured at the front end does not end up where one might wish. R&D often ends up not as patents for new technology but as experience that informs personal and institutional knowledge—including how things fail and what does not work. Experimentation and failure is a source of human capital.

Acceptance of experimentation and failure in private enterprise is a hallmark of innovation in the U.S., especially in Silicon Valley. Here as elsewhere, OECD recommends loosening of bankruptcy laws in line with U.S. practice. Ultimately, this is an acknowledgment of the risks of entrepreneurship and the need to unburden human capital from errors and to maximize the learning and wisdom that comes from experience—rather than punishing what in retrospect may have been a mistake.

Ironically, one of the cognitive failings that bedevils decision-making, public or private, is the assumption that knowledge is either true or false, known or unknown. A corollary to the great digital fallacy, “information wants to be free”—and that once exposed knowledge is, in effect, known everywhere. This is not unique to the digital environment. The assumption that disclosure vitiates secrecy underlies a traditional rationale for patents. The resonance of Rumsfeld’s “unknown unknowns” shows that we know there is a problem and that it is bigger than we surmise. Knowledge can be wrong, misleading, defective, even dangerous, as well as incomplete, costly, and uncertain.

Even when knowledge can be turned into a patent, the most tangible and specific embodiment of intangibility, its value may lie entirely in its power to disable the investments of others. Or to shield its owner from other patents—to undo the exclusivity that the patent system offers.

When patents are aggregated, their value lies in canceling each other out and in the event of an imbalance, firms could buy freedom of action from firms with bigger portfolios. In an interdependent IT environment where most of the patents belong to somebody else, claims are made that cross-licensing aggregates value, yet firms [fought against the Internal Revenue Service imputing value to cross-licensing](#) for tax purposes.

Although assets may still be privately owned and controlled, although they may be more versatile and more valuable shared rather than sequestered or hoarded. Platforms are more valuable the more they are used. Homes and cars, normally not business assets, are partially commercialized via Airbnb and Uber. If [Elon Musk gives competitors free use of patented technology](#) under conditions of reciprocity are the patents still “assets”? Does organizational capital migrate to reputation, platforms, and other external relationships? Does the network become more valuable than the node?

Some intangible assets create balance sheet liabilities elsewhere, although liability may be widely dispersed and contingent. Noncompete agreements may enhance an employer’s organizational capital, but limit the available human capital of employees. Patents look like assets, but they impose limitations and potential liabilities on others—not something that conventional assets and the reason that patent assertion is a viable business model.

But digital technology quietly subverts the silo, box, and bright line. Spanning boundaries and distance, the Internet blurs lines between firms, markets, and jurisdictions. The Internet enriches two-way communications, but it revolutionizes many-to-many communications—functionality that barely existed in the pre-digital economy. Software, platforms, and infrastructure are becoming [services](#). Networks (email lists, protected websites, conferences, hyperlinked documents) can be set up and torn down at will.

The juxtaposition of knowledge networks and markets points to the underlying tension between relationships and transactions, between unimpeded flow and bankable assets, and between public and private investment in knowledge. The discussion of sovereign/state-supported patent funds raises important questions about the role of the state in promoting, participating in, or at least making sense of markets, especially markets where the state creates the assets involved. Should all nations aspire to maximizing investment in knowledge-based capital? Under the same rules? Should national strategies aim at specialization and barriers to imitation, as the growth of global value chains suggests? Or building a broad but versatile base in human capital that can better address long-term uncertainty.

In the digital environment, the path from human capital to property is quicker and easier. Where property derives from human knowledge, the routes and rules are far more complex, and controversial, than they are for tangible and financial assets. Statistical infrastructure (OECD’s forte) lags far behind.

Knowledge-based capital may look like an esoteric domain from the perspective of the tangible economy. Yet, ironically, public sector intervention in the intangible economy has been greater than in the more familiar tangible world. But the extent of intervention has been

blurred by many differences among forms of intangible assets and the diverse contexts in which they are used.

## Conclusion

Europe with its high levels of unemployment faces a global digital economy where minds and eyeballs are owned by high-tech behemoths, mostly American, that employ few local workers. In the U.S., the employment problem is on a long fuse, and there is greater optimism in the complementarity of human knowledge and advanced technology.

Unlike the U.S., some governments have innovation agencies that can benefit from the diverse insights and implicit provocations within the OECD report. In the U.S., connecting the dots in exotic domains is left to the White House with the consequence that it may be seen as temporary, invasive, or partisan. The jurisdictional lines within Congress are fewer but harder to bridge, and Congress will be remembered for eliminating its own Office of Technology Assessment, demonstrating that it did not need broad capacity for foresight.

The OECD work on knowledge-based assets spans a lot of boundaries. The tax chapter stands out, by showing eye-opening linkages between R&D tax credits, patents, and cross-border regulatory arbitrage—and the ultimate disadvantaging of small business in favor of multinational incumbents. This effort has just culminated in report on the [tax challenges of the digital economy](#).

In many respects, *Supporting Investment in Knowledge Capital, Growth and Innovation* is OECD at its top of its form, probing economic frontiers for the benefit of its members and, increasingly, the global public. While it contains few new conclusions, it leaves governments better informed to develop their own in very murky territory. It invites further interaction with the secretariat and OECD peers.

Yet there are many in the U.S. who are skeptical of anything out of Paris and are convinced that the U.S. has little to learn from the rest of the world, let alone others in the OECD. While it has a small, ably staffed office in Washington, OECD lacks an enduring intellectual presence in the U.S. This is unfortunate in that the U.S. experience with new knowledge, innovation, economic competencies, and intellectual property often informs the experience and reactions of other countries—and the shaping of global consensus where that may be possible. It means that venturesome reports like this one do not get the traction they deserve.