

# A Taxonomy of Moats

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Value is created through innovation, but how much of that value accrues to the innovator depends partly on how quickly their competitors imitate the innovation. Innovators must deter competition to get some of the value they created. These ways of deterring competition are called, in various contexts, barriers to entry, sustainable competitive advantages, or, colloquially, moats. There are many different moats but they have at their root only a few different principles. This post is an attempt at categorizing the best-known moats by those principles in order to evaluate them systematically in the context of starting a company.

I am going to try to focus on only the barriers that seem to have structural causes. This excludes things like management talent, founder vision, company culture, and the like. These things are often not imitated, but not because they are not imitable: in many cases they are simply indications of an apparently rare competence. And while competence may be the ultimate competitive advantage to an individual, it is the property of the individual, not the company. (There are some things about company culture that are more than individual competence, and we'll talk about them later.)

Last in this lengthy preamble: I am not inventing anything here, I am categorizing. Every business strategist seems to have a list of moats—Porter, Rumelt, Helmer, Greenwald, Mauboussin, etc. all the way back to Adam Smith. This post is less interested in the catalog of moats or the advantage a particular moat confers; it is more interested in attempting to isolate the underlying mechanisms that moats have in common to determine the difficulty a startup might have in establishing a barrier against competition.

A word of thanks: I started this process by thinking out loud on Twitter and got a ton of useful feedback. People who contributed, not necessarily in order of importance: @varma\_ashwin97, @BrentBeshore, @vpmishra01, @shearic, @allafarce, @CeoNunneley, @amontalenti, @KyleJudah, @trbouma, @aortenzi, @nww3, @CookedDoug, @clearingfog\_III, @Zenomercer, @DickeySingh, @khaleddealy, @DavidShrier, @harshagopi1, @wminshew, @CantHardyWait, @nikillinit, @kerryritz, @rtrpkovski, @harshagopi1, @modestproposal1, @SwitchCost, @simonbayly, @ric0seq, @tek\_fin, @Rick\_Zullo, @dhaber, @jmelaskyriazi, @JonahCrane, @jrfuisz, @msitver, @ErikThomson7, @wardleymaps, @nlpnyc, @jpvisto, @mdawes2, @emrahyalaz, @anglebalancing, @LeonardoDCruzJr, @evolvable, and @chriskeating. And, of course, (though not on the Twitter) the inimitable Justin Singer. (If I missed you, let me know, Twitter threading is awful.)

In high school economics you learned that in perfect markets there is no excess profit, companies compete it away. But when an innovation that creates a better product or a cheaper way of making the product comes about, the innovator can reap some of the innovation's value as excess profit. This excess only lasts until competitors catch on and imitate the innovation. One of the strategic tasks of an innovator is to deter imitation for as long as possible.

This applies not just to companies in established markets, but to startups that are creating new markets. If a startup is manifestly successful, if customers are rapidly adopting their product, then more established companies and other entrepreneurs will quickly move to imitate them, taking some of the innovation's value and ultimately eliminating the excess profit the innovator can capture. Startups too must try to deter imitation.

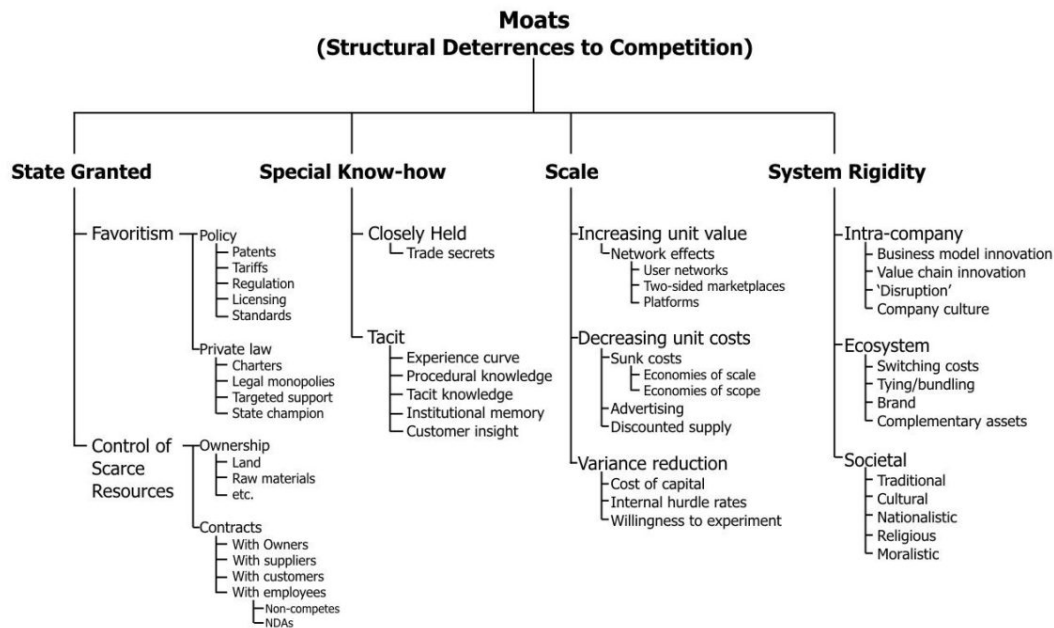
An innovation is a type of competitive advantage (though not all competitive advantages are innovations) and the strategic job is to make that competitive advantage sustainable over time<sup>1</sup>, to maintain the advantage as a bulwark against competition. Mechanisms to deter or slow imitation are called, colloquially, moats.

Moats draw their power to prevent imitation from one of four basic sources:

- The state,
- Special know-how,

- Scale, or
- System rigidity.

Below is a taxonomy of the most common moats, organized by these sources.



The four sources are each either a particular sort of non-business power or a self-reinforcing mechanism. I am going to argue that it is very rare for a high-growth-potential startup to have a competitive advantage that is sustainable from their very beginning, that in most cases a sustainable competitive advantage must be built up over time. But the reason this is true depends very much on how moats are obtained and so on these underlying sources.

In each section I will discuss a source of competitive advantage and some of the more common moats that result. These are not meant to be comprehensive lists. I will also briefly discuss how useful these types of moats are to an early-stage startup.

### State Granted Advantages

The conceptually simplest barriers to entry are those that are state granted. In these the government is, directly or indirectly, protecting a company from competition. Governments choose to restrict competition for a range of reasons, from encouraging a certain type of behavior (patents, for instance) to economic protectionism (tariffs, national champions) to politics itself (a quid pro quo, the fear of displeasing a powerful constituency, or even just simple political favoritism.)

A common form of government-granted monopoly are patents and other protections extended to companies through intellectual property laws. These generally have the purpose of incentivizing inventors or preventing customer confusion. Patents are the most pertinent to startups, and they can be a huge incentive because they prevent competition for some period of time. For instance, pharmaceutical companies might not spend the money required to develop and test a drug if the government did not allow them a period of exclusivity. Warner-Lambert devoted significant investment to a potential cholesterol reducing substance in the face of weak results with similar drugs because the reward, if it worked, could be huge. But the reward would only be huge to Warner-Lambert if they could prevent others from copying any successful drug they found. Warner-Lambert succeeded and Lipitor became one of the top selling drugs in the world, generating more than \$125 billion in sales over the life of the US patent.<sup>2</sup>

Governments can also grant monopolies for more obscure policy goals. In the United States, Major League Baseball has been exempted by the government from antitrust laws for reasons that are mysterious, at best.<sup>3</sup> Releasing MLB from restrictions any competitors would face gives it an advantage no entrant could match.

Other policies may not prevent competition but impede it. Tariffs may make competition by non-native firms uneconomic, licensing may make it expensive and time-consuming to enter a market, regulation may impose standards that newcomers will find very difficult to meet. Governments may not grant

monopolies but rather oligopolies, like only a few licenses to provide scooter service, or a few thousand taxi medallions.

Regulation may be an attempt to protect citizens, but it is also often a means of rewarding political loyalty. Other means of doing the same are sometimes more direct. Politicians may cause government support to be directed to businesses whose success may benefit them, either because they have an interest in the business or because the business has an influence on that politician's power. In the United States, laws favoring car dealerships fall into this category, as may the choice of government suppliers.

Other ways governments lessen competition include anointing national champions—national airlines, for instance—or by favoring certain companies—either through financial support or preferred purchasing—so that entering the market may be economically infeasible. Airbus has been an example of this.

Another sort of state granted moat is a company's control of scarce resources through property ownership and contracts. This control is state granted in the sense that it is enforced through state power. This is a different sort of government action than in the last few paragraphs: the government is not granting the advantage, it is defending an advantage a company has been clever enough or lucky enough to procure for itself. There are many overlaps—a patent may be bought by a company and the government is then both the grantor of the patent and the defender of the buying company's ownership—but they are discrete functions.

The most straightforward control of resources is ownership of real property that creates economic benefit: the ownership of a gold mine, a highly-trafficked retail site, a warehouse sited at a transportation hub, etc. Companies can also control resources without owning them. A company may have contracts that give it exclusive or preferential access to some raw material, like fracking from a particular piece of property. Or contracts that guarantee it a certain amount of the output of a supplier. It may have contracts with municipalities or other partners that allow it to be the only provider of telecommunications, or one of a few companies with access to a crucial API. Or it may have contracts with a distribution network that make distribution of a competitive product very difficult—Pepsi and Coca Cola have made good use of this, among others. While this is legally different than outright ownership, the results are similar.

Ideally, the state's enforcement of a moat is a non-market system. This means the durability of the moat is whatever the government says it is. In some cases this leads to a lack of predictability, and in others quite a bit of predictability. But government favor generally requires either doing something that substantially advances government policy (such as the investment of time to invent something that merits a patent); buying something; or having the political power to garner targeted government support.

Startups can and do start with one of these moats. Many bio-medical startups are founded to further the development of research done and patented at a university. This also happens, though less frequently, with tech patents: tech patents are usually easier to work around, and the predictability of the value of a tech breakthrough is usually higher at an earlier stage than a drug patent, so the cost/benefit analysis companies make around copying the innovation in defiance of patent law is usually different. Google, for instance, openly and knowingly copied Overture's (née GoTo.com) pay-per-click auction business model in 2002, violating several of its patents while it did.<sup>4</sup> Google eventually paid Yahoo!, Overture's then-owner, some \$300 million in Google stock to settle the suit. Overture's intellectual property protections did not prevent its imitation.

The value of Google's own intellectual property, including their patent on the PageRank algorithm that made their early search engine so effective, was not evident when it was patented. Page and Brin tried hard to sell the technology to an existing search engine company soon after they had deployed it, but could find no buyers offering anything close to the eventual value garnered.

Similarly, because these moats are transferable, once the moat is created it can't *create* excess value: it could be sold now for the amount of value it would create in the future (if that were known). It is the creation of the moat that creates the value, not the ownership of it.

#### **Special Know-How**

Having knowledge that no one else has is an excellent way to prevent imitation. It restricts access to a scarce but needed resource.

For instance, Renaissance Technologies, a hedge fund, used proprietary mathematical algorithms to generate a 71.8% per annum return *for twenty years* in its Medallion Fund.<sup>5</sup> These algorithms were

invented by Renaissance Technologies employees and kept a closely guarded secret. If they had become more widely known, the profits Renaissance made from them would have quickly disappeared.

Exclusive access to something is only possible when you have the power to control that access. Access to knowledge or know-how must be limited by keeping that knowledge secret. But how? Know-how is in the heads and hands of people, and people generally have the right to change employers, aside from the limited circumstances where NDAs and non-competes apply (Non-competes are invalid in some jurisdictions, and NDAs are hard to enforce in practice.)

Companies can keep some knowledge protected by keeping it closely-held: Kentucky Fried Chicken's secret spice recipe, locked in a safe inside a vault at their headquarters in Louisville, Kentucky, is a popular example, as is Coca Cola's 'secret' recipe (though I believe these are more branding exercises than meaningful secret knowledge). A better example are the trading algorithms hedge funds like Renaissance have employed to earn market beating returns. If these algorithms were not closely held within these firms, junior employees could learn them and then bring them to a less profitable firm in exchange for a salary hike or career advancement.

In the 1700s the British government tried to maintain a national monopoly on technologically sophisticated cotton mills by prohibiting the export of their designs. Samuel Slater, who began working at a mill in England at the age of 10, memorized the details of the mill's machinery and then emigrated to Connecticut, where he advised on the construction of textile mills and eventually set up his own using the designs he had taken from England, to the outrage of the people in his hometown. This type of knowledge "theft" regularly occurs, though it is hard to quantify.

While the government sometimes tries to prevent this sort of thing through trade secret law, and companies can try to enforce contractual prohibitions against it, knowledge diffusion through employee movement is common. This is one reason industries have congregated in specific places<sup>6</sup>: the lineage of many of the Detroit car companies, for example, are entwined through employee and founder movement. The same is true of much of the semiconductor industry in Silicon Valley. One study of knowledge diffusion of new industrial technology found that "information concerning the detailed nature and operations of a new product or process generally leaks out within about a year."<sup>7</sup> Closely held knowledge is usually a fleeting competitive advantage.

A more enduring advantage is tacitly held knowledge. Tacit knowledge is knowledge that can't be easily communicated; it can't be easily transferred, e.g. verbally or through writing. The classic example is riding a bike: you can't read a book or watch a video to learn how. To learn to ride a bike, you must attempt to ride a bike (hopefully under the guidance of someone who has ridden a bike before.)<sup>8</sup> In a company tacit knowledge can include manufacturing techniques and other procedural knowledge (this is highly important in exacting environments such as integrated circuit production), customer insight, supplier dynamics, and paths for continuing innovation. Any field of which it can be said "there is more art than science" is probably one where tacit knowledge is important. This sort of knowledge can't be obtained by competitors through industrial espionage and not always by hiring away employees.

Examples of tacit knowledge in companies are everywhere—from the engineer in the chemical plant who can tinker with a process to improve its efficiency though can't tell you exactly how they do it, to the mechanic who can get any engine to run, to the lawyer who can read a complex document and have problematic clauses jump out at them. Complex tacit knowledge is usually formed over some period of time through hands-on-work using trial and error and is maintained in the organization through mentorship.

Individual tacit knowledge, while always valuable, is a weak competitive advantage as an organization gets larger because it is hard to scale. It is also only sustainable until a competitor hires the individual who has it.

Some tacit knowledge is not contained within the head or hands of individuals but embodied in an organization. All companies have undictated and undocumented means and paths to get things done. Two people may have tacit knowledge about how to work most effectively with each other's role, or three people, or whole organizations. The organizational routines of these companies are a difficult to replicate advantage because they are not describable in words, in any deep sense, and they are not held within the head of a single person.<sup>9</sup>

While individual tacit knowledge goes down the elevator every day, collective tacit knowledge is more durable and harder for competitors to obtain or imitate. The continuing success of Goldman Sachs in the highly competitive investment banking industry is due in part to collective tacit knowledge passed from senior employees to more junior employees through many hours of supervised work. Some of this

knowledge is how to do the work itself—this then becomes individual tacit knowledge—but some of it is how to effectively work with each other and within the firm. This knowledge is only useful if others within the same firm have complementary knowledge. Even if star individual performers or whole teams are hired away, only a part of the collective tacit knowledge moves with them, rendering it much less useful.

Special know-how is a weak moat for startups. Founders often start a company because they know something very few others do: they might be experts at some leading-edge technical subject, they might have learned something valuable from previous work and realize few others know it, or they might have come up with a novel solution no one else seems to have thought of yet. But if the knowledge is easily transferred or imitated, any advantage it lends to the startup will be fleeting, unless it can be effectively kept secret for a long period of time. The ability to do this has proved to be rare in the real world.

Even tacit knowledge, if held by one or a few people, is hard to control. And in both cases, if the value of the knowledge is evident then its holders might be better rewarded by bringing it to an established company, who could pay them more than they would get on their own while offering them a career track after the knowledge becomes more widespread.

Collective tacit knowledge, on the other hand, is a great moat but it takes time to build, so a startup needs to find some interim way to deter competition.

### **Returns to Scale**

Returns to scale are advantages that appear or increase as a company gets bigger. They are a powerful barrier to entry because, by definition, they are not available to any entrant that starts out small (as most would have to.) They take several forms but generally either the cost per unit product decreases or the quality of the product increases as more units are produced, sold, and used.

Railroads had to spend a huge amount of money laying track before running trains. The more trains that were run, the lower the cost of track per train. Similarly, if a software company can spread the cost of development of the software over many customers, the cost per customer is lower. These are examples of economies of scale, where the cost per unit is decreasing as more units are produced, typically because sunk or fixed costs are a large proportion of the total cost of the product. Lower cost per unit than competitors can be sustained by either lowering prices to harm companies who begin to build competing products or by simply threatening to.

Economies of scope come from the same place. If a railroad is built to carry freight, then the additional cost of adding passenger service can be small in comparison. A competitor who builds track to provide just passenger service would not be able to compete. Fixed and sunk costs are not only product costs: advertising can be far cheaper if amortized over many customers, for instance.

Decreasing unit costs are also sometimes available at scale because the company has more bargaining power with suppliers. Walmart, for instance, is famous for extracting better deals from suppliers than the suppliers offer to others.

In addition to lowering costs, scale can also increase the value of a product. This is often called network effects (regardless of whether there is a 'network' or not.) Telephone service is worthless if you are the only one with a telephone. It becomes valuable when someone else also has one, and more valuable as more and more people get them. The key is that it becomes more valuable not just to you but to everyone on the network. This dynamic lends itself to monopolization, so long as different companies can't interconnect. Even when they can, competition is limited by the cost of interconnection. (So, as a counter-example, fax machines—though more valuable the more people who had them—did not lead to a single fax machine producer because every fax machine, no matter who made it, could talk to every other; there was a standard fax protocol.) The current crop of large social media companies primarily use the size of their user networks as a way to maintain their dominance.

Two-sided marketplaces and platforms are often lumped into network effects, though they don't really create networks. Marketplaces, like eBay or the New York Stock Exchange, create more value from scale because scale creates both more supply and more demand for the products sold through the marketplace. This creates a virtuous cycle—sellers want more buyers rather than fewer, buyers want more sellers rather than fewer—so a small advantage in scale can become self-reinforcing. Platforms, in a similar fashion, garner value from other companies creating uses for them, and those companies would prefer to create uses for large platforms rather than smaller ones. The users of those platforms, meanwhile, prefer more uses to fewer. This makes it difficult for competing platforms to get a foothold. Apple's iPhone with its App Store is a good example.

Advantages to scale are also caused by the reduction in outcome variance when risky endeavors are bundled together. If a life insurance company had a single customer, it would be a very risky company; if it has a million customers with little relation between their individual mortalities it is not very risky at all. This bundling of risk is less obvious but still applicable in many other companies: companies that rely on R&D for growth can spread the risk of research and development over many programs. This lowers the cost of capital for the company and allows it to experiment with riskier programs. Smaller companies can't finance these risks, so R&D programs that are expensive or take a long time to produce results are undertaken by larger companies. (Sometimes financial markets abstract the variance reduction into extra-corporate vehicles such as venture capital firms, but these intermediaries extract a very high fraction of the ultimate value produced.)

The beneficiaries of returns to scale are often determined early in an industry's life. When a product is new and there are few, if any, competitors, a company can charge enough to offset the high cost of low scale. Or it can offer a product that is the highest quality only because it is the only product competing on that measure of quality. For instance, when Facebook started it offered the ability to network with people you knew and who had to use their real names. This was somewhat unique among social networks at the time. So while the value of the network was quite low if you were one of the first 20 or so users, it was still higher *on that quality metric* than its competitors. This allowed it to accrue users until the network was large enough to offer significant value, even to people who cared less about that quality metric. At this point, any company trying to imitate Facebook was at an insurmountable disadvantage.

Of course, Facebook was not the last social network to succeed. Instagram, WhatsApp, and others became valuable because they picked other qualities users desired and made themselves best at those. Scale advantages are only durable to the extent they inhibit *direct* competition.

Companies that are started from scratch obviously can't use returns to scale to deter competition because they don't yet have scale. Some companies can build scale faster than others, but any startup hoping to use this moat needs some way to deter competition until they get to an unassailable size.

### **System Rigidity**

The last group of moats is probably the most common but least often articulated. These are advantages that arise because change is hard in a complex or highly interlinked system. If changing from one product to another also requires changing other things—other products, routines, skills, etc.—the total cost of the change may outweigh the benefits so the product already embedded in the system can maintain an advantage over similar entrant products that are not (or not yet) interconnected. I will call this system rigidity.

Customers may decide to stick with a product in the face of a better product because it is expensive to switch (having learned how to use a complex software package, a user may not want to invest the time and energy in learning a new one, even if it is better) or because it is expensive to learn that a new product is better (the customer may trust a producer or its brand and learning whether a new producer or brand is trustworthy may take either risky trialing or time-consuming research.) In the first instance the cost of change must include the cost of learning or the cost of changing established work routines. In the second the cost must include the cost of searching for the alternative.

Customers may also resist switching when products are closely tied to other products in a tight network. Changing one may mean having to change others, increasing the difficulty and cost. Sometimes companies create this constraint intentionally by tying products together (it is very difficult to use an app store other than Apple's without also switching away from the iPhone, for instance.) Sometimes they create a softer constraint by bundling products (most iPhone users are probably using Apple's built-in Mail program rather than better alternatives because Mail is already there.) The cost of change must include the costs of changing interconnected things.

This tight network is not always imposed by a company, it also arises naturally through industry dynamics. If a product requires complementary assets to be useful, the ability of any competing product to use those complementary assets is a prerequisite to adoption. This can lead to a situation where one company's products can't be replaced. For instance, many applications are written for a specific operating system. Applications and operating systems are complementary assets: each needs the other in order to be useful. If a user changes operating systems they may then have to change many other pieces of software and then also adapt their routines to the new software. This makes it very difficult for substitute operating systems to compete. (Note that this could also be viewed as a platform moat. A platform can create a barrier to entry when it attracts a large number of 'platformees', none of which has high value. Or it can create a barrier by having a few high-value platformees.)



Societal mores may also inhibit change. Traditional products are advantaged over innovations in some cultures; nationalism may favor products produced in the customers' own country; religion may prohibit certain substitute products; and some new products may be considered secularly immoral by some, as credit cards were at one time and facial recognition is now. These things inhibit adoption of new products, favoring existing solutions.

Building strong and appropriate links in a system takes time and painstaking effort. The process must be thought out carefully. When the Altair, the first personal computer of note, was starting to catch on its manufacturer, MITS, thought they would own the market for not just the machine but for its peripherals. But when they faltered in producing quickly enough, other companies stepped in, reverse engineered how peripherals plugged into the Altair and started producing them without MITS' permission. Because these third-party peripherals used the same interface as the MITS peripherals, they could easily replace them. In some cases a company strategy of building unimitable products has to change to one of building unimitable links between system components. MITS lost the peripherals market because they did not do this.

System rigidity can be a quite durable source of advantage in an environment of incremental change. Products that are the same as existing ones, or even somewhat better, will not give the customer enough additional value for them to switch if the switching costs are high. Startups entering an environment like this have a hard time getting their solution adopted at all, and incumbents who are already embedded in the system can get the idea adopted more cheaply, raising their interest in finding a way to copy it.

Startups have an easier challenge when they can use systems rigidity against established companies. Traditional brokerage firms had a hard time adapting to discount brokerages like Schwab and Fidelity because so much of the power in a brokerage house was held by the (commissioned) sales force, while discount brokerages relied on customers to initiate trades, not a sales force.<sup>10</sup> Startups can approach an industry in a way that requires a fundamentally new system, putting the startup and incumbents on the same footing. Most established companies prefer to compete by exploiting their competencies while new systems make old competencies useless.<sup>11</sup>

This type of challenge to incumbents is described both by Christensen's 'disruptive innovation' (imitating the innovation would require incumbents to change so many things about what they do that their current customer base would be poorly served; deciding to ignore the needs of existing customers is a very difficult decision for any management team to make) and Porter's 'value chain' innovation (mimicking the business model innovation or value chain innovation of the innovator would require an established company to abandon ways of doing things that are currently successful.)

Exploiting system rigidity to avoid incumbent competition is a huge advantage for a startup, but it doesn't prevent other startups or well-resourced companies tangential to the industry from entering. Until the startup can forge its own system links, it has only half a moat.

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If a startup is to become a valuable self-sustaining company it must eventually have a moat. Building one must be part of their strategy.

Some startups have a moat they start with. These moats are generally fungible: they have the same or greater value if they are sold to an existing company as they would if they were incorporated into a new company. If a company incorporates to exploit a patent that will generate a certain amount of money, that patent could be sold to an existing company for an equivalent amount of money. This, of course, assumes the value of the patent can be known. The same is true of closely held knowledge and individual tacit knowledge: if these are worth a certain amount to a startup, then an existing company should be willing to pay at least that amount to bring that knowledge to their company. Most of the state granted moats and special know-how moats, aside from collective tacit knowledge, fall into this category.

Warner-Lambert, the company who did the research and clinical trials for Lipitor and was awarded a patent for their efforts, was acquired in 2000 by a competitor, Pfizer, for \$90 billion so that Pfizer could take control of Lipitor. Pfizer then had a way to exclude any competitor that wanted to copy Lipitor, even though Pfizer did not invent it. Pfizer presumably acquired the patent for a price that reflected the value it would generate. If so, then the transaction did not generate excess profit.

Other startups develop moats over time. No company can have a moat from returns to scale, for instance, before they have scale. No company can generate collective tacit knowledge in their

organization until they have an organization. And building links from the product into the surrounding system takes time and, usually, a working product.

Startups can avoid the competition of better resourced incumbents for some period of time by using system rigidity against them through disruptive innovation or value chain innovation. These startups can still be challenged by other startups and by better-resourced entrants that are not incumbent in that industry. While this is a better position than competing against incumbents, it is still not a moat. Developing a moat based on system rigidity also takes time.

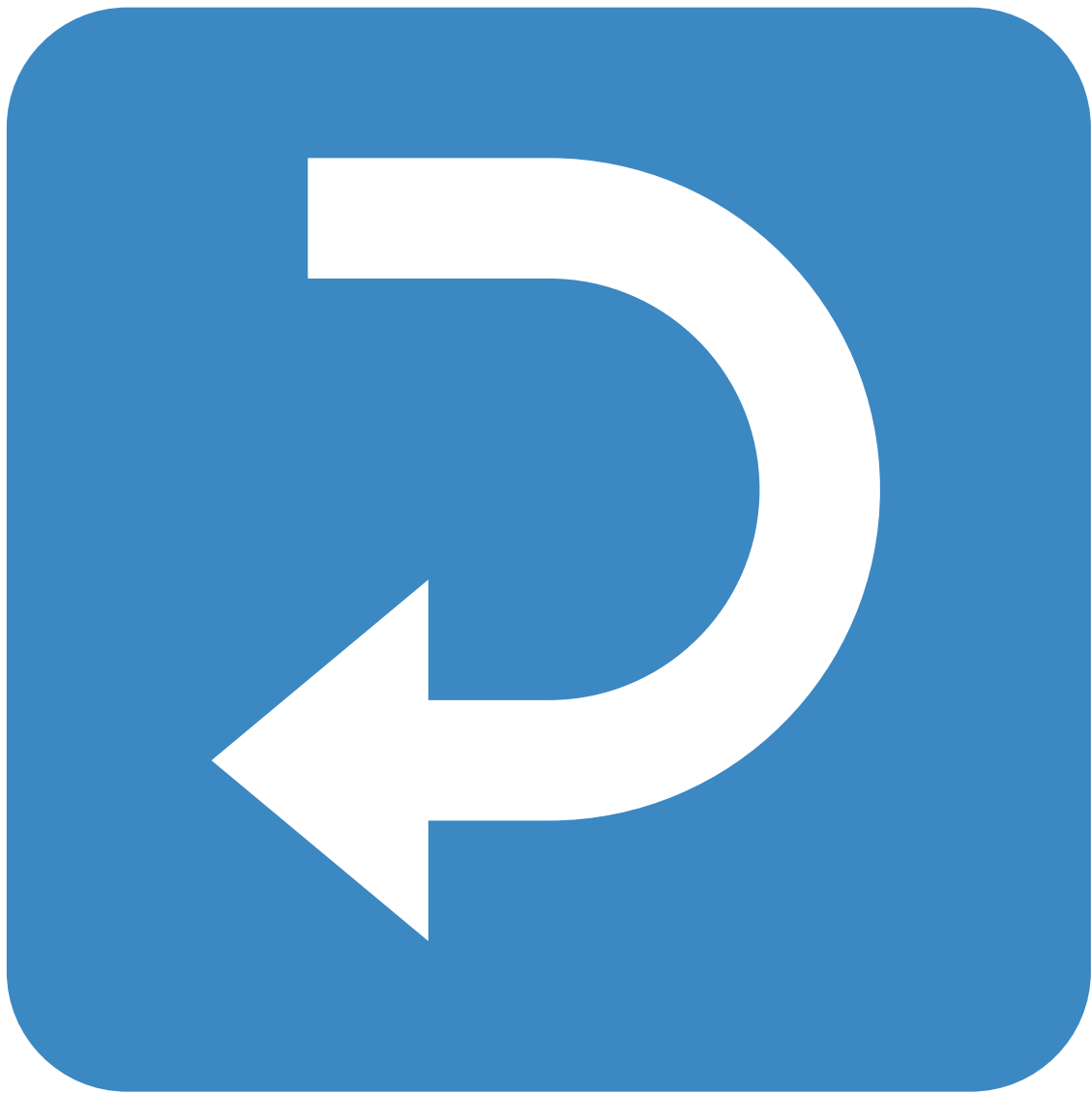
The strength of a moat that develops over time is generally correlated to the amount of time it has been developing so these moats are weak for a long time. In the interim the startup can still be damaged by incumbents or other startups deciding to enter their field.

But, you may protest, there are many examples of companies starting with each of these types of moats that you are saying it is impossible to have unless you have either time or money. Researchers start companies to exploit a patent and make far more money than they would have if they had sold the patent; students with specialized skills start companies using those skills and make far more money than they would have as employees, etc. But in these types of cases the value of the rare asset, the patent or the knowledge, is uncertain: the entrepreneur starts a company because they *disagree* with others' valuation of that asset. The researcher may believe that the patent is worth far more than anyone is willing to pay for it (as Page and Brin did re Google's PageRank patent.) There can be different beliefs about the value of the asset because value is a prediction and predictions can't be made when there is significant uncertainty about the future.

Uncertainty can be seen everywhere in the startup process: in the people, in the technology, in the product, and in the market. This analysis shows something more interesting though: uncertainty is not just a nuisance startup founders can't avoid, it is an integral part of what allows startups to be successful. Startups that aim to create value can't have a moat when they begin, uncertainty is what protects them from competition until a proper moat can be built. Uncertainty becomes their moat.

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1. Porter, M., "[Competitive Advantage: Creating and Sustaining Superior Performance](#)", Collier Macmillan, London, 1985; 2nd edn, Free Press, New York and London, 1998.





2. [“Lipitor becomes world’s top-selling drug”](#). Crain’s New York Business. 28 December 2011.  
Retrieved 8 August 2019.



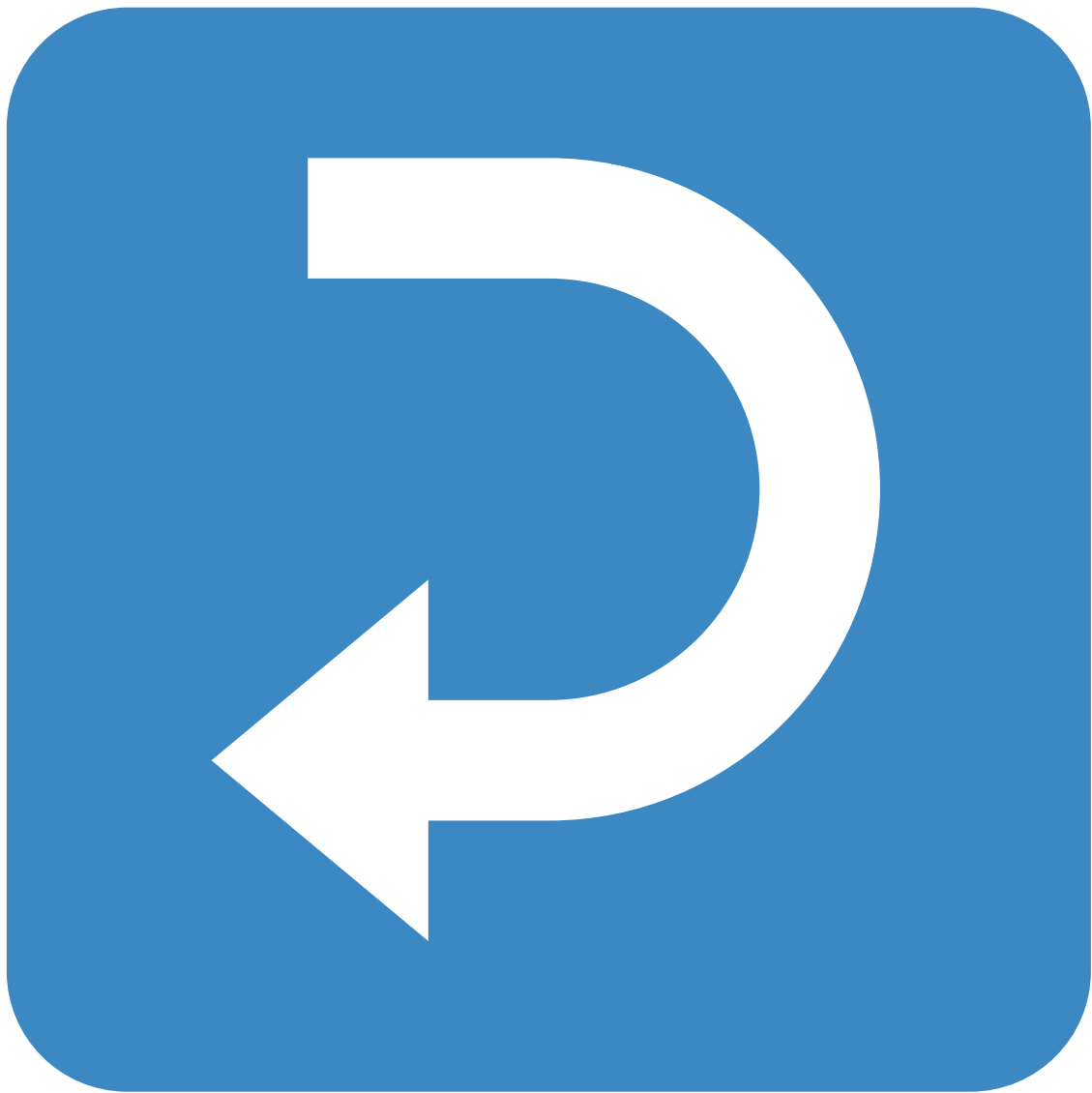
3. Wright-Mendoza, Jessie, [How MLB Gamed its Way Into a Baseball Monopoly](#), The Week, June 21, 2018.



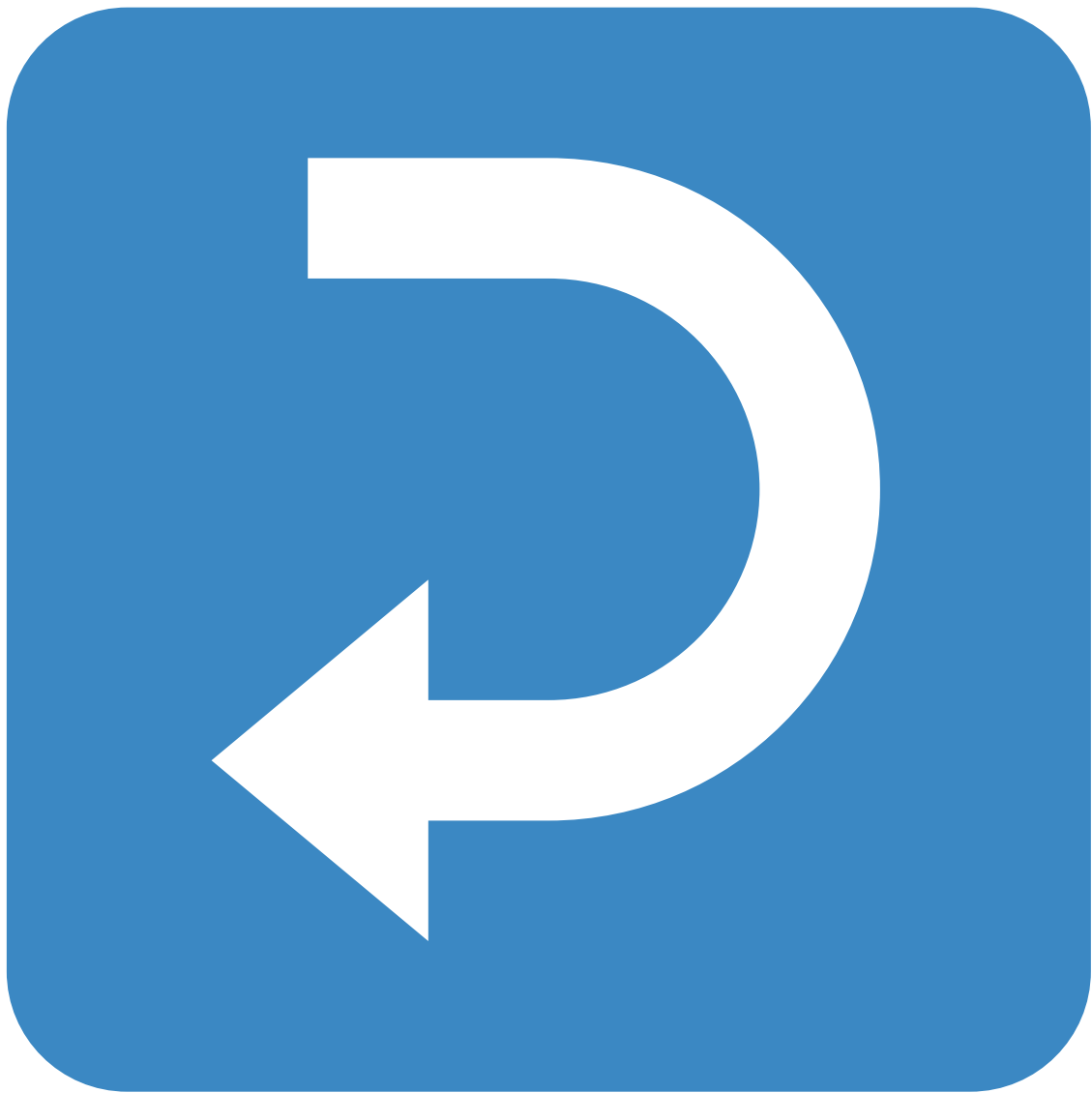
4. <https://www.cnet.com/news/overture-sues-google-over-search-patent/>



5. Rubin, Richard, [“How an Exclusive Hedge Fund Turbocharged Its Retirement Plan”](#). Bloomberg L.P. 16 June 2015, via [Wikipedia](#).



6. Klepper, S. and Braguinsky, S. and Hounshell, D.A. and Miller, J.H., [Experimental Capitalism: The Nanoeconomics of American High-Tech Industries](#). Princeton University Press: 2015.



7. Mansfield, Edwin. "How Rapidly Does New Industrial Technology Leak Out?" *The Journal of Industrial Economics*, vol. 34, no. 2, 1985, pp. 217–223. [www.jstor.org/stable/2098683](http://www.jstor.org/stable/2098683).





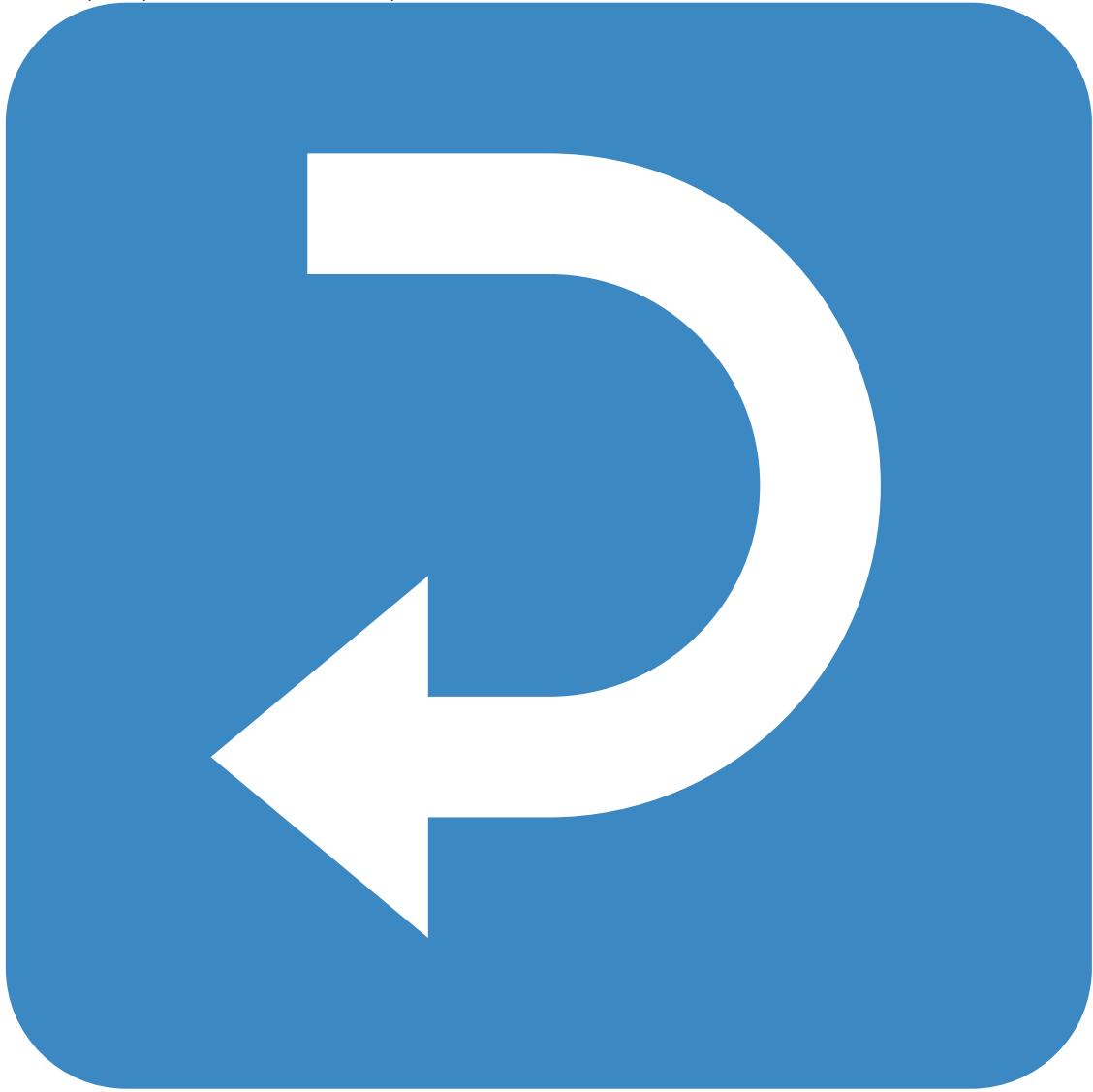
8. Polyani M., [Personal Knowledge: Towards a Post-Critical Philosophy](#), University of Chicago Press: 1962.



9. Nelson, RR and SG Winter, [An Evolutionary Theory of Economic Change](#), Belknap Press: 1982.



10. Nocera, Joe, [A Piece of the Action](#), Simon & Schuster: 1994.



11. M. L. Tushman and P. Anderson, "Technological discontinuities and organizational environments", *Administrative Science Quarterly*, 31 (1986), 439-65.

