

Know-How in Postwar Business and Law

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ABSTRACT: In the mid-twentieth century, businesses around the world began to see technical know-how as one of the most important assets they could possess. While their exact definitions of *know-how* varied (usually centering on employees' tacit knowledge; accumulated, minor innovations rather than just patentable inventions; and tailoring to local conditions), the rapidly growing perception that it was invaluable led to widespread know-how licensing. As businesses embraced it, legal scholars and business lawyers during the 1950s through the 1970s scrambled to clarify legal bases for intellectual property protections for know-how. In the 1970s Supreme Court decisions undermined this effort, and a consortium of legal organizations turned instead to lobbying for statutory protection for the related, narrower category of "trade secrets." Despite the rise and relative decline of know-how in American business and law, interest in the term spread to other languages and legal systems, and the repercussions of these shifting understandings of technology transfer remain with us today.

Introduction

From the 1950s to 1980s a number of surveys asked companies what they viewed as the most important factor in technology transfer, and the consensus was clear: *know-how*.¹ The International Chamber of Com-

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1. I will discuss details of these below, but examples include survey results in Jack N. Behrman, "Licensing Abroad Under Patents, Trademarks, and Know-How by U.S. Companies"; Jack N. Behrman and Wilson E. Schmidt, "New Data on Foreign Licensing";



merce (ICC) in 1955 argued that know-how had “become in recent times tremendously valuable subjects of industrial property . . . [it has] assumed a great economic importance, and [is] the subject matter of an increasing number of very important agreements between business enterprises.”² A 1952 article in the trade journal *Chemical and Engineering News* dubbed know-how “our Maginot Line,” suggesting that a public poll would show that Americans regarded the nation’s security as based on the atomic bomb and “the great American Production Know-How.”³

This importance is remarkable, in part because know-how was—at least in the perception of businessmen and their lawyers at the time—an entirely new phenomenon that arose after World War II. Starting in the 1940s and continuing through at least the 1970s, interest in technical know-how shot up dramatically among business leaders, politicians, and legal scholars alike. As the following graph from Google’s Ngram tool shows, usage of the term took off during this period, from obscurity to becoming far more widely used than similar terms (fig. 1).⁴

As will be discussed below, business and legal scholars writing at the time corroborate this trend, frequently commenting on the novelty and sudden importance of know-how. The term, then as now, was somewhat amorphous, a catch-all for the hands-on knowledge, skill, and experience necessary to utilize a technology effectively, with the concept of *tacit knowledge* at its heart.⁵ Although the definition shifted somewhat, it usually encompassed the closely related concept of *trade secrets*. An example would include a mechanic who, through years of working with particular factory machinery, had discovered small adjustments that made it more efficient or that a particular type of wood pulped more easily, or who had simply mastered a complex piece of equipment and could effectively pass

Lajos Schmidt, “Licensing Know-How, Patents, and Trademarks Abroad”; Irving H. Siegel, “Scientific Discovery, Invention, and the Cultural Environment”; and Joel A. Bleeke and James A. Rahl, “The Value of Territorial and Field-of-Use Restrictions in the International Licensing of Unpatented Know-How.”

2. International Chamber of Commerce, *Statements and Resolutions of the ICC*, 98–99.

3. A. M. Zarem, “Know-How, Our Maginot Line.”

4. Ngram charts how often a term appears in the corpus of all books that Google scanned (over 5 million), as described in Jean-Baptiste Michel et al., “Quantitative Analysis of Culture Using Millions of Digitized Books.” While some commentators have rightfully argued that Ngram is not definitive proof of anything, since its data cannot easily be cross-checked, it is still suggestive and useful. Very little historical evidence is, by itself, indisputable proof of anything; it is in balance with other sources that we can build worthwhile arguments.

5. Michael Polanyi, *The Tacit Dimension*; Harry Collins, *Tacit and Explicit Knowledge*; Davis Baird, *Thing Knowledge*; H. M. Collins and R. G. Harrison, “Building a TEA Laser”; Stuart W. Leslie and Robert Hugh Kargon, “Exporting MIT”; David Kaiser, *Drawing Theories Apart*; Donald MacKenzie and Graham Spinardi, “Tacit Knowledge, Weapons Design, and the Uninvention of Nuclear Weapons.”



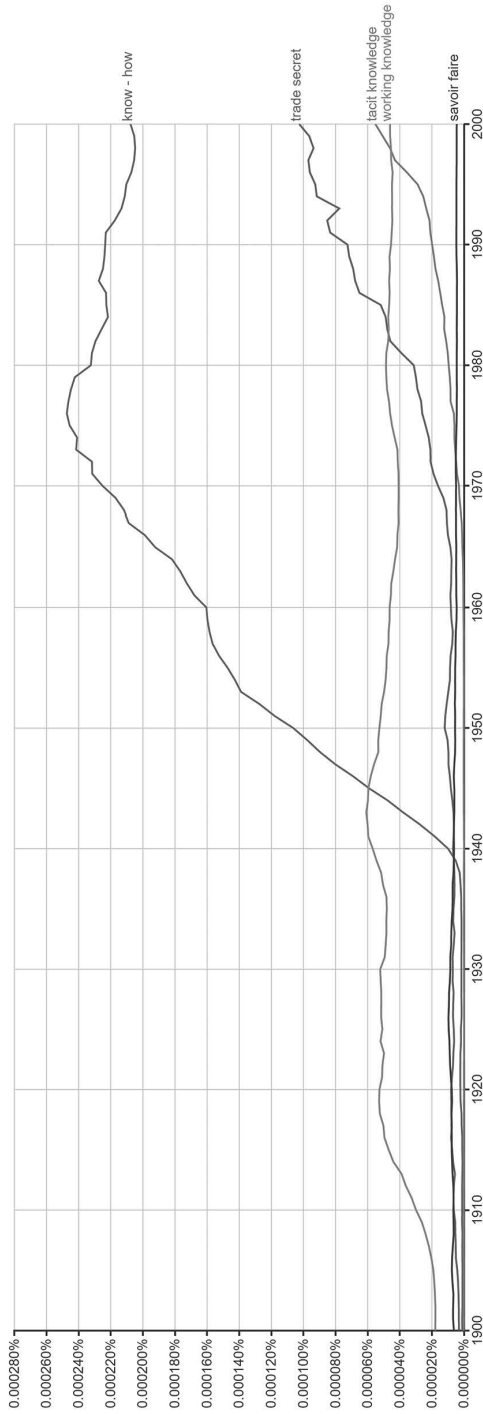


FIG. 1 Know-how versus trade secret, tacit knowledge, working knowledge, and savoir faire in English-language usage. The data are drawn from Google's Ngram (<https://books.google.com/ngrams/>).

on that skill only through personally training others. Those seeking to replicate the factory without these accumulated, individually minor insights might eventually succeed, but only after extensive cost and uncertainty; thus it might be far easier to purchase the know-how by hiring the company to send the skilled mechanic to oversee the new factory for a time. Similar concepts are at least centuries old, including the early modern guild system built around passing on skills through apprenticeship training. Yet, if the concept is old, the widespread use of the term *know-how* was a new phenomenon, its spiking popularity reflecting (and perhaps creating) major changes in the international business and legal worlds during the second half of the twentieth century.⁶

Know-how mattered because if, indeed, some vital aspects of technology resisted codification and easy communication, technology transfer was impacted. In a postwar economy in which multinational corporations sought to expand into new markets, governments reformed their intellectual property regimes to achieve various policy goals, and economic-development programs sought to “modernize” less wealthy nations through exporting technology, understanding how to make technology work within new contexts took on new importance. The extent to which this interest in technology transfer drove the rise in the usage of the term and whether its availability within the common lexicon enabled easier and clearer discussion of the concept (and thereby shaped these policy discussions) are difficult to untangle. Regardless, this was a period in which how technology was conceived—and its embodiment in skilled workers—became a far higher priority in international business and law.

The ambiguity of the *know-how* only made it more useful to businesses, as it highlighted all of the value the firm had to offer that went beyond what could be protected through the patent system: the trade secrets, the hands-on knowledge and employee technical skill that resisted codification, and the multitude of minor innovations that did not rise to the level of novelty and non-obviousness necessary for a patent. The rising popularity of the term made it possible to conceive of and enact “know-how licenses” in which one firm agreed to teach another how to utilize a technology, usually by exchanging engineers and providing hands-on training. These licenses became so popular during the 1960s that they overtook patent licenses in number and importance for technology-transfer agreements.⁷

That same imprecision made know-how a nightmare for lawyers. In reaction to the rapid ascent of know-how licensing, practicing lawyers and legal scholars produced a flurry of law-review articles during the 1950s–70s

6. Pamela O. Long, *Openness, Secrecy, Authorship*; Catherine Fisk, *Working Knowledge*.

7. For the relative importance of patents and know-how in mixed patent/know-how licenses and the prevalence of pure-patent, mixed know-how/patent and pure know-how licensing, see the surveys cited in footnote 1 and the discussion below.



period (and to some degree continuing through the present) in which they tried to grapple with the legal implications of conceiving of technology in such an inclusive way. There was no law on the books in the United States or elsewhere for the legal protection of know-how per se in 1950, nor was there statutory protection for the related concept of *trade secrets*.⁸ The question then was to which established body of law could know-how be analogized? Was it like patents, since they were frequently licensed in a package and were both intangible embodiments of technology? Was it more like a list of customer-contact information—that is, privileged information though deserving less legal protection? How “valuable” was know-how? Was it *property* per se, *intellectual property* (itself an evolving concept), or not property at all?

All of these questions mattered a great deal in antitrust decision-making, as interpreted by state-level courts (each with its own precedents), and for tax implications, as interpreted by the IRS (following its own completely separate precedents and chosen analogies). Should industrial espionage aimed at know-how be a criminal act, falling under theft statutes, even though know-how is intangible “property” and its value difficult to quantify? For that matter, how should courts determine recompense for successful civil suits against a company that illegally acquired know-how—for example, through industrial espionage? Many of these considerations depended on whether or not the know-how had been kept “secret,” yet what did secrecy mean when discussing employees’ technical skills? Was an industrial process uniformly used in the United States though unknown in India a secret to the Indian licensee?

This contrast, between a business world happy to embrace the ambiguity of the term and a legal world that required exactitude and precedent or at least clear analogies, prevented know-how from becoming a lasting intellectual property right. As businesses licensed their know-how widely their lawyers faced judges unfamiliar with the term and prone to compare such licenses (often unfavorably) to the more familiar patent licenses. The end result was a retreat from *know-how* to the narrower category of *trade secrets*, which today is one of the four major categories of intellectual property rights (the others being *patents*, *trademarks*, and *copyrights*). Considering the power that present-day trade-secret law gives companies over current and former employees, this may or may not be a positive development, but it was never a certain or necessary one.⁹ This was not a decision debated by policymakers weighing the best strategies for incentivizing research, rewarding invention, promoting economic growth, or any other

8. On the history of trade secrets protection through common law in the nineteenth and early twentieth centuries, see Catherine Fisk, *Working Knowledge*.

9. For a recent example of trade secrets as a priority for national security and offering firms more control over workers, see the Sergei Aleynikov saga in Peter Lattman, “Court Overturns Conviction of Ex-Goldman Programmer.”



policy goals. Instead, it was a result of centuries-old common law providing only partial precedents for the ownership of technological processes conceived of this broadly; uncertainty about what, exactly, the legal definition of *know-how* might be; and the indirect effects of Supreme Court and circuit court decisions about the how patents fit into society (often with little or no discussion of know-how itself).

This article focuses primarily on U.S. business and law, but there is a broader story here. The term's popularity spread abroad by the late 1950s to countries without the United States' common law or long-standing concern about patents (and things analogous to them) potentially creating monopolies. Know-how has largely disappeared from discussion of intellectual property in America today, and has been similarly ignored in the histories of science, technology, business, law, and ideas. During its heyday, however, *know-how* was a significant phenomenon, shaping and reflecting quickly changing ideas about how technology moves from place to place and person to person.

The Rise of Know-How in Language and Business

The basic idea that technicians develop valuable skills through experience, and can pass these on more easily in person than through writing, was hardly new in the mid-twentieth century. Pamela Long argues that a concept of *intellectual property* began in the early modern guild system, and tacit knowledge lay at the heart of guild organization.¹⁰ The earliest patent systems during the fifteenth and sixteenth centuries were based on attracting immigrant craftsmen with valuable trade skills.¹¹ Catherine Fisk has detailed how nineteenth-century American businesses fought continually for more control over workers' skills and working knowledge, including non-compete clauses in employment contracts.¹²

The importance of the rise of the term *know-how* was not that the concept was new, but that it crystallized an existing one at a time when technology transfer took on new importance for firms. Having a term made possible the licensing, sale, and attempted legal protection of the preexisting, but somewhat inchoate thing. As the term's usage spread, debates about what it takes to transfer technology and communicate industrial science filled the minute books of the International Chamber of Commerce, Supreme Court dockets, trade journals, and enough popular press to shape overall linguistic trends.

10. Pamela O. Long, "Power, Patronage, and the Authorship of Ars" and *Openness, Secrecy, Authorship*.

11. Christine MacLeod, *Inventing the Industrial Revolution*; Christopher May and Susan K. Sell, *Intellectual Property Rights*; Alain Pottage and Brad Sherman, *Figures of Invention*.

12. Fisk, *Working Knowledge*.



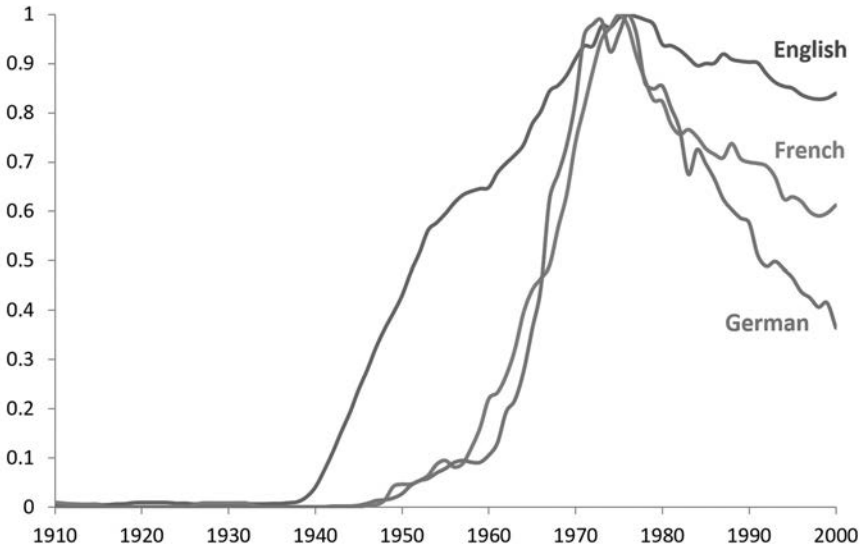


FIG. 2 The normalized usage of *know-how* as a percentage of all words used in English, French, and German. The data are from Google's Ngram.

Within the English language the term rose sharply in popularity during this era and commanded far more attention than similar terms ever had (see figure 1).¹³ Indeed, the term became so prevalent in American English during these decades that it became incorporated into many other languages, including Spanish (*el know-how tecnico*), German (*das Know-how*), and Russian (*ноу-хау*), among others. Foreign trends for these borrowed words follow American usage fairly closely (fig. 2).¹⁴

Figure 2, which also draws data from Google's Ngram tool, demonstrates the similar spikes in how often this term was used (as a percentage

13. Additional Ngram graphs, although not included here, show similar trends for the phrases the know-how, technical know-how, and know-how license, thus reducing the possibility that false positives (such as I know how to do that) are significantly skewing this data.

14. Figure 2 combines Ngrams for the term *know-how* in English, French, and German. I normalized the percentage numbers (the *y* axis) so that the trends can be compared on one graph, and because the exact percentage numbers have little interpretive value (even relatively common words like *history* are never more than 0.023 percent of English in any given year). Since numbers are based on usage of the term as a *percentage* of all words used in that language, the "decline" during the post-1970s era is not necessarily a reduction in the absolute number of times the word was used, but simply a decline in its *relative* frequency. If, for example, the word were used a thousand times per year from 1970 onward, we would see a similar decline here, since the overall volume of published information grew quickly throughout the century. In other words, each successive instance is a smaller slice of a bigger pie, each of which is normalized independently. Thus usage of the term in French and German peaked around 1975. The figure does not tell us whether it was used more frequently in French or in German.



of all words used) in these three languages, with English usages spreading to other languages. As with figure 1, we should not take these Ngram graphs as gospel truth—like any other historical evidence, it would be foolish to rely upon one piece of evidence (however theoretically simple it is for anyone curious to search Google Books for know-how in each year, and verify that the term is being mostly used in the manner discussed in this article). Fortunately, many contemporary observers interested in business, law, and policy also commented on this trend. No journal article tracing the history of an idea can be truly exhaustive, but quotations from those at the time, combined with these Ngrams and cited secondary materials, can together support the argument that a significant shift took place in the intensity with which people concerned themselves with the tacit dimensions of industrial science and technology during this era.

As early as the late 1940s British MPs debating patent reform commented on a new trend toward the importance of know-how. Viscount Swinton noted in April 1948 that “it is interesting to observe that in the United States the tendency to seek protection by patents is, I think, rather falling into desuetude. The tendency over there, when a new process is discovered, is now not to take out a patent to protect it but rather to rely on being first in the field and having the know-how.” Lord Chorley agreed: “In many industries the isolated invention is of no importance. Invention is a matter of building up an immense expertise and ‘know-how’ and that is a matter the Corporation will have closely in mind.”¹⁵ Prime Minister Clement Attlee saw “what is sometimes called the industrial ‘know-how’” as the key to preserving atomic secrecy, and Sir J. Hutchison later promised to make available “that American jargon—the ‘know-how’” to other European countries “on reasonably favourable terms.”¹⁶

The reasons for the timing of this spike in usage are impossible to prove definitively, but a number of possibilities seem at least highly plausible. World War II forced a wide range of government and business leaders to actively consider the challenges of technology transfer. Internally, U.S. firms worked on army contracts that required information sharing, while externally, sharing technical information and intelligence with Allied nations was a priority.¹⁷ There was some hope that the great information technology of the day—microfilm—would revolutionize intelligence sharing of all kinds, since it dramatically reduced the cost of transporting and storing data, but these hopes (as with so many idealistic others of free

15. Hansard, House of Lords, 29 April 1948.

16. Hansard, House of Lords, 8 October 1946; House of Commons, 12 November 1956.

17. This led to some consternation among firms after the war, as their lawyers sought ways to defend against losses of their trade secrets and general know-how through the government’s requirements for disclosure in defense contracts. See, for example, Robert E. Beach, “A Question of Property Rights.”



information through technology) were never quite fulfilled.¹⁸ Immediately after the war, the United States, United Kingdom, and other Allied governments recruited a wide array of businesses to investigate and acquire technology from occupied Germany. The business leaders, enthusiastic at the start, struggled with this massive technology-transfer project, and throughout these nations they described their challenge in terms of no amount of written information being able to capture the all-important *know-how*.¹⁹ For the wide range of industries participating in and discussing these frustrations, this was likely a lasting lesson.

The technological achievements of the war—not least the atomic bomb—augmented America's already strong and growing reputation for science and industrial technology, while simultaneously destroying much of the European competition. In the years after the war U.S. businesses led the expansion of multinational corporations, which became such a prominent feature of postwar global economics.²⁰ U.S. firms reported in a survey in 1958 that revenues from the licensing of industrial processes was becoming a major export, with much of the increase driven by foreign demand rather than their own efforts: “foreign companies seek know-how licenses because of the complexity and expense of obtaining know-how on their own.”²¹

This was especially true for developing countries, who hoped to leapfrog Western technological leads while avoiding dependency, and some of these regarded know-how licensing as better for that goal than patent licensing or allowing foreigners to invest directly. Of course, while the term *el know-how tecnico* spread into Spanish, not all terms translated precisely their English originals. As one observer noted regarding Latin America:

The term “technology,” as used by third world countries, goes considerably beyond its traditional concept as understood in western countries, and covers in addition to scientific and industrial know-how, operational and managerial know-how, such as how to organize and operate industrial, agricultural, touristic and other types of large

18. Pamela Richards, *Scientific Information in Wartime?*; Alan M. Meckler, *Micro-publishing*.

19. Douglas O'Reagan, “Science, Technology, and Know-How.”

20. Mira Wilkins has traced the roots of multinationals further back, but she and other business historians place the rapid expansion of such businesses from the 1950s onward. See Wilkins, *The Emergence of Multinational Enterprise* and *The Maturing of Multinational Enterprise*; and Alfred D. Chandler Jr. and Bruce Mazlish, eds., *Leviathans*. On earlier multinationals, see Volker R. Berghahn, ed., *Quest for Economic Empire*; Hans-Joachim Braun, *The German Economy in the Twentieth Century*; John Lesch, ed., *The German Chemical Industry in the Twentieth Century*; and Mira Wilkins, “German Chemical Firms in the United States from the Late Nineteenth Century to the Post-World War II Period.”

21. Behrman and Schmidt, “New Data on Foreign Licensing.”



projects. In fact, a growing number of transactions have recently involved exclusively this type of know-how.²²

Still, in 1958 highly industrialized nations were the most common licensors of U.S. know-how: England, France, Germany, Canada, Australia, and Japan. This was a bidirectional flow of technology, but a very uneven one. In that year, only a third of the U.S. firms licensing know-how had themselves licensed foreign know-how.²³

Cold war foreign aid played a role in promoting American know-how as well, as President Truman advertised his principal post-Marshall Plan foreign-development plan as “making our scientific advances and technical know-how available for the improvement and growth of underdeveloped areas.”²⁴ This principle was not just addressed to developing nations; programs like the Anglo-American Council on Productivity placed British engineers in U.S. firms for weeks or months in order to learn how to improve British productivity (thereby, in theory, making them stronger defense partners).²⁵ U.S. firms later reported that these programs drove know-how licensing: “the technical missions visiting in the United States had increased inquiries and eventually [our] licensing agreements.”

Setting the appropriate terms for sharing know-how caught the attention of the ICC in the early 1950s. It launched a study in 1955 on the legal protection of industrial know-how, finding that “hardly any country so far has dealt in an adequate and comprehensive way with the protection of industrial know-how.”²⁶ The resolution resulting from this study, published in 1961, was part of a successful campaign by the ICC to have the nascent European Economic Community (EEC) recognize know-how as an equivalent to intellectual property.

Few sources exist to document overall trends in technology licensing (which is part of the reason why trade secrets and know-how have received

22. Quote from Samuel V. Goekjian, “Legal Problems of Transferring Technology to the Third World,” 565. See also: Stephen P. Ladas, “Legal Protection of Know-How”; Edward Wolfe, “Restrictions in Know-How Agreements”; Carlos M. Correa, “Legal Nature and Contractual Conditions in Know-How Transactions”; Bleeke and Rahl, “The Value of Territorial and Field-of-Use Restrictions in the International Licensing of Unpatented Know-How”; Suzanne F. Greenberg, “The WIPO Model Laws for the Protection of Unpatented Know-How.”

23. Behrman, “Licensing Abroad Under Patents, Trademarks, and Know-How by U.S. Companies”; Behrman and Schmidt, “New Data on Foreign Licensing.”

24. Harry S. Truman, “Special Message to the Congress on the Mutual Security Program,” 185.

25. Anthony Carew, “The Anglo-American Council on Productivity (1948–52)”; C. X. George Wei, “The Economic Cooperation Administration, the State Department, and the American Presence in China, 1948–1949.”

26. International Chamber of Commerce, *Statements and Resolutions of the ICC*, 98–99. For a discussion of the history and organization of the ICC, see Dominic Kelly, “The International Chamber of Commerce.”



so much less scholarly attention than easily quantifiable patents), but researchers studying the business world viewed this interest in know-how licensing as a major trend throughout the 1960s and into the '70s. The journal of the United States Trademark Association noted in 1964 that “know-how is a subject of increasing importance in international agreements and international investment. . . . [I]t has come to be the handmaid of progress and the core of industrial competition.”²⁷ Another legal scholar in 1967 agreed: “There is a current and real interest in the licensing of know-how or technical information. The volume of such licensing is said to be increasing, particularly in dealings abroad.”²⁸ A survey conducted in 1979 of forty major American companies about common practices in technology licensing found that “frequently licensors are licensing primarily know-how.”²⁹ According to these companies’ responses, 25 percent of all licenses were solely for know-how, and another 42 percent were mixed patent/know-how agreements. This was consistent with similar findings from a study of the British patent system in which researchers found that “many industrialists whom we consulted said quite categorically that the main purpose of licensing is to exchange know-how, etc., with patents a minor consideration added in the small print at the end of an agreement.”³⁰

Overall, know-how licensing became a significant American export. The U.S. National Industrial Conference Board estimated total foreign licensing royalties at \$500 million in 1957, “of which know-how licensing undoubtedly constituted a substantial portion.”³¹ The U.S. Department of Commerce’s Bureau of Economic Analysis provides data on licensing fees paid to and by U.S.-based companies for “industrial processes” from 1987 to 2005. Over this period the net revenue in license fees for these industrial processes grew by 7.2 percent annually, from \$10.2 billion in 1987 to \$64.8 billion in 2005.³² Data for 2012, although tabulated differently enough to disallow direct comparison to the 1987–2005 numbers, show that licensing of “industrial processes” brought in greater revenue than “general use computer software” (\$42.8 billion to \$39.5 billion), and substantially more

27. Ladas, “Legal Protection of Know-How.”

28. Wolfe, “Restrictions in Know-How Agreements.”

29. Bleeke and Rahl, “The Value of Territorial and Field-of-Use Restrictions in the International Licensing of Unpatented Know-How.”

30. Christopher Thomas Taylor and Aubrey Silberston, *The Economic Impact of the Patent System*, 111–12.

31. David R. Macdonald, “Know-How Licensing and the Antitrust Laws,” 252.

32. Using constant 2014 dollars (adjusting for inflation) for each of these numbers and adjusting by simply using the increase in the Consumer Price Index for each year, this would be approximately \$4.08 billion in 1957, \$20.6 billion in 1987, and \$76.2 billion in 2005. Other methods of adjusting for inflation will give different results, but the growth in the importance of exporting “industrial processes” over the second half of the twentieth century is clear. The data for the period 1987 to 2005 are from http://www.bea.gov/international/international_services.htm.



than either “film and television tape distribution” or trademarks (\$16.2 billion and \$16.8 billion).³³

So what exactly were these companies licensing? The breadth of definitions was a feature, not a bug: it was “a convenient term to denote a variety of different matters,” eschewing the narrow focus of patents.³⁴ It usually meant the firms exchanging technical personnel for extended periods, with details laid out in the contract. An article in the trade journal *Electrical Engineering* in 1949 pushed firms to consider the new trend of know-how licensing, describing them as “provid[ing] the foreign manufacturer with reliable ‘de-bugged’ designs in return for . . . payment,” as well as “another less tangible but equally desirable feature from the standpoint of the foreign licensee . . . a technical listening post within the United States where a large fraction of the world’s technical research is being carried on today.”³⁵ Those licensing out their know-how, in turn, received extra revenue for their abilities and an opportunity to explore foreign markets without the commitment of wholesale expansion. All of this depended of course on finding a basis for protecting these agreements in courts of law.

Amorphous “Glob[s] of Technology”

Another way of answering what know-how licenses meant (as well as to define and clarify the term itself as much as possible) is to examine the changing legal definitions of *know-how* in U.S. law. This is more difficult, however, than it might seem. Even limiting ourselves to the legal community (including both professors of law and practicing business lawyers), nearly every author of the hundreds of articles and books on the topic subtly redefines the term. The only clear trend overall is a tendency from the 1980s onward—as will be discussed below—to subsume the term into “trade secrets.” This is a reversal of the standard from the 1950s to the ’70s of considering trade secrets as a limited aspect of know-how.

A few examples might clarify (or appropriately muddle) our understanding of what the term meant to scholars and business lawyers during the 1950s through the ’70s. A basic definition that more or less matches most later attempts is that from Kingman Brewster, a professor at Harvard Law School (and later president of Yale University) in his influential 1958 book *Antitrust and American Business Abroad*:

For convenience, we shall call all unpatented information “know-how.” Know-how, however, may mean several different things. It

33. The data for 2013 are from http://www.bea.gov/international/international_services.htm.

34. Ladas, “Legal Protection of Know-How,” 398–99. This entire paragraph is repeated, with suspicious similarity and minus the citation to Ladas, in Hale A. Newcomer, “Legal Protection and Licensing of ‘Know-How’ Internationally,” 228.

35. David Bartlett, “Engineering.”



may consist of designs, formulas, and processes which could be patented but for reasons of nondisclosure were not. Or it may be a highly personalized skill accumulated over years of experience which cannot be communicated or taught except in person. It may be objectively recorded information embodied in manuals which represent the continuing accumulation of solutions to production “bugs” and problems. Or it may be the provision of a personal advisory service, managerial or technical, expert but not unique.³⁶

Many authors began with a disclaimer of the impossibility of a precise definition, such as in a 1960 article on “‘Know-How’ Licensing and Capital Gains”:

The term “know-how” is not susceptible to exact definition. In the broadest sense, it may consist of inventions, processes, formulae, or designs which are either unpatented or unpatentable; it may be evidenced by some form of physical matter, such as blue-prints, specifications, or drawings; it almost invariably includes trade secrets; and it may involve accumulated technical experience and skills which can best, or perhaps only, be communicated through the medium of personal services. It can be seen that know-how as a general descriptive term comprehends a variety of forms and natures.³⁷

Some definitions were broader: “In its highest form, know-how is everything that is necessary to create a going business other than capital and labor.”³⁸ Others were more lyrical:

Know-how, in contrast [to patents], is more likely than not to be an amorphous, ill-defined glob of technology that has no clear time limits and no clear geographic limits. Its subject matter is not only vaguely defined; it is not even publicly defined. As likely as not it is ever changing, like a stream of water flowing through a fish pond, as old know-how becomes public property and new know-how is added to the batch. . . . Know-how, in terms of content and legal status, is like a cloud in the sky that forms, dissolves, forms again, shapes and reshapes as the atmospheric conditions change.³⁹

Most agreed that tacit knowledge acquired by employees through hands-on experience was the core of know-how.⁴⁰ Sometimes codified

36. Kingman Brewster, *Antitrust and American Business Abroad*, 159.

37. John F. Creed and Robert B. Bangs, “‘Know-How’ Licensing and Capital Gains,” 93-94.

38. Macdonald, “Know-How Licensing and the Antitrust Laws,” 254-55.

39. John C. Stedman, “Legal Problems in the International and Domestic Licensing of Know-How,” 250-51.

40. None, however, used the term tacit knowledge until the 1990s to my knowledge. The first time I saw it in legal writing about licensing was in Ashish Arora, “Licensing



knowledge (for example, blueprints, data, drawings) was included. In a small number of cases authors attempted a distinction between *know-how* and *show-how*, although the latter is an even less well-defined term. (For example: “The subject matter involved in a show-how contract is know-how.”⁴¹ Or: “[T]he element of *knowledge* of how science might, in particular situations, be applied in the service of man—sometimes contracted to ‘know-how’—and demonstration of such applications—‘show-how.’”⁴²) This article will ignore the relatively rare show-how/know-how distinction, although it underlines the uncertainty and variety with which people discussed this concept. Ultimately, everyone was united on just two issues: that there was no standard definition of *know-how*, but that the concept was invaluable.

Legal Protection for Know-How

The increased importance of know-how licensing in international trade led quite naturally to businesses and their lawyers questioning exactly how enforceable such contracts would be in U.S. courts. Excited by the prospects, legal scholars and practicing business lawyers perceived “a discernable trend, both in the United States and abroad, to recognize a property right in know-how” in the 1950s, and know-how became a hot topic in the legal world.⁴³ From the 1950s to late ’60s, legal scholars pored over decades of court cases, piecing together arguments for treating know-how as a property right, and found precedents in which know-how had been “sold, licensed, assigned, taxed, transferred by mortgage, subject to levy and sale under a common law writ of execution, exchanged for stock shares in a corporation, the subject of a contract for purchase, [or] considered as good will or other asset in bankruptcy.”⁴⁴ Articles debated know-how licensing,⁴⁵ antitrust implications,⁴⁶ its status as property, and whether to

Tacit Knowledge.” It is certainly possible that others used the term before this point in discussing know-how, but it was not used commonly.

41. Thomas R. Savage and Michael A. Slania, “New Directions in U.S. Export of High Technology.”

42. M. C. W. Pinto, “Legal Aspects of North/South Transfer of Marine Technology.”

43. Christopher G. Root, “The Validity of Transnational Technical Know-How Licensing Agreements in the United States Courts,” 132.

44. John B. Nash, “The Concept of ‘Property’ in Know-How as a Growing Area of Industrial Property,” 292. Nash includes citations to each of the cases that discusses these specific uses of know-how, spanning from 1822 (*Bryson v. Whitehead*, 1 Sim & Stu 74) to 1950 (*Lapin v. La Mour, Inc.*, 87 PQ 390, 11 FRD 339, Minn.).

45. Ladass, “Legal Protection of Know-How”; Newcomer, “Legal Protection and Licensing of ‘Know-How’ Internationally”; Schmidt, “Licensing Know-How, Patents, and Trademarks Abroad”; Stedman, “Legal Problems in the International and Domestic Licensing of Know-How”; Wolfe, “Restrictions in Know-How Agreements.”

46. Macdonald, “Know-How Licensing and the Antitrust Laws”; Wolfe, “Restrictions in Know-How Agreements.”



treat know-how as a capital gain or technical service for taxation purposes, among many other topics.⁴⁷

Ultimately, most of the legal questions that these articles debated came down to two closely interrelated ones: How do you define *know-how*, and what analogies can be drawn between this concept and more established areas of law?

KNOW-HOW AND THE LAW OF UNFAIR COMPETITION

An established body of common law precedents protected *secret*, valuable business information from being *improperly* acquired (such as through fraud or bribery) under principles of unfair competition.⁴⁸ Such principles had the benefit of being an internationally recognized standard through early-twentieth-century revisions to the Paris Convention for the Protection of Industrial Property—a convenient feature for transnational licenses.⁴⁹ As the ICC noted in its 1955 call for stronger international legal protection for know-how, “existing national laws on contract, breach of trust and unfair competition are sometimes applicable to the subject.”⁵⁰ Arguing the value of know-how in court was rarely a problem; secrecy, on the other hand, was tricky.

Unfair competition certainly protected “secret know-how,” or that component also called “trade secrets.” Trade secrecy was itself not a well-established concept during the mid-twentieth century, although businesses in the nineteenth century and earlier certainly recognized the value of workers’ skills and attempted to gain more control of them through employment contracts with non-compete clauses.⁵¹ *Secrecy* was a difficult concept to prove in court, however, thus substantially raising the bar of what could receive legal protection, compared with the broader concept of *know-how*. A new entrant in the chemical industry might be willing to pay for even basic knowledge of industry-standard techniques, and the secrets—that is, the items for which the licensor could prove in court that it had taken significant steps to preserve secrecy and which were not widely known or published anywhere—would only be a small part of what might be needed.

Many legal articles attempted to build on these unfair competition laws—for example, by arguing that *secret* should be interpreted broadly to include knowledge not generally available *within the context of the licensee*; that is, common American know-how might be secret to someone in

47. Creed and Bangs, “Know-How’ Licensing and Capital Gains.”

48. See American Law Institute, *Restatement of the Law, Unfair Competition*.

49. The Paris Convention was one of the first international intellectual property treaties, adopted in 1883.

50. International Chamber of Commerce, *Statements and Resolutions of the ICC*, 98–99.

51. See Fisk, *Working Knowledge*.



China.⁵² Still, this would be a substantial reduction of what businesses meant by know-how, and many felt that focusing on secret know-how fundamentally missed the point. “Know-how seems to me to mean something essentially different from secret and confidential information. It indicates the way in which a skilled man does his job and is an expression of his individual skill and experience,” argued a British judge in *Stevenson Jordan and Harrison v. Macdonald and Evans* (1952).⁵³ Edward Wolfe, a practicing business lawyer, put forth what he regarded as a common viewpoint that “know-how is not capable of absolute secrecy. Like such grave and substantial matters as the ‘secret’ of the atom bomb, it is discoverable through intellectual endeavor or research or experience by anyone who may undertake such effort, subject only to their own limitations.”⁵⁴ Put succinctly, “[k]now-how is much broader than, and includes, that information commonly referred to as ‘trade secrets.’”⁵⁵

KNOW-HOW, PATENT ANALOGIES, AND ANTITRUST

Another inclination of many judges and lawyers was to treat know-how like patents. Both were intangible, valuable business assets involving technology, and the same licenses frequently included both patents and know-how. This had advantages: patents were well-studied, had a clear policy goal (namely, “To promote the Progress of Science and useful Arts”⁵⁶), and a substantial body of precedents addressed a wide range of circumstances. Some lawyers explicitly leaned on this connection by including patents into know-how licenses “in the small print at the end of an agreement to lend an extra element of precision and security to the contract.”⁵⁷ Nor was this empty paranoia. The British Board of Trade and Bank of England rejected one know-how license in 1958 “based on the high royalties being asked, particularly as no patents were involved, and the difficulty of describing and evaluating the intangible asset of know-how. Exception was also taken to the infinite aspect of the know-how which our American friends claimed.”⁵⁸ Courts unsure of the value (or definition) of know-how could find comfort in the familiarity of a patent-sharing agreement, even if the businessmen on both sides understood that the patents were nowhere near as valuable as the know-how.

Patent analogies were not uniformly favorable to know-how licensing;

52. John L. Ruppert and David K. Pansius, “Transfers of Know-How under Section 351.”

53. *Stevenson, Jordan and Harrison Ltd. v. Macdonald and Evans*, 1 T.L.R. 101 (1952).

54. Wolfe, “Restrictions in Know-How Agreements.”

55. Root, “The Validity of Transnational Technical Know-How Licensing Agreements in the United States Courts.”

56. United States Constitution, art. 1, sec. 8, clause 8.

57. Taylor and Silberston, *The Economic Impact of the Patent System*, 111–12.

58. Behrman, “Licensing Abroad Under Patents, Trademarks, and Know-How by U.S. Companies,” 386.



in fact, the mid-twentieth century was a particularly harsh time for patents in U.S. law. One issue was a changing standard of what qualified for being granted a patent. The Supreme Court ruled in 1850 in *Hotchkiss v. Greenwood* that “non-obviousness” was a requirement, which the 1941 case of *Cuno Engineering v. Automatic Devices Corp.* strengthened considerably by requiring that inventions embody a “flash of genius.”⁵⁹ In 1950 the Supreme Court dismissed a patent for a device on the grounds that it was just a “gadget”—a combination of known elements.⁶⁰ The response of the business community was sufficient to successfully lobby Congress to pass the Patent Act of 1952, which codified and reduced the non-obviousness standard. With patentability a moving target, firms became less willing to divulge their inventions via the patent system.

Similarly, a trend toward stricter antitrust scrutiny by the Department of Justice and in judicial rulings substantially eroded the enforceability (and thus value) of patents from roughly the 1910s through the '80s. Patents are inherently limited monopolies on a technology, but U.S. courts balance this against their value for making new knowledge available to the public upon patents' expiration. In addition, they create economic incentives for research and development. The twentieth century saw major swings in how courts weighed this balance between the value of patents and the perceived threat of the monopolies they created. Beyond rhetorical shifts internal to the law, there were broader phenomena involved, such as the distrust of German cartels known for using (and perhaps abusing) patents to dominate chemical markets.⁶¹ Further, some American firms during the interwar period began using patent-licensing agreements as a pretext for dividing up markets, fixing prices, and otherwise operating in violation of the Sherman Antitrust Act. In their history of intellectual property, Christopher May and Susan Sell argue that “the concept of patent misuse reached its zenith in a series of cases in the 1940s, including the *Mercoid* cases and *Morton Salt Co. v. G. S. Suppinger Co.*”⁶² The resulting backlash led to what David Silverstein has called “The Dark Age of Patents.”⁶³

To be sure, patents never went away in the United States, but their utilization declined during the 1960s and '70s, with 66,715 patents filed by domestic companies in 1963, but only 59,390 in 1983. During this period of absolute decline the U.S. economy continued to expand, so the relative decline in patent filing is steeper still. In contrast, the number of patents

59. *Hotchkiss v. Greenwood*, 52 U.S. 248 (1850); *Cuno Engineering v. Automatic Devices Corp.*, 314 U.S. 84 (1941).

60. *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147 (1950).

61. Graham Dutfield, *Intellectual Property Rights and the Life Science Industries*; Kathryn Steen, *The American Synthetic Organic Chemicals Industry*; Lesch, ed., *The German Chemical Industry in the Twentieth Century*.

62. May and Sell, *Intellectual Property Rights*, 139.

63. David Silverstein, “Patents, Science and Innovation,” 304.



accelerated during the 1980s as court decisions made patent protection more enforceable and additional statutory provisions and treaties added to intellectual property protection on the international level (fig. 3).

To the extent that companies felt less confident that a patent would sufficiently protect their technology, this stricter antitrust scrutiny of patents seems likely to have fueled the rise of know-how—especially the secret know-how that could be protected under unfair competition principles. On the other hand, the same sentiment that patents were undue constraints on the free flow of knowledge could undercut know-how agreements also. As legal theorists of antitrust viewed the issue, anyone was free to develop know-how on his own, so in that way it was less monopolistic than patents; but if no one could or did re-create the know-how, it could potentially grant monopoly control over a technology forever, unlike a patent's set term. This was not an issue that U.S. courts have fully resolved. Department of Justice guidelines on antitrust from 1988 commented that

[b]ecause of the essentially similar roles that know-how transfers and patent licensing play in the competitive process, the Department generally analyzes them in the same way. In fact, precisely because know-how is not statutorily defined and protected by a government grant, restrictions in agreements transferring know-how may be even more essential to protecting pro-competitive investment in valuable technology. Because know-how is not necessarily susceptible to precise definition, however, in some cases it may be difficult to distinguish a legitimate know-how transfer from a sham arrangement shielding a naked cartel.⁶⁴

Analogy to patents, with all of their baggage, continued to shape know-how's treatment (for international use) in U.S. courts throughout the post-war decades.

THE COLLAPSE OF KNOW-HOW INTO TRADE SECRECY

Know-how is still a widely used concept in the business world and know-how licenses still certainly exist, but the narrower concept of *trade secrecy* is far more common today in U.S. legal discussions. The transition was gradual and incomplete, but the latter 1970s to the '80s were at least an inflection point in this trend. Continual uncertainty of the definitions of know-how, combined with Supreme Court decisions on patent law, drove this shift.

64. Examples of debate over this issue include Macdonald, "Know-How Licensing and the Antitrust Laws"; American Bar Association, "Comments on Antitrust Law of EU Guidelines on Know-How"; Guillermo Cabanellas and José Massaguer, *Know-How Agreements and EEC Competition Law*. Quote from "U.S. Department of Justice Antitrust Enforcement Guidelines for International Operations," 21612.



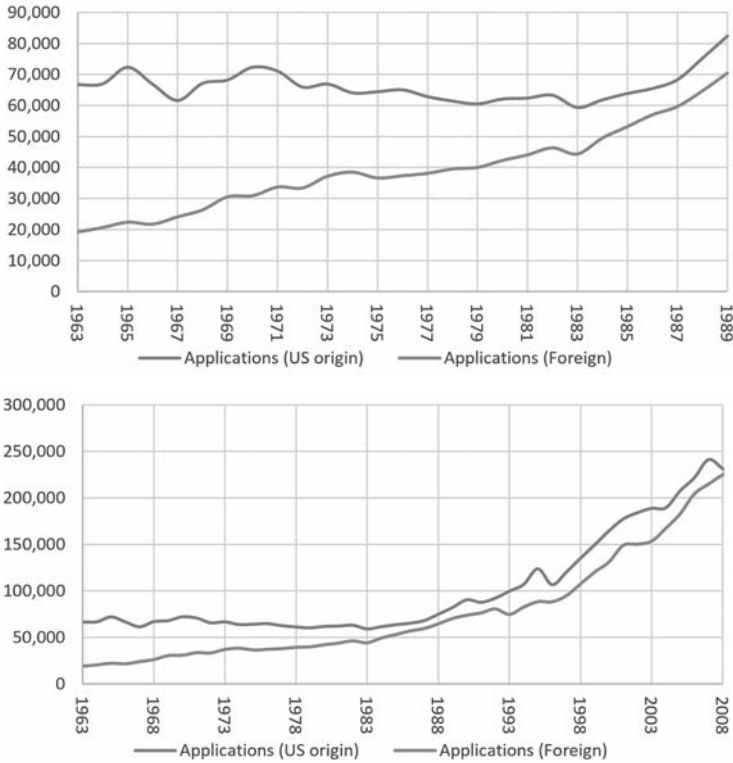


FIG. 3 Utility patents (“patents for invention”) filed with the U.S. Patent and Trademark Office. Top: 1963–89; bottom: 1963–2008. (Source: U.S. Patent and Trademark Office, “Patent Counts by Country, State, and Year—Utility Patents” report.)

Cases unrelated to know-how per se were fundamental to undermining the efforts of lawyers who sought to ensconce it as a clear intellectual property right. The Supreme Court’s decision in *Erie Railroad Co. v. Tompkins* in 1938, delivered just prior to World War II, threw into question the extent to which common law precedents applied in federal courts.⁶⁵ Since the common law principle of *unfair competition* underpinned much of the legal discussion of know-how in U.S. courts, this effectively meant that only state courts would or could enforce know-how licenses, based on state-level precedents. Much more problematic for firms hoping to sue for unfair acquisition of know-how were the 1964 cases of *Sears, Roebuck & Co. v. Stiffel Co.* and *Compco Corp. v. Day-Brite Lighting, Inc.* In these cases the Supreme Court ruled that state-level unfair competition laws, whether statutory or common law, would be struck down if they impinged upon territory handled by federal patent principles (that is, legal protection of

65. *Erie Railroad Co. v. Tompkins*, 304 U.S. 64 (1938).



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technical knowledge). The broad language used in these decisions deeply worried those in the legal community interested in intellectual property, such as the United States Trademark Association, since it could be taken to mean any laws at all that regulated unpatentable knowledge were invalid. During the ensuing years licensing lawyers publicly applauded any ruling that they felt might limit the breadth of *Sears and Compco*.⁶⁶

Three additional cases during the late 1960s and early '70s further undermined the framework for the legal protection of know-how. In *Lear, Inc. v. Adkins* (1969), the Supreme Court placed additional limits on the types of contract clauses permissible in know-how licenses.⁶⁷ Worse, from the perspective of those in the burgeoning field of know-how licensing, the three dissenting justices commented disparagingly about “self-styled inventors” licensing their unpatented or unpatentable knowledge, arguing that it was fundamentally contrary to federal patent policy and an illegitimate restriction of trade.⁶⁸ *Painton and Co. v. Bourns, Inc.*, although a state-level rather than federal decision, went further, specifically invalidating an international know-how license because patent policy “allows compensation only for ideas which rise to the level of invention.”⁶⁹ This reasoning, if taken as a general precedent, would have effectively ended know-how licensing under U.S. law.⁷⁰ It was viewed by licensing lawyers as “a radical departure from the law applicable to know-how agreements” and generated considerable angst. Business lawyers attempted to find loopholes through contract law. These loopholes included clauses requiring arbitration by a body recognizing know-how or specifying the choice of law or forum to make only foreign laws applicable to the contract’s enforcement, as many nations had adopted formal protections for know-how by this time.⁷¹ The overruling of *Painton* by the Second Circuit Court of Appeals in 1971 dampened, but did not end their fears.

Kewanee Oil v. Bicron Corp. (1974) was a milestone in reassuring licensors of technology who worried about the accumulating limitations of the 1960s, while also reshaping the legal discussion about know-how into one about the limits of trade secrecy. In this case a division of Kewanee Oil was ordered to develop a process for creating synthetic crystals for detecting ionizing radiation. Over seventeen years it did so at a cost estimated at \$1 million for research and development, and the employees signed agreements not to divulge any trade secrets learned during their work. Several

66. Sharon K. Sandeen, “The Evolution of Trade Secret Law and Why Courts Commit Error When They Do Not Follow the Uniform Trade Secrets Act,” 507–8.

67. *Lear, Inc. v. Adkins*, 395 U.S. 653 (1969).

68. *Ibid.*

69. *Painton and Co. v. Bourns, Inc.*, 309 F. Supp 271, 164 USPQ 595 (SDNY 1970).

70. *Kewanee Oil v. Bicron Corp.*, 478 F. 2d. 1074, 1086–87 (6th Cir. 1974) (see Sandeen, “The Evolution of Trade Secret Law,” 516).

71. *Painton and Co. v. Bourns, Inc.*, 442 F. 2d. 216, 221 (2d Cir. 1971).



employees left to form their own company, and after they developed comparable crystals within a year, Kewanee sued. The district court granted Kewanee an injunction and damages for the misappropriation of trade secrets, as Ohio (where Kewanee was based) was one of a few states that had passed laws protecting trade secrets. However, the appeals court overturned this, claiming that Ohio's trade secrets law was itself invalid because it poached on the territory of federal patent law. The United States Supreme Court disagreed, arguing that trade secrets protection differed from patents and only prevented the *misappropriation* of knowledge, while leaving open the possibility of others independently developing the same technology. In any event, since much know-how cannot be patented, the fundamental differences between trade secrets protections and patents were found to be such that the two did not conflict, and thus federal patent law did not preempt state-level trade secrets laws, so long as those laws were similar to those of Ohio.

This final aspect was key in reframing legal discussion about commodifying and protecting trade skills and industrial processes. In *Kewanee* the appellants only argued for a narrow interpretation of trade secrets and emphasized the limits of Ohio's law. The court endorsed trade secrets laws protecting information “[not] of public knowledge or of a general knowledge in the trade or business.”⁷² This was a considerably narrower definition than most meanings of know-how. Although this case did not explicitly forbid the legal protection of know-how more broadly conceived, it moved the rhetorical battle lines to defending even a limited scope of trade secrets. Its high profile drew the attention of lobbyists to the uneven protection of even this limited category of secret, valuable know-how. The response to these accumulating cases—what Sharon Sandeen has dubbed the “Erie/Sears/Compco squeeze”—led thirty-six professional associations, including the American Patent Law Association, United States Trademark Association, and the American Bar Association, to form a National Coordinating Committee to work on drafting a uniform trade secrets act⁷³ (fig. 4).

Figure 4 represents the percentage of articles each year in the Hein-Online law review journal database (which is comparable to JSTOR for social science journals) using the phrase *technical know-how*. It neatly illustrates know-how's fortunes in U.S. law. Because it only represents articles using the exact phrase *technical know-how*, it understates the importance of know-how, but its similarity to overall trends in usage of the term is striking (see figures 1–2). Like the Ngram graphs, figure 4 charts the percentage of all articles discussing technical know-how. The actual number

72. *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 475 (1974). This point about the narrowing of trade secrecy through *Kewanee* is Sharon K. Sandeen's; see her “*Kewanee Revisited*.”

73. Sandeen, “The Evolution of Trade Secret Law,” 509.



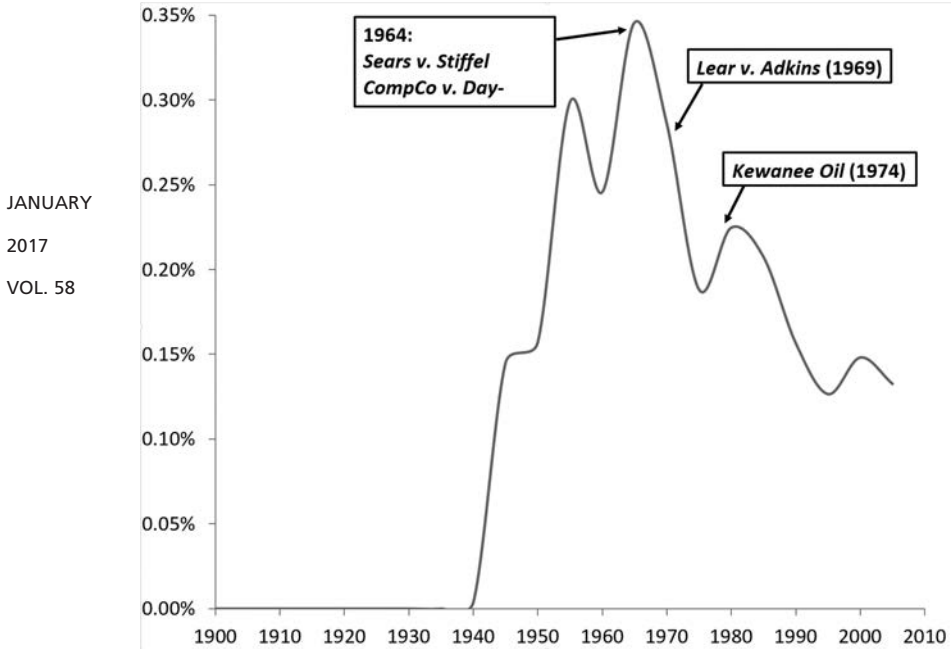


FIG. 4 Articles that contain the phrase *technical know-how* in the HeinOnline law review journal database, as a percentage of all articles.

of articles on know-how continued to grow (modestly) from 1960 onward; only the percentage of law review articles discussing it falls, amid an exponential increase in overall legal writing.

As debate over definitions and politics of what became the Uniform Trade Secrets Act (UTSA) continued for decades, trade secrecy remained the focus of debate, and attention to know-how per se declined. The UTSA became the predominant law governing these issues in U.S. states (superseding common law doctrines) in the late 1980s, but was still not law in every state as of 2013.⁷⁴ Meanwhile, definitions of know-how in U.S. legal discourse increasingly conflated it with trade secrets. A lawyer writing in *International Tax and Business Lawyer* in 1985 noted that “most commentators consider the terms ‘industrial trade secrets’ and ‘technical know-how’ to be functional equivalents. This Article will therefore use the two terms interchangeably.”⁷⁵ An article in 1988 similarly claimed that “[k]now-how’

74. *Ibid.*, 538. As of 2013 the UTSA was law in forty-seven states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. Holdouts were Texas, New York, North Carolina, and Massachusetts. Recently, there have been calls for a federal trade secrets law, although there is already a federal-level economic espionage act that criminalizes the theft of trade secrets by foreign powers.

75. Greenberg, “The WIPO Model Laws for the Protection of Unpatented Know-How.”



is a category of industrial property or intellectual property known in the United States as 'trade secrets.'⁷⁶ An article in 2011 footnoted a discussion of the definition of *trade secrets* by adding: "To further complicate things, trade secrets are sometimes lumped in with 'know-how,' an even less precise type of information that seems to have no legal definition whatsoever."⁷⁷ This was not an absolute shift and *know-how* remains a viable term, especially among licensing specialists. Still, while occasionally definitions of know-how in the 1950s considered it equal to trade secrets, most did not; by the 1990s a distinct concept of know-how in American legal writing became relatively rare.

OTHER LEGAL THREADS IN THE HISTORY OF KNOW-HOW

Of course, the United States is just one country, for all its influence on shaping international intellectual property law.⁷⁸ Supreme Court cases—and the antitrust bent of U.S. courts in general—apply only to the United States, and know-how became an international phenomenon. In the law of the EEC, the primary debate about know-how in the 1970s and '80s was whether it was similar enough to patents to merit the same blanket exemption from certain trade restrictions.⁷⁹ José Gómez Segade, author of *El Secreto Industrial (Know-How): Concepto y Protección* (1974) and professor at the Universidade de Santiago de Compostela in Spain, argued that

[o]ne should not attempt to define know-how in a valid universal sense, but its definition and limits should be left to the national legislatures. A uniform definition of know-how could prejudice those countries which are fundamentally recipients of know-how (underdeveloped nations) to the benefit of the wealthier countries which are those who habitually export the know-how.⁸⁰

Kenichiro Osumi, a former justice of the Japanese Supreme Court, wrote extensively on know-how in Japan, where there were no laws against

76. Dianne R. Phillips, "The [R]evolutionary Treatment of Know-How Licensing under EEC Competition Law."

77. Harry First, "Trade Secrets and Antitrust Law."

78. Regarding U.S. influence on international intellectual property law, see Paul A. David, "Intellectual Property Institutions and the Panda's Thumb"; and Wyatt Wells, *Antitrust and the Formation of the Postwar World*.

79. Cabanellas and Massaguer, *Know-How Agreements and EEC Competition Law*; Phillips, "The [R]evolutionary Treatment of Know-How Licensing under EEC Competition Law"; James S. Venit, "Know-How Licensing under EEC Law."

80. Cited in Correa, "Legal Nature and Contractual Conditions in Know-How Transactions," 457. On know-how laws in Peru and Colombia during the 1950s and '60s, see Bleeke and Rahl, "The Value of Territorial and Field-of-Use Restrictions in the International Licensing of Unpatented Know-How," 453, 465. Of course, these are just starting points; this subject merits substantially more research, especially from the perspectives of developing nations' governments and businesses.



industrial espionage, yet the value of know-how was readily accepted. (One argument he related as being convincing in Japanese courts was the depth of tacit knowledge embodied in forging a samurai sword, beyond what could be conveyed in writing.⁸¹) The German and Austrian “utility model” system (*Gebrauchsmuster*), which provides shorter-term, patent-like protection for processes and methods that do not merit a patent, would seem to reduce the value of a concept of *know-how*, yet the term (*das Know-how*) seems to have become extremely popular regardless.⁸² A comparative history of national laws on know-how—which will inevitably collide with the history of postwar imperialism; the grand debacle of modernization theory; how local ideology influenced understandings of workers’ roles in technology; and cold war diplomacy—is unfortunately beyond the scope of this article.

Another set of issues in need of further research revolves around the move toward criminalization of the theft of know-how/trade secrets and the attendant concern about industrial espionage. Some historians have argued that early U.S. industry was built in large part on the theft of other nation’s industrial secrets.⁸³ Business interests used tales of industrial spies during the 1970s to push for new laws criminalizing trade secrets theft.⁸⁴ Existing histories (and policy debates) that touch on industrial espionage tend to be somewhat credulous about business’s own reported “losses” to corporate spies. There are a number of dissertation projects here awaiting historians: among them are the U.S. (or even better, comparative) legislative and judicial responses to fear of industrial espionage; the diplomatic history of industrial espionage, especially among Allied nations; the history of corporate intelligence firms and firms that specialized in defending against corporate intelligence; and the coevolution of intellectual property and immigration policy during the twentieth century.

The present status of know-how in the business world is difficult to pinpoint, because firms are particularly reluctant to discuss current licensing

81. Kenichiro Osumi, “Know-How and Its Investment.”

82. On shifts in the German patent system during this period, see Kees Gispén, *Poems in Steel*. For evidence of the importance of know-how in the German language, see, for example, the Ngram at the following URL in which *know-how* became a more commonly used word than *Sachkenntnis*, *patent*, or *Gebrauchsmuster* by 1990: https://books.google.com/ngrams/graph?content=Know-how%2CPatent%2CGebrauchsmuster%2CSachkenntnis&year_start=1900&year_end=2000&corpus=20&smoothing=3&share=&direct_url=t1%3B%2CKnow%20-%20how%3B%2Cc0%3B.t1%3B%2CPatent%3B%2Cc0%3B.t1%3B%2CGebrauchsmuster%3B%2Cc0%3B.t1%3B%2CSachkenntnis%3B%2Cc0

83. Doron S. Ben-Atar, *Trade Secrets*.

84. Sharon D. Nelson and Charles R. Wolfe Jr., “Tightening the White Collar”; Cynthia M. York, “Criminal Liability for the Misappropriation of Computer Software Trade Secrets”; Arthur G. Connelly III, “Theft of Trade Secrets”; John C. Coffee Jr., “Hush”; Geraldine Szott Moohr, “Problematic Role of Criminal Law in Regulating Use of Information.”



practices and technology-management policies, and there is no analog to the United States Patent and Trademark Office to collect and publish data on know-how. Legal scholars discussing the rise of know-how in the 1950s described it as “a by-product of the technical complexity and intensive specialization of modern industry and its products.”⁸⁵ Others worried about employees increasingly taking trade secrets with them upon changing jobs “as our commercial world has grown increasingly more complex.”⁸⁶ Certainly, these trends have not abated in recent times. The editors of *Global Dimensions of Intellectual Property Rights in Science and Technology* (1992) ascribed growing attention to intellectual property rights to an increasing “rate and cost of technological progress . . . and as national borders [became] even more transparent.”⁸⁷ These trends also remain very much with us, whether or not know-how is a standard intellectual property right.

Conclusion

Know-how was not new in the twentieth century. The term itself entered American English around the 1830s, according to the *Oxford English Dictionary*. Nor was it a novel idea in the mid-twentieth century that workers develop economically valuable skills that were difficult to explain or transfer without hands-on instruction. Long has traced “proprietary attitudes towards craft knowledge, indicated both by craft secrecy and by patents for invention” even back to “the context of medieval urbanism from the thirteenth century,” when guilds protected such know-how.⁸⁸ The issues she discusses are unquestionably captured in the postwar meanings of *know-how*.

Similarly, although this article barely touches on labor law and employees’ perspectives, another way of framing business’s interest in treating know-how as intellectual property is as another step in a long-standing process of commodifying and controlling workers’ invention and skills. Fisk has documented the work of business-friendly lawyers and judges that, over the nineteenth and early twentieth centuries, completely reversed the presumption that workers would always own the patent rights to their inventions (and copyright to their art), to the assumption that employees’ creativity was the property of their employer.⁸⁹ Know-how licenses almost invariably involved sending skilled workers to the licensee for extended periods. The same journals discussing prospects for know-how licensing included jeremiads about the danger of “disloyal” employees

85. Beach, “A Question of Property Rights,” 1024.

86. Douglas S. Liebhafsky, “Industrial Secrets and the Skilled Employee.”

87. Mitchel B. Wallerstein, Mary E. Moguee, and Robin A. Schoen, eds., *Global Dimensions of Intellectual Property Rights in Science and Technology*, v.

88. Long, *Openness, Secrecy, Authorship*, 1.

89. Fisk, *Working Knowledge*, 2.



finding new work and robbing the firm of its know-how.⁹⁰ This business concern persists in modern-day employment contracts with non-compete clauses and threats of criminal prosecution for trade secret theft to deter employee mobility. In a sense, the entire know-how phenomenon was a new front in a long-standing battle for further legal control of workers' minds and limits on employee mobility.

Language matters, however. As Long argues regarding a very different time, when distinctions between Aristotle's *episteme* and *techne* were more hotly debated than *science* and *technology* (much less *know-how* and *trade secrets*), "the categories of material production, action, and theoretical knowledge, and their relative status vis-à-vis one another, have complex histories . . . obscured by disciplinary histories such as the history of technology, the history of architecture, and the history of science."⁹¹ In this case, legal history, the history of science/technology, and business history seem to have obscured the flourishing of an important conceptual category during the postwar decades. It is vital to recognize the continuities of "craft knowledge," "working knowledge," and "trade secrets" that Fisk studies in the time just prior to know-how's heyday, when courts debated whether early modern concepts of a servant's duties to his master carried over into a technical employee's duties to his employer. It is also vital to recognize the important change of those categories reifying, for a time, into one usable term. Even if its definition was no more precise than "an amorphous, ill-defined glob of technology," having such a term allowed businessmen, lawyers, and politicians to grapple with the shortcomings of thinking of technology as a shiny bauble to be passed around, stolen, or safeguarded with ease.⁹²

Recognition of the importance of know-how—and implicitly the tacit and social nature of technology requiring continual, in-person exposure and adaptation to local needs for communication—is a fairly sophisticated understanding of technology, and one that the business world seems to have grasped before academics. The start of this business and legal interest in know-how precedes Michael Polanyi's popularization of "tacit knowledge" in his 1958 book *Personal Knowledge*; it also precedes the ongoing debate among academic philosophers on whether *know-how* is reducible to *know-that* (or vice versa), which began with Gilbert Ryle's *The Concept of Mind* in 1949.⁹³ The linkages, if any, between these academic discussions

90. See, for example, Victor M. Harding, "Trade Secrets and the Mobile Employee."

91. Long, *Openness, Secrecy, Authorship*, 3.

92. Stedman, "Legal Problems in the International and Domestic Licensing of Know-How," 250.

93. The *Stanford Encyclopedia of Philosophy* describes Ryle as "where the contemporary discussion of knowledge-how starts"; see <http://plato.stanford.edu/entries/knowledge-how/> (accessed 2 July 2015). This debate continues through the present, such as in John Bengson and Marc A. Moffett, "Know-How and Concept Possession"; Jeremy Fantl, "Knowing-How and Knowing-That"; Jennifer Hornsby, "Ryle's Knowing-How, and Knowing How to Act"; and Greg Sax, "Having Know-How."



and business/legal considerations of know-how are unknown and merit further research. Polanyi, at least, was involved in debates about British patent reform in the 1940s and could plausibly have been influenced in that way, but this is simply speculation.⁹⁴

Since the 1960s, concepts akin to know-how have been important in the history of science and technology, and perhaps this also should be seen as part and parcel of the broader know-how phenomenon. Eugene Ferguson, Elting Morison, and many others have written about the ties among technology, technique, and knowledge, such as in the history of engineering education.⁹⁵ Many other STS works in recent years have similarly capitalized on the idea, either explicitly or as a tool in understanding particular cases of scientific communication and technology in society.⁹⁶ This is all for the best, because know-how (howsoever defined) clearly matters. We should be careful, however, not to regard tacit knowledge as an ahistorical category. When our actors' own understanding of what they are engaged in changes, it is important to know how.

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94. Michael Polanyi, "Patent Reform." On Polanyi's life, see Mary Jo Nye, *Michael Polanyi and His Generation*.

95. Eugene S. Ferguson, *Engineering and the Mind's Eye*; Elting E. Morison, *From Know-How to Nowhere*. Other key examples include John K. Brown, "Design Plans, Working Drawings, National Styles"; John K. Brown, Maria Paula Diogo, and Gary Downey, eds., *Engineering Education and the History of Technology*; David A. Hounshell, *From the American System to Mass Production, 1800–1932*; and Carroll Pursell, "The Technology of Production."

96. Although there are a thousand invaluable works here, a few arbitrarily chosen examples include Mario Biagioli, "Tacit Knowledge, Courtliness, and the Scientist's Body"; Collins, *Tacit and Explicit Knowledge*; Kaiser, *Drawing Theories Apart*; Long, *Openness, Secrecy, Authorship*; MacKenzie and Spinardi, "Tacit Knowledge, Weapons Design, and the Uninvention of Nuclear Weapons"; and Lissa Roberts, "The Circulation of Knowledge in Early-Modern Europe." One could even argue that know-how is closely tied to the thinking behind actor-network theory, focused as it is on the material embodiments of technology and the ways in which only sustained relationships can make technology function.



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