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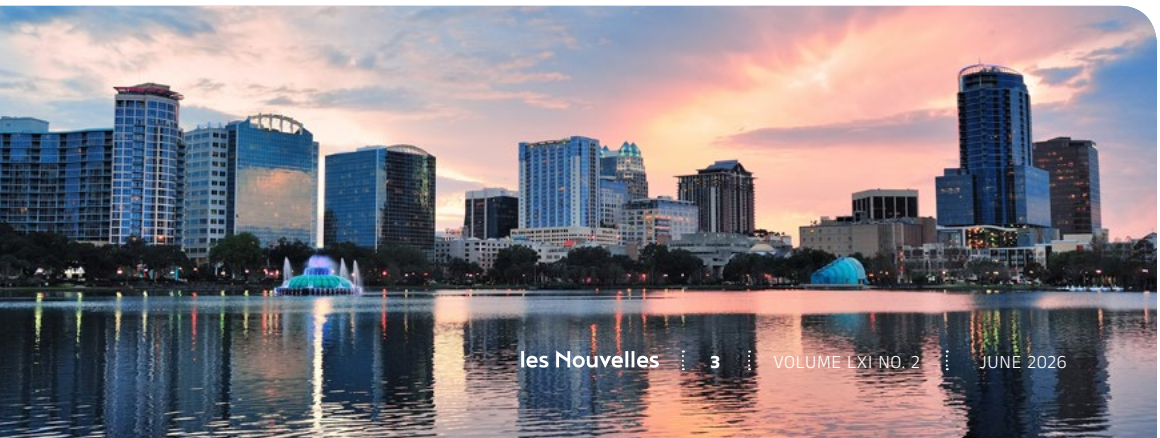

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Invisible Gold: Commercializing the 'Shadow' of Your Technology

- The Shadow Market Method for IP Commercialization

By

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Silicon Valley, California, U.S.A.

ABSTRACT

You are about to read something that will change how you look at your portfolio — or your client's. Not because the technologies in it have changed, but because you will see, for the first time, what has been hiding in their shadow.

Ninety-seven percent of patents never generate revenue. Not because the technologies fail on their merits — but because the shadow has never been read. In that shadow lives a buyer with a funded budget, an urgent problem, and no idea your client's technology exists. That buyer would move fast. They would pay a premium. They have already tried every alternative and found it insufficient. The only thing missing is someone who knew where to look.

This article introduces the Shadow Market Method: a demand-first commercialization framework built on sixty years of pattern recognition across thousands of inventions and hundreds of markets. By the time you finish it, you will understand why the most valuable trait in a patent is frequently not the one the inventor named — and why the history of a failed pitch actively prevents the question that would have found the right buyer. You will have a new framework for the asset on the back of your shelf. You will know why Peter Drucker's 10x principle is more achievable in shadow markets than in core ones, and why that changes the economics of every deal you bring to clients.

What you will take away: a method for identifying shadow demand before committing capital; a filter that shifts the practitioner's question from "will this close" to "how do we structure it"; a new language for conversations with boards, college presidents, investors, and defense procurement officers who each hold a different piece of the shadow market puzzle; and a framework for seeing the financially valuable trait in a patent rather than the apparent one.

The authors operate a commercialization advisory practice applying this method and disclose that relationship. This is a practitioner contribution to professional literature, not independent academic research.

There Is More Value in Your Portfolio Than Your Last Valuation Captured

There is a technology in your portfolio — or your client's — that you have quietly stopped believing in. The patent is valid. The invention is real. The pitch was made, the presentations were given, the obvious buyers were visited. Nothing closed. Someone wrote 'timing' or 'market not ready' in the file, and the file went to the back of the shelf.

That technology is almost certainly casting a shadow — and in that shadow, there is a buyer with a funded budget, an urgent problem, and no idea your client's technology exists. That buyer would move fast. They would pay a premium. They have already tried every alternative and found it insufficient. The only thing missing is someone who knew where to look.

Consider what that means in practice. A technology written off at zero book value becomes a validated licensing opportunity in a market the inventor never pitched. The IP holder receives revenue they had stopped expecting. Patent counsel opens a new engagement on a client relationship they thought was closed. The licensing agent brings a confirmed shadow buyer to the table rather than a cold portfolio presentation. The TTO reports revenue on a dormant asset and a new corporate relationship in a sector it had never engaged. These are not hypothetical outcomes. They are the predictable result of reading the shadow before anyone else does.

A shadow market is not an underground market. It is an overlooked one — hidden not by design but by the accident of the inventor's focus. Every great technical mind that solves a hard problem does so by narrowing their field of vision until peripheral markets become invisible. That narrowing is the mechanism of invention. The flaw is assuming the market the inventor saw is the only market worth seeing.

There is a second mechanism that pushes value deeper into the shadow: the claims themselves. A patent attorney's job is to draw the strongest possible fence around what the inventor described. But the inventor described their intended application — which means the claims are, by construction, optimized for the market the inventor saw. A claim drafted with maximum specificity around a consumer electronics application protects that application completely and the medical device application not at all. The fence that protects the known territory simultaneously casts a shadow over the unknown one. The more precisely the claims are drafted for the intended market, the deeper the shadow falls over every market the inventor never named.

Edison Innovations is not in the protection business. The IP profession — attorneys, agents, licensing managers — is organized, rightly, around defense: keeping infringers out, maintaining perimeters, holding the line around what exists. We face the other direction. We are seekers of the unseen — trained to find the undetected pains and frustrations of buyers who could use a technology in ways the original patent never anticipated, and that the attorneys who drafted it were never asked to find.

The fence was built to protect the known territory. Shadow markets live outside the fence.

What distinguishes the Shadow Market Method from standard adjacency analysis is the qualifying filter that precedes deal engagement: the systematic elimination of opportunities that lack both market scale and intensity of latent demand. When demand is confirmed and the buyer is identified before deal engagement begins, the practitioner's question shifts from "will this close" to "how do we structure it." This article describes a discipline for making that confirmation before capital is committed — and before any professional in the chain spends time on a deal that was never going to close.

The shadow market was always there. Reading it brings your technology — and your client's — out of the shadows and into the transactions it was always capable of producing. The fence was built to protect the known territory. Shadow markets live outside the fence.

THE SHADOW MARKET VOCABULARY

Shadow Market: The sector where latent demand lives, invisible from the inventor's vantage point. Not hidden by design — hidden by the accident of focus.

Shadow Demand: Concentrated, unserved need that has not yet surfaced in RFPs, procurement signals, or visible market activity. The buyers are real. The budgets exist. The signal is just below the surface.

Shadow Buyer: The specific purchaser who would move fast, at a higher price, if the offer appeared in their field of vision. They are not browsing patent databases. They are waiting.

Shadow Value: The economic potential in the IP that current commercialization efforts cannot see — because they are looking in the wrong direction.

Casting a Shadow: What happens when inventor focus creates blind spots. Every technology casts one. The shadow grows larger the more precisely the inventor was focused.

Reading the Shadow: The process: pattern recognition across thousands of inventions, AI-assisted scanning across databases and demand signals, ethnographic research to surface pain buyers cannot yet articulate.

Into the Light: What happens when the shadow market is identified, the IP is positioned correctly, and the shadow buyer receives an offer that makes the transaction obvious rather than effortful.

Stop Spending Time on Deals That Were Never Going to Close

The Shadow Market Method reports consistently high close rates on validated opportunities. That claim deserves scrutiny — and the scrutiny reveals why the result is less surprising than it sounds. When demand is confirmed and the buyer is identified before deal engagement begins, the question is no longer whether the market exists. It is how to structure the transaction. The deals that do not close at this stage fail on execution variables — timing, budget cycles, regulatory shifts, switching costs — not on fundamental market absence. Those are the genuinely unpredictable residues: the acts of God that no filter eliminates.

The filter operates in stages. For any given IP asset, the search may identify twenty plausible shadow market categories. Ethnographic research and AI-assisted demand analysis narrow that to eight with concentrated latent demand. Competitive landscape analysis reduces that to four where the IP position is

defensible and the cost-to-value ratio is demonstrably superior to available alternatives. Shadow buyer confirmation conversations — direct engagement with specific buyers to test willingness to pay, budget authority, and regulatory readiness — reduce that to one or two viable opportunities. In the best cases, one proceeds to deal engagement. Often none do, and the search resumes. This is not failure. This is the filter working exactly as intended.

What this means for every professional in the chain: fewer wasted engagements, faster time to term sheet, and materially higher confidence in the deals you bring to clients. A licensing agent working validated shadow market opportunities closes more deals per year than one working cold portfolios — not because they are more skilled, but because the deals they are working were confirmed before engagement began. Patent counsel opens new scope on existing client relationships rather than writing opinions that go nowhere. The TTO reports revenue on assets that had been quietly written off.

When demand is confirmed and the buyer is identified before deal engagement begins, the question shifts from "*will this close*" to "*how do we structure it*."

THE 10X PRINCIPLE: WHY SHADOW MARKETS OUTPERFORM CORE MARKETS

Peter Drucker observed that successful innovations do not simply improve on what exists — they make the alternative obsolete. The threshold he described is roughly ten times better: not incrementally superior, but so much more effective that switching becomes obvious and the prior solution becomes embarrassing in retrospect.

Shadow markets are structurally more likely to produce 10x value than core markets, for a reason that has nothing to do with the technology itself. In the core market, the buyer's alternative is a competing technology. Price and performance are benchmarked against rivals. A 20% improvement closes at a modest premium, if it closes at all.

In the shadow market, the buyer's alternative is the status quo — an unresolved problem they have stopped expecting to solve. There is no competing technology. There is only the cost of the problem continuing versus the cost of the solution appearing. When a pacemaker manufacturer's alternative to battery life extension is an unplanned surgical intervention, the technology is not competing against a rival product. It is competing against resignation. That is an entirely different negotiation — and it is why the cost-to-value ratio in shadow markets shifts by an order of magnitude.

The 10x threshold that Drucker described as the bar for successful innovation is, in shadow markets, frequently the floor rather than the ceiling. The shadow buyer does not need to be persuaded that the technology is better. They need only to be reached.

The Technology You Wrote Off May Be Ready Now

The 97 percent failure rate for patents[1] obscures a critical distinction. Not every non-commercialized technology failed. Many were simply early. The inventor arrived a decade before the shadow demand became visible. The shadow buyer did not yet have the budget line, the regulatory pressure, or the operational problem acute enough to make the technology an obvious purchase. What the industry recorded as failure was, in many cases, a timing mismatch — a real answer to a question the market had not yet learned to ask.

Timing is not a peripheral variable in IP commercialization. It is the variable. Inventors see a decade ahead by temperament — it is the cognitive signature of people who build genuinely new things. The shadow market they were building for was real. It simply had not yet arrived when they needed it to. Think of it as a river that had not yet reached the delta: the water was always coming. The problem was standing at the mouth before the current arrived.

A technology written off today — carrying no book value, no active commercialization effort — may now be sitting directly in the path of the shadow demand it was always meant to serve. Regulatory environments shift. Cost thresholds fall. Adjacent industries mature and create new shadow buyer classes. The shadow buyer who did not exist five years ago may be running a procurement process right now in a sector nobody has thought to contact. One of the most consistent patterns in long-form commercialization work: the technology that found no takers in the first search often closes fastest in the second, because the shadow demand that was invisible at the first pitch has had a decade to concentrate.

What the industry calls a failed technology is often a correctly-built answer to a question the market had not yet learned to ask.

The Trait That Closes the Deal Is Rarely the One That Was Pitched

There is a form of knowledge that does not appear in any certification curriculum. It accumulates from having evaluated thousands of inventions across hundreds of markets over multiple decades — from having watched the same structural errors repeat themselves across industries and generations, and from having recognized, often years before a licensing

transaction, which technologies were carrying shadow value that their inventors could not see.

After enough engagements, the signatures become readable. A timing problem looks different from a market problem. A technology over-engineered for its core market — where simplification for a shadow sector would shift the cost-to-value ratio by an order of magnitude — is recognizable once you have seen it across enough sectors. The shadow buyer in a regulated industry who would pay ten times the core market rate because the technology eliminates a compliance liability worth fifty times the license fee: that pattern repeats across medical devices, financial services, industrial safety, and food processing in ways that would surprise practitioners who have worked in only one.

One of the most consistent findings across sixty years of shadow market work is this: the trait that generates the licensing transaction is frequently not the trait the inventor named, patented for, or pitched on. The apparent value — the capability the inventor set out to create — is rarely the financially valuable one. It is the structural capability that the intended application happened to require, which, when read laterally, addresses an entirely different problem in an entirely different sector at an entirely different price. A battery life extension technology is pitched as a consumer convenience. Read laterally, it is a surgical intervention avoidance system, a capital expenditure reduction for remote infrastructure, and a life-safety compliance tool. The apparent value was modest. The shadow value was substantial. They were present in the same patent all along.

The implication for practitioners is direct: the trait that failed to close a deal in the core market may be the trait that defines an entirely new category in a shadow sector. Reading a technology only for what the inventor intended is reading it with one eye closed. The other eye is looking for the structural capability — the thing the technology can do that nobody thought to ask about.

Pattern recognition also applies to productive accidents — the unintended properties that surface in technologies whose primary application has already been abandoned.

Sildenafil was synthesized in 1989 at Pfizer's Sandwich laboratories as a potential anti-angina compound. Clinical trials in the early 1990s revealed modest cardiovascular effects but a pronounced and unexpected effect on erectile function. Pfizer pivoted. Viagra was approved by the FDA in March 1998 and reached annual revenue exceeding $1 billion within its first two years of sale.[2] Spencer Silver at 3M set out in 1968 to create a super-strong adhesive for aerospace bonding. He produced the opposite: a pressure-sensitive microsphere that adhered lightly and released cleanly. The result sat on a shelf for five years. Arthur Fry found the application in 1974. Post-it Notes launched commercially in 1980; 3M now produces more than 50 billion annually, sold in over 150 countries.[3]

In each case, the shadow value was not in the intended application. It was in the unintended characteristic — a property that only became commercially visible because someone was still paying attention after the original pitch had failed. The practitioner discipline required is lateral attention: the willingness to ask what an unexpected property reveals about markets that were never in the original plan.

The trait that generates the licensing transaction is frequently not the trait the inventor named, patented for, or pitched on. The apparent value is rarely the financially valuable one.

THE SCAVENGING LAYER: WHEN THE INVENTION IS NOT WHAT THE INVENTORS THOUGHT

An inventor set out to solve a simple problem: batteries die too soon. The technology he developed — a dual-circuit system that automatically detects when a battery has fallen below conventional operating voltage and extracts the remaining 15 to 30 percent of chemical energy that devices are designed to abandon — worked exactly as intended. It extended battery life. It was real, patented, and demonstrably effective.

The licensing campaign that followed went nowhere.

The obvious buyers — consumer electronics manufacturers, flashlight companies, commodity battery brands — heard the pitch and passed. A 20 percent battery life extension in a cost-sensitive consumer market is a feature. Features get competed away. The margin math didn't close, the switching costs were real, and the obvious buyers had seen incremental improvements before. The technology went to the shelf.

What the inventor had built for was not what he had built.

Reading the patents laterally — not for what they claimed to do, but for what they were structurally capable of doing — revealed something the inventor had not named and the original pitch had never described: a hardware layer that could be inserted between any depleted energy source and any electrical load, in any form factor, without modifying either. The apparent value was battery life extension — a consumer convenience. The financially valuable trait was something else entirely: an infrastructure layer that sits underneath every battery-powered device ever made, controlling what happens when

power approaches zero. That trait had never been named. It had never been pitched. It had never appeared in any licensing conversation. It was in the shadow of the patent the whole time.

The shadow markets came into focus one by one.

A cardiac device manufacturer does not think about battery life the way a flashlight company does. When a pacemaker's power source approaches depletion, the clinical consequence is not inconvenience — it is an unplanned surgical intervention. A system that automatically extends operation past the conventional voltage floor, without a transformer and without electromagnetic interference that could affect adjacent implanted electronics, is not a feature. It is an adverse event avoided. The willingness-to-pay calculation in that room is a different number by an order of magnitude — a textbook illustration of Drucker's 10x threshold, met not by improving on a competitor but by eliminating a problem the buyer had stopped expecting to solve.

A pipeline monitoring company has sensors in locations where battery replacement costs more than the sensor itself. The technician who services a remote installation in the Permian Basin is not comparing battery brands at the hardware store. He is calculating helicopter hours and shutdown windows. A 25 percent extension of the service interval on a distributed sensor network is not a convenience — it is a capital expenditure reduction that appears in the operating budget of a multi-billion dollar energy company.

A smoke detector manufacturer lives under a different kind of pressure entirely. The chirping low-battery warning that precedes detector failure is the industry's open embarrassment — everyone knows occupants disable it, and everyone knows what happens next. A system that automatically extends detector operation past the chirp threshold addresses a documented public safety gap that building codes and liability insurers are increasingly watching.

In each case, the same patented technology. Different sector. Different buyer. Different problem. Different price. In each case, the financially valuable trait was not the apparent one — it was the structural capability hiding in the shadow of the intended application.

What the shadow market analysis revealed was not a new technology. It was a new identity for an existing one — and with that identity came buyers whose willingness to pay was an order of magnitude higher than anything the original pitch had found. The IP holder's position changed from "no takers" to "multiple validated markets" without a single change to the underlying patent.

Edison Innovations improves licensability. We find the markets that make a transaction worth having — the shadow buyers whose willingness to pay is real, whose budgets exist, and whose urgency makes the conversation a different one than any prior pitch produced. The fence around the patent was drawn in one direction. The value was in another.

Everyone Is Doing Their Job. Ours Is the One Nobody Was Assigned.

Every professional in the IP commercialization chain is focused, correctly, on claim-based marketability. The inventor built for a specific application and described it precisely. The patent attorney drafted claims that protect that application as completely as possible. The licensing agent pitched the technology to the buyers most likely to need what the claims describe. The TTO evaluated the asset against the markets the inventor identified. Each of these professionals was doing exactly what they were supposed to do — and none of them were supposed to be looking for what we look for. The shadow market analyst is not a better version of any of these functions. It is a different function entirely: the one that asks what the technology can do for buyers who were never in the original plan, in markets the claims were never written to reach.

A common objection to the premise of shadow market identification is that inventors are capable of identifying adjacent applications themselves — and that experienced technology transfer professionals already perform this function. Both observations are correct. The structural argument here is more specific: that the cognitive demands of solving a hard technical problem are in direct tension with the lateral market scanning required to find shadow markets, and that this tension systematically produces blind spots regardless of the inventor's intelligence or the TTO's diligence.

There is a second, subtler force at work that compounds the blind spot: the history of the pitch itself. Every time a technology is presented to a buyer category and rejected, that rejection becomes part of the file. "No traction." "Market not ready." "Timing." These notes accumulate until they form a belief — not a finding, but a belief — about what the technology is and is not capable of producing commercially. That belief is then carried into every subsequent conversation. The licensing professional reviewing the portfolio is not asking "who else has this problem" — they are asking "why didn't the obvious buyers close." The shadow buyer's pain never gets heard because the search never reaches them. The history of failure in the light actively prevents the question that would find the answer in the shadow.

This is confirmation bias with a specific commercial cost. The practitioner who has watched a strong patent go through three pitch cycles without closing is not more likely to find the shadow buyer — they are less likely, because the accumulated rejections have narrowed their sense of what is possible. The file says "no market." The shadow buyer says "nobody has

ever offered me this." Both are true. They are simply not talking to each other.

The same structural logic applies to legal counsel. Patent attorneys are trained to build the strongest possible fence around a defined territory — exactly the right training for freedom-to-operate analysis, claim prosecution, and infringement defense, and structurally misaligned with the task of scanning laterally for unserved demand in markets the inventor never named. The attorney who recognizes that a client needs shadow market analysis and refers them is doing exactly what a trusted advisor does: matching the problem to the right tool at the right stage.

The mechanism throughout is attention, not capability. The inventor who is focused on solving a specific technical problem has necessarily narrowed their field of vision. The TTO that manages hundreds of disclosures annually has limited time for lateral market analysis on any individual asset. Every professional in the chain is attending to what they were retained to attend to. The shadow market analyst is attending to what nobody was retained to find — and finding it before the asset is written off permanently.

The result is consistent across sectors: inventors pitch to the buyers they built for, walk past entire shadow markets where the same technical capability would address a larger problem at a cost-to-value ratio producing a transaction three to ten times the size of anything the core market would support. The shadow buyer is not being asked to pay more for the same value. They are paying far less, relative to the problem the technology solves, than any buyer in the core market would. That asymmetry is where transactions close.

Every professional in the chain was doing exactly what they were supposed to do. None of them were supposed to be looking for what we look for.

A NOTE TO DRAFTING ATTORNEYS: LEAVE THE SHADOW DOORS OPEN

The claims you draft today define the fence. But they also define the shadow — the territory adjacent to the fence that a future shadow market analyst will need room to enter. A claim drawn with maximum specificity protects the known application completely. It also casts the deepest shadow over every application nobody has yet imagined. This is not a drafting error. It is an unavoidable trade-off — and one worth making consciously.

The financially valuable trait in a patent is frequently not the trait the inventor named. It is the structural capability that the intended application happened to require — which, read laterally, may address an entirely different problem at an entirely different price. Claims drafted only for the market the inventor described may protect that market precisely while inadvertently foreclosing the shadow markets that carry the larger opportunity.

The practitioner advice: leave as many shadow doors open as possible. You do not know which adjacent sector will mature in five years and create a buyer class that needs exactly this technology. You do not know which unintended property will surface in field data and prove more valuable than the intended one. The attorney who writes claims that can accommodate markets the inventor never considered has done the whole job.

Shadow markets are found after prosecution is complete. The doors left open during drafting are the ones we walk through later. Leave them open.

THE COST-TO-VALUE SHIFT: HOW SHADOW MARKETS CHANGE THE EQUATION

- Same technology. Different sector. Value-to-cost ratio shifts by 5–10x.
- In regulated industries, IP that eliminates liability may be worth multiples of its development cost.
- Shadow buyers in capital-intensive sectors often have larger budgets and shorter decision cycles than core market buyers.
- Cross-border shadow markets capture value in jurisdictions where domestic competitors have no presence.
- Timing recovery restores shadow value in technologies previously written off as too early.

Your Client's Shadow Buyer Has Already Given Up Waiting. Here Is How We Find Them.

The shadow buyer is not posting RFPs or browsing patent databases. The reason runs deeper than simple market inefficiency. The pain has been normalized — absorbed into standard operating procedure, budgeted as a fixed cost, staffed around, and eventually stopped being called a problem at all. It became a condition.

The pipeline operator does not say "we need a better battery solution." He says "remote installations are expensive to service." The hospital procurement officer does not say "our portable devices fail at the worst moments." She says "battery management is part of our maintenance protocol." The smoke detector industry does not say "our low-battery warning system is broken." It says "occupant compliance is a known challenge." In each case, the pain has been individualized, operationalized, and made invisible — not because it is small, but because

no alternative has appeared long enough to make the status quo feel like a choice rather than a fact.

This is the structural condition that creates shadow demand. The buyer is not waiting for a better product in a category they are actively shopping. They are waiting in a category they have stopped believing exists. They would move fast — because the moment a solution appears, a decade of accumulated frustration becomes a procurement decision.

You have clients whose technologies are sitting in exactly this condition right now. Somewhere in a sector nobody has thought to contact, a buyer has normalized a problem that your client's technology solves completely — and would pay a multiple of the original asking price to solve it. The gap between that buyer and that technology is not a market failure. It is an information failure. And information failures are recoverable.

Finding them requires ethnographic intelligence: the discipline of listening not for what buyers are asking for, but for what they have stopped expecting to change. Structured conversations in non-obvious sectors establish whether latent demand is real or theoretical. Competitive landscape mapping determines whether the IP position is defensible. Regulatory environment assessment identifies pressure signals that convert latent urgency into active procurement. Procurement trail analysis traces the path from the normalized condition back to the budget authority that could fund a solution.

AI-assisted database intelligence transforms the scale at which this fieldwork operates. Database mining across patent filings, regulatory submissions, user forum complaints, maintenance records, R&D job postings, procurement trends, and M&A activity surfaces the signal of normalized pain at a scale no individual network would find. The forum post where a plant engineer vents about helicopter service costs. The regulatory filing where a medical device company discloses battery depletion as a contributing factor in an adverse event report. The job posting where an IoT company lists "battery life optimization" as a required skill. These are the fingerprints of shadow demand.

What AI does not do is replace the human judgment required to evaluate those signals — to distinguish genuine shadow demand from a market that is quiet for good reason, to recognize whether the shadow buyer is ready now or in three years, to understand why a patent that failed in one sector carries exactly the property a buyer in a different field has been trying to source. That judgment is the pattern library. AI is the telescope that extends its reach. It does not substitute for sixty years of knowing what to look for.

Shadow buyers are not waiting for a better product in a category they are shopping. They are waiting in a category they have stopped believing exists. Your client's technology may be the answer they have given up looking for.

Not Every Patent Has a Shadow Market. More Do Than You Think.

Not every patent casts an attractive shadow. Some technologies were built for the only market that needed them, and when the shadow is read, it is empty. The value of the method is not that it finds shadow markets in every asset — it is that it finds them efficiently where they exist and stops wasting everyone's time where they don't. What is surprising, consistently, is how many assets that have been written off as commercially exhausted turn out to have shadow markets that were never searched. The shelf is more crowded with recoverable value than most portfolios assume.

Most shadow market searches do not yield viable opportunities on the first pass. That is not a failure of the method — it is the method. The high elimination rate at each stage is precisely what produces reliable close rates on the opportunities that do proceed. For any given technology, the search may identify twenty candidate shadow market categories. Research and AI-assisted demand analysis identify eight with concentrated latent demand. Competitive analysis reduces that to four where the IP position is defensible. Shadow buyer confirmation conversations reduce it to one or two where willingness to pay is genuine, budget authority is real, and the regulatory pathway is navigable. Often none proceed. The search resumes with different framing. This is the filter working exactly as intended.

Timing is the variable that humbles every other test. A technology can satisfy every shadow market criterion and still arrive at the wrong moment. Reading timing signals with the same rigor applied to demand signals is what separates useful intelligence from a pipeline of premature engagements.

There is also a human dimension that analytics cannot capture. The conversation that explains to an inventor that the shadow demand did not materialize in the direction searched — and that the honest next step is a different shadow market rather than a harder push in the same direction — requires trust built on repeated candor. It is the conversation that determines whether the practitioner is a partner or a vendor.

The shelf is more crowded with recoverable value than most portfolios assume. The method's discipline is what makes the recoveries reliable.

When the Shadow Buyer Is Confirmed, the Deal Structures Itself

When a shadow market is validated and the shadow buyer is identified, deal structure is not secondary. The wrong architecture can collapse a transaction the underlying economics fully support.

A direct license is the simplest path: IP holder

retains ownership, the shadow buyer pays royalties or a lump sum against confirmed field-of-use, and the transaction closes through licensing professionals with expertise in the relevant sector. This works when the technology is deployment-ready, the buyer is established, and the field-of-use boundaries between the core and shadow market are legally clean.

A development partnership is appropriate when the technology requires adaptation for the shadow market and the buyer has both the technical capability and strategic interest to co-develop. Both parties carry risk and capture upside. Payment structures typically combine an upfront component, development milestones, and a royalty tied to commercial deployment. The shadow buyer's domain knowledge in the shadow sector becomes an asset in the partnership, not merely a commercial target.

A spinout is right when the shadow market opportunity is large enough to justify its own entity and when neither the IP holder nor the shadow buyer is the natural vehicle to pursue it at full speed. More than fifty ventures have been formed through this mechanism, and spinout formation should be treated as a legitimate first-choice commercialization outcome, not a fallback. A well-structured spinout attracts dedicated capital, moves faster than a large corporate licensee, and returns equity to the IP holder in a market that would not have existed without the shadow market identification.

In some cases the IP holder's company funds the startup directly, preserving the opportunity within the corporate family while allowing focused pursuit of the new market.

Cross-border transactions deserve more than passing attention. The instinct of most domestic commercialization efforts is to exhaust the home market first. That instinct is understandable and frequently wrong. Shadow markets are often invisible from within the inventor's domestic environment not because demand is absent, but because the relevant buyers operate in jurisdictions where the demand pressure that has not yet arrived domestically has been acute for a decade. Regulatory regimes that do not yet exist in the United States may have already created urgency in Germany, Japan, or South Korea. Environmental standards that are still emerging in North America may already be compliance requirements in the European Union. A medical device that is a nice-to-have in a cost-conscious domestic market may be a procurement necessity in a jurisdiction where liability exposure is structured differently.

The shadow buyer in Stuttgart or Seoul is not attending the same conferences as the inventor in Columbus. They are not in the domestic licensing agent's contact list. They are waiting, with funded budgets and genuine urgency, for an offer that has simply never arrived because no one in the domestic commercialization chain knew to look across the border. The LES International member network is one of the few mechanisms that can close this gap systematically — which is why cross-border shadow market identification is a core component of the method, not an afterthought reserved for technologies that have already failed domestically.

A license is one way to bring shadow value into the light. A partnership, a spinout, a funded startup, a cross-border deal — each is the right structure in the right context.

What Every Professional in the Chain Actually Gets

The Shadow Market Method is a front-end function — market intelligence, timing assessment, demand validation, buyer identification, and strategic positioning. It produces the one thing every professional in the licensing ecosystem needs but rarely receives: a validated opportunity with a confirmed buyer before significant time or capital is committed.

What follows shows exactly what each professional in the chain receives — as the direct result of shadow market intelligence arriving before deal engagement begins.

PARTNER ROLE	WHAT THEY BRING	THE WIN
IP Holder / Inventor	Patented technology; domain expertise; inventor credibility in shadow buyer conversations; access to development partners.	Revenue from a shadow market they would never have identified; extended patent utility; no wasted capital on unvalidated paths; equity in spinouts where the structure supports it.
Patent Counsel	Freedom-to-operate in the shadow sector; prosecution strategy aligned to the new field of use; prior art mapping; cross-border filing strategy for international shadow opportunities.	New engagement scope on existing or new client relationships; portfolio value they actively helped create; fees tied to a transaction moving toward close rather than a portfolio review that goes nowhere.

PARTNER ROLE	WHAT THEY BRING	THE WIN
Licensing Agent / Broker	Deal structuring; term sheet negotiation; royalty rate benchmarking in the shadow sector; shadow buyer relationship management; field-of-use boundary definition.	A qualified, validated opportunity with a confirmed shadow buyer — not a cold portfolio presentation; faster time to term sheet; materially higher closing probability.
Corporate IP / Licensing Counsel	Due diligence framework for the shadow market context; indemnification structure; cross-licensing opportunities; international jurisdiction analysis; development partnership documentation.	A de-risked transaction with shadow market validation completed before significant deal cost is incurred; clean IP position confirmed early; expanded client relationships in sectors not previously engaged.
Technology Transfer Office	Existing disclosure pipeline; institutional credibility; co-inventor relationships; sponsored research infrastructure; faculty expertise in shadow market sectors.	Revenue on previously dormant assets; expanded mission impact; new corporate relationships in shadow sectors; spinout pipeline from the shadow market identification process.
International LES Members & Partners	Jurisdiction-specific shadow buyer relationships; local regulatory knowledge; cross-border deal structuring experience; cultural and language fluency in shadow market negotiations.	Deal flow on validated shadow market opportunities with full intelligence in hand; fees on transactions that would not exist without cross-border identification; durable relationships built on deals that close.
Investment / Deal Structuring Professional	Capital access; deal architecture; earn-out and milestone structuring; startup formation and capitalization for spinout opportunities; buyer financing facilitation.	A deal that has cleared the hardest stage — shadow market validation — before capital is committed; pipeline deal flow on validated opportunities, not one-off transactions.

This architecture works across industries because shadow markets exist in every sector. The discipline holds across every engagement: qualify the shadow demand, confirm the shadow buyer, validate before committing. Every professional works on deals built to close.

THE UNIVERSITY RESEARCH PROGRAM: SHADOW MARKET INTELLIGENCE AT SCALE

One of the structural constraints facing technology transfer offices is bandwidth. A TTO managing hundreds of active disclosures cannot conduct deep adjacency research on every asset. The promising technology sits in the pipeline, waiting for attention the existing staff cannot provide.

Edison Innovations is developing a structured program in partnership with university business school programs. Graduate and MBA students — trained in the Shadow Market Method framework — conduct shadow market scans on selected TTO assets as part of supervised practicum work. Student teams gain applied experience in demand analysis, competitive intelligence, and cross-sector pattern recognition. The TTO gains research output that would otherwise require consulting engagements it cannot afford. Edison Innovations gains a broader pipeline of qualified shadow market candidates to evaluate.

The program generates income for students, increases licensing effectiveness for TTOs, and trains the next generation of practitioners in a methodology the field currently lacks. The technology on the back of the shelf gets attention it would never otherwise receive.

The Same Shadow Market. Six Different Wins.

The shadow market conversation looks different depending on who is having it. The following is not a theoretical allocation of benefits — it is a description of what changes, concretely, when shadow market intelligence arrives before the conventional conversation begins.

STAKEHOLDER	THE SHADOW THEY ARE STANDING IN	WHAT CHANGES
Board Members & Corporate IP Committees	IP assets carried at zero or distressed values because obvious buyers passed; fiduciary exposure from undisclosed latent value; strategic decisions made without the full picture of portfolio potential.	Shadow market analysis is a board-level asset revaluation tool. Validated shadow markets change the IP line on the balance sheet and the narrative in the annual report. The question "why didn't we know this existed" becomes "we found it before anyone else did."
Licensing Professionals	Cold portfolio presentations to skeptical buyers; low close rates on general commercialization efforts; time invested in deals that were never going to close.	A confirmed shadow buyer arriving before deal engagement begins changes the entire negotiation dynamic. You are not benchmarking against competitors — you are structuring a transaction where the buyer's next-best alternative is continued suffering. That closes faster and at higher values.
College Presidents & University Boards	TTO bandwidth constraints; dormant IP generating no return on the research investment that created it; corporate relationships limited to sectors the faculty already know.	Shadow market commercialization honors the institution's research investment by finding the buyers who need the discoveries most — often in sectors the TTO has never engaged. Dormant disclosures become revenue. New corporate relationships open in sectors the development office has never approached.
Defense & Military Procurement	Commercially developed technologies with shadow military applications that defense procurement has never been offered; readiness gaps that acquisition timelines cannot close.	Shadow market analysis identifies which commercially available technologies address documented readiness problems the acquisition system has not yet reached. The value is fielded capability faster and cheaper than the traditional process. Shadow market intelligence is the bridge between commercial IP and defense need.
Private Equity	IP portfolios in acquisition targets carried at distressed values because obvious buyers passed; standard IP due diligence that asks *"what has this generated"* rather than *"what could this generate."*	Shadow market analysis before acquisition is due diligence alpha: IP carried at zero because the original pitch failed is a misvalued asset if shadow buyers exist. Post-acquisition, shadow market commercialization is a value creation lever most PE operating teams do not currently have.
M&A Advisors	Target valuations that do not reflect shadow market IP potential; buyers who overpay for apparent value and underpay for shadow value.	A patent portfolio with confirmed shadow market opportunities is worth materially more than one with a history of failed pitches — even if the underlying technology is identical. For targets, shadow market validation before going to market creates the narrative that drives premium valuations.

You Already Know Which Asset We Are Talking About

You already know which asset we are talking about.

It has been there for a while — presented to the obvious buyers, received politely, stalled in procurement or committee review. Someone wrote 'no traction' in the file. The inventor still believes in it. The patent is still valid. The technology still works. But the commercialization effort has quietly stopped, and the assumption — never quite spoken aloud — is that the market was not there.

The market was there. It was in the shadow.

The absence of visible demand is not the same as the absence of demand. The shadow buyer is not in the same room as the obvious buyer. The financially valuable trait may not be the apparent one — it may be a structural capability hiding in the patent that no prior pitch ever named. The history of failed pitches has made the shadow invisible, not absent.

Before you finish this section, you will have thought of at least one asset — yours or your client's — where the shadow market has never been searched. An asset where the timing problem that killed the first pitch may have resolved as adjacent markets matured. An asset where the highest-value buyer is in Stuttgart or Seoul, not in the domestic market where all the pitches were made. An asset where the Drucker threshold — ten times better than the alternative — is not just achievable but inevitable, because the shadow buyer's alternative is a problem they have given up solving.

The expected benefit follows from the logic of the filter. When the shadow buyer's willingness to pay is confirmed before deal engagement begins — when the budget is real, the problem is acute, and the alternatives have already been found insufficient — the remaining question is execution. A dormant asset generating zero revenue becomes a validated licensing opportunity. A licensing professional working cold portfolios becomes one working confirmed buyers. A board discovers asset value that no prior valuation captured. A college president reports revenue on a five-year-old disclosure in a sector the institution had never engaged. A PE firm captures upside the purchase price did not reflect. These outcomes are not guaranteed. They are the predictable result of confirming demand before commitment — and of asking, for the first time, what the technology can do for buyers who were never in the original plan.

Ninety-seven percent of patents never generate revenue. The shadow they are casting is larger than most of them will ever know. The question is whether anyone is going to read it. ■

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CONFLICT OF INTEREST DISCLOSURE

The authors operate a commercialization advisory practice that applies the Shadow Market Method described in this article. The framework, vocabulary, and qualitative findings presented here derive from the authors' practitioner experience and are offered as a contribution to professional knowledge rather than as independent academic research. The performance figures cited (86% deal close rate on validated opportunities) are proprietary operational data derived from the authors' practice and have not been independently verified. Readers should apply appropriate weight to practitioner-reported metrics. The authors have no financial relationship with *les Nouvelles* or LESI beyond their LES membership. No external funding was received for this work.

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Note on citation 1: The 97% figure is widely cited in IP commercialization literature and is used here as a conservative practitioner-consensus indicator consistent with broader commercialization literature. The figure is supported by AUTM licensing survey data showing that a small minority of active university licenses generate meaningful revenue.

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Royalty Rate Determination: A Reproducible Framework

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ABSTRACT

Royalty rate determination is a common task in intellectual property licensing, valuation, transfer pricing, and dispute-related work. In many assignments, the question is not the value of the subject intellectual property, but the appropriate royalty rate for a defined bundle of rights, field of use, territory, and royalty base. The practical difficulty is that royalty-rate conclusions are often drawn from heterogeneous data and professional judgment without a sufficiently clear and reproducible explanation of how the selected rate was reached. This article presents a reproducible framework for royalty-rate determination. It combines a structured classification of methods with a documented procedure for defining comparability, selecting observations, and constructing a royalty-rate distribution. Within that framework, LABRATE ROYALTY PRO (LRP) is treated as a Group B analytical method, and a point royalty rate may subsequently be derived under a pre-specified range-to-point rule. The framework also incorporates royalty-base normalization, stop conditions, robustness checks, and evidence levels. It is especially useful where comparable license data are scarce, incompletely disclosed, or difficult to interpret, including know-how and other intangible assets for which observable market transactions are limited. The framework does not replace professional judgment. It structures that judgment, documents it, and makes it open to independent review.

Keywords: royalty rate determination; LABRATE ROYALTY PRO; comparability; reproducibility; transfer pricing; know-how; intellectual property valuation; royalty-base normalization

1. Introduction

Royalty rate determination is a common analytical task in intellectual property licensing, valuation, transfer pricing, and dispute-related work. In many such assignments, the client does not need a monetary value conclusion for the subject intellectual property. Instead, the client needs a supportable royalty-rate conclusion for a defined bundle of legal rights, a defined field of use, and a defined royalty base. This is often the case in license negotiations and in other assignments where the royalty-rate conclusion is itself the intended analytical output.[1]

That distinction matters because a royalty rate is a pricing metric, whereas value is a monetary conclusion developed within a separate valuation model.

Accordingly, the valuation analyst's task is not merely to identify a reasonable number. The analyst must be able to explain, in a clear and structured way, how the selected method, data, and analytical steps lead to the royalty-rate conclusion. That task becomes more difficult when apparently similar royalty rates relate to different royalty bases, fields of use, territories, time periods, or license structures. In such circumstances, the stated rate, standing alone, may say very little unless the economic and legal context of the observation is clearly identified.[2]

International professional guidance, including the OECD Transfer Pricing Guidelines and the International Valuation Standards (IVS), appropriately emphasizes comparability, data quality, documentation, and professional judgment.[3] However, those sources do not provide a single reproducible protocol linking comparability specification, sample construction, and construction of a royalty-rate distribution from which a point conclusion may later be derived under a documented rule.[4]

As a result, two practical problems arise repeatedly. First, an otherwise acceptable method may be applied beyond its proper domain of applicability. Second, an independent reviewer, court, tax authority, transaction counterparty, or other intended user may be unable to reconstruct how the analyst moved from observed or analytically derived inputs to the final royalty-rate conclusion.

1 Robert F. Reilly, "Intellectual Property Valuation Approaches and Methods," *les Nouvelles* 46, no. 3 (2011): 199.

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3 Organisation for Economic Co-operation and Development, OECD Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations 2022 (Paris: OECD Publishing, 2022); International Valuation Standards Council, International Valuation Standards: Effective 31 January 2025 (London: IVSC, 2024), 5, 8–15.

4 International Valuation Standards Council, IVS (effective 31 January 2028) Exposure Draft (London: IVSC, 2026), 3–9, 11–18, 68–74, 93–112.

This article presents a reproducible framework designed to address both problems. It offers a structured classification of royalty-rate determination methods, a documented procedural sequence for constructing a royalty-rate distribution within a defined comparability perimeter, and an evidence framework for distinguishing indicative estimates from fully supported computations. The framework does not replace valuation analyst judgment. It structures that judgment, documents it, and makes it open to independent review. At the center of the framework is a simple proposition: royalty-rate determination becomes reproducible only when comparability, activity scope, and rate distribution are defined before point selection begins.[5]

2. Background and Research Gap

A review of the royalty rate determination literature reveals a consistent pattern: methodological disagreement usually arises not from a dispute over a single number in the abstract, but from the absence of a reproducible basis linking that number to the subject intellectual property, the relevant bundle of legal rights, the royalty base, the market setting, and the material terms of the transaction.

The fifteen factors set out in *Georgia-Pacific Corp. v. United States Plywood Corp*.[6] established a structured framework for analyzing a reasonable royalty. In *Uniloc USA, Inc. v. Microsoft Corp.*,[7] the court rejected the mechanical use of the "25 percent rule" because it lacked a sufficient tie to the facts of the case. In the professional literature, Goldscheider, Jarosz, and Mulhern[8] documented both the practical influence and the analytical weakness of that rule, while Binder and Nestler[9] revisited profit-split reasoning as a more structured alternative. Taken together, these authorities point to the same weakness: absent a disciplined comparability analysis and a transparent selection rule, the stated rate risks becoming an unsupported assumption rather than a reasoned conclusion.

The OECD Transfer Pricing Guidelines formalize the arm's-length principle and place comparability analysis at the center of the assessment of controlled transactions, while also recognizing that reliable comparable uncontrolled transactions for intangible property are often unavailable or incomplete. In transfer pricing terminology, the search for and use of such transactions is commonly described as Comparable Uncontrolled Transaction (CUT) analysis. CUT terminology, however, should not be conflated with relief-from-royalty, which is a valuation model that may use transaction data as an input. In this context, transfer pricing references to intangible property should not be treated as identical to appraisal or accounting references to intangible assets; that distinction is specified in Section 3. Crouzet and Ma[10] likewise highlight data scarcity and the sensitivity of results to model structure and assumptions as central sources of valuation risk.

Current IVS, and IVS 210 in particular, reinforce the importance of assignment definition, data quality, model selection, documentation, and quality control. The IVS 2028 Exposure Draft[11] strengthens that process discipline further. However, neither current IVS nor the Exposure Draft, standing alone, provides a step-by-step royalty rate determination protocol linking comparability specification, observation selection, construction of a royalty rate distribution, and derivation of a point conclusion. The standards discipline the valuation process; they do not by themselves supply the computational bridge from observed or analytically derived inputs to a supportable royalty rate conclusion.

Professional practice adds a further complication. Observed license data are often limited, incompletely disclosed, and affected by transaction-specific noise. Public sources may combine different royalty bases, bundled rights, territory restrictions, milestone or minimum-payment provisions, service obligations, cross-licensing elements, and other transaction-specific terms that are not fully visible to the analyst. This practical difficulty is well recognized in professional discussions of CUT and relief-from-royalty practice, including those published in *les Nouvelles*.[12] The analytical task is therefore not simply to collect royalty rates. It is to define a supportable comparability perimeter, normalize the observations within that perimeter, and explain the transition from observed dispersion to the selected conclusion.

As Gordon Smith observed in *Trademark Valuation,*[13] economic analysis cannot be separated from context, intended use, and the relevant bundle of legal rights. The same applies to royalty rate determination. In many assignments, particularly license negotiation assignments, the client may need a royalty rate conclusion rather than an opinion of value. What is required, however, is a methodologically supportable procedure that structures and documents professional judgment,

5 International Valuation Standards Council, International Valuation Standards Summary and Consultation Questions (London: IVSC, 2026), 2–4; International Valuation Standards Council, IVS (effective 31 January 2028) Exposure Draft (London: IVSC, 2026), 68–74.

6 *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116 (S.D.N.Y. 1970).

7 *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292 (Fed. Cir. 2011).

8 Robert Goldscheider, John Jarosz, and Carla Mulhern, "Use of the 25 Per Cent Rule in Valuing IP," *les Nouvelles* 37, no. 4 (2002): 123-33.

9 Christoph Binder and Andreas Nestler, "Valuation of Intangibles and Trademarks-A Rehabilitation of the Profit-Split Method after Uniloc," *les Nouvelles* 50, no. 4 (2015): 203-12.

10 Nicolas Crouzet and Yueran Ma, "Financing and Valuation of Intangible Assets" (paper prepared for the WIPO Expert Consultative Group on Valuation of Intangible Assets, 2023).

11 IVSC, IVS Exposure Draft (effective 31 January 2028) (London: IVSC, 2026).

12 Reilly, Robert F. "Relief from Royalty Method of Intellectual Property Valuations." *les Nouvelles* 57, no. 1 (2022): 15–30.

13 Gordon V. Smith, *Trademark Valuation* (New York: John Wiley & Sons, 1997).

distinguishes indicative estimates from fully justified computations, and makes the final conclusion open to independent review.

This article integrates the author's prior work on LABRATE ROYALTY PRO, the BC → K → SRRD sequence, the documented derivation of SRR under a range-to-point rule, and a consistent classification of royalty rate determination methods into a single framework for discussion in an international licensing and valuation context. The author's companion article[14] presents the broader applicability matrix and more detailed stop conditions; the present article focuses on the integrated procedural framework and its professional implications.

3. Definitions and Notation

The following working definitions provide the conceptual foundation of the proposed framework. Author-coined definitions are marked [A].

In this article, intangible asset is used as an appraisal or accounting category. Intellectual property, or legally protected intangible property, refers to legally protected subject matter and/or rights that may, but need not, coincide with an accounting intangible asset. The distinction matters because the subject intellectual property, the bundle of legal rights under analysis, and the accounting presentation of the related asset are not necessarily coextensive.

Analytical Distinction Between Rate and Value [A]: the royalty rate r (%) is a pricing measure, not a monetary valuation. It should not be conflated with the periodic royalty R_t (a monetary amount), the lump-sum payment F (a monetary amount), or the value of the relevant intellectual property right (a monetary amount). These quantities are analytically distinct and are not interchangeable in computation or documentation.

Bounded Context (BC) [A] is the formal intersection of the comparability coordinates, BC = U ∩ M ∩ B ∩ T ∩ P, where U = mode of use of the subject intellectual property right, M = monetization method, B = royalty-base specification, including the source base and the normalization rule used for comparison, T = territory, and P = observation period together with the valuation date. Any change in one coordinate implies departure from the current BC. The set of relevant activities, K = {K1, K2, …, Kn}, within which the subject intellectual property is used or is intended to be used as of the valuation date, is specified separately. In this article, BC denotes a comparability-coordinate construct, not a software or organizational bounded context. In practical terms, BC identifies the comparability perimeter: what type of IP use is being analysed, on what royalty base, in what territory, and over what period. Royalty rates drawn from different BCs may still be informative, but they are not directly comparable without a separately justified adjustment.

Comparable Royalty Rate Observation [A] means a royalty rate observation whose source royalty base is already expressed on, or can be supportably normalized to, the article's reference sales-revenue comparison base. A royalty rate observation is not rejected merely because its source royalty base differs from the comparison base. It may be used only if such normalization can be performed on a supportable basis. Otherwise, the observation is excluded from the analysis.

Comparable Transaction / Guideline Transaction [A] distinguishes between two levels of analytical reliance. A comparable transaction is an observed market transaction whose material economic, legal, and contractual characteristics are sufficiently close to those of the subject intellectual property, the defined bundle of legal rights, and the assignment conditions to permit direct analytical use. A guideline transaction provides directional benchmark evidence but is not treated as a direct equivalent. The distinction is therefore one of degree and analytical reliance, not merely of label.

Contractual Royalty Base [A] means the base specified in the license agreement for calculating royalty payments. That base may be expressly defined, partially defined, or left economically indeterminate. It should not be assumed to be identical to the article's Reference Sales-Revenue Comparison Base (defined below). Where the contractual royalty base is stated differently, the analyst should determine its composition and, where justified, map it to a functionally comparable sales-revenue comparison base before a market rate comparison is performed.

Evidence Level [A] means a formalized class (Level 0-3) assigned not to the rate itself, but to the sufficiency of the evidentiary basis of the computation, based on verifiable criteria.

LABRATE ROYALTY PRO (LRP) [A] is a Group B royalty rate determination method in which the royalty rate conclusion is derived from the licensor's share in the licensee's profitability and from two parallel profitability-based rate expressions derived from industry data arrays, both stated on the article's Reference Sales-Revenue Comparison Base. Specifically, the method uses two parallel rate expressions:

r(ROS) = LS × ROS

r(EM) = LS × EM

where LS is the licensor's share in the licensee's profit, ROS is return on sales, and EM is EBIT margin. These two expressions are applied in parallel rather than as alternatives. They do not, by themselves, constitute SRR (defined below). Instead, they provide the financial-economic basis for constructing SRRD

14 Alexander V. Kostin, "IVS-2028 and the Applicability Limits of Royalty Rate Determination Methods," *Digital Economy* 1, no. 36 (2026): 68-80.

(defined below) and for the subsequent derivation of SRR under a documented, pre-specified, and reproducible range-to-point rule.

Observation Window Rule [A] means that SRRD is constructed only over eligible five-year observation windows. Eligible windows are those five-year periods that contain the calendar year of the valuation date. Where more than one eligible window exists, one is designated as the primary window and the remainder serve as verification windows.

Observed Market Transaction [A] means an externally observable market exchange containing sufficiently disclosed economic and contractual terms to support a comparability analysis. Unless separately justified, the term excludes purchase price allocations, litigation settlements, purely controlled intercompany arrangements, regulatory benchmarks, judicial ceilings, and other non-market or quasi-market constructs.

Professional Judgment [A] means, for purposes of this framework, the informed selection, interpretation, weighting, and synthesis of data, assumptions, comparability decisions, filtering choices, and point-selection rules within the defined assignment. The framework does not replace the analyst's judgment. It structures that judgment, documents it, and makes it open to independent review.

Profitability Measure [A] is used only if both its numerator and denominator are explicitly defined and can be independently reproduced from the underlying evidence. Where Russian accounting examples are used, PFS (Profit from Sales) = RAS line 2200; Sales = RAS line 2110; ROS = PFS / Sales; EBIT = RAS line 2300 + line 2330 − line 2320 − line 2310; and EM = EBIT / Sales. In this article, ROS and EM are preserved as analytically distinct profitability measures used in parallel rather than as interchangeable labels for a single metric.

r [A] denotes the general royalty rate variable. In this article, r may be used generically across Group A and Group B methods. It is related to SRR, but it is not interchangeable with SRR.

Reference Sales-Revenue Comparison Base [A] means the single sales-revenue base used throughout this article for royalty rate comparison. In this framework, "sales" means revenue from the licensed product, good, or service stated on a functionally comparable basis across observations and methods and used as the common denominator for normalization and rate comparison. This does not mean that every contractual, observed, or analytically derived royalty base is inherently sales-based. It means only that, for analytical comparability within this framework, royalty rate observations and analytical outputs are used only if they are already stated on, or can be supportably normalized to, the same sales-revenue comparison base. For Russian accounting examples, "sales" refers to sales revenue under RAS, line 2110, unless sector-specific reporting requires reconstruction of a functionally equivalent revenue measure. For other jurisdictions, sales should be mapped to the closest functionally comparable revenue measure, with explicit disclosure of whether that measure corresponds to gross sales, net sales, net revenues, recognized revenue, or another sales-based concept.

Robustness Check (CT) [A] means a formalized sensitivity test examining the stability of the SRR conclusion under permissible changes to assumptions, filters, or the point-selection rule.

Royalty Rate Determination Method [A] means a reproducible analytical procedure used to derive a royalty rate or royalty rate range from identified, documented, and screened evidence under a stated and documented decision rule. Depending on the method class, the procedure may rely on observed market transactions, other defined evidentiary inputs, or both. A method is distinct from a data source, a benchmark, a stand-alone formula, or a valuation model that uses a royalty rate as an input rather than deriving the rate itself.

SRR [A] means the Sales-based Royalty Rate. It is a royalty rate stated on the article's reference sales-revenue comparison base and derived within the framework from one SRRD(Ki) or from a documented combination of SRRD(K1), SRRD(K2), …, SRRD(Kn) under a stated, pre-documented, and independently verifiable range-to-point rule. In this article, SRR is a sales-based term and should not be used as a generic synonym for any royalty rate conclusion.

SRRD(Ki) [A] means the Sales-based Royalty Rate Distribution for activity Ki. It is the statistical distribution of royalty rates stated on the article's reference sales-revenue comparison base for a defined activity Ki, reproducibly constructed within a fixed BC under documented inclusion, exclusion, normalization, and processing rules. At a minimum, it is described by quartiles Q1, Q2, and Q3. Where the data indicate multimodality or materially distinct subpopulations, stratification is required rather than simple pooling.

Stop Condition (SC) [A] means a formalized condition whose activation blocks the derivation of a point SRR and, depending on the nature of the deficiency, either retains the quartile result as a range conclusion or renders the computation invalid unless the analytical setup is rebuilt.

The notation used throughout this article is summarized in Table 1. Unless expressly stated otherwise, the SRRD/SRR notation refers to royalty rates stated on, or supportably normalized to, the article's reference sales-revenue comparison base.

TABLE 1. Unified Royalty Rate Notation

ITEM	SYMBOL	DEFINITION	EXPRESSION
Royalty Rate	r	General royalty rate variable expressed as a percentage of the article's reference sales-revenue comparison base once stated on, or supportably normalized to, that base	r = % of S
Reference Sales-Revenue Comparison Base	S	Single sales-revenue comparison base used consistently throughout the article for normalization and royalty rate comparison	Revenue from the licensed product, good, or service used as the comparison denominator; for Russian accounting examples, RAS line 2110; for other jurisdictions, the functionally comparable revenue measure identified under the stated normalization rule
Periodic Royalty Payment	R_t	Royalty payment for period t	$R_t = r \times S_t$
Lump Sum Payment	F	Fixed component of the license consideration	$F \geq 0$
Total License Consideration	LP_t	Total license consideration for period t	$LP_t = F + r \times S_t$
Bounded Context	BC	Formal intersection of the comparability coordinates	$BC = U \cap M \cap B \cap T \cap P$
Sales-Based Royalty Rate Distribution	$SRRD(K_i)$	Distribution of royalty rates for activity K_i stated on, or supportably normalized to, the article's reference sales-revenue comparison base within a fixed BC	Q1, Q2, Q3
Sales-Based Royalty Rate	SRR	Point royalty rate conclusion derived from SRRD by a documented range-to-point rule and stated on the article's reference sales-revenue comparison base	$SRR \in [Q1, Q3]$, unless a stop condition blocks a point conclusion

Note: *Table 1 presents the working notation used in this article. Rows 3–5 are monetary measures. r is the general royalty rate variable, not a value conclusion. S denotes the article's reference sales-revenue comparison base. This does not imply that every contractual, observed, or previously calculated royalty base is inherently sales-based. Within this framework, royalty rate observations and analytical royalty rate outputs are used only if they are already stated on, or can be supportably normalized to, S. SRRD and SRR refer to royalty rates stated on that comparison base. The symbols r and SRR are related, but they are not interchangeable.*

4. A Verifiable Two-Tier Classification of Royalty Rate Determination Methods

International valuation and transfer pricing practice recognizes two broad ways in which a royalty rate may be established: it may be inferred from observed market transactions, or it may be derived analytically from the economic and financial characteristics of the relevant IP use. The classification proposed in this article applies a single criterion at each level—the manner in which the numerical royalty rate is established—and applies that criterion consistently so that data source, computational procedure, and result form are not conflated.

One additional discipline governs the classification used in this article: a royalty rate is not comparable unless the royalty base is comparable. That does not mean that every contractual, observed, or analytically derived royalty base is naturally sales-based. It means that, for analytical comparability within this framework, both Group A observations and Group B analytical outputs may be used only if they are already stated on, or can be supportably normalized to, the article's reference sales-revenue comparison base. If such normalization cannot be performed, the observation or analytical result is excluded.

Class A comprises methods in which the royalty rate is established from observed market transactions. A rate derived in this way may be used only after a documented comparability review covering the BC coordinates, the royalty base specification, and the material economic and contractual terms of the underlying transaction. Market-derived royalty observations are analytically usable only if their source royalty base is already stated on, or can be supportably normalized to, the article's reference sales-revenue comparison base. Otherwise, they are excluded.

Class B comprises methods in which the royalty rate is derived analytically from the economic and financial characteristics of IP use rather than from direct adoption of observed transaction rates. In such methods, the initial analytical result may arise from a profitability, incremental effect, or other economic base. For use within this framework, however, the resulting rate must be stated on, or supportably normalized to, the same reference sales-revenue comparison base used for royalty rate comparison throughout the article.

Within this article, LABRATE ROYALTY PRO (LRP) is treated as a Group B method. At the method-core level, it belongs to the profit allocation family. Operationally, however, it works through two parallel profitability-based rate expressions, one based on ROS and the other on EM, both stated on the article's reference sales-revenue comparison base. These expressions are applied in parallel rather than as alternatives. They do not themselves constitute SRR. Instead, they provide the financial-economic basis for constructing SRRD and for the subsequent derivation of SRR under a documented, pre-specified, and reproducible range-to-point rule.

At the second level, Class A is divided according to how market evidence is used. A1 relies on specific, individually identified comparable transactions. A2 relies on aggregate databases, surveys, or externally parameterized benchmarks, including the LES Build-up method.

TABLE 2. Verifiable Classification of Royalty Rate Determination Methods

CLASS / GROUP	CRITERION	METHODS	KEY CONDITIONS	TYPICAL OUTPUT
Class A — Market-Derived	Rate derived from observed market transactions	—	Comparability confirmed; BC specified; source royalty base stated on, or supportably normalized to, the article's reference sales-revenue comparison base	Range; point only under strict conditions
A1 — Specific Comparable Transactions	Rate from individually identified disclosed transactions	Direct comparable analysis; distributional analysis	≥ three verified transactions; material terms disclosed	Range → point by documented rule
A2 — Aggregate Data and Benchmarks	Rate from databases, surveys, or benchmarks	Aggregate databases; LES Build-up	Source, date, and adjustments disclosed	Typically range only
Class B — Analytical	Rate derived from economic/financial characteristics of IP use	—	BC and K defined; data verifiable and reproducible; resulting rate stated on, or supportably normalized to, the article's reference sales-revenue comparison base	Q1/Q2/Q3; point only by pre-specified rule
B1 — Profit Split	Rate via allocation of aggregate economic result	Profit split; Novoseltsev; LABRATE ROYALTY PRO	Profitability data available; licensor's share justified; resulting rate stated on, or supportably normalized to, the article's reference sales-revenue comparison base	SRRD → SRR
B2 — Incremental Effect	Rate derived from the incremental economic effect attributable to IP use	Incremental effect methods	Incremental effect isolatable; conversion to rate documented; resulting rate stated on, or supportably normalized to, the article's reference sales-revenue comparison base	Range or point by rule

Note: *The LES Build-up method appears under A2 as an externally parameterized benchmark. Methods under B1 and B2 require a pre-specified point-selection rule before any point SRR is stated. In both Group A and Group B, comparability requires that the rate used in the analysis be stated on, or supportably normalized to, the article's reference sales-revenue comparison base.*

Class B is divided according to the economic character of the analytical base. B1 includes profit allocation methods, in which the aggregate economic result of IP use is allocated between the parties; this group includes LRP and the Novoseltsev method. B2 includes incremental effect methods, in which the economic effect attributable to IP use is isolated and converted into a royalty rate. In either group, the resulting rate must ultimately be stated on, or supportably normalized to, the article's reference sales-revenue comparison base.

As framed in this article, methods based on IP development or reproduction cost fall outside the main classification of royalty rate determination methods because they do not establish a royalty rate through either observed transaction evidence or analytical conversion of the economic results of IP use. Externally imposed benchmarks—such as tariffs, judicial ceilings, or regulatory benchmarks—are likewise outside the main classification because they are prescribed externally rather than derived by the analyst as the output of a method.

A further distinction is therefore necessary. The relief-from-royalty method, the Multi-Period Excess Earnings Method (MPEEM), and the with-and-without method are valuation models that may use a royalty rate as an input. They are not methods for determining the royalty rate itself.[15]

The full classification is summarized in Table 2, together with the principal conditions for use and the typical output form associated with each class and group.

5. The BC → K → SRRD Framework and the Derivation of SRR

The methodological core of the framework is the reproducible sequence BC → K → SRRD. Within this framework, SRR may then be derived under a pre-specified, documented, and independently reviewable range-to-point rule. Each step should be documented to a degree sufficient for independent review. The point-selection rule should be established before the final rate is chosen.

Step 1. Define BC and the activity set K. The five BC coordinates U ∩ M ∩ B ∩ T ∩ P are defined as verifiable analytical descriptors rather than left as abstract labels. At the same time, the set of relevant activities $K = \{K_1, K_2, \ldots, K_n\}$ is defined. If any BC coordinate is not established, or if K cannot be justified, SC-1 is activated: derivation of a point SRR is blocked, and the quartile result is retained as a range conclusion (see Table 6).

Step 2. Construct SRRD. In practical terms, this step answers a simple question: what range of royalty rates is consistently observed or derived for the defined activity under comparable conditions? For each K_i within the fixed BC, a separate SRRD is constructed from royalty rate observations stated on, or supportably normalized to, the article's reference sales-revenue comparison base. Observations that cannot be supportably normalized to that comparison base are excluded. Under Class A, the analyst collects comparable transactions with disclosed BC coordinates and a source royalty base that can be normalized where necessary. Under Class B—and in LRP in particular—the analyst processes industry data arrays over each eligible five-year observation window, designates a primary window and one or more verification windows, and applies documented filtering and normalization rules. In LRP, this step uses two profitability measures, ROS and EM, in parallel to generate profitability-based rate expressions on the common comparison base. The result is not a single number but a structured statistical description of SRRD, including Q1, Q2, Q3, sample size, observation window, filtering rules, data provenance, and a concise data-quality assessment.

Step 3. Document the point-selection rule in advance. Before SRR is derived, the rule by which SRR will be obtained from SRRD should be documented. That rule may, for example, select the median of SRRD(K_i), the lower quartile supported by documented justification, or a documented aggregation procedure across multiple distributions. *Post hoc* formulation of the rule is impermissible. If the rule is not fixed in advance, SC-6 is activated.

Step 4. Apply the rule and derive SRR. The pre-specified rule is then applied to derive SRR on the article's reference sales-revenue comparison base. In LRP, point positioning within SRRD should take into account the central tendency of the licensee's ROS and EM over the eligible five-year windows, assessed relative to the industry data arrays underlying the distribution. If the monetary equivalent of SRR appears economically inconsistent with the licensee's operating result over a comparable period, CT-5 is applied to determine whether the result should be downgraded by evidence level, limited to a range conclusion, or blocked unless additional justification is provided.

Illustrative Example

Assume a registered trademark licensed on a non-exclusive basis for use exclusively within OKVED 30.1 (Building of ships and boats), functionally corresponding to NAICS 33661 (Ship and Boat Building). The royalty base is sales revenue from the licensed goods. The valuation date is December 10, 2023. Accordingly, the relevant activity set is defined as K = {K1}, where K1 = OKVED 30.1. Given the valuation date, the primary five-year observation window is 2019–2023. The adjacent windows 2020–2024 and 2021–2025 are used as verification windows.

For purposes of the example, BC is fixed as follows: non-exclusive trademark license; royalty base = sales revenue from the licensed goods; territory = Russian

15 Robert F. Reilly and Robert P. Schweihs, *Valuing Intangible Assets* (New York: McGraw-Hill, 1999).

Federation; valuation date = December 10, 2023. Because the licensed use is confined to a single industry, no cross-industry aggregation is required and SRRD is constructed only for K1.

The 2019–2023 window is the primary analytical window and is based on cleaned data. The 2020–2024 window, also based on cleaned data, is used as the first verification window. The 2021–2025 window is used as an additional verification window based on unadjusted data because at the time of preparation not all 2025 company reporting had yet been fully completed. This distinction is methodological rather than cosmetic: the primary cleaned window supports the core computation, while the two subsequent windows are used only to verify the stability of SRRD across adjacent five-year periods and not as substitutes for the primary analytical window.

For each window, the industry data are first summarised by quartile profitability measures for ROS and EM. Those profitability distributions are then converted into a sales-based royalty rate distribution (SRRD) under a fixed licensor-share assumption. Table 3 presents the representative profitability inputs by observation window. Table 4 reports the resulting SRRD for the core case of LS = 25 percent. Table 5 presents a sensitivity check under alternative licensor-share assumptions.

The key result of the example lies in the stability of SRRD across adjacent five-year windows. Under the core case, the median SRRD remains at 1.9 percent in all three windows, while the interquartile ranges remain broadly comparable. The sensitivity check further indicates that this central tendency is robust to reasonable variation in the licensor-share assumption. In this illustrative case, the reproducible analytical core lies in the sequence BC → K → SRRD. A point SRR may then be derived from SRRD under a separately documented range-to-point rule. The tables below present the data in a simplified form to illustrate how the distribution is constructed and how its stability can be assessed across adjacent periods.

TABLE 3.
Industry Profitability Inputs by Observation Window (OKVED 30.1)

Observation Window	Final Sample (n)	ROS (Q1–Median–Q3)	EM (Q1–Median–Q3)
2019–2023	154	3.72% – 7.68% – 15.93%	3.26% – 6.92% – 14.24%
2020–2024	167	4.23% – 7.87% – 15.64%	3.77% – 7.04% – 14.17%
2021–2025*	120	3.97% – 8.80% – 17.99%	3.36% – 7.69% – 17.07%

Note: *The 2019–2023 window is the primary analytical window. The 2020–2024 window is the first verification window; both are based on cleaned data. The 2021–2025 window is an additional verification window based on unadjusted data.*

TABLE 4.
SRRD by Observation Window (Core Case: LS = 25%)

Interpretation: *The median SRRD remains stable at 1.9% across all three adjacent five-year windows.*

Observation Window	SRRD (Q1–Median–Q3)	Mean
2019–2023	0.9% – 1.9% – 4.0%	3.3%
2020–2024	1.0% – 1.9% – 3.9%	3.1%
2021–2025*	0.9% – 1.9% – 4.3%	3.2%

TABLE 5. SRRD Sensitivity to Alternative Licensor-Share Assumptions

Observation Window	Median SRRD (LS = 25%)	Median SRRD (LS = 20%–30%)	Median SRRD (LS = 10%–40%)	Q3 SRRD (LS = 25% / 20%–30% / 10%–40%)
2019–2023	1.9%	1.9%	1.9%	4.0% / 4.1% / 4.2%
2020–2024	1.9%	1.9%	1.9%	3.9% / 4.0% / 4.1%
2021–2025*	1.9%	1.9%	2.0%	4.3% / 4.3% / 4.4%

Table 5 is presented as a supplementary robustness check rather than as part of the core reproducibility demonstration.

Interpretation: *The median SRRD is highly stable across reasonable variations in the licensor-share assumption, while the upper quartile shifts only modestly.*

6. Stop Conditions, Robustness Checks, and Evidence Levels

Stop conditions block the derivation of a point SRR. Depending on the nature of the deficiency, they either retain the quartile result as a range conclusion or require the analytical setup to be rebuilt before any result can be treated as methodologically supportable. The complete set of stop conditions is presented in Table 6.

Robustness checks CT-1 through CT-6 test the stability of the conclusion under permissible changes: CT-1) sensitivity to change of a BC coordinate; CT-2) sensitivity to change of the set K; CT-3) resistance to tail truncation; CT-4) sensitivity to change of the point-selection rule; CT-5) economic consistency; and CT-6) consistency with the functions, assets, and risks (FAR) allocation.

The evidence level scale, presented in Table 7, classifies the sufficiency of the evidentiary basis of the computation.

TABLE 6. Stop Conditions

Code	Condition	Effect
SC-1	Any BC coordinate (U, M, B, T, P) is undefined, or the set K is not established	Point SRR blocked; quartile output retained
SC-2	Source unverifiable, undated, or sample non-reproducible	Data source reconfiguration required
SC-3	Material license terms not established from sources	Comparability destroyed; SRR blocked
SC-4	Royalty base undefined, non-comparable, or non-normalizable	Base must be redefined
SC-5	No Class A transactions satisfy stated comparability conditions	Point SRR under Class A blocked; Class B transition permissible
SC-6	No *ex ante* point-selection rule was documented before SRR was chosen	SRR invalid; rule must be set *ex ante*
SC-7	Insufficient observations, or a data period shorter than three years	Range-only conclusion or block
SC-8	Monetary equivalent of SRR is economically inconsistent with licensee's operating result for the comparable period, unless special justification is provided	Range conclusion permissible; point conclusion blocked pending justification

Table 7. Evidence Level Scale

Level	Data and Comparability	SRRD / SRR	Forensic Supportability
0	BC absent; source unverifiable; stop condition active	SRRD absent; SRR chosen arbitrarily	Not methodologically supportable
1	BC partially described; source only partially verifiable	SRRD with reservations; minimal rule disclosure	Indicative use only
2	BC and K defined; source verifiable	SRRD reproducible; point-selection rule documented	Suitable for valuation and analytical use
3	BC and K fully defined; eligible five-year observation windows applied	SRRD and SRR fully reproducible; digital audit trail present	Generally suitable for forensic supportability, subject to jurisdiction-specific procedural rules

Note: *The evidence level is assigned to the computation, not to the rate itself. Level 3 does not guarantee admissibility in every forensic context; it indicates that the minimum methodological conditions for forensic supportability within the framework are satisfied.*

7. Alignment with IVS 2028

The January 2026 IVS Exposure Draft, effective January 31, 2028, does not set out its own methodology for royalty rate determination. It does, however, reinforce and extend requirements relating to scope of work, data and inputs, valuation models, documentation and reporting, and quality controls—without which a royalty rate computation cannot be considered reproducible or independently reviewable.

The framework proposed in this article provides a royalty rate-specific implementation that is consistent with that process discipline. Under IVS 101 (Scope of Work), the BC coordinates, the set K, the method class, and the point selection rule are specified before the computation begins. Under IVS 104 (Data and Inputs), source identification, extraction date, filtering rules, normalization rules, and exclusion criteria are documented and capable of review.

Under IVS 105 (Valuation Models), the BC → K → SRRD sequence makes the model structure explicit, while the subsequent derivation of SRR is articulated separately as a pre-specified range-to-point step rather than treated as implicit in the distribution itself. Under IVS 106 (Documentation and Reporting), the digital audit trail records BC specification, K definition, SRRD construction, robustness-check results, evidence level, and applicability limits.

The proposed stop conditions and robustness checks also align with the strengthened emphasis on quality controls reflected in the Exposure Draft, including the introduction of IVS 107 Quality Controls. In that respect, the framework converts quality control from a general process expectation into a royalty rate-specific analytical protocol.

With respect to IVS 210 (Intangible Assets), the framework structures the analysis of the competitive environment, asset significance, life-cycle considerations, profitability, and the contribution of the subject IP by requiring explicit comparability definition, normalization discipline, and consistency testing within a documented procedural sequence.

8. Know-How and Intangible Assets with Limited Observable Data

For know-how and other intangible assets for which directly comparable licensing transactions are rare or insufficiently disclosed, Class B methods—and LRP in particular—may be more reliable than nominally market-based approaches. In such cases, industry financial data are gathered over fixed observation windows, filtered under documented rules, and processed within the relevant set of activities K. In LRP, ROS and EM are used in parallel as analytically distinct profitability measures. They do not themselves constitute SRRD. Instead, they provide the financial-economic basis for constructing a reproducible SRRD of royalty rates stated on, or supportably normalized to, the article's reference sales-revenue comparison base.

Even in data-scarce conditions, a point SRR still requires a pre-documented rule. If stop conditions remain active but the distribution itself remains reproducible, the quartile result may be retained as a range conclusion. If the data source, normalization process, or computational configuration is not reproducible, no result should be treated as analytically usable until the configuration is reassembled.

9. Practical Implications for Licensing and Valuation

The proposed framework has direct practical implications for licensing, valuation, and dispute-related work.

- First, it provides a more disciplined basis for method selection by making clear when market-derived evidence can be used on a supportable basis and when an analytically derived royalty rate is methodologically preferable.
- Second, it reduces room for unarticulated expert discretion by requiring the transition from distribution (SRRD) to point rate (SRR) to be specified in advance rather than justified after the result is known.
- Third, it improves not only replication but also challenge. Because each material step is separately identified and documented, opposing experts, courts, tax authorities, and transaction counterparties can test where the conclusion is strong, where it is weak, and where it depends on judgment rather than evidence.
- Fourth, the stop-condition system operates as a practical quality control filter. Rather than forcing a point-rate conclusion in every case, the framework allows the analyst to state a range when that is the only methodologically supportable result.
- Fifth, the evidence-level scale gives courts, tax authorities, transaction parties, and other intended users a practical way to distinguish indicative estimates from fully supported computations.
- Finally, a royalty rate conclusion supported by a documented BC, a reproducible SRRD, and a pre-specified rule for deriving SRR is not merely a selected percentage. It is a defensible analytical result grounded in a method that can be explained, tested, and independently reviewed.

10. Supportability in Forensic and Non-Forensic Expert Contexts

For purposes of this framework, a royalty rate computation is sufficiently supported for forensic use only if: (a) BC and K are fully disclosed; (b) the royalty base is stated on, or supportably normalized to, the article's reference sales-revenue comparison base; (c) the point-selection rule is documented and established *ex ante*; (d) the sample, filters, and normalization rules are disclosed; and (e) the digital audit trail enables independent review and reproduction. These conditions do not guarantee admissibility in every jurisdiction or proceeding; they define the minimum analytical requirements for forensic supportability within the framework. Outside forensic settings, the same conditions provide a structured basis for transparent reviewability in licensing, valuation, and transfer-pricing work.

The framework does not require the analyst to re-establish from first principles, in every assignment, that royalty rate distributions remain sufficiently stable within a fixed BC. What must be verified in each case is whether the stated conditions of application are defined, documented, and satisfied. Evidence that may rebut that proposition includes material discrepancies between sub-periods within the observation window, identified structural breaks, or instability of the result under a justified change in K or filter configuration.

11. Limitations

This article is methodological in nature. It does not claim comprehensive empirical validation across all LRP application settings, nor does it suggest that a reproducible protocol eliminates the need for professional judgment. Its narrower claim is that professional judgment should be structured, documented, and capable of independent review.

The quality of Class B results depends on the correctness of the BC specification, the choice of K, the completeness and quality of the underlying data, and the transparency of filtering, normalization, and point-selection rules. The discussion of IVS 2028 is based on the January 2026 Exposure Draft and therefore refers to expected rather than currently binding standards. Further work is needed on cross-jurisdiction mapping of sales-revenue comparison bases and on sector-specific reconstruction of functionally comparable revenue measures in reporting environments in which sales revenue is not directly stated.

12. Conclusion

Royalty rate determination is not a matter of selecting a market average. It requires a procedure that is reproducible, transparent, and open to independent review. In this article, the reproducible core of that procedure is the sequence BC → K → SRRD. Within the framework, SRR may then be derived under a pre-documented range-to-point rule, subject to stop conditions, robustness checks, and an explicit assessment of the evidentiary basis.

This framework makes three principal contributions. First, it introduces a consistent classification of royalty rate determination methods based on a single criterion at each level. Second, it formalizes the transition from data to a point-rate conclusion through a pre-documented range-to-point rule, thereby reducing after-the-fact justification. Third, it proposes an evidence scale that links methodological rigor to the practical reliability of the result and, where relevant, to its forensic supportability.

Taken together, these elements move royalty rate determination away from unsupported expert assertion and toward a procedure that can be explained, tested, replicated, and defended. ■

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Comprehensive Analysis of a Revocation Action:

Court of First Instance, Opposition Division, and Court of Appeal

By

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On 25 November 2025, the Court of Appeal of the Unified Patent Court (UPC) issued a highly instructive decision in cases UPC_CoA_528/2024 and UPC_CoA_529/2024 (twin decisions) in the dispute *Amgen v Sanofi/Regeneron*. However, this article is not confined to an analysis of that decision alone. It offers a comparative reading of the Court of Appeal's decision, the first instance decision of the Munich Central Division (UPC_CFI_1/2023 for Sanofi and UPC_CFI_14/2023 for Regeneron, also twin decisions), and the decision rendered by the Opposition Division of the European Patent Office (EPO) involving the same parties in order to examine how each of these bodies assessed the various grounds for revocation relied upon. This comparative approach also makes it possible to highlight areas of convergence and divergence in methodology, whether from a strictly practical perspective or in terms of legal reasoning.

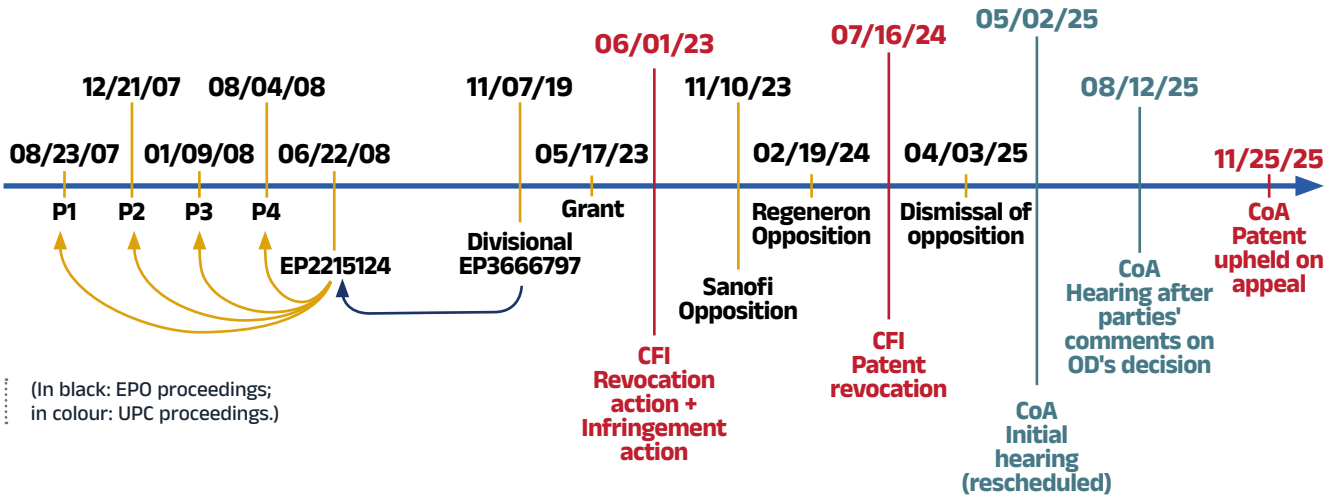
1. Facts

All three decisions concern revocation actions directed against European patent EP 3 666 797, owned by Amgen Inc., relating to the use of an antibody to lower cholesterol levels.

Specifically, Amgen markets the antibody Evolocumab under the trade name *Repatha*, while Sanofi — understood here in a broad sense, the parties to the proceedings before the UPC being Sanofi Aventis Deutschland GmbH, Sanofi Aventis Group and Sanofi Winthrop Industrie S.A. — and Regeneron Pharmaceuticals Inc. (hereinafter "Regeneron") market the antibody Alirocumab under the trade name *Praluent*, which is alleged to infringe the patent.

On 1 June 2023, the date on which the UPC entered into force, Sanofi initiated a revocation action before the Munich Central Division. On the same day, Amgen brought an infringement action before the Munich Local Division against Sanofi and Regeneron. In response to that infringement action, Regeneron filed a counterclaim for revocation of the patent on 24 November 2023.

On 2 February 2024, the Munich Local Division referred Regeneron's counterclaim for revocation to the Munich Central Division with the agreement of the parties. An order joining the two cases was issued by the Central Division on 27 February 2024. References to the two cases concern Sanofi's revocation action and Regeneron's counterclaim for revocation.



(In black: EPO proceedings; in colour: UPC proceedings.)

European patent EP 3 666 797 is a divisional application derived from European patent application EP 2 215 124, filed on 22 August 2008.

European patent application EP 2 215 124 claims priority from four applications (P1 to P4), filed between 23 August 2007 and 4 August 2008. European patent EP 3 666 797 was granted on 17 May 2023.

As indicated above, the revocation and infringement actions were filed on 1 June 2023. On 10 November 2023 and 19 February 2024, respectively, Sanofi and Regeneron each filed an opposition against the patent before the EPO.

The Court of First Instance (CFI) of the UPC issued its decision on 16 July 2024, revoking Amgen's patent. Amgen filed an appeal within the prescribed time limit.

On 3 April 2025, the EPO Opposition Division (OD) rejected the oppositions filed by Sanofi and Regeneron and maintained the patent as granted. It is worth noting in this regard that the decision was issued less than 14 months after expiry of the opposition period, which is a very short timeframe for this type of proceeding, the parties having requested acceleration of the proceedings upon filing their oppositions pursuant to the EPO Guidelines E-VIII, 5.

The hearing before the Court of Appeal of the UPC was initially scheduled for 2 May 2025, but was postponed to 12 August 2025 in order to allow the parties to comment on the decision of the Opposition Division (see para. 28 of the Court of Appeal decision).

On 25 November 2025, the patent as granted was ultimately upheld on appeal.

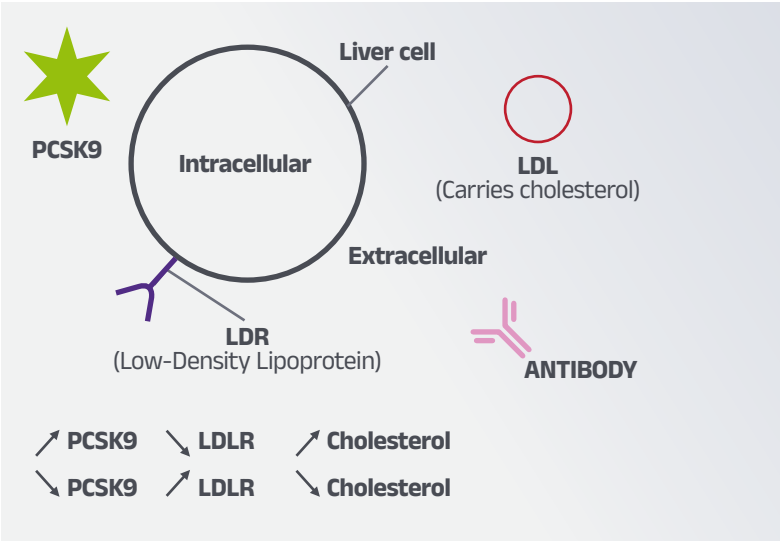
An appeal has also been filed before the EPO by Sanofi and Regeneron under reference T716/25.

2. Technical Background

In view of the highly technical nature of the decision, the following developments aim to simplify its reading, so that readers who are not familiar with the field of biotechnology — and more particularly with antibodies — may better appreciate the variations in the legal reasoning adopted by the different bodies.

The invention relates to the field of cholesterol metabolism at the level of the liver. Cholesterol is a lipid transported by a low-density lipoprotein (Low-Density Lipoprotein, hereinafter "LDL") to hepatic cells. For this purpose, the lipoprotein binds to an LDL receptor ("LDLR") located on the surface of liver cells in order to be internalised. Once inside the liver cell, cholesterol is metabolised.

The protein PCSK9 (Proprotein Convertase Subtilisin/Kexin type 9) also plays a role in this environment: PCSK9 is capable of binding to the LDL receptor. It is secreted by liver cells into the extracellular medium and may, via the LDL receptor, be internalised again into the cell. PCSK9 can therefore interact with LDLR both inside and outside the cell (through an intracellular pathway and an extracellular pathway). This distinction will become important later.



European patent EP 3 666 797 relates to an antibody directed against PCSK9, intended to prevent its binding to the LDL receptor. At the filing date, it was known that:

- when the concentration of PCSK9 increases, the number of LDL receptors on the surface of liver cells decreases and blood cholesterol level increases;
- conversely, when the concentration of PCSK9 decreases, the number of LDL receptors on the surface of liver cells increases and blood cholesterol level decreases.

Claim 1 is directed to a monoclonal antibody, or an antigen-binding fragment thereof, for use in the treatment or prevention of hypercholesterolemia or an atherosclerotic disease related to elevated serum cholesterol levels; or for use in reducing the risk of a recurrent cardiovascular event related to elevated serum cholesterol levels; wherein the monoclonal antibody, or antigen-binding fragment thereof, binds to the catalytic domain of a PCSK9 protein of the amino acid sequence of SEQ ID NO: 1, and prevents or reduces the binding of PCSK9 to LDLR.

3. Overview of the Decisions

As indicated in the introduction, three decisions are analysed:

- the decision revoking the patent rendered by the Court of First Instance of the UPC (CFI), namely the Munich Central Division (UPC_CFI_1/2023);
- the decision of the EPO Opposition Division (OD) rejecting the oppositions and maintaining the patent;
- the decision of the Court of Appeal (CoA) of the UPC maintaining the patent.

TABLE 1:
Comparative overview of the grounds/issues analysed in the different decisions (X: discussed; /: not discussed).

	CFI	OD	CoA
Art.123(2) EPC / 76(1) EPC – Extension	/	X	X
Art.83 – Sufficiency	/	X	X
Art.69 EPC – Interpretation	X	/	X
Art.87 EPC – Priority	X	X	Not contested
Art.54 EPC – Novelty	X	X	Not contested
Art.56 EPC – Inventive step	X	X	X
Conclusion (patent)	Revoked	Maintained	Maintained

As shown in Table 1, the various grounds/issues relied upon by the parties were not addressed to the same extent by the different bodies.

First, it may be observed that the Court of First Instance did not examine added subject matter (Articles 123(2) and 76 EPC) or sufficiency of disclosure (Article 83 EPC), whereas, at least compliance with Article 123(2) EPC is traditionally examined first by an Opposition Division. One possible explanation is that the parties presented their arguments relating to these provisions at the end of their submissions.[1]

Claim interpretation (Article 69 EPC) was addressed by the Court of First Instance and by the Court of Appeal, but not by the Opposition Division, which is consistent with usual EPO practice. Indeed, although patentees and opponent(s) commonly address this issue in their written submissions, it is relatively uncommon for the Opposition Division to take a clear position on claim interpretation. However, in light of the recent decision G 1/24 (published on 18 June 2025, approximately two months after the Opposition Division's decision in the present case), current practice may evolve.

The issues of priority (Article 87 EPC) and novelty (Article 54 EPC) were analysed together, as the outcome of the priority assessment had a direct impact on the examination of novelty. They were dealt with at first instance and in opposition proceedings, but were not examined on appeal, as no appeal was filed on those issues.

Inventive step (Article 56 EPC), by contrast, was examined in detail by all three bodies, with differing conclusions leading to revocation of the patent at first instance and to its maintenance in opposition and on appeal.

More generally, a reading of the various decisions shows that the Opposition Division carried out a detailed analysis of the decision rendered at first instance, whereas the Court of Appeal examined not only the first instance decision but also that of the Opposition Division.

Indeed, the decisions contain numerous references to the reasoning developed by the previous body or bodies, often expressed in similar, or even identical, terms. In its decision, the Opposition Division expressly sets out the reasons why it departed from the assessment of inventive step adopted at first instance (see paras. 10.29–10.34). The Court of Appeal, for its part, makes several explicit references to paragraphs of the first instance decision which it considers relevant (see, for example, para. 143). Furthermore, at the end of each of its analyses, the Court of Appeal expressly states that it agrees with the decision of the Opposition Division (see para. 34), in some instances on the basis of substantially similar arguments (see paras. 102, 121), and in others on the basis of partly different considerations (see para. 209).

Moreover, the postponement of the hearing by the Court of Appeal may appear somewhat surprising, in particular because its purpose was to invite the parties to provide reasoned comments on the decision of the Opposition Division. While this intention to promote harmonisation between the UPC and the EPO may be welcomed, one may question the introduction into UPC proceedings of debates which are, in principle, not meant to form part of them.

In addition, this approach raises the issue of its compatibility with the front-loading principle and with Rule 222 of the UPC Rules of Procedure, insofar as it may lead the parties to address arguments, or even evidence, which were admitted in opposition proceedings but had not been admitted at first instance. One might indeed envisage that the relative flexibility of the Opposition Division — in particular with regard to the late admission of documents considered *prima facie* relevant — could result in elements being taken into account that had been disregarded at first instance. This, more generally, raises the question of how the Court of Appeal intends to deal with such situations.

1 See, for example, the statement of defence and counterclaim for revocation dated 10 November 2023, which was also filed in the opposition proceedings and is therefore available in the register of the opposed patent.

4. Added Subject Matter – Articles 123(2) and 76 EPC

As regards Articles 123(2) and 76 EPC, the methodology applied by the Court of Appeal is set out explicitly in paragraph 61:

"It is also irrelevant whether and when Amgen referred to any particular paragraph in the application. The assessment of whether there is added matter is a question of law to be decided on the basis of the facts brought forward by the parties. The facts are the relevant claims and the application as filed. Since the test is whether the relevant claims have basis in the application as a whole, the Court is allowed to look at the entire document."

This approach is relatively similar to that of the EPO: the Court is not limited to the specific paragraphs cited by the parties and may examine the entire content of the application as filed in order to identify a basis for the claimed subject matter.

In practice, and as indicated in the comparative Table 2 below, several elements were examined by the Opposition Division and by the Court of Appeal, whereas the Court of First Instance did not rule on these grounds.

TABLE 2:
Elements analysed in the different decisions from the perspective of Articles 123(2) and 76 EPC.

	CFI	OD	CoA
Monochlonal	/	X	X
Therapeutic uses	/	X	X
Binds to the catalytic domain Claim 10	/	X	X
SEQ ID N°1	/	X	X
prevents or reduces the binding of PCSK9 to LDLR	/	X	X
Combination of features of claim 1	/	/	X
Claims 3, 5, 6, 7, 8	/	X	X
Claim 10	/	X	/

The Opposition Division analysed all of these features in detail and concluded that they were sufficiently supported in the application as filed.

The Court of Appeal adopted this analysis and supplemented it by developing specific reasoning aimed at demonstrating that the combination of these features was also disclosed. This approach is consistent with EPO practice, according to which it is not sufficient to establish that each feature is disclosed in isolation; rather, the combination of all the claimed features must be clearly and unambiguously derivable from the application as filed.

The analysis of these two decisions further shows that the Court of Appeal draws extensively on the reasoning of the Opposition Division, for example by adopting its terminology, such as the notions of "*emphasis*" when assessing the monoclonal character, or "single(d-)out" with regard to binding to the catalytic domain, and by relying on paragraphs identified by the Opposition Division. However, it adds further developments. In particular, the Court of Appeal emphasises that the skilled person, when faced with several alternative features, is able to identify those that are preferred (para. 90), and that the combination of preferred features is permissible. It further clarifies that, even if all the features do not appear in a single paragraph, they are linked to one another in different passages of the application (para. 91), such that the combination of the features of claim 1 is clearly and unambiguously derivable from the application as filed as a whole. Such reasoning is in line with the case law of the EPO.

In conclusion, not only does the Court of Appeal adopt an approach fully consistent with that of the EPO, but it also deepens its analysis compared with that carried out by the Opposition Division.

5. Sufficiency of Disclosure – Article 83 EPC

As regards Article 83 EPC, the general methodology applied by the Court of Appeal is set out in paragraph 105:

"*Sufficiency has to be examined on the basis of the patent as a whole, thus on the basis of the claims, description and drawings, from the perspective of the skilled person with his common general knowledge at the filing or priority date.*"

The methodology adopted by the Court of Appeal (see also paras. 106–107 and 114) again appears largely aligned with that of the EPO, albeit with certain nuances. Both the EPO Guidelines (F-III, 1) and the Court of Appeal accept that "*at least one way*" of carrying out the invention may suffice (para. 106), and that "*a reasonable amount of trial and error does not prevent the invention from being enabled*" (para. 114).

A difference in wording may nevertheless be observed: whereas the EPO Guidelines appear to require that the invention can be carried out over the entire scope claimed without undue burden, the Court of Appeal states that the "*non-availability of some embodiments of a functionally defined claim is immaterial to sufficiency*" (para. 107). This approach

may give the impression of a slightly more flexible assessment by the Court of Appeal. However, this impression should be qualified and read in conjunction with the position of the Opposition Division, which expressly stated that "*Article 83 EPC allows for occasional failure*" (para. 7.4.2).

The analysis of sufficiency was conducted in considerable detail by the Opposition Division, in particular with regard to the techniques available for producing antibodies, whereas the Court of Appeal adopted a more concise approach.

It appears, however, that the arguments put forward by Sanofi and Regeneron faced two main obstacles.

The first lies in an apparent contradiction between the arguments based on sufficiency of disclosure and those relied upon in respect of inventive step. While it was argued, in the context of Article 83 EPC, that producing the antibody across the entire claimed scope exceeded the capabilities of the skilled person, the inventive-step arguments were based on the assertion that the skilled person would have been able to obtain antibodies falling within the scope of the claims using routine techniques available at the priority date. The Court of Appeal inferred that this latter assessment must also apply to the examination of sufficiency of disclosure (Article 83 EPC), all the more so since, for that purpose, the skilled person has the benefit of knowing the invention and the description (para. 109), thereby highlighting what it considered to be an inconsistency.

The second obstacle concerns the burden of proof, which rested on the parties alleging invalidity of the patent. Both the Opposition Division (para. 7.4.2) and the Court of Appeal (para. 121) found that Sanofi and Regeneron had failed to demonstrate insufficiency of disclosure, their arguments relying exclusively on documentary considerations, without any experimental evidence to substantiate a concrete inability to carry out the invention.

6. Claim Interpretation – Article 69 EPC

As regards claim interpretation, the UPC courts rely on the decision *NanoString v 10x Genomics* (UPC_CoA_335/2023), which is repeatedly cited both at first instance (paras. 6.4–6.6) and on appeal (para. 39). As noted above, the Opposition Division did not expressly rule on claim interpretation. However, where possible, its interpretation has been inferred from the overall reasoning of its decision.

Four main notions were thus defined or clarified: the skilled person, the concept of "therapeutically effective," the catalytic domain, and the notion of "bind to."

The Skilled Person

Somewhat surprisingly, no definition of the skilled person can be found in the Opposition Division's decision.

By contrast, the Court of First Instance considered that the skilled person was a team specialised in antibody technology (para. 6.9), a definition that had a significant impact on the assessment of inventive step. Amgen objected to this approach on the ground that it relied on hindsight reasoning incorporating the teaching of the patent. The Court of Appeal partially upheld this objection, adopting a broader definition of the skilled person as a team of scientists experienced in the pharmaceutical field, including expertise in antibodies but also in chemical compounds (paras. 36–37).

The Concept of "Therapeutically Effective"

All three bodies agreed on the principle that a claim directed to a therapeutic use implies that the claimed product must be therapeutically effective (see para. 6.10 CFI; paras. 10.5.3 and 10.5.4 OD; paras. 2 and 42 CoA). However, their assessment of this notion diverged.

First, it should be noted that no explicit interpretation of the concept of "*therapeutically effective*" could be identified in the Opposition Division's decision.

At first instance (see para. 6.30), it was accepted that a very limited therapeutic effect, consisting of a (very) small cholesterol-lowering effect, could suffice, in particular in light of the data contained in the application and the possibility of combined administration with other lipid-lowering agents such as statins. The Court of Appeal rejected this interpretation, requiring a "*noticeable improvement*" (para. 47) in order to establish a therapeutic effect, without, however, quantifying it explicitly, considering that such precision was not necessary (para. 49). This lack of precision renders the notion particularly vague, especially from the perspective of a European Patent Attorney. It is all the more frustrating given that this concept proves to be decisive, in particular because it sheds light on the subsequent divergences observed in the assessment of inventive step.

Catalytic Domain and the Notion of "Bind To"

The interpretation of these two notions did not raise any particular difficulty.

The concept of the catalytic domain, defined as corresponding to amino acids 123 to 419 of sequence No. 1, was interpreted consistently by the Court of First Instance (para. 6.12) and by the Opposition Division (paras. 8.10–8.11, in the context of priority) and was not challenged on appeal.

Similarly, the notion of "bind to" was interpreted as requiring an interaction with at least one amino acid residue of the catalytic domain (para. 6.17 CFI

and para. 7.4.1 OD, in the context of sufficiency of disclosure) and was likewise not disputed on appeal. Amgen did, however, challenge the first instance court's analysis regarding the absence of a causal link between binding and the technical effect, which had led that court to regard this feature as arbitrary for the purposes of inventive step. The Court of Appeal did not comment on this point, considering that it fell within the assessment of inventive step.

7. Priority and Novelty – Articles 87 and 54 EPC

As regards priority and novelty, priorities P1 and P2 were denied, whereas priority P4 was acknowledged as valid. The main issue concerned priority P3, due to the absence in that document of the figure explicitly describing the catalytic domain, a figure which was, however, included in P4.

The different decisions nevertheless considered that, on the basis of the information available in P3, the catalytic domain could be defined with sufficient clarity, corresponding to amino acids 123 to 419. Priority P3 was therefore recognised as valid, with the consequence that the documents relied upon for novelty, all published after the filing date of P3, no longer prejudiced the novelty of the patent.

It should finally be noted that the reasoning adopted in this respect was largely convergent between the Court of First Instance and the Opposition Division and was not challenged on appeal.

8. Inventive Step – Article 56 EPC

The assessment of inventive step undoubtedly constitutes the most complex aspect of the case, both substantively and procedurally. Indeed, beyond the differences in the arguments put forward, the methodological approaches adopted by the Court of First Instance, the Opposition Division and the Court of Appeal differ. From the decisions, it is possible to identify a distinct methodology for each of these bodies.

8.1 Methodology

The Different Approaches Adopted

At first instance, the Court stated that:

"*Comparing the claimed subject matter, after interpretation following the guidelines provided above under "claim interpretation," and the prior art, the subsequent question is whether it would be obvious for the skilled person to, starting from a realistic prior art disclosure, in view of the underlying problem, arrive at the claimed solution.*" (para. 8.7)

From this paragraph, it may be inferred that it is necessary (2) to interpret the patent claims, (3) to compare the claimed subject matter with the prior art and (4) to select a realistic prior art disclosure, the entire analysis having to be conducted in the light of an underlying problem, which itself appears to have to be defined beforehand (1/?) The technical effect is mentioned (para. 8.9), but only as a factor that may be taken into account and is therefore optional. Finally, the Court of First Instance emphasises that hindsight needs to be avoided (para. 8.10).

The Opposition Division, for its part, applied the EPO's classical problem-solution approach. It proceeded sequentially by identifying the closest prior art, comparing the claims with that prior art, identifying the resulting differences, and determining the associated technical effect. On that basis, it formulated the objective technical problem before examining whether the skilled person, at the relevant date, would have been prompted to arrive at the claimed solution (the "*would*" approach).

The Court of Appeal appears to be somewhat more specific in its methodology. It stated:

"*It first has to be established what the object of the invention is, i.e. the objective problem. […] This must be done by establishing what the invention adds to the state of the art, not by looking at the individual features of the claim, but by comparing the claim as a whole in context of the description and the drawings, thus also considering the inventive concept underlying the invention (the technical teaching), which must be based on the technical effect(s) that the skilled person on the basis of the application understands is (are) achieved with the claimed invention.*" (para. 127)

The claimed solution is obvious when at the relevant date the skilled person, starting from a realistic starting point in the state of the art in the relevant field of technology, wishing to solve the objective problem, would (and not only: could) have arrived at the claimed solution." (para. 129)

Here again, it may be inferred from these paragraphs that it is necessary (1) to interpret the patent claims ("the claim as a whole in the context of the description and drawings"), (2) to compare the claimed subject matter with the prior art in order to determine what the invention adds to the state of the art, (3) to determine the object of the invention, that is to say the objective problem, taking into account the technical teaching and the technical effect, and (4) to select a realistic starting point. The Court of Appeal further specifies that hindsight reasoning must be avoided (para. 128).

Although the Court of Appeal relies on concepts that are closer to those used by the EPO ("*technical effect,*" "*technical teaching,*" "*technical field,*" see para. 130), it should nevertheless be emphasised that the "*objective problem*" as defined by the Court of Appeal — also referred to as the "*object of the invention*" or the "*underlying problem*" — does not correspond to the objective technical problem of the EPO's problem-solution approach. Indeed, the objective problem as defined by the Court of Appeal is determined in

relation to the prior art considered as a whole (a so-called "*holistic*" approach), and not in relation to a single prior art document. This constitutes a notable methodological difference compared with a problem-solution approach as conducted by an Opposition Division.

It is therefore apparent that the approaches adopted by the three bodies differ to a noticeable extent, in particular as regards the order in which the various steps of the analysis are carried out.

Finally, although in its methodological explanations the Court of Appeal indicates that claim interpretation precedes the determination of the technical problem, the structure of its decision reveals that the technical problem (para. 38) is formulated before the detailed interpretation of the claims (para. 39). Moreover, the comparison with the prior art and the precise identification of the technical effect appear relatively underdeveloped, highlighting a certain discrepancy between the methodology as announced and its practical implementation.

Realistic Starting Point / Closest Prior Art

The Court of First Instance (para. 8.6) and the Court of Appeal (para. 131) define the concept of a realistic starting point in similar terms: "*A starting point is realistic if the teaching thereof would have been of interest to a skilled person [at the priority/relevant date].*"

A common feature of the decisions of the Court of First Instance and of the Court of Appeal lies in the recognition that several realistic starting points may exist, an approach consistent with that of the EPO, according to which several "*springboards*" may be envisaged. This position is moreover expressly endorsed by the Opposition Division, which refers to the possibility of several "promising springboards" (para. 10.1.4).

Some uncertainty nevertheless remains as to the relationship between the concepts of objective problem, underlying problem and object of the invention. While a combined reading of certain paragraphs (paras. 38 and 11) of the Court of Appeal's decision tends to equate these notions, paragraph 131 cited above suggests that they may not entirely overlap, as the objective problem is described there as potentially addressing the same underlying problem or a similar underlying problem. In this context, the distinction between objective problem and underlying problem appears somewhat unclear, and it is uncertain whether the Court of Appeal intended to draw a genuine conceptual distinction.

"Next Step"

Another concept introduced by the *NanoString v 10x Genomics* case law mentioned above is that of the "*next step*." At first instance, this notion is addressed in relatively general terms, the Court positioning itself "*starting from the prior art*" (para. 8.8).

The Court of Appeal, however, introduces a slight terminological and conceptual shift by linking this notion to the realistic starting point. It also introduces concepts borrowed from EPO practice, in particular the notion of "pointers," which is then connected to the concept of "reasonable expectation of success." These two notions are closely related, as a reasonable expectation of success arises only once prior pointers provided by the state of the art have been identified.

In the present case, the closest prior art — or at least the realistic starting point — contained an indication that an antibody directed against PCSK9 could be envisaged for the treatment of hypercholesterolemia, a suggestion that essentially corresponded to the subject matter of claim 1. The Court of Appeal expressly acknowledged the existence of this suggestion. Like the Opposition Division, it did not infer the existence of a reasonable expectation of success.

Conclusion

In its decision, the Court of Appeal adopted a decidedly pedagogical approach, setting out a relatively detailed methodology that largely incorporates concepts derived from EPO practice, even if the Court's formulation of those concepts does not entirely align with that of the EPO. Nevertheless, certain areas of uncertainty remain, in particular regarding the precise relationship between the concepts of objective problem, underlying problem and object of the invention, as well as the practical implementation of the announced methodological sequence. The Court of Appeal nevertheless concludes that, despite the differences in approach — whether the EPO's problem-solution approach or a more holistic approach as developed, for example, in Germany or the United Kingdom — the analysis should, in principle, lead to the same conclusion (para. 124).

8.2 The Different Substantive Analyses

Court of First Instance

For its inventive step analysis, the Court of First Instance selected the document *Lagace* as the realistic starting point. This choice was unsuccessfully challenged by Amgen and was ultimately upheld, *Lagace* having also been adopted by the Opposition Division as the closest prior art and by the Court of Appeal as a realistic starting point.

The Court of First Instance observed that *Lagace* suggested the use of an antibody capable of blocking the LDLR:PCSK9 interaction, but did not disclose any specific antibody. It therefore identified as the distinguishing feature the absence in *Lagace* of an antibody capable of binding to the catalytic domain of PCSK9 and blocking the interaction between PCSK9 and the LDL receptor (para. 8.30).

In its earlier analysis of the patent, the Court had formulated the underlying problem as follows:

"*the aim of the Patent is to provide a treatment or prevention of hypercholesterolaemia or atherosclerotic disease associated with elevated serum cholesterol levels or for use in reducing the risk of recurrent cardiovascular events associated with elevated serum cholesterol levels targeting PCSK9 to regulate levels of LDLRs (and thereby LDL).*" (para. 5.16)

The Court's analysis then focused on the fact that *Lagace* validated the use of an antibody as a therapeutic target, insofar as that document disclosed the existence of an extracellular pathway involving PCSK9 and the LDL receptor. The validation of this extracellular pathway was considered important because an antibody exerts its action outside the cell (paras. 8.56 and 8.58).

From this perspective, the "next step" was identified as the development of an antibody inhibiting the PCSK9:LDLR binding for the treatment of hypercholesterolemia. The Court held that the production of such an antibody fell within routine techniques (para. 8.81), and that a reasonable expectation of success therefore existed.

The arguments put forward by Amgen to contest the existence of such a reasonable expectation of success were considered insufficient (para. 8.65), a substantial part of its reasoning being based on the alleged difficulty of generating such an antibody. In these circumstances, the burden resting on the proprietor to demonstrate the absence of a reasonable expectation of success was considered not to have been discharged, leading the Court of First Instance to conclude that the patent lacked inventive step.

Opposition Division

The Opposition Division did not share the analysis of the Court of First Instance.

Like the Court of First Instance, it selected *Lagace* as the closest prior art and likewise considered that the distinguishing feature over the prior art lay in the absence of any disclosure of an antibody blocking the interaction between PCSK9 and the LDL receptor (para. 10.3). However, it derived from this difference a technical effect, namely the first demonstration of an *in vivo* therapeutic effect of such an antibody (para. 10.4).

Accordingly, the objective technical problem identified by the Opposition Division was: "*the provision of a therapeutically effective treatment, prevention or risk-reduction of the conditions related to elevated serum cholesterol levels referred to in the claims*." (para. 10.5.3)

As indicated above, the Opposition Division thus introduced the concept of "*therapeutically effective*," a notion that had effectively been set aside by the Court of First Instance following its interpretation.

The Opposition Division agreed with the Court of First Instance that the production of the antibody as such did not involve an inventive step, since the production methods relied on routine techniques (para. 10.17.8). However, its reasoning on inventive step focused on therapeutic efficacy (para. 10.5.4). It considered that, in light of *Lagace* and the prior art in general, the skilled person would not have been prompted to prepare such an antibody, since there was no basis to anticipate that it would be therapeutically effective.

The Opposition Division based its analysis primarily on the absence, in *Lagace* and in the other prior art documents examined, of any demonstration allowing the skilled person to anticipate that direct inhibition of the interaction between PCSK9 and the LDL receptor would lead to a therapeutic effect (para. 10.19.6). It further emphasised the complexity and unpredictability of biological systems (para. 10.20.7), factors that further diminish the likelihood of a reasonable expectation of success. This point was subsequently echoed by the Court of Appeal, which confirmed that the more unexplored a technical field and the more difficult the predictions, the lower the expectation of success (para. 136).

In other words, although the preparation of an antibody did not in itself present any particular technical difficulty, there was no reason to expect that such an antibody would be "therapeutically effective."

In conclusion, the Opposition Division acknowledged the presence of an inventive step in the absence of a reasonable expectation of success in developing such an antibody for therapeutic purposes. It considered that, even if it was obvious to try to set up an experiment as suggested by the prior art, it was not necessarily true for the skilled person to have any reasonable expectation of success (para. 10.31). It further specified that the reasoning of the Court of First Instance might have been justified in the case of a claim directed to the antibody as such, but was not transposable to a therapeutic use claim, since the therapeutic effect of the product could not be predicted (para. 10.34).

Court of Appeal

Finally, the Court of Appeal also selected *Lagace* as the realistic starting point. It further stated that it "*agrees with [the Court of First Instance] that at the priority date the skilled person, starting from* Lagace*, had a strong incentive to block PCSK9 activity to reduce LDL levels in order to be able to treat hypercholesterolemia and similar diseases…*" (para. 160)

Moreover, in its earlier analysis of the patent, the Court had formulated the underlying problem as follows: "*to provide a therapeutically effective treatment or prevention of hypercholesterolemia or an atherosclerotic disease or other conditions related with elevated serum cholesterol levels*" (para. 38).

It should be noted that, like the Opposition Division, the Court of Appeal thus introduced the notion of "*therapeutically effective*" into the formulation of the underlying problem.

However, contrary to the analysis of the Court of First Instance, it held that the "next step" was not the development of an antibody, since the skilled person would not have considered to pursue that route with a reasonable expectation of success (para. 160).

The Court of Appeal's reasoning on inventive step again rests essentially on therapeutic efficacy. In this respect, it considered that the Court of First Instance had adopted an incorrect interpretation of that concept, as "*therapeutic effective*" cannot be equated with just any reduction in cholesterol levels, but must correspond to a noticeable improvement (paras. 163–164). The prior art, however, contained no indication allowing the skilled person to conclude that developing an antibody blocking the interaction between PCSK9 and the LDL receptor would lead to such an improvement.

While acknowledging the line of reasoning developed by the Opposition Division (namely the existence of the extracellular pathway), the Court of Appeal based its analysis primarily on the disclosure in the prior art of the coexistence of two distinct pathways for PCSK9, intracellular and extracellular, without it being established that one of them was predominant or that intervention on one of them — namely the extracellular pathway — would lead to a therapeutically effective outcome (paras. 178 and 180). From this, it inferred the absence of a reasonable expectation of success (which it contrasts with the notion of a mere "hope to succeed," another concept developed in EPO case law, para. 205). Furthermore, it emphasised that, in this context, the burden of proof lay with the parties alleging invalidity of the patent, who had failed to demonstrate the existence of such a reasonable expectation (para. 137).

The conclusion of the Court of Appeal thus aligns with that of the Opposition Division in recognising the presence of an inventive step in the absence of a reasonable expectation of success in developing the antibody for therapeutic purposes, although the reasoning adopted differs to some extent.

In particular, the Court of Appeal criticised the Court of First Instance for having misidentified the "next step": this did not consist in producing the antibody, but rather in determining whether there was sufficient motivation to envisage antibody therapy in view of an expected therapeutic effect. The actual production of the antibody could only arise at a later stage, once such motivation had been established (para. 205).

It finally emerges from this analysis that the Court of Appeal conducted a comprehensive reassessment of the entire case, rather than limiting itself to a review of the first instance decision.

9. Conclusion and Key Takeaways

In conclusion, the revocation action relating to European patent EP 3 666 797 highlights decisions of particularly high technical complexity, marked by a clear intention to ensure consistency between the Unified Patent Court and the European Patent Office, even though disparities remain both in the methodologies applied by the different bodies and in the reasoning developed to justify their conclusions.

The shifts observed in the reasoning from one body to another suggest that, from a strategic perspective, it may be advisable — for either party — to initiate opposition proceedings before the EPO where possible, in order to benefit from an additional forum for debate and, where appropriate, to influence the procedural timeline. The postponement of the hearing before the Court of Appeal to allow the parties to comment on the Opposition Division's decision provides a concrete illustration of the close interplay between EPO and UPC proceedings.

More broadly, this case raises the issue of the pace of UPC proceedings, which may appear particularly rapid, especially at first instance, to the extent that arguments seem to evolve and respond to one another from one body to the next.

Finally, the thorough review by the Court of Appeal of the Opposition Division's decision, coupled with the invitation to the parties to submit observations, calls for particular vigilance regarding the interaction between these two levels of decision making, especially as regards the identity of the facts, evidence and arguments taken into account. The relative flexibility traditionally admitted in opposition proceedings for the introduction of new submissions may result in elements not debated at UPC first instance being examined at a later stage, thereby raising the question of how the Court of Appeal will position itself in such situations.

In this context, the technical complexity of the issues raised, the increasing consideration of parallel proceedings before the EPO, and the particularly tight time limits imposed by the UPC now make it essential for UPC litigation to be handled by a team of representatives mastering both court litigation and EPO procedural practice, in particular through the involvement of a European Patent Attorney alongside qualified lawyers. ■

One Rung Up the Ladder:
How Products That Practice Prior Art Can Inform Lost Profits Calculations

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ABSTRACT

Estimating lost profits in patent litigation requires reconstructing a counterfactual "but-for world" in which the alleged infringement did not occur. This article examines how products that practice the prior art can serve as practical, market-based benchmarks for lost profits analyses when direct licensing evidence is limited or unreliable. We explain how prior art products clarify both the plaintiff's competitive position and the defendant's available non-infringing alternatives, and we discuss how standard economic tools can leverage observed substitution patterns to isolate the incremental value of patented features. We conclude that prior art products can materially strengthen the economic foundation of lost profits analyses.

The concept of the "but-for world" lies at the heart of a lost profits analysis, which measures the profits that a plaintiff would have earned but for the defendant's infringement. The challenge of such an analysis is that it requires the analytical equivalent of both a time machine and a crystal ball: the expert must reconstruct the market's past, while considering how it might have unfolded differently under different circumstances. A jury (or the court) has to determine what *would have* happened, counterfactually, but for the infringement – what *would* the market value of a license have been, at the time? How many products *would* the patent owner have sold? What profits *would* the patent owner have earned, but for the infringer's acts?

The many variables involved, such as market fluctuations, competitor products, and changes in technology over time, further complicate the equation. For this reason, economic experts often look to concrete measurements of value, such as existing licenses for the patent that were sold to others, when making their calculations. Unfortunately, information on existing or comparable licenses may not be readily available (if they exist at all).

However, another sort of benchmark sometimes exists: products that embody or practice the prior art cited by the allegedly-infringed patent. These "prior art products" can inform the construction of the but-for world that the patent damages calculation requires, either by clarifying the defendant's available alternatives, the plaintiff's pre-existing market position, or both. In these cases, lost profits may be calculated relative to the but-for world in which the defendant marketed these prior art products instead of allegedly-infringing products.

In this article, we examine how prior art products, when available, can serve as concrete, market-based benchmarks for lost profits analyses in patent litigation. The article proceeds in four sections. First, we discuss why, conceptually, prior art products can serve as a useful comparator for the economic expert. Second, we review some well-known tools in the economic expert's toolbox and demonstrate how prior art products can make those tools especially useful in patent infringement cases. Third, we take a deeper dive into the underlying economic and competitive dynamics of a lost profits analysis that prior art products can illuminate. Fourth, we discuss the implications of our findings for litigation strategy, applicable to both plaintiffs and defendants.

I. Why Prior Art Products Matter in Lost Profits

Damages awards for patent infringement generally take two forms: lost profits or reasonable royalties. The basic principle behind both approaches is to put the patent owner in the same position they would have been in had the infringement not occurred.

An added complication to the damages analysis is the principle of apportionment. Apportionment is not expressly required by the patent statute, 35 U.S.C. § 284, which merely promises that the patent owner will be compensated by damages "adequate to" the infringement. "Apportionment" means that, in a damages award for infringement, the patent owner is only entitled to the incremental value that is specifically attributable to the patented technology. It was first introduced by the Supreme Court in the 1853 case *Seymour v. McCormick,* which involved patented improvements to a reaping machine. There, the Court reversed and remanded a patent damages award as excessive. It cautioned against awarding lost profits for the value of the whole machine when the

infringed patent covered only a small improvement over the prior art.[1]

There, the Court was clearly concerned that patent owners could reap a windfall in damages awards when the invention infringed was not the entire machine, but merely some trivial improvement on the existing technology. Apportionment prevents patentees from extracting a larger award than is necessary to compensate for the harm caused by infringement of their patent.

However, in the past decade, as the size of patent damages awards has become a focus of debate, some commentators have argued that the Federal Circuit has strayed from the apportionment principle by permitting so-called "built-in apportionment" in damages calculations.[2] Built-in apportionment is an indirect way of determining a per-unit royalty for a product that practices a patented technology. It begins with a lump-sum license and then divides that sum by the number of projected units to arrive at a per-unit royalty rate, based on the assumption that the negotiators of that lump-sum license accounted for the value of the asserted patent in arriving at that license amount.[3] These commentators have argued that built-in apportionment is a flawed method because lump-sum licenses often do not reflect an accurate per-unit royalty assessment, and they caution that such licenses can also be manipulated to yield an artificially high per-unit rate.[4]

In the recent *EcoFactor v. Google* matter, the Federal Circuit rejected an expert's use of "built-in apportionment," reflecting the court's concern with the reliability of such techniques. In *EcoFactor*, one of the three license agreements relied on by the expert did not involve the patent-in-suit at all, and the other two were lump-sum agreements covering EcoFactor's entire patent portfolio – with no indication that the licensees agreed to pay a per-unit rate for the asserted patent. The court found the expert's methodology relied on licenses that were insufficient and misleading under Daubert.[5] The decision reflects the view that damages are more reliable when grounded in concrete economic evidence rather than abstract shortcuts.

Prior art products offer precisely this kind of evidence. Unlike license-derived formulas, prior art products are often tangible, sold in real markets, and directly comparable to the patented invention. In infringement disputes, attorneys often use prior art strategically to challenge or defend a patent's non-obviousness, but it can also play a central role in assessing damages. By showing what features were already available, prior art products can help isolate the incremental value of the patented invention, just as the Supreme Court did in apportioning the value of McCormick's patented improvement (a convenient seat for the grain-raker) to the prior art reaping machine.

That incremental value, in turn, sheds light on the profits associated with market exclusivity – and in the context of infringement, on the losses from its erosion. Likewise, if the defendant markets prior art products, they can serve as benchmarks for evaluating how much the patented features – rather than other factors – contributed to the defendant's market gains and the plaintiff's corresponding losses.

Thus, in many circumstances, prior art products can inform the construction of the but-for world that the patent damages calculation requires, either by clarifying the plaintiff's pre-existing market position, the defendant's available alternatives, or both.

II. What Prior Art Products Tell Us About Patented Value

Many of the analytical tools available to economic experts are well-suited to estimating the incremental value of a patented invention by analyzing observed or reported market outcomes across products – some that include the patented features and others that do not. Products that embody the patent's prior art are particularly useful in such analyses: they help quantify the incremental value of the patented features and ensure that the economic assessment is directly tied to the scope of the claimed invention.

One of the analytical tools commonly used in this context is a conjoint survey, which estimates how much consumers value specific features – such as those claimed in a patent – by observing how they trade off attributes when choosing among product alternatives. In a choice-based conjoint (CBC), for example, respondents are typically shown sets of

1 "If the measure of damages be the same whether a patent be for an entire machine or for some improvement in some part of it, then it follows that each one who has patented an improvement in any portion of a steam engine or other complex machine may recover the whole profits arising from the skill, labor, material, and capital employed in making the whole machine, and the unfortunate mechanic may be compelled to pay treble his whole profits to each of a dozen or more several inventors of some small improvement in the engine he has built. By this doctrine, even the smallest part is made equal to the whole, and 'actual damages' to the plaintiff may be converted into an unlimited series of penalties on the defendant." (U.S. 491 at 57).

See also *Garretson v Clark*, 111 U.S. 120, 121 (1884): "[t]he patentee, . . . must in every case give evidence tending to separate or **apportion** the defendant's profits and the patentee's damages between the patented feature and the unpatented features" (emphasis added).

2 William F. Lee & Mark A. Lemley, "The Broken Balance: How 'Built-In Apportionment' and the Failure to Apply Daubert Have Distorted Patent Infringement Damages," *Harvard Journal of Law & Technology*, Vol. 37, No. 2, Spring 2024.

3 *Vectura Ltd. v. GlaxoSmithKline LLC*, 981 F.3d 1030, 1041 (Fed. Cir. 2020) ("Built-in apportionment effectively assumes that the negotiators of a comparable license settled on a royalty rate and royalty base combination embodying the value of the asserted patent...[A] party relying on a sufficiently comparable license can adopt the comparable license's royalty rate and royalty base without further apportionment and without proving that the infringing feature was responsible for the entire market value of the accused product.").

4 William F. Lee & Mark A. Lemley, "The Broken Balance: How 'Built-In Apportionment' and the Failure to Apply Daubert Have Distorted Patent Infringement Damages," *Harvard Journal of Law & Technology*, Vol. 37, No. 2, Spring 2024.

5 *EcoFactor, Inc. v. Google LLC*, , 137 F.4th 1333, 1343 (Fed. Cir.), cert. denied, 146 S. Ct. 333, 223 L. Ed. 2d 165 (2025), 20-22.

hypothetical products that differ in key characteristics – *e.g.*, price, functionality, brand, or performance – and are asked which product they would prefer or be willing to purchase.[6] A conjoint survey can therefore isolate consumers' value of the patented feature itself, holding other factors – such as brand, distribution, or price levels – constant. Moreover, existing prior art products can improve the realism and credibility of the conjoint design: their actual price points and technical attributes can serve as anchors for the survey's choice sets, and their observed sales data can be used to validate or calibrate the conjoint model's predictions.[7]

Another tool in the economic expert's toolkit is hedonic regression, which estimates the value of specific product features – such as patented innovations – using observed market data rather than survey-based consumer responses.[8] In this regression-based analysis, the prices of products in the marketplace are statistically modeled as a function of their attributes. The estimated coefficients indicate how much each attribute contributes to the overall market price. For example, in a market for smartwatches, a hedonic model might estimate how much of the price variation across models is explained by differences in battery life, display quality, connectivity features, and brand reputation.

Like conjoint surveys, hedonic regression aims to measure the marginal economic value of the patented feature. Instead of survey-based trade-offs, however, hedonic regression relies on actual market behavior, capturing the revealed preferences of consumers who made real purchasing decisions. To produce useful results, a hedonic regression requires sufficient variation in purchased product characteristics in the available data, and there needs to be a discernible relationship between the patents of interest and product characteristics. When prior art products are present in the dataset, they provide real-world benchmarks that help separate the contribution of patented features from those already available in earlier designs – going a long way to ensure that the data are suitable for hedonic regression. This linkage to prior art strengthens the economic analysis, anchoring the estimated feature values in actual market conditions rather than in hypothetical ones.

Finally, an economic expert can directly construct a model of the relevant market, including products that practice the patent and those that practice prior art as options for consumers in that model. Indeed, in many cases, such a model may be required to reliably predict outcomes in the but-for world, even when using the conjoint survey or hedonic regression tools mentioned above.

Next, we discuss how an economic expert might use prior art products to inform their construction of such economic models, discussing how prior art products can help determine how the market might adjust in the but-for world, demonstrating the ways in which prior art products can impact lost profits calculations depending on the specific case at issue.

III. Market Setting: Products and Substitution Patterns

Consider a hypothetical market for smartphones. There are two manufacturers in this market, Plantain and Banana, and initially both companies market smartphones with a single rear camera, the P1 and B1, respectively. Plantain's R&D team develops a smartphone with a dual rear camera – the P2 – and obtains a patent on the use of dual rear cameras in smartphones. Plantain's patent identifies prior art covering the use of a single rear camera on smartphones. Banana, not to be outdone, develops and launches its own smartphone with a dual rear camera, the B2. Plantain then sues Banana for patent infringement, citing Banana's use of dual rear cameras on the B2.

Prior to the launch of the patented P2, Plantain's P1 and Banana's B1 each maintained a consistent share of the smartphone market. When Plantain's P2 launches, its sales come from two sources: Plantain's cannibalization of its own sales of P1 phones and Banana's lost sales of B1 phones.[9] In Banana's case, however, sales of the infringing B2 after its launch come from three sources: Plantain's lost P1 sales, Plantain's lost P2 sales, and Banana's cannibalization of its own B1 sales.

Figure 1 illustrates the evolution of the market and related substitution patterns. Before the introduction of any dual-camera products, the blue ovals labeled P1 and B1 represent the single-camera status quo. After the launch of Plantain's patented P2, the two

6 In addition to CBC, there are several other conjoint survey formats, including full-profile conjoint, adaptive conjoint (ACA), and adaptive choice-based conjoint (ACBC), among others. These approaches differ in how product attributes are presented and how respondent preferences are elicited. *See* Bryan K. Orme, *Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research*, 4th ed. (Madison, WI: Research Publishers LLC, 2019).

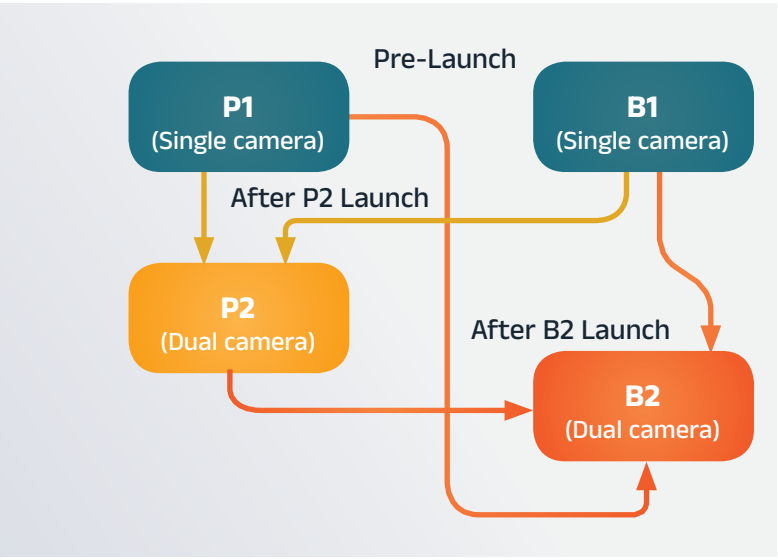
7 For a more detailed discussion of how conjoint surveys can isolate consumer valuation of individual features, *see* Lisa Cameron, Michael D. Cragg, and Daniel McFadden. "The Role of Conjoint Surveys in Reasonable Royalty Cases." *Law360*, October 16, 2013, 6:37 PM ET. Available at: https://www.brattle.com/wp-content/uploads/2017/10/7480_the_role_of_conjoint_surveys_in_reasonable_royalty_cases.pdf; and Lisa Cameron, Daniel McFadden, and Pablo Robles. "Price Premium Damages in Product Market Litigation: Issues in Survey-Based Market Simulations." In *International Comparative Legal Guides – Product Liability 2022. The Brattle Group*, June 2022. Available at: https://www.brattle.com/wp-content/uploads/2022/06/Price-Premium-Damages-in-Product-Market-Litigation-Issues-in-Survey-Based-Market-Simulations.pdf

8 *See* Sherwin Rosen, "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition," *Journal of Political Economy* 82, no. 1 (1974): 34–55.

9 Plantain's P2 could potentially expand the market as well, earning sales from new customers who would not have otherwise purchased a smartphone. We do not consider these sales here for simplicity.

yellow lines show substitution toward P2. Following the subsequent launch of Banana's infringing B2, the three orange lines indicate the three sources of substitution driving B2's sales.

FIGURE 1: Substitution Patterns in the Smartphone Market



The prior art products P1 and B1 in this market can help understand the incremental value associated with Plantain's patented dual rear camera feature, informing a lost profits calculation, in two main ways. First, P1 and B1 can act as **benchmarks**; the parties' losses in their respective prior art products upon the launch of their new products capture the incremental value of the dual-camera feature. Second, **substitution** from one party's prior art product to their competitor's innovative product informs which sales constitute Plantain's damages and Banana's ill-gotten gains – and which sales do not. We consider each in turn, then discuss variations on the setting and the subsequent implications for analysis.

III.A. Benchmarks

Market outcomes for P1 and B1, such as prices and market shares, can serve as points of comparison for measuring the market success of P2 and B2. These comparisons can indicate the incremental value provided by the patented functionality, especially if other features of the products are similar. In the simplest case, if Plantain sells P1 for $499 and sells its P2 for $599, then the incremental market value of the second rear camera is about $100.[10]

Benchmark-style analysis is more difficult if one tries to compare products across companies – *e.g.*, a comparison of the prior art P1 against the infringing B2 – should a within-company benchmark product not be available. Even if the products are identical save the second rear camera, differing brand names, manufacturing costs, and installed user base make an "apples-to-apples" comparison difficult. A proper comparison across companies, therefore, requires an understanding of customer substitution patterns between the companies' various products on offer.

III.B. Substitution

When Plantain launches the P2, it draws sales from erstwhile purchases of the P1 and B1 smartphones (the yellow lines in Figure 1 above). Both paths will be driven, at least in part, by the introduction of the second camera, and both will therefore inform us of the value of the patented features relative to prior art products: if P2 generates large sales volumes, then consumers place a high value on the patented features, and vice versa. Whether the draw from P1 or B1 sales is larger will depend on consumer preferences for the Plantain and Banana brands as well as the difference in other features offered on the devices.

Similarly, when Banana launches the B2, it draws sales from consumers who would otherwise have purchased the P1, B1, or P2 smartphones (the orange lines in Figure 1 above). Again, assuming that the only differentiating feature of the B2 is the patented dual rear camera, sales diverted to B2 from *both* P1 *and* P2 qualify as lost sales due to infringement. Likewise, sales diverted to B2 from B1 can add to Banana's gains from infringing Plantain's patent if, for instance, B2 can command a price premium over B1.

In this example, observed substitution patterns from prior art products to practicing or infringing products give a clear indication of Plantain's lost sales and Banana's ill-gotten gains from Banana's infringement of Plantain's patent.

However, if the parties' product launches overlap, or if B2 *does* include differentiating features, or if Banana's brand itself simply has some differentiating value in the marketplace, then deriving the incremental value of the patented feature becomes less clear-cut. A qualified economic expert can often use evidence on market outcomes of the products that do exist, applying the techniques mentioned earlier, to infer underlying substitution patterns and disentangle the value of the patented features themselves.

III.C. Disentangling Effects

If P2 and B2 launch roughly concurrently, then previous purchasers of P1 and B1 devices have two new choices, and disentangling substitution effects becomes more difficult. At minimum, P2 is distinguished from P1 by the patented features, while B2 is distinguished from P1 by both the patented features and brand-level differences between Banana and Plantain. In such markets, sales diverted from P1

10 The exact value implied by this comparison can depend upon the other features, differences in production costs, and the shape of the demand curves for the products at issue. A qualified economic expert can use the various techniques mentioned earlier – conjoint analysis, hedonic regression, and market modeling – to derive a more precise answer.

to B2 are driven at least partially by Banana's brand value – indeed, if B1 does not exist in the market, P1-to-B2 substitution may be driven by brand alone.

The methods previously discussed – conjoint analysis, hedonic regression, and market modeling – can help isolate substitution driven by patented/infringing features from brand value and other drivers of consumer demand, and consideration of prior art products can enhance the ability of these methods to produce insightful results. These effects impact the calculation of monetary remedies, and can therefore impact litigation strategy more broadly, as discussed below.

IV. Implications for Litigation Strategy

The inferential nature of estimating lost profits in a but-for world has important considerations for how the litigating parties might factor prior art products into their overall strategy, at least as it relates to evidence on damages for infringement.

For example, plaintiffs may want to highlight evidence that contrasts the value of prior art products with that of the patent-practicing product, demonstrating the desirability of the patented improvement – the very fact that Banana launched an infringing B2 phone shows that the invention was valuable to consumers, and if B2 commands a price premium over prior art products P1 or B1, that provides further evidence on the patent's apportioned value. The plaintiff could also seek production of any internal studies from the defendant assessing consumer demand for the patented feature, contrasting with demand for contemporary prior art products.

Similarly, defendants may want to highlight evidence that the value consumers place on their infringing product derives not from the patented feature but from other sources. For instance, the defendant could produce evidence that their infringing product diverted sales from their own prior art product offering instead of the plaintiff's products; evidence on costs of production to demonstrate that observed pricing differences between infringing and prior art products are driven by production costs, not consumer demand for the patented feature; or evidence demonstrating that consumers valued aspects of their product offering unrelated to the patented technology, such as their brand reputation or their own technology, that were available in both infringing and prior art products.

In summary, prior art products present a particularly suitable grounding point for lost profits analyses in patent litigation. Data on prior art products can make the tools in an economic expert's toolbox more powerful and effective, helping the economic expert isolate the value of the patented feature in an allegedly infringing product from other drivers of value, such as other features or brand value. Given the scrutiny placed recently by the courts on the size of patent damage awards, such direct benchmarks may become increasingly important for economic experts, plaintiffs, and defendants. ■

The New Protection Instrument in European Pharmaceutical Law: The Transferable Data Exclusivity Voucher

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Introduction

European pharmaceutical law is currently undergoing its most ambitious reform in more than two decades. Through the so-called EU pharmaceutical package - centered on a recast directive and a new regulation - the Union has spent the last several years redesigning core rules on authorization, regulatory protection, access, shortages, unmet medical need, and antimicrobial stewardship. After extensive drafting, negotiation, and political compromise among the Commission, Parliament, and Council, the reform now stands close to implementation.

One of the most novel and controversial elements of that package is the attempt to address antimicrobial resistance ("AMR") through a new protection mechanism that EU law has not previously known: the transferable data exclusivity voucher. U.S. readers may be familiar with exclusivity vouchers as they have been proposed in a similar form by the U.S. Congress in the "Re-Valuing Antimicrobial Products Act" of 2018.[1] The instrument is intended to create an additional incentive for antibiotic R&D by generating a new form of tradable regulatory exclusivity. In that sense, it is not merely another adjustment of existing data- or market-protection rules, but the creation of a genuinely new regulatory asset designed to stimulate antimicrobial innovation and, in policy terms, to strengthen pharmaceutical R&D in Europe.

AMR is frequently described as a "silent pandemic," and for good reason. According to the European Centre for Disease Prevention and Control ("ECDC"), more than 35,000 people die each year in the EU/EEA as a direct consequence of infections caused by antimicrobial-resistant bacteria.[2] At the same time, the development pipeline for novel antimicrobials remains inadequate when measured against the public health need.[3]

The structural reason is well known. Antibiotics are medically valuable precisely because they should be used prudently. Unlike therapies for chronic conditions, they are usually taken for a limited period only. Their commercial potential is therefore constrained from the outset, and stewardship policies further restrict use in order to preserve efficacy. The result is a classic market-failure scenario: the social value of innovation is high, but the expected private return is often too low to justify the underlying R&D risk.[4]

Transferable Data Exclusivity Voucher

Under the revised EU pharmaceutical package, a transferable data exclusivity voucher ("TDEV") is intended to reward the development of a "priority antimicrobial" with an additional 12 months of regulatory data protection.[5] The crucial point, and in practice the far more important one, is that the voucher may be used not only for the priority antimicrobial itself, but for another centrally

1 Beth Boyer & David Ridley, *Design of a Transferable Exclusivity Voucher Program* (Duke-Margolis Ctr. for Health Pol'y, White Paper, Jan. 26, 2022); cf. H.R.6294 - 115th Congress (2017-2018): REVAMP Act | Congress.gov | Library of Congress. Accessed October 21, 2021; https://www.congress.gov/bill/115th-congress/house-bill/6294/.

2 European Centre for Disease Prevention and Control, *Antimicrobial Resistance in the EU/EEA (EARS-Net) – Annual Epidemiological Report 2024* (Nov. 18, 2025), https://www.ecdc.europa.eu/en/publications-data/antimicrobial-resistance-eueea-ears-net-annual-epidemiological-report-2024.

3 See European Commission, Commission Staff Working Document, *Impact Assessment Report Accompanying the Proposals for a Revision of the Union Pharmaceutical Legislation,* SWD(2023) 192 final, at 56–57 (Apr. 26, 2023), https://health.ec.europa.eu/system/files/2023-04/swd_2023_192_1-2_ia_en.pdf.

4 See *Id;* see also Council compromise text, Recitals 77, 77a, in *Proposal for a Regulation Laying Down Union Procedures for the Authorisation and Supervision of Medicinal Products for Human Use* (Council document ST 6366/26, Feb. 24, 2026).

5 Council document ST 6366/26, Art. 41(1); see also European Parliament, *Deal on Comprehensive Reform of EU Pharmaceutical Legislation* (Dec. 11, 2025), https://www.europarl.europa.eu/news/en/press-room/20251209IPR32110/deal-on-comprehensive-reform-of-eu-pharmaceutical-legislation.

authorized medicinal product of the same or a different marketing-authorization holder.[6] In economic terms, the mechanism is therefore designed less as a reward tied to commercialization of the antibiotic itself than as a tradable instrument whose principal value will normally lie in extending exclusivity for another product. As a practical matter, one may expect that the voucher will often not be used for the antibiotic that generated it but will instead be transferred and monetized in order to prolong the regulatory protection period of a different medicinal product. The mechanism is designed to "delink" the reward for antimicrobial innovation from the sales volume of the antibiotic itself.

That basic architecture remains consistent with the earlier Commission proposal. However, the legislative text has evolved materially during the negotiations. The co-legislators reached a provisional political agreement in December 2025, and the Council's 2026 compromise text now reflects a significantly more constrained and more sophisticated voucher model than the one originally proposed in 2023.[7]

Requirements for Granting the Voucher

The voucher is reserved for human medicines that qualify as "priority antimicrobials." Substantively, the antimicrobial must represent a genuine advance against AMR. The relevant legislative text requires non-clinical and clinical data demonstrating a significant clinical benefit with respect to antimicrobial resistance and, in addition, at least one of the following characteristics: it must represent a new antimicrobial class, or have a mechanism of action distinctly different from any authorized antimicrobial in the Union, or contain an active substance not previously authorized in the Union that addresses a multidrug-resistant organism or a serious or life-threatening infection.[8]

For antibiotics, the assessment is tied to pathogen-prioritization systems. The legislative text still refers to the WHO priority pathogens list or an equivalent Union list.[9] In that respect, the surrounding scientific context has also moved on since the earlier draft. WHO updated its bacterial priority pathogens list in 2024; the revised list covers 24 pathogens across 15 families and continues to emphasize multidrug-resistant Gram-negative bacteria, while also updating the categorization of several other high-burden resistant pathogens.[10] That update reinforces the basic point already made in the earlier version of this article: the voucher is not meant for ordinary follow-on products, but for genuinely high-priority antibacterial innovation.

The formal conditions for obtaining the voucher are also strict. The applicant must demonstrate the capacity to supply the priority antimicrobial in sufficient quantities for the expected needs of the Union market. It must also disclose all direct financial support received for research related to the development of the product. In addition, the more recent legislative text now requires the applicant to show that the EU marketing-authorization application was submitted first to the European Medicines Agency, or at least no later than 180 days after the first filing outside the European Union.[11] This is a significant addition. It reflects the broader logic of the pharmaceutical reform package, which seeks not only to reward innovation, but also to anchor innovation in the Union and to encourage timely EU filing.

Once the marketing authorization is granted, the marketing authorization holder must publish the information on direct funding on a dedicated webpage and provide the corresponding link to the Agency.[12] The transparency rationale is explicit: the institutions want a clearer basis for assessing whether the voucher risks overcompensating the developer when public funding has already materially de-risked the underlying R&D effort.[13]

Transfer and Use of the Voucher

The dogmatically and economically most striking feature of the voucher remains its one-time transferability. Its practical importance lies above all in the fact that the voucher can be deployed for another medicinal product, and that this will likely be the commercially decisive use case in many situations. The voucher may be transferred once to another marketing-authorization holder, but it may not be transferred further. This creates a tradable exclusivity asset that is detached from the medicinal product whose development is being incentivized. It is precisely this detachment - and the possibility of extending protection for a different product with materially greater market value - that gives the instrument its commercial appeal, but it is also the source of its controversy.

6 Council document ST 6366/26, Art. 41(1).

7 European Parliament, *Deal on Comprehensive Reform of EU Pharmaceutical Legislation, supra note 5; Council of the European Union, Pharma Package: Council and Parliament Reach a Deal on New Rules for a Fairer and More Competitive EU Pharmaceutical Sector* (Dec. 11, 2025), https://www.consilium.europa.eu/en/press/press-releases/2025/12/11/pharma-package-council-and-parliament-reach-a-deal-on-new-rules-for-a-fairer-and-more-competitive-eu-pharmaceutical-sector/; Council document ST 6366/26.

8 Council compromise text, Recital 78; Art. 40(3), Council document ST 6366/26; cf. COM(2023) 193 final.

9 *Id.*

10 World Health Organization, WHO Bacterial Priority Pathogens List, 2024 (May 17, 2024), https://www.who.int/publications/i/item/9789240093461; World Health Organization, WHO Updates List of Drug-Resistant Bacteria Most Threatening to Human Health (May 17, 2024), https://www.who.int/news/item/17-05-2024-who-updates-list-of-drug-resistant-bacteria-most-threatening-to-human-health.

11 Council document ST 6366/26, Art. 40(4)(a)–(c).

12 *Id.* Art. 40(4), final subparagraph.

13 *Id.* Recital 81.

In the original proposal, the voucher could be used for a centrally authorized medicinal product if that product was still within its first four years of regulatory data protection.[14] That version was criticized because it potentially allowed the extension of protection for very high-revenue products and created substantial uncertainty for generic and biosimilar entry planning.

The current compromise text now substantially narrows that risk. If the voucher is used for a medicinal product other than the priority antimicrobial itself, the use must occur only in the fifth or sixth year of the regulatory data protection period, and only if the annual gross sales of that product in the Union did not exceed €490 million in any of the first four years following the grant of the marketing authorization.[15] Moreover, the holder must demonstrate that the sales information is accurate and complete and has been audited by an independent external auditor.[16] This is, in substance, the "blockbuster clause" that had already begun to appear in the later drafts and political discussion, but it is now much more concretely formulated.

According to a study by Charles River Associates published in 2025, only 21 medicines would, in theory, be eligible to buy and use a TEV. The main reason the pool of potential candidates becomes so small is the rule that a TEV can be used only for products still protected by regulatory data protection as a last line of IP protection, which removes 67% of otherwise possible candidates. A further 23% of the remaining products are excluded by the rule limiting use to the fifth year of data protection, and another 9% are excluded by the sales cap, which bars products that exceeded €490 million in annual sales in any of their first four years on the EU market. Accordingly, there are no blockbuster products that would be able to use a TEV, even in the absence of a revenue cap, since the average forecasted revenue of the 21 eligible products in their final year before loss of RDP is estimated at €257m.

However, these changes significantly reduce the distant theoretical prospect that the voucher will be used to prolong the monopoly of a mega-blockbuster in a manner grossly disproportionate to the antimicrobial innovation being rewarded – also in the future. In addition, the voucher may be used only if the marketing authorization for the priority antimicrobial has not been withdrawn.[17] This further ties the continuing value of the voucher to the continuing regulatory life of the antimicrobial product that originally earned it.

Transparency has also been strengthened. When a voucher is transferred, the receiving marketing-authorization holder must notify the Agency within 30 days and state the value of the transaction; the Agency is then to make that information public.[18] From a policy perspective, that disclosure requirement is sensible. If the voucher is justified as a targeted pull incentive, legislators and the public need visibility into how much economic value is in fact being generated and captured.

Critical Assessment

The core advantage of the voucher model remains the same as in the original draft: it seeks to decouple return on investment from antimicrobial sales. That is its principal conceptual strength. For SMEs and other developers that do not themselves possess a lucrative late-stage commercial portfolio, the transferability feature may be particularly important, because it permits monetization through sale to a larger company with a suitable target product.[19] In that sense, the instrument may support precisely the type of collaboration structure that often characterizes antimicrobial R&D: smaller innovation-focused firms on one side, larger commercialization-capable firms on the other.

At the same time, the classic objections have not disappeared. Even in its narrowed form, the voucher works by delaying follow-on competition for another medicinal product. The cost of that delay is not borne by the innovator alone, but by health systems and, ultimately, by payers and patients. Critics have therefore argued that transferable exclusivity vouchers are a poor and potentially regressive method of financing antimicrobial innovation because they externalize the reward onto unrelated product markets and healthcare budgets.[20]

That criticism is serious and cannot simply be dismissed. Earlier economic analyses in the United States likewise warned that voucher-type systems may generate extreme and volatile social costs unless their value is capped or otherwise tightly constrained.[21] The recent EU compromise text is best understood as a direct response to precisely that concern. The €490 million cap, the fifth- or sixth-year use restriction, the one-time transfer rule, the publication of transaction value, the disclosure of public funding, and the limited overall application period all serve the same objective: reducing the risk of overcompensation.[22]

Whether those safeguards are sufficient is another matter. The answer is not obvious. Much will depend

14 COM(2023) 193 final, Art. 41(1); see also M. Stief & K. Tsakiliotis, Übertragbare Datenexklusivitätsgutscheine: Ein regulatorischer Anreiz zur Bekämpfung der AMR-Krise?, 86 *Pharm. Ind.* no. 12, at 1087 (2024).

15 Council document ST 6366/26, Art. 41(1), second subparagraph.

16 *Id.* Art. 41(1a).

17 *Id.* Art. 41(1a), final sentence.

18 *Id.* Art. 41(4); see also Recital 82.

19 See *Id.* Recitals 77, 79–82.

20 Astrid Berner-Rodoreda *et al.*, "Transferable Data Exclusivity Vouchers Are Not the Solution to the Antimicrobial Drug Development Crisis: A Commentary on the Proposed EU Pharma Regulation," 9 *BMJ Glob. Health* e014605 (2024).

21 Outterson & McDonnell, *supra* note 4, at 784, 788.

22 Council document ST 6366/26, Recitals 79–84; Arts. 40–42.

on how many vouchers are eventually granted, which products become realistic targets, and whether the narrowed design still provides enough expected value to change investment behavior in antimicrobial R&D. If the economic value is cut back too far, the instrument may cease to function as an effective pull incentive. If the value remains too high, the cost objection returns. The TDEV therefore remains a calibration problem.

There is also a broader policy question whether exclusivity-based rewards are the best available instrument at all. The revised pharmaceutical package itself expressly recognizes subscription models as another response to antimicrobial market failure.[23] The United Kingdom has already moved from pilot experimentation to a broader antimicrobial subscription model under which companies are paid a fixed annual fee linked to the value of the product to the health system rather than to sales volume.[24] From a conceptual standpoint, that model addresses the "delinkage" problem more directly than a transferable exclusivity voucher. It avoids extending monopoly protection on an unrelated product. Whether it is politically and fiscally scalable across the EU is a different question, but as a matter of design, it remains an important comparator.

Outlook

The earlier draft correctly identified the data exclusivity voucher as a potentially important new protection instrument in European pharmaceutical law. That remains true. But the legal and political context has changed. What began as a comparatively open-ended Commission proposal has evolved into a much more conditioned mechanism. The current text reflects an attempt to preserve the basic delinkage logic of the voucher while constraining its fiscal and competitive side effects through tighter eligibility, use restrictions, transparency obligations, and anti-windfall safeguards.[25]

Whether the instrument will ultimately prove effective depends on two unresolved issues. First, it must still create enough expected value to influence real-world R&D decisions in the antimicrobial field. Second, that value must not be generated at a cost to health systems that is out of proportion to the benefit achieved. The TDEV is therefore neither an obviously flawed measure nor an obviously successful one. It is a carefully hedged experiment in regulatory incentive design.

For that reason alone, it deserves close attention from pharmaceutical companies, generic and biosimilar manufacturers, payers, and legal practitioners. If adopted in its present form, the voucher will not merely add another exclusivity rule to the European pharmaceutical acquis. It will create a new type of tradable regulatory asset at the intersection of pharmaceutical law, innovation policy, market access, and competition. That is why the instrument is likely to become a significant focus of pharmaceutical strategy and legal analysis in the coming years.

However, in its current form, it remains to be seen whether the incentive is sufficiently attractive to induce pharmaceutical companies to shift investment in antimicrobial R&D away from less risky and more profitable fields, or to attract additional talent to this area. Rather, it appears more likely to function as a strong pull incentive for undertakings already engaged in antimicrobial research. ■

23 *Id.* Recitals 77, 77a.

24 NHS England, *Antimicrobial Products Subscription Model: Guidance on Commercial Arrangements* (May 8, 2024), https://www.england.nhs.uk/long-read/antimicrobial-products-subscription-model-guidance-on-commercial-arrangements/; NHS England, *Antimicrobial Products Subscription Model: Thematic Analysis Report* (May 8, 2024), https://www.england.nhs.uk/long-read/antimicrobial-products-subscription-model-thematic-analysis-report/.

25 European Parliament, *Deal on Comprehensive Reform of EU Pharmaceutical Legislation, supra* note 5; Council document ST 6366/26, Arts. 40–42 and Recitals 79–84.

It's Time to Rethink Our Enterprise Software Licensing Practices

By

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ABSTRACT

Our objective in this paper is to discuss how three advancements in the enterprise software industry: 1) Software as a Service; 2) End of Availability; and 3) Software in Suites have impacted enterprise software licensing practices. Taken together, these three advancements reduce customer control over version lifecycle and purchasing scope while also shifting more standardization and timing decisions to the software vendor. These advances, particularly in combination, have impacted the acquisition process for enterprise software by increasing short-term costs for companies while also providing many benefits to enterprise software customers. We conclude that those of us involved with licensing software at enterprises need to rethink our licensing practices.

Introduction

Advances in technology and business practices are requiring those of us involved with licensing enterprise software to adjust to a new reality. Three related advances are worth noting. First, licensing has shifted toward subscription-based access, most commonly delivered as Software-as-a-Service or SaaS, instead of perpetual licenses that customers deploy and operate in their own environments (on premises or customer-managed hosting, including public-cloud infrastructure).[1] Second, vendors are increasingly implementing and enforcing End of Availability (EOA) and End of Support policies that limit how long perpetually-licensed versions remain available for purchase, maintenance, and updates. Third, vendors are packaging software programs as integrated suites sold by subscription, which reduces the ability for enterprises to license only one discrete program to meet narrow needs.

Taken together, these advancements reduce customer control over version lifecycle and purchasing scope while shifting more standardization and timing decisions to the software vendor. More specifically, these advancements, particularly in combination, have impacted the acquisition process for enterprise software by increasing short-term costs for enterprise customers while providing benefits in reduced business and security risks, more robust functionality, and increased productivity.

Our objective in this paper is to review these major advancements and to discuss how these advancements may impact your work as a licensing professional. We begin with the shift to SaaS because it has enabled the other two advancements. We then address EOA as the lifecycle consequence of version sprawl and finally we then discuss suites as the packaging and commercial structure that is increasingly part of the software licensing.

The SaaS Advancement

During the past several years software companies and their enterprise company customers have shifted to SaaS as the primary way to access and use software.[2] Although companies and government agencies have used computers for over seventy years, the development and use of SaaS for enterprises began about twenty-five years ago with NetSuite, an accounting and financial management SaaS targeting SMB (small and midsized businesses) and Salesforce's CRM (customer relationship management). With the dotcom crash in the year 2000 along with other factors it took several years for SaaS to become readily acceptable as an alternative to on premises deployment of applications by most enterprises and governments.

1 Henceforth we will refer to these "own operations" as "on premises."

2 We discuss how SaaS has disrupted the enterprise software industry in a recent article. See, Kursh, Steven and Pratik Patel, "Assessing the Impact of Software As A Service (SaaS) Innovations on Disrupting the Enterprise Software Industry," *The Business Education Innovation Journal*, Vol. 16. 2, December 2024.

SaaS is now the primary method for selling rights to use software.[3] Many enterprise software companies no longer license software for on premise provisioning and instead sell SaaS subscriptions.[4] Most of these enterprise software companies still provide support and maintenance for existing on premise licensees due to some licensees preferring not to make the switch to SaaS due to financial, inertia, security, and regulatory factors, among other factors.

IDC, a leading IT-research company, forecasts that spending by companies for SaaS and ASP[5] accounted for over 70 percent of the enterprise software market as of 2024. Another leading research organization, Gartner, found similar growth numbers for SaaS.[6]

Clearly, there are a wide and deep range of categories of SaaS products available to companies and government agencies, particularly compared to licenses for software provisioned on premises as a product option. Based on our experience this wide and deep range of categories far exceeds what was ever available with on premises deployment of licensed enterprise software.

Obviously, no one single factor explains the advancement of SaaS. Some obvious factors are technology, economics, and business design (*i.e.*, models).

A key difference between SaaS and traditional on premises deployment is that SaaS applications are designed to be hosted in the cloud by the software vendors versus by the enterprise software customers in their own-controlled facilities. A SaaS vendor hosts its application(s) with cloud service providers like Microsoft's Azure, Amazon's AWS, IBM Cloud, Google Cloud, Rackspace, or other hosting services. Alternatively, a SaaS vendor can host its application(s) on its own cloud, which we have seen particularly prominent in vertical markets where security, regulatory, and unique business factors may be relevant. Some cloud services vendors, for example, IBM, offer a hybrid cloud option (a combination of a public cloud and private cloud) in response to these needs from enterprises and governments.

The technology benefits of SaaS are that a user at an enterprise, assuming s/he has rights to use the SaaS application, may access the application from a web browser. This includes not just desktop computers, but also mobile devices, *i.e.*, phones and tablets. In effect, user interfaces (UI) and, more broadly, user experiences (UX) with SaaS facilitates training time of personnel. Almost all of us are comfortable with using SaaS applications like Gmail, Quicken, and apps on our mobile devices.

These personal experiences enable most of us to learn and adopt SaaS applications relatively easily and certainly faster than what many people did in the past with most perpetually-licensed software that was sold for the customer to provision on their servers. From the perspective of IT managers and C-level personnel, this ease of use and shorter learning curve often lead to faster implementations, which can make SaaS more attractive even when SaaS applications are less customizable or flexible than perpetual licensed software.

Focusing on economics, SaaS has cost advantages since an enterprise does not need to invest in large upfront costs for hardware, networking, and other critical infrastructure, including even physical facilities, thus reducing the TCO (total cost of ownership). In our experience enterprises also mitigate many of the implementation failure risks and costs associated with on premises deployment.

Another cost benefit with SaaS is that enterprises using the software do not need to have as many technical and support staff as they would when compared with a perpetual-licensed software. Consider alone the cost savings that favor SaaS such as no hassles with system implementation, no data backup, not having to install and test upgrades and patches, and, critically important for most enterprises, security and data protection.

In fact, one research firm found that TCO with SaaS could be reduced by over 70 percent as compared with on premise deployments. Even if this finding of an over-70-percent reduction is off by half, a cut in TCO by 35 percent is significant, particularly in today's environment where IT management are continually asked to do more with less.

Additionally, from the perspective of an enterprise facing peak demand for its software, say, for example, a retailer that needs to process transactions at peak periods such as the holiday shopping season, SaaS provides elasticity because they are typically built on top of IaaS.[7] In other words, the software capability can quickly scale with increases in demand during peak periods and with growth in subscribers overall.

This elasticity enables scale and significantly decreases the investment costs for subscribers since there is no need to acquire expensive hardware with the capability of handling future growth demand

3 Datanami, "Gartner Forecasts Worldwide Public Cloud End-User Spending to Surpass $675B in 2024." https://www.datanami.com/this-just-in/gartner-forecasts-worldwide-public-cloud-end-user-spending-to-surpass-675b-in-2024/. August 5, 2024.

4 Lin, B, "SAP share surge shows companies' cloud strategies are alive and well in AI boom." *The Wall Street Journal.* July 26, 2024.

5 ASP definition by Gartner: "An application service provider (ASP) is defined as an enterprise that delivers application functionality and associated services across a network to multiple customers using a rental or usage-based transaction-pricing model." https://www.gartner.com/en/information-technology/glossary/asp-application-service-provider? February 21, 2026.

6 Datanami, 2024.

7 IaaS definition by by Gartner: "Infrastructure as a service (IaaS) is a standardized, highly automated offering in which computing resources owned by a service provider, complemented by storage and networking capabilities, are offered to customers on demand. Resources are scalable and elastic in near real time and metered by use." https://www.gartner.com/en/information-technology/glossary/infrastructure-as-a-service-iaas. February 21, 2026.

needs. It also reduces, importantly, transaction costs. When demand peaks the software scales immediately.

In our experience the faster positive returns help SaaS applications to enable success stories and build credibility among an enterprise's users. Just as an individual can quickly set up a Gmail and Dropbox account without installing software on their own device, an enterprise can often get up and running relatively quickly with a SaaS application. This agility enables an overall positive experience that builds momentum and enhances the software company's credibility.

Another economic benefit enabled by the advancement of SaaS solutions is that the process and related costs for rolling out new features and fixing software bugs is often easier, less risky, and significantly less costly as compared with the past. In contrast to software running on premises, a SaaS company monitors the real-time use of its software, detects and resolves issues, and makes incremental changes that can be easily assimilated by subscribers. In turn, the SaaS solution becomes more "locked in" with many subscribers. More importantly, by controlling the continuous update lifecycle process, SaaS companies can innovate continually, creating a faster and more efficient innovation cycle.

Another benefit, referenced above, provided by SaaS is better security. Although each of us should have security software installed and operational on our computers and other devices, security-related risks are lower with software that runs in the cloud at vendors like AWS Microsoft Azure, Google Cloud and others as compared with an organization obtaining, installing, and updating security software on its own hardware.

This is largely because cloud vendors can apply security patches and configuration updates centrally and quickly, instead of relying on each organization to maintain consistently every server and endpoint on its own. The cloud vendors also have dedicated security teams, continuous monitoring, and built-in redundancy at a scale that most organizations cannot reasonably replicate internally. This reduces the likelihood that a known vulnerability stays unpatched long enough to be exploited.

The reality is that no software application can be entirely free of security risks, but having a SaaS application is less risky than if the software runs on premises.[8] It is also more economical for SaaS application providers to utilize security solutions offered by their IaaS (Infrastructure as a Service) provider (*i.e.*, the cloud vendor) instead of trying to do it themselves, which allows them to concentrate on building and running software applications.

In sum, SaaS came about with the internet and, through a series of technology and business innovations (discussed below), has effectively replaced traditional, customer-deployed software for most users, whether enterprises, government or individuals. The technology innovations have enabled software companies to provide a superior product at a lower cost, with lower risk, better features and better performance. SaaS has effectively "set the table" for more advancements and, accordingly, is changing practices in software licensing.

The EOA Advancement

In our experience the primary driver of EOA (End of Availability) is the accompanying problems with software that has aged, despite on the surface being operational at many companies.

While some of us may think that EOA reflects primarily greed from enterprise software companies, the fact is that many enterprise software applications were developed and licensed when IT infrastructures and software development tools were quite different than what exists today. These older software applications have become increasingly difficult to maintain, support and update due to factors such as technical debt, obsolete code, reduced functionality and other constraints.[9] In addition, organizations often struggle to recruit and retain the talent needed to maintain antiquated code.

Some history worth reviewing is that for much of the software industry's history, enterprise applications were sold as stand-alone products rather than as integrated suites. Hence, most companies had many software applications largely running independently of each other. Even if two pieces of software were from the same vendor, they could have different architectures, user interfaces, compatibility, *etc*. because the software was developed over different time periods and different teams.

Today many companies operate on different combinations and versions of a vendor's software, often customized or configured uniquely for each company's business needs and environments. Over time, version growth occurred, *i.e.*, moving from version 1.0 to 2.0, to 2.01, to 2.11 and beyond, requiring support and maintenance across multiple generations.

Many enterprises still choose not to update, even when new versions are available, due to various operational and organizational constraints. In our experience companies often skip modernization or

8 Kursh, Steven and Pratik Patel, "Revisiting Goldilocks: Reasonable Measures to Protect Trade Secrets in an Era of Enterprise Collaboration and Cybersecurity Risk Management," *les Nouvelles,* Volume LX, No. 3, September 2025.

9 Gutteridge, Lance, "Enterprise Software Is the Hardest Software to Write," *Codeburst*, August 24, 2018, https://codeburst.io/enterprise-software-is-the-hardest-software-to-write-c76d59725f3.

delay migration to a new version unless a cost-saving case is obvious or when there is a major operational, security, or business risk. Such decisions though may ultimately undermine organizational operations, security and strategic agility.[10]

Consider, moreover, the perspective of enterprise software vendors. By licensees postponing installation of upgrades, vendors eventually face an exponentially growing number of combinations to support. Compatibility testing, ensuring that software works properly across different hardware, operating systems, browsers, databases and mobile devices becomes a massive challenge. Even minor updates can trigger failures across enterprise environments due to variations in operating systems, middleware, or integrated third-party tools.

In effect, "the math doesn't work." For example, assume that an enterprise software vendor offers ten applications, each with five versions in the field. If so, the number of combinations becomes unmanageable. Mathematically, the total number of permutations is: 5^10. This equals 9,765,625 (about 10 million) possible combinations.

In other words, there are nearly 10 million possible version interactions that a software company's staff must account for if its enterprise licensees are free to use any mix of the software applications and versions. Maintaining, supporting and updating every variant of every version is extremely difficult in practice, requiring compatibility testing that grows exponentially with each new release and unique combination. Of course, a software vendor may have fewer than ten applications and fewer than five versions for each application, but the overall number of combinations can still be insurmountable from the perspective of ongoing support and maintenance for the enterprise software vendor.

Consider, too, that a recent survey from Saritasa found that 60 percent of organizations continue to run legacy systems, citing security risks and integration challenges as primary barriers to modernization.[11] These organizations simply have too many day-to-day fires to put out, as well as ongoing constraints on spending for IT. They also obviously face multiple demands for resources, not just IT-related needs. The "if something works, don't fix it" strategy has become a hallmark given the increasing demands on senior-IT personnel and departments. It's not surprising to us to learn that an enterprise client is using a software application that was originally licensed decades ago. Some clients, moreover, have stopped maintenance and updates. Several clients, while continuing to pay for maintenance and updates with a "just in case mindset," rarely install most updates from their software vendors except in extreme circumstances.

This approach has produced fragmented software environments that restrict vendors' ability to deliver consistent functionality, introduce new features quickly and address security vulnerabilities across all licensees. It also makes it far more difficult for enterprise software companies to leverage advances in modern hardware and operating systems. The result is an environment where both innovation and protection lag behind technology's pace, a reality that lays the groundwork for today's EOA with so many software applications.

Over time, enterprise software inevitably accumulates maintenance tasks, outdated code and architectural compromises that compound with each release. Technical debt grows as tools, software development kits (SDKs) and programming languages evolve. What was once stable, well-understood software becomes increasingly brittle, dependent on obsolete libraries and unsupported frameworks. The longer a software application persists without major modernization, the more fragile it becomes beneath the surface.

Additionally, outdated modules and languages introduce vulnerabilities that are difficult and, sometimes, practically impossible to patch without rewriting substantial portions of code. Refactoring, the process of restructuring software while preserving its functionality, becomes an engineering challenge when dependencies are deeply embedded and documentation no longer matches the underlying software and system.

In many cases, simply keeping old software and systems operational demands specialized knowledge that is no longer commonly known among developers working at companies that originally licensed the software. Indeed, in our work we often have been engaged by multinational and national enterprises that run applications written in COBOL, a language created in the late 1950s, where even routine security updates are extremely difficult to write because so few developers remain who are fluent in the software code.

Unlike smartphones, EVs and cloud-based applications that can update seamlessly, enterprise software operates within a complex and fragile ecosystem often across many organizations. Each update requires careful coordination across databases, integrations and infrastructure components that may differ from one customer to the next. Updates in enterprise environments can be unpredictable and when something goes wrong, the results can be catastrophic.

10 Mee, Paul and Chris DeBrusk, "Why End-of-Life IT Is Ruining Innovation and How to Fix It," Oliver Wyman, February 2024, https://www.oliverwyman.com/our-expertise/insights/2024/feb/eol-technology-how-to-avoid-risks-drive-digital-innovation.html.

11 Froehlich, Sabrina, "Legacy Software Modernization in 2025: Survey of 500+ U.S. IT Pros," Saritasa, August 25, 2025, https://www.saritasa.com/insights/legacy-software-modernization-in-2025-survey-of-500-u-s-it-pros.

Consider, by way of example, that in 2023 United Airlines had a system outage due to an update that forced it to halt departures nationwide on a busy travel day.[12] There are many other examples that are well known.

The reality is that once software reaches its end of life,[13] it stops receiving the updates, patches and bug fixes that defend against emerging threats. Each unpatched component effectively becomes an unlocked door in an organization's security perimeter. Fundamentally, we know that in enterprise computing, the greater the interconnectivity, the higher the consequences of failure.

Focusing on maintaining backward compatibility often forces software vendors to make difficult choices, including delaying or even skipping critical security hardening to ensure that their software, with the multiple combinations in the field, continues to function for licensees. Nearly every concession for backward compatibility reasons leaves licensees' software and, accordingly, the licensees' systems exposed to threats that legacy systems were never designed to withstand. Over time, this trade-off not only increases risks for licensees, it also erodes an enterprise software vendor's reputation. Any software update that "breaks" a legacy application can result in potential liability for the software vendor, even when the root cause is structural obsolescence or other factors driven by licensee decisions.

An August 2025 Microsoft update is an example of this situation. (Disclosure: one of the authors has previously worked as a consultant for Microsoft.) The update was intended to improve performance and security, but it broke backward compatibility with older enterprise applications. This event confirms the reality that modernization and preservation of legacy models with outdated applications are fundamentally at odds. Indeed, each new generation of software has a different architecture and fragmented legacy software will never be able to deliver equivalent functionality. This tension between progress and preservation lies at the heart of why EOA and standardized lifecycles have become engineering necessities rather than marketing choices.

Some people may think that EOA is more a marketing/sales issue driven by a desire by software vendors to increase revenue. While it is true that most software vendors are focused on growing revenue and profits, as, indeed, all companies on behalf of their stakeholders are, the reality is that EOA is grounded in well-established engineering principles and standards.[14] Ending support for legacy versions is not an act of abandonment driven by a desire to squeeze licensees for more revenue, but an engineering practice required to maintain security and stability while increasing functionality.

The Advancement to Suites

The third advancement that necessitates our rethinking about software licensing is enterprise software companies licensing software in suites. This change is not merely for commercial purposes, but often driven by technical necessity, for many of the same reasons we noted above when discussing EOA. SaaS architecture gives vendors total control over the environment, so updates can be tested once and rolled out in a far more predictable manner.

SaaS and other types of subscription models enable enterprise software companies to maintain uniform patching cycles, enforce a consistent security posture and deliver feature parity for all their users. By operating on a single, continuously updated version, enterprise software vendors reduce the complexity of supporting dozens of outdated releases and mitigate further cybersecurity risks inherent in fragmented product ecosystems by bundling them in integrated suites.

For vendors offering multiple complementary applications (*e.g.*, Microsoft Word, Excel and PowerPoint), the evolution toward integrated suites (*e.g.*, Microsoft Office 365) was a natural progression. Selling software as individual products creates overhead with compatibility testing, update management and cross-application performance. In contrast, suites come with centralized update management so security updates are coordinated across the full product line.

Adobe's 2013 transition to Creative Cloud marked a defining moment in this shift, demonstrating how ending perpetual licenses can standardize patching and accelerate delivery of new capabilities across all users.[15] (Disclosure: one of the authors has previously worked as a consultant for Adobe.) Similarly, VMware's 2024 EOA announcement for perpetual licenses underscored the industry's transition to cloud-based delivery with a unified subscription lifecycle.[16] (Disclosure: one of the authors has previously worked as a consultant for

12 Associated Press, "United Airlines Resumes Flights After Equipment Outage," *AP News*, September 5, 2023, https://apnews.com/article/united-airlines-flights-stopped-faa-ce9623ae0fd1e657830dc6acb6cccbc4.

13 The industry terms "end of life" and "end of availability" are generally equated.

14 In fact, EOA and suites are consistent with international standards such as ISO/IEC/IEEE 12207:2017 and 24728-1:2024. (International Standard ISO/IEC/IEEE 12207, "Systems and Software engineering – Software life cycle processes," Reference number ISO/IEC/IEEE 12207:2017). Also, International Standard ISO/IEC/IEEE 24748-1, "Systems and software engineering—Life cycle management—Part 1: Guidelines for life cycle management," Reference number ISO/IEC/IEEE 24748-1:2024 and International Standard ISO/IEC/IEEE 24748-2, "Systems and software engineering—Life cycle management - Part 2: Guidelines for the application of ISO/IEC/IEEE 15288 (system life cycle processes)," Reference number ISO/IEC/IEEE 24748-2:2024.

15 https://www.adobe.com/creativecloud/plans.html.

16 https://blogs.vmware.com/cloud-foundation/2024/01/22/vmware-end-of-availability-of-perpetual-licensing-and-saas-services/.

VMWare's prior owner EMC and as a consultant for VMWare's present owner Broadcom.) Many other companies including Archicad, Cisco and Microsoft illustrate this transformation by retiring perpetual licenses in favor of subscription models that ensure every customer operates within a consistent, modern and secure software environment.[17]

The benefits of this transition are tangible for end users and IT support teams at companies. A 2024 Nucleus Research report highlights that integration and consulting costs for standalone (best-of-breed) applications often exceeds the cost of the software itself, whereas integrated suites help lower technical complexity and support expenses, particularly for enterprises.[18]

Furthermore, subscriptions embed updates directly into the software lifecycle, removing the overhead of version management and reduce maintenance costs for subscribers. Subscription updates include security patches, feature enhancements and performance improvements that arrive seamlessly and create minimal disruption.

This approach has altered the relationship between enterprise software vendors and their enterprise customers from transactional to a continuous relationship and, accordingly, aligns interests around stability, innovation and long-term value. Software delivered via a subscription like SaaS uses modern development frameworks that enable vendors to build enhancements faster for their licensees because of the speed in which versions need to be released.[19] These changes have transformed software from a static purchase into an evolving service that strengthens the relationship between vendors and users where users expect stability and continuous innovation and vendors grow revenue through ongoing value delivery.

Going forward, we need to recognize that enterprise software vendors must embrace lifecycle discipline, unified architectures and continuous software delivery as the foundation of responsible engineering and best practices. The lifecycle approach recognizes that every product has a natural endpoint, *i.e.*, EOA and that expecting indefinite support is not feasible. Subscription-based models with unified architectures reduce version sprawl, simplify integration and create the cadence needed to deliver consistent updates that quickly push out new functionality and security fixes. Together, these practices form a viable roadmap for sustainable innovation that helps to enable value creation at subscribers.

The industry's shift towards cloud-based delivery with unified subscriptions in a suite is not merely modernization for convenience; it represents a scalable and disciplined path forward for enterprises. In a world of constant change and accelerating threats, the only sustainable strategy is rigorous lifecycle management. Software companies that treat EOA as an engineering obligation rather than as a business option, as well as offering suites if they sell multiple applications have defined and will continue to define enterprise software and will set the standards for customer expectations. Similarly, enterprise licensees need to recognize the reasons why their software vendors are moving from the legacy model of perpetual licenses, customer provisioned and stand-alone software applications. Accordingly, those of us involved with licensing software at our enterprises need to rethink our licensing practices. ■

17 https://www.mynewsdesk.com/graphisoft/pressreleases/graphisoft-announces-next-phase-of-its-shift-to-future-proof-subscription-model-3345644, https://www.cisco.com/c/en/us/products/collateral/unified-communications/unified-communications-licensing/eos-eol-notice-c51-744286.html and https://clientsfirst-us.com/blog/end-of-microsofts-perpetual-licensing-era.

18 Campbell, Ian. "The Shift from Best-of-Breed to Integrated Suites: Streamlining Costs and Enhancing AI Capabilities," *Nucleus Research*, March 26, 2024, https://nucleusresearch.com/the-shift-from-best-of-breed-to-integrated-suites-streamlining-costs-and-enhancing-ai-capabilities.

19 "Software Product End of Life and Why It Is Good for Your Business," *ECI Software Solutions*, August 11, 2020, https://www.ecisolutions.com/blog/software-product-end-of-life-and-why-it-is-good-for-your-business/.

Balancing Innovation and Fair Sharing:

Practical Options for IP Licensing and Benefit Sharing

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ABSTRACT

IP owners can be faced with different demands on how to most effectively deal with their important assets alongside commitments to fair and equitable benefit-sharing in line with international frameworks on biodiversity and also with sustainability and climate action. This piece discusses work leading to model licences and policy wording developed in an EU-funded interdisciplinary project. The piece shares the documents which are openly available, and invites future use of the materials.

Introduction

Combining the generation of value from IP assets with an IP owner's sustainability, corporate governance and environmental social and governance (ESG) approaches, and including obligations which might apply to innovation from earlier in the research and development change from use of genetic resources, can be complex. This balancing can involve expertise often found in different parts of a law firm or organization; yet if the perspectives are dealt with entirely separately, there is a risk that points will not be identified fully, and this could have adverse business and reputation consequences.

BlueRemediomics,[1] an international interdisciplinary research project funded by the European Union Horizon Europe Programme and UK Research and Innovation, provides some paths through these spaces. The project developed wording for use in policies and webpages; pledges, open licences, and suggested clauses for use in a negotiated licence; and guidance notes.[2]

These materials were developed as part of BlueRemediomics' aim to ensure equitable access to and sharing of benefits derived from new products (such as new medicines or cosmeceuticals) developed from natural products and the marine microbiome.[3] The proposals made could, however, be of use to businesses working in any sector, particularly those which have a link – direct or indirect – with natural resources.

This piece identifies some key aspects of the new BlueRemediomics materials and some important factors for consideration in relation to the different suggested paths. Readers are encouraged to consider the resources in full and, as appropriate, make use of them (with an acknowledgement) and further develop them.[4]

Decisions To Be Made

The path to be taken to IP rights will always depend on the priorities and decisions of an IP owner from time to time, and on the full set of relevant facts. An established approach is to gain as much commercial reward as possible from the IP owner's investment

1 See BlueRemediomics website https://blueremediomics.eu/ Horizon Europe Grant Agreement No. 101082304 and UK Government's Horizon Europe funding guarantee IFS 10057167 (University of Aberdeen).

2 See Policy Brief "Balancing Innovation and Fair Sharing: Practical Options for IP Licensing and Benefit Sharing October 2025 Guidance for IP Rights Holders on Access and Benefit Sharing (ABS) and Sustainability" https://blueremediomics.eu/wp-content/uploads/2025/10/IP-Licensing-Policy-Brief.pdf and Policy Brief "Balancing Innovation and Fair Sharing: Practical Options for IP Licensing and Benefit Sharing October 2025 Guidance for IP Rights Holders on Access and Benefit Sharing (ABS) and Sustainability. Additional Content"https://blueremediomics.eu/policy-brief-balancing-innovation-and-fair-sharing-practical-options-for-ip-licensing-and-benefit-sharing-additional-content/.

3 BlueRemedionics explores harnessing the Marine Microbiome for Novel Sustainable Biogenics and Ecosystem Service, through developing industrial processes that reduce waste, increase the reuse of natural products and by-products, and improve aquaculture processes.

4 All comments are most welcome to abbe.brown@abdn.ac.uk

in developing or acquiring an IP right, and in many cases IP owners will still choose to take this path. Alternatively, in some cases IP owners may choose to allow broader use of an IP right for the more collective good – supporting global sustainability, climate change[5] or health goals. Such an approach may reduce short-term revenue for the IP owner but could strengthen reputation, collaboration and long-term impact. It is suggested that decisions about licensing approaches should be reviewed regularly as part of a wider strategy and business planning.

A more open approach to IP could sit alongside the possibility of an IP owner's ESG policy, including commitments to moving beyond compliance, engaging proactively with the power and influence which an organisation can hold over its customers, suppliers, licensees and wider society; and to looking beyond short-term profit, pursuing socially and ethically driven models of shareholder value (*e.g.*, committing to emission reduction and enhancing environmental sustainability).[6] In a similar vein, an IP owner may wish to demonstrate how it is choosing to operate in the context of obligations on states under the Convention on Biological Diversity[7] (and its Cali Fund[8] and Nagoya Protocol[9]), the Global Biodiversity Framework,[10] the UN Marine Biodiversity Beyond National Jurisdiction Agreement,[11] The Sustainable Development Goals,[12] the Paris Agreement[13] and the WHO Pandemic Treaty. [14]

Delivery: Balancing IP and Benefit Sharing

A key early consideration involves looking beyond IP. A resource - such as in essence plankton or bark - might have been shared and provided to scientists by a community, for example under the Nagoya Protocol of the Convention on Biological Diversity, with restrictions and requirements on use. The terms might include returning benefit to the community, for example through a percentage of sales, joint ownership of IP, or building a school in a community.

In such circumstances, a very open sharing of an IP right, no matter how consistent this might be with an ESG policy, is unwise. It should also be borne in mind that these benefit sharing obligations might extend as far as a third-generation product from a genetic resource or digital sequence information on the genetic resource (broadly, resources in digital form, from the original resource or are the results of manipulation of digital information obtained from public databases).

Delivery: Open Sharing

If open sharing appeals to an IP owner and there are no relevant benefit sharing restrictions, IP owners could choose to share under an "open licence." By this, the IP owner grants a licence to anyone who wishes to take the licence up on particular preset terms, possibly also with a linked website with a list of rights and an "I agree" button. One of the best-known examples is Creative Commons.[15] This initiative has evolved into a complex set of licences, from a "public domain" explicit waiver of rights to a licence which permits specific acts. Open licences are usually for no fee.

BlueRemediomics has developed the Sustainability and Sharing IP Public Licence[16] with a "Label" and also "Legal Code." This licence can be adapted to suit different contexts and levels of openness, using standard terms such as Non-Commercial (NC), No Derivatives (ND), Attribution (BY), or Share Alike (SA). It should be borne in mind that some businesses who receive material on an open basis, or future purchasers of the business, might be nervous about the technology, as they may consider that they cannot assess fully the risks which could arise.

Delivery: A Pledge

Another option is the pledge. A complete pledge is rare, given the significant costs and time which can be involved in obtaining rights. But having a patent or design and then pledging it in some circumstances can still enable a business to demonstrate its innovation and leadership in a field (for example with the non-profit making COVID Moonshot).[17] IP owners could

5 For example, linked with initiatives such as https://chancerylaneproject.org/, which includes Benjamin's "Licence Intellectual Property: Free Licence for Climate Purposes" (2021) Climate Solutions IPR Licence | The Chancery Lane Project

6 This could build on, for example, International Sustainability Standard Board; Global Reporting Initiative Biodiversity Standard GRI 101; Union for Ethical Biotrade; Bcorp; Recommendations of the Taskforce on Nature-related financial disclosures; ISO social responsibility 26000.

7 1760 UNTS 30619 (entered into force 29 December 1993).

8 Decision CBD/COP/DEC/16/2* and "Multilateral Mechanism and the Cali Fund - Cali Fund Guide 2025," https://www.cbd.int/califund.

9 Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization to the Convention on Biological Diversity, opened for signature 22 February 2011, UNEP/CBD/COP/DEC/X/1 (entered into force 12 October 2014).

10 Decision CBD/COP/DEC/15/4 and Kunming-Montreal Global Biodiversity Framework, https://www.cbd.int/gbf.

11 Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction, A/CONF.232/20234*.

12 UN Sustainable Development Goals.

13 UNFCCC 2015 Paris Agreement 3156 UNTS 79.

14 WHO Pandemic Agreement 20 May 2025 WHA78.1. Regarding scope for intersection across regimes, see also Scarlett Sett *et al.*, "Harmonize rules for digital sequence information benefit-sharing across UN frameworks" *Nature Communications* 15, 8745 (2024); Bita Amani, Caroline B NcCube and Matthew Rimmer, (eds), *The Elgar Companion to Intellectual Property and the Sustainable Development* Goals (Edward Elgar, 2024), especially chapters 1, 10, and 15; and DOSI Policy Brief "Towards coherence and avoiding undermining: policy recommendations on implementation of the BBNJ Agreement regarding marine genetic resources" (2025) https://blueremediomics.eu/wp-content/uploads/2025/12/BBNJ-Policy-Recommendations.pdf.

15 Creative Commons CC By 4.0 and see also Apache Licence, BioS/CAMBIA Open Licence.

16 See https://blueremediomics.eu/wp-content/uploads/2025/10/5-The-Sustainability-and-Sharing-IP-Public-Licence-SSIPPL.pdf.

17 See "COVID Moonshot" https://dndi.org/research-development/portfolio/covid-moonshot/.

publicly commit to making IP available for responsible use. These pledges – sometimes called "non-assertion commitments" – can support equitable access to technologies in times of emergency, in low income or resource limited settings, or for humanitarian and climate-related purposes.[18]

An IP owner could also choose to prioritise recognition and reward through a period of enforcement or licensing; the IP owner could then choose to prioritise creating an industry sector in which members choose to share and learn from each other. This could reduce freedom to operate difficulties and enhance sector sustainability and manufacturing capacity. [19]

For pledges, BlueRemediomics provides wording and guidance notes to help IP owners tailor the scope, duration, and conditions of pledges, notably in line with the IP owner's sustainability and ESG goals.[20] It is wise to confine any limits in a pledge to points which can clearly be established (such as if the other party sues the rights holder) and, from a manageability point of view, to not involve any monitoring or reporting.

Delivery: Negotiated Approaches

Often, a more targeted approach will be more suitable to a particular arrangement, both in terms of substantive clauses and financial terms. BlueRemediomics provides model licensing clauses with accompanying guidance notes.[21] The clauses provide a flexible basis for negotiation, allowing adaptation to sectors, technologies, and partnership contexts such as regarding humanitarian use, purposes and technologies, sublicensing, and reporting, which can be helpful for ESG and benefit sharing.

Regarding payment, an IP owner could choose to seek adequate and fair reward for the innovation and creativity that has been obtained by the IP owner, or for a "reasonable fee." This could be linked with fair, reasonable and non-discriminatory licensing, which is part of many formal industry standards and competition law. It is again important to check what other obligations have been imposed – for example, if there is an existing best endeavours provision in relation to maximising sales, then these approaches would not be suitable.

Conclusions

BlueRemediomics has aimed to provide a holistic and workable approach to laws relating to benefit sharing, IP and sustainable development goals. Readers are warmly invited to visit the website and look at the resources in full. It is hoped that these resources will be of use to all in working with clients and colleagues, and that they provide paths for reflections on balance reward and sustainable sharing, and the possible emergence of new communities of practice. Comments on use would be gratefully received. ■

18 See Moderna Updated Patent Pledge(2022).

19 Tesla "Patent Pledge" https://www.tesla.com/en_gb/legal/additional-resources; Toyota "Toyota Promotes Global Vehicle Electrification by Providing Nearly 24,000 Licenses Royalty-Free" (2019) https://global.toyota/en/newsroom/corporate/27512455.html; Gabriela Lenarczyk and Mateo Aboy, "OpenAI's patent pledge: a post-Moderna analysis" *Journal of Intellectual Property Law & Practice* Volume 20, Issue 6, (June 2025), Pages 392– 397; Jorge L. Contreras and Meredith Jacob, (eds), *Patent Pledges: Global Perspectives on Patent Law's Private Ordering Frontier* (Edward Elgar, 2017)

20 See https://blueremediomics.eu/wp-content/uploads/2025/10/4-Model-text-and-Guidance-for-responsible-IP-non-assertion-pledges.pdf.

21 See https://blueremediomics.eu/wp-content/uploads/2025/10/3-Implementing-responsible-licensing-Model-clauses-and-guidance.pdf.

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Legal Risk Management in China

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These are interesting times in international trade. Tensions are high and many wonder which country to trust. Although there is a need to diversify trading links, many think that the PRC is too risky.

But if you wish to diversify your markets, Asia Pacific, and particularly China, is where the growth is and where the people are. Is it worth the risk? After more than twenty years of assisting foreign businesses in China to manage their risks and going to court, primarily with intellectual property, we know that the legal risks can largely be costed and managed.

Businesses must always be aware of their commercial risks. To manage them they often use contracts. So as a matter of legal risk, can the contracts be enforced in China? After litigating in the PRC since 2007, we know that the answer is generally yes, if properly prepared.

The Legal System in China

The PRC has undergone some tumultuous years, but all that time it has been working towards its goal of building a reliable legal system. For historical reasons going back to the Qing Dynasty, China has a civil law legal system modeled after that of Germany. After years of drafting the **中华人民共和国民法典** or PRC Civil Code came into effect in 2021.

The Supreme People's Court manages an online database of millions of publicly available cases. It also publishes selected "guiding cases" and now there is a new collection of edited cases to provide guidance to lawyers and business people. Judges also have their own database that they use when deciding cases and writing judgments. Consistency is considered a priority in the PRC courts.

But things are different in China from other jurisdictions. Constitutionally the PRC is a "unitary" state. That means national laws take precedence, despite what somebody who claims to be a friend of the provincial governor may tell you. In 1999 the Constitution was amended to add the phrase "**依法治国**." Detractors will tell you that it means "rule by law," not "rule of law." In our experience it means that Beijing wants national laws to set the market order.

Law reform is ongoing and vigorous. Deng Xiaoping set the tone in 1978 when he said "**改革开放**" – meaning "reform and opening up." That same phrase was the headline in People's Daily when Xi Jinping became President.

Law reform requires some trial-and-error experiments with the new rules, something that foreigners need to understand. In China there is another pertinent saying, "**摸着石头过河**", "to cross the river by feeling for the stones."

The path to reform is not always direct. You need to feel your way past obstacles. Fortunately, the PRC emphasizes public consultation on draft laws and regulations. Foreigners are encouraged to participate. It has even been said in jest that laws cannot be adopted until the foreigners have had a chance to comment.

In civil law systems, the courts work very differently from the courts in common law systems as found in English speaking countries.

Firstly, there is no discovery by production of documents or by depositions. Each party is responsible for producing their own evidence. A plaintiff should collect and evaluate its evidence before filing the complaint. This is the reverse of what is often done in common law jurisdictions where there is discovery. It also changes how cease and desist letters are used.

Secondly, the judges rely much more on documentary evidence than on oral testimony. Oral testimony in a commercial matter is relatively uncommon. When your company sues in China, the CEO does not have to travel there to testify, or otherwise. In fact, evidence prepared by one of the parties, such as an affidavit, is given little weight.

In China judges have a strong preference for documents verified by independent third parties, such as notaries, or documents properly signed and sealed by both parties, preferably initialed on every page. And documents from outside China used as evidence in the proceedings must be notarized and legalized or apostilled. This takes time.

The written documents are a key part of the process, and judges read them carefully before the trial. At the hearing the oral arguments are very short, and the judges ask questions of the lawyers for both sides based on their understanding of what they have read. Such hearings can be as short as 20 minutes. This tends to reduce costs as well.

So how are winning strategies developed? Firstly, your story needs to be correctly analyzed based on the laws. For foreign businesses this often requires some cross-cultural explanations. Then the written pleadings (in Chinese, of course) should reflect the strong points of that story. And finally, there needs to be written evidence submitted in formal compliance with the requirements to support the key points.

The difference in procedures is one of the factors contributing to the considerably lower legal costs to resolve disputes in China. And court proceedings are completed more quickly. For domestic matters PRC judges must provide an explanation to the head of the court if the matter is not resolved after six months.

Due Diligence

China is not as opaque as foreigners think. When you read Chinese, and understand how the system works, there is a lot of information available. To reduce your risks when you have a potential party that you want to contract with, you should have a due diligence report prepared to identify risks. Is the corporation incorporated? Who can sign on behalf of the corporation? Who are the shareholders?

What is the Chinese name of the company? The PRC only incorporates companies with Chinese character names, even subsidiaries of foreign companies.

The most basic step is to ask for a copy of the **营业执照** or business license. This is similar to the "articles of incorporation" in other countries. Then ask your lawyers to confirm it. They can find it online. Sometimes this document will be volunteered. I have even seen them in shop windows in a mall.

This document will clearly identify the corporation, tell you who is the **法定代表人** (often translated as "legal representative") who is the only person who can sign for the corporation, and who keeps the corporate legal seal in a safe to use when signing. Corporations in China are structured on a civil law model with a "Geschäftsführer" or managing director. If this person does not sign and seal your proposed contract, you may have a problem.

This will also tell you who the shareholders are. Not the main shareholders, but every shareholder. Searches can then be done to find any other corporation that each shareholder holds shares in.

We have found that the target corporation was incorporated to avoid the bad track record of its sister corporation. We have found one individual that was a shareholder in over 600 other corporations.

Once the identity of the target corporation has been clearly established there are other searches that can be undertaken to uncover administrative filings and penalties, court cases, what the target owns in the way of intellectual property, and general reputation. And of course, if the target is a public company there are securities filings that are available.

All of these searches can provide a sense of how the target corporation is operated and can definitely reduce the risk of contracting with a rogue operator.

Contracts

Chinese judges do enforce contracts. But it helps the judges if you prepare a contract that is easier for them to enforce, one that will give you effective remedies.

As mentioned above, in the PRC there is usually only one person whose signature officially binds the corporation on a contract, namely the legal representative. This person is not the company's lawyer, but rather more likely the major shareholder.

Contracts can be made by seal alone in much of East Asia, and it is important to have the official seal placed on the contract alongside the signature of the legal representative. The seals are numbered, and the use of the correct one can be verified online.

As the judges rely heavily on documentary evidence rather than trying to determine the truth of contradictory oral testimony, it definitely helps to mark all the pages. For shorter contracts in China the pages are often spread out and the corporate seal or chop placed on the edges of the pages. For longer contracts, it is easier to ask the parties to initial each page. These steps prevent challenges to the contract as evidence in court.

PRC law does not require that a contract be in Chinese or even be bilingual. But there are some reasons why a bilingual contract is a good idea. Firstly, it fixes the translation that will be used in court. If the contract must be provided to the PRC authorities for regulatory purposes, such as buying foreign exchange to pay you, then a Chinese version will be required. Finally, not everybody in the target company is likely to be able to read English well. If you want the clerks to comply with the payment terms, it does help to have the terms written in the language that they do understand.

One of the more important choices to be made is for the parties to choose where and how to resolve disputes. The first question to ask is what is the most desired remedy, money as damages for breach, or an enforceable order to stop using, for example, a trademark? Then you ask either where does the counterparty have assets to pay damages, or where should the order apply?

If you are selling into China through a distributor, the answer to both questions will likely be "China."

If the answer is damages, the next thing to do is to estimate the approximate amount.

The PRC, like other Asian countries that used the German Civil Code as their model, has historically only recognized court decisions for countries that also recognize their court decisions. They have focused on reciprocity.

Many developed countries have been reluctant to recognize PRC court decisions. Enforcing a U.S. or Canadian court decision in the PRC is not easy. If your contract says that the parties have chosen U.S. law and U.S. courts, that may look good only until you actually try to use it.

International arbitration is an option, but any arbitral award has to be presented to a court in the target country, in this case China, to be ratified. There is the cost of the arbitration and the cost of the court proceeding in China. It has been said that unless the amount in dispute exceeds $5 million USD, international arbitration is not a good option.

Some lawyers with experience in China recommend using the PRC courts. They are faster, cheaper, and the decision will be directly enforceable in China. If you want your counterparty to stop using your trademark in China, or making your product, or pay damages, it is more likely to happen. The PRC courts take their duties seriously, and PRC citizens know it.

Risk management in China is possible and can be costed and managed in most cases. And there are ways to spot high risk situations in advance. ■

Why Licensing Lacks Its Own Metadata System:

A Practitioner–Scholar Examination of Data Fragmentation and the Need for a Unified SKU-Level Licensing Intelligence Infrastructure in the $369B Global Consumer Products Industry

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ABSTRACT

The worldwide consumer products licensing industry, which generates $369 billion in value, lacks a single metadata system to track and authenticate licensed products throughout different product segments and geographic markets. The licensing sector operates without an official system that provides standardized identifiers for IP-intensive sectors to use such as ISBN, ISRC and DOI. The lack of data collection leads to multiple problems that include data fragmentation across different territories and the loss of data to other regions and the entry of counterfeit products and problems with royalty payment records. The research investigates structural factors which create metadata gaps through a three-year study that involved fans and mystery online shoppers and distributed volunteers who performed manual SKU verification. The research analyzed more than 40,000 licensed SKUs together with hundreds of global licensees, which provided scientists with unusual opportunities to study product expansion and market reactions. The research results show that information access between licensors and licensees and retailers and digital platforms and enforcement bodies creates a widespread knowledge gap that contradicts conventional beliefs about licensing transparency and compliance. The research demonstrates that a single licensing intelligence system which uses real-time SKU information and verified licensee lists and digital territory monitoring technology would create better IP protection and precise royalty payment systems and improved customer confidence. The practitioner–scholar lens shows how real-world operations affect theoretical aspects that produce valuable insights for intellectual property management, anti-counterfeiting policy development, digital commerce governance and future global licensing system modernization.

Keywords:
Licensing metadata • SKU-level data • Intellectual property protection • Licensing industry infrastructure • Counterfeit prevention • Territorial rights • Royalty compliance • Global consumer products industry

1. Introduction

The worldwide consumer products licensing industry functions as a major commercial network that enables intellectual property (IP) monetization through its connection of entertainment studios with manufacturers and retailers and their global fan base. The most recent global study from Licensing International shows that licensed merchandise and services produced $369.6 billion in retail sales which demonstrates their substantial economic influence and widespread cultural reach. The industry of licensing operates as a large-scale IP-driven business, but lacks a standardized metadata system to track licensed products through their individual stock-keeping units (SKUs). The system lacks any form of organization, which differs from the controlled metadata systems that manage creative content and rights information such as ISBN for books, ISRC for recorded music and DOI for scholarly publications. The current systems provide clear visibility and product tracking and maintain uniformity but product information management through licensing depends on multiple proprietary systems that operate without standard procedures.

The absence of metadata infrastructure systems has created major problems because digital commerce operations continue to grow while supply chains extend across international borders. The combination of e-commerce platforms with online marketplaces and reseller networks and social media commerce has virtually eliminated physical borders and allows licensed products to move freely into

markets that were not their original destination. The market contains vast amounts of counterfeit and unlicensed products, which oftentimes look identical to authentic items both to customers and to customs officials who inspect borders. The lack of a single official source that provides SKU-level metadata information makes these problems worse because it blocks all parties from getting correct instant access to licensed product status and distribution and authenticity information.

The industry depends on yearly surveys, physical reporting, digital approval systems with variable performance, and agent-controlled knowledge distribution networks, which results in separate data segments. The internal product approval platforms that licensors operate do not share common functionality and are missing essential features, including complete identifier systems, required metadata rules and retail outlet integration capabilities. The market environment with numerous authorized and unauthorized products makes it difficult for licensees to find their products and control their distribution channels. The process of maintaining authenticity and compliance has become more challenging for retailers and marketplaces because they lack specific metadata references. People who want brands with genuine value face a growing problem because they cannot tell which products have official authorization and which ones are fake. The system shows fundamental weaknesses because its design problems exceed the abilities of its participants.

This article investigates the fundamental causes that create these institutional weaknesses while analyzing their effects on the system from the perspective of both practitioners and scholars. The research collected more than 40,000 licensed SKUs and multiple hundreds of global licensees throughout three years of exploratory study through crowdsourced data collection and field verification, mystery online shopping, volunteer network participation and manual marketplace evaluation. The method follows practical standards of the field because it operates without traditional academic data collection methods. The special dataset provides researchers with actual data to study how product variations increase and how products disappear from different markets, as well as how product information becomes incorrect, how counterfeit products spread and how authorized products move through hidden distribution channels on the internet. The research combines practical knowledge about operational problems with academic methods to study these issues through systematic analysis and conceptual growth.

The research results demonstrate that data fragmentation exists as a fundamental problem that affects the entire licensing system. The absence of SKU-level metadata creates a chain of problems, which prevents licensors from tracking product life cycles and licensees from detecting unauthorized distribution, border authorities from identifying counterfeit items and consumers from accessing reliable verification systems. The system failures result in operational inefficiencies which lead to financial losses and legal consequences and prevent organizations from developing new innovative solutions. The lack of standardized infrastructure creates a paradox for the industry because it makes licensing rights and compliance enforcement impossible despite being based on contractual agreements.

The solution to these problems requires the development of a single licensing intelligence system that should handle SKU registration and verification, licensee mapping, digital territory enforcement and anti-counterfeiting protection. The system would operate as a metadata backbone instead of functioning as a marketplace because it would serve as a foundation similar to ISBN in publishing and GS1 standards in retail supply chains. The development of this framework needs all parties involved to work together, including licensors and licensees, rights organizations, agencies, legal bodies and technology providers. The industry needs to adapt to this cultural and operational change because it has operated with proprietary workflows and decentralized relationships throughout its history. The global trend toward digital transformation and data-driven governance and compliance automation supports this development.

The following section establishes the main issue which the complete paper will thoroughly investigate. The Literature Review section establishes the research context by reviewing current studies about IP management, counterfeit markets, digital commerce fragmentation and metadata standards. The Methodology section establishes the practitioner-led crowdsourcing method and describes its advantages together with its potential drawbacks. The Findings and Discussion section demonstrates how the metadata gap creates structural problems while introducing new conceptual frameworks which enhance our comprehension of licensing systems as information networks. The Conclusion section evaluates the current state of infrastructure readiness for reform before establishing research paths for upcoming studies.

The main objective of this research paper involves showing that the worldwide licensing industry needs an organized metadata system to maintain its current economic and cultural power base. The lack of SKU-level intelligence creates a fundamental problem which impacts both transparency and compliance and consumer trust and the sustainability of licensing as a worldwide IP strategy. The research examines this problem by using practitioner–scholar analysis

which draws from scientific evidence to advance discussions about licensing system development for digital network requirements.

2. Literature Review

The global licensing industry exists at the point where intellectual property law meets consumer product manufacturing, retail distribution and digital commerce operations. The creative industry depends on standardized metadata systems to handle rights management and product distribution, but licensing operations remain disorganized because of insufficient academic research about their metadata systems and their compliance and enforcement requirements. The research investigates four main academic fields, which help explain the institutional barriers studied in this paper: (1) intellectual property metadata frameworks, (2) global counterfeiting and authenticity verification, (3) territorial rights and digital marketplace leakage, and (4) licensing industry data and governance structures. The existing research provides context about the absence of a single metadata system for licensing and demonstrates how this situation affects the field.

2.1 Intellectual Property Metadata and Standardization Frameworks

Metadata systems serve as the base system that enables the organization and tracking of creative and commercial content through indexing and output management. The study of metadata standards demonstrates how standardized identifiers, including ISBN for books, ISRC for recorded music, ISSN for serial publications and DOI for digital scholarly objects, enable worldwide content dissemination, rights administration and archival preservation (Borgman, 2015). These identifiers allow different market participants, including publishers, distributors, rights societies, libraries and digital platforms to work together while maintaining accurate discovery of content in complex market environments. The metadata literature demonstrates that standardization must occur because it enables both transparency and sustained information integrity (Park & Tosaka, 2020).

The licensing system does not have a matching framework that exists for consumer product regulation. The absence of a standardized identifier for licensed SKUs prevents licensors and licensees from using a common system, which forces them to depend on company-specific portals, manual spreadsheets, approval systems and internal coding systems that do not work between different organizations or retail outlets. Research indicates that missing metadata information creates operational problems that block copyright protection activities (Greenberg, 2009), although this specific issue has not received sufficient study regarding licensing practices. The lack of SKU-level standardization creates informational asymmetry because market participants maintain different levels of understanding about available inventory, authentic products, and their distribution networks (Akerlof, 1970). The increasing number of products available through global e-commerce platforms creates an unbalanced situation because these products lack standardized metadata which would help establish their identity and maintain their territorial boundaries.

2.2 Counterfeiting, Authenticity Challenges, and Enforcement Barriers

The World Intellectual Property Organization (WIPO) and the OECD have documented the increasing global problem of counterfeiting through their research. The OECD and EUIPO published their "Trade in Counterfeit and Pirated Goods" report in 2021, which shows that counterfeit items make up more than 3.3 percent of worldwide commercial activities. Consumer products such as toys, clothing and entertainment items face the highest rate of counterfeiting. Research shows that counterfeit products damage brand worth while creating market irregularities, and also present dangers to consumer safety (Chaudhry & Zimmerman, 2013). The absence of instant product authentication systems at customs borders creates ongoing difficulties for enforcement operations because the officials struggle to identify authentic products from high-quality counterfeit items.

Research indicates that metadata-based authenticity systems that use blockchain serialization (Kshetri, 2021) and RFID tagging need official product databases to function properly for enforcement purposes. The absence of centralized SKU repositories prevents customs authorities from obtaining necessary reference points that they need to verify licensed products (Turgeman, 2020). Research studies demonstrate that counterfeiting operations succeed in areas with insufficient information while law enforcement agencies must respond after crimes occur because they lack access to unified data (Wilcox *et al.*, 2016). The licensing sector operates without an official metadata framework, which creates an environment similar to the one described in the study. The study supports this assessment through its analysis of practitioner reports and industry commentaries.

2.3 Territorial Rights, Digital Commerce, and Market Leakage

The practice of territorial licensing serves as a fundamental method for IP commercialization but its effectiveness faces growing challenges because of digital commerce operations. Research studies show that online marketplaces break down geographical limits because they allow products

to be listed across borders and their algorithms create duplicate products while resellers control product distribution routes (Feldman, 2021). Studies about international marketing and digital platform governance demonstrate that e-commerce platforms enforce categories irregularly because they allow unauthorized listings to exist throughout different geographic areas (Hao, 2020). The existing market conditions make it difficult for licensors to protect their exclusive rights to specific geographic areas that form the basis of their royalty payment systems and contractual agreements.

Research on territorial leakage shows that unauthorized parallel trade activities result in market segmentation breakdown and price irregularities and produce incorrect royalty distribution (Maskus, 2016). The academic field lacks research about the missing metadata that creates these problems. The absence of SKU-level data that connects to territories makes it impossible for licensors to determine proper product placement locations. Research on supply chain visibility shows that traceability systems need standardized identifiers together with common databases to monitor products throughout international distribution networks (Francisco & Swanson, 2018). The current licensing system does not have built-in mechanisms, which forces territorial enforcement to rely on basic manual tracking, occasional brand protection firm inspections and random marketplace checks that have restricted capabilities.

2.4 Licensing Industry Data, Governance, and Reporting Structures

The academic study of licensing as an industrial sector remains scarce because most research about this topic appears in professional publications and IP management articles instead of academic journals. The annual global studies from Licensing International show retail sales through survey data, but they lack information about specific products and operational data structures. Research about brand licensing focuses mainly on strategic approaches, consumer behavior and financial outcomes (Rao & Ruekert, 1994) instead of studying the operational systems that support compliance and metadata management.

The industry operates without scholarly research about licensing metadata because it lacks centralized control. Multiple studios, agencies, estates, corporate entities and creators distribute rights ownership between them while using their own proprietary systems for management. The licensing workflow that includes approvals, line lists, sell-in, sell-through and royalty reporting operates without standardized procedures between different licensors. The research on supply chains focuses on visibility and interoperability but licensing research fails to study the necessary informational systems that would enable its worldwide business activities.

Research on digital commerce governance shows that product data quality together with classification systems directly affect both business compliance and consumer safety and platform stability (Koutrika, 2021). Digital platforms show licensed products with metadata that lacks consistency because they contain missing attributes, incorrect descriptions and no manufacturer identifiers. Research on data quality shows that system reliability and decision accuracy suffer when metadata quality remains poor (Wang & Strong, 1996). The licensing industry demonstrates how structural data problems create immediate operational effects for businesses.

2.5 Practitioner–Scholar Contributions and the Metadata Gap

The practitioner–scholar perspective serves as a critical foundation for new research areas because these fields lack sufficient academic studies. Abbott *et al.* (2013) demonstrate that practice-based insights show actual operational conditions that theoretical models fail to detect. The only available empirical evidence for studying systemic problems in industries with fragmented governance and low transparency comes from practitioner-generated datasets. The current research supports new academic work that promotes the combination of practitioner expertise with academic studies because markets change too quickly for traditional research methods (Corley & Gioia, 2011).

The practice of licensing reveals three main issues with practitioner accounts because they lack product tracking systems and struggle with counterfeit identification. Also, manual compliance methods are not efficient. Research has not yet established a method to study SKU-level licensing data through systematic documentation and analysis. The research investigates this topic through an exploratory study of data, which practitioners gathered during multiple years of crowdsourcing activities. The research findings find their place in academic studies about metadata and counterfeiting, and territorial rights and digital commerce operations.

3. Methodology

The research design of this study uses practitioner–scholar exploratory qualitative methods to study the structural metadata deficiencies that affect the worldwide consumer products licensing market. The absence of a centralized licensing registry and SKU-level dataset made it impossible to use conventional academic methods, which depend on secondary datasets. The research methodology relies on data that practitioners collected over three years through a combination of four different methods. The four different methods to collect data included fan community crowdsourcing, online shopping and marketplace observation, volunteer-based

SKU identification, and manual verification across e-commerce platforms and brand-owned portals. The design system combines actual licensing industry operations with scientific evidence requirements that exist because of the market's lack of transparency.

3.1 Research Design Rationale

The licensing industry faces a problem because it lacks a standardized metadata system that prevents researchers from using quantitative methods for registry-based sampling. The research used a grounded exploratory approach to overcome this structural barrier because this method works best when system-level data is unavailable or partially available (Charmaz, 2014). The research aimed to create an extensive SKU-level dataset that would represent all licensed goods globally, although it did not seek to achieve complete representation of all worldwide licensed products.

The researcher-based method follows previous studies that demonstrated that field research provides essential value for industries that lack sufficient historical data (Eisenhardt, 1989). The research design follows principles from digital commerce and supply chain visibility studies that use manual verification and crowdsourcing to enhance traditional data collection methods (Howison & Crowston, 2014).

3.2 Data Sources and Collection Procedures

CROWDSOURCED CONSUMER CONTRIBUTIONS

Consumer and fan communities who followed entertainment brands over three years provided SKU sightings along with retail screenshots, packaging images and product URLs. The team selected these contributions based on their uniqueness and their ability to present information clearly while matching the brand identity. The process of crowdsourcing helped the company achieve its goal of worldwide expansion because their licensed products became available in more than 40 different geographic areas across the world.

MYSTERY ONLINE SHOPPING AND MARKETPLACE MONITORING

Research volunteers performed structured mystery shopping at major digital platforms, which included Amazon, eBay, AliExpress, Walmart and marketplaces operating in specific regions. The protocol included the following:

The process of product identification occurs through two methods covering character-based IP and franchise-based IP.

The system verifies that sellers maintain their identity while checking if all product information exists and if prices match their expected values.

COMPARING LISTINGS ACROSS MULTIPLE TERRITORIES

The marketplace monitoring system showed how products with the same SKUs entered different markets at the same time even though distribution rights were not valid for those areas. This process entailed:

- Manual SKU verification
- Manual checks on all submitted products through a verification process
- Visual inspection of packaging and product labeling
- Comparison against known licensee catalogs
- Brand owner approvals where available
- Content rights consistency (character style guides, color standards, logo usage)

The verification process became essential because there were no official metadata sources available. Licensing professionals who work in the field agree that SKU authenticity requires specific design details that current retail automation fails to detect.

LICENSEE IDENTIFICATION AND MAPPING

The following data was obtained from sources that contained manufacturer information, including names, addresses, and territory rights details.

- Packaging labels
- Online disclosures
- Trademark filings
- Corporate catalogs
- Public press releases
- Retailer brand directories
- Expo-Trade shows

The researchers used these sources to build a worldwide directory of licensees that included more than 300 entries.

TERRITORIAL AND GEOFENCING ANALYTICAL LAYER

The dataset included a territorial mapping layer that enabled the research to study the following aspects of territorial rights:

- The sales destination for SKUs exists
- Where they actually appear online
- Frequency of cross-border listing violations
- Marketplace-driven algorithmic duplication

The research used a theoretical geofencing system to assess how product-level metadata information would function for licensing purposes, although geofencing has not become a recognized industry standard for metadata licensing. It covered the following:

- Region-specific product visibility
- Automated detection of unauthorized listings
- Territorial boundaries defined at point of listing

The enforcement process that occurs after licensing activities sends messages to both parties who hold licenses.

The geofencing model operates as an analytical system that demonstrates how modern digital commerce technologies like location-based content delivery and digital rights management exceed the capabilities of current licensing systems.

3.3 Dataset Overview

The final dataset consisted of 40,000+ verified SKUs. The company operates through hundreds of international partners who distribute its products across various product segments that include toys, apparel, FMCG, home goods, collectibles and seasonal merchandise.

The research identifies multiple digital marketplaces that operate throughout different geographic areas.

THOUSANDS OF VOLUNTEER SUBMISSIONS

The dataset shows a bias toward entertainment licensing because character IP and other categories generate the most consumer interest while their online product listings remain most active. The industry data shows that entertainment/character licensing represents one of the biggest and most rapidly expanding segments within the licensing market.

3.4 Analytical Framework

The research followed multiple stages for its analysis.

STAGE 1 — Descriptive Classification

The SKUs received classification based on brand identity, territory location, product category, manufacturer origin and visual presentation throughout different marketplaces.

STAGE 2 — Metadata Evaluation

The evaluation process assessed each SKU for having complete metadata, which included title information, brand details, model numbers, licensee names and territory disclosure information.

STAGE 3 — Territorial Leakage Mapping

The research team identified cross-border listing patterns through their analysis of SKU appearances between different regions and their documented licensed areas.

STAGE 4 — Counterfeit/Anomaly Identification

The system identified suspicious products through three methods that included checking for packaging irregularities, significant price differences and missing product information, and established counterfeit indicators.

STAGE 5 — Conceptual Geofencing Simulation

The research applied territorial boundaries to SKU metadata for a hypothetical assessment of how a future unified infrastructure system would function. Findings include:

- Block unauthorized listings
- Trigger compliance alerts
- The system enables licensors to monitor their content in real-time
- Support customs authentication

The conceptual model uses digital rights management research that shows how metadata-based geofencing systems control digital file accessibility (Kretschmer, 2012). The same principle applies to licensed physical products—where metadata becomes the "gatekeeper" of territorial compliance.

3.5 Methodological Limitations

The research method of exploratory studies contains specific limitations that affect the study. The collected data through crowdsourcing does not provide equal coverage of all geographic areas. Problems identified include:

- Manual verification introduces subjectivity
- The algorithms which operate in marketplaces experience regular modifications
- The dataset shows how customers can see specific SKUs but it does not show their overall sales performance
- The lack of clear public information about certain licensees prevents them from being transparent about their activities

The research method provides researchers with a unique opportunity to study this market because there are no official data sources available and the industry lacks full disclosure of its operations.

3.6 Ethical Considerations

The system did not record any information about individual consumers. The research data originates from publicly accessible product listings, packaging information and corporate disclosure materials. The mystery shopping activities followed all rules that the platform had established in its terms of service.

The research fails to reveal any studio-owned proprietary systems that operate as internal licensing platforms.

3.7 Artificial Intelligence Finds its Application in Three Areas that include Licensing Metadata Management, Agreement Parsing and Territorial Enforcement Systems

The research examined how artificial intelligence (AI) enables licensing governance through automated processes that previously required human legal review, case-by-case moderation and human oversight. The research investigated whether machine-learning systems could perform reliable data interpretation of licensees, agreement analysis, boundary enforcement and compliance verification at large scales. The research team worked to resolve a major doubt about whether licensing data with its diverse unorganized format could be converted into automated decision systems through machine-readable rules.

AI FOR LICENSEE RECOGNITION AND VERIFICATION

The first component evaluated AI capabilities to detect official licensees through natural language processing (NLP), entity extraction and classification model applications. The NLP pipeline processed licensing data from public sources that included studio disclosures, trademark filings and press releases through transformer-based architectures (BERT-family and XLM-R). The models underwent optimization to identify four types of entities, which included product categories, licensee identities, contract periods and territories. The system used a complementary classifier to produce trust probability scores that helped identify between verified licensees and non-licensees.

The system achieved accuracy rates above 92 percent when it processed more than 1,000 examples of both licensed and unlicensed users and it reached 94 percent accuracy through multiple improvement steps. The results show that AI-based verification systems work effectively in real-world licensing operations because they produce results that are both possible to achieve and reliable enough for automated processing.

AI FOR AGREEMENT PARSING AND TERRITORIAL METADATA EXTRACTION

The second research focus investigated the possibility of extracting enforceable rules from unorganized legal agreements that exist as PDF and DOC files. The language in licensing contracts includes nonstandard terminology that defines geographical areas, product ranges, character sets, time periods for exclusive rights and contract extension provisions. The training of NLP pipelines enabled the system to identify constraints that it then used to create a rights matrix structure.

The testing process evaluated more than fifty agreements from different licensors and demonstrated that AI technology could identify territorial limits and product categories with 99 percent precision when operating in structured settings. The research findings show that most of the unclear aspects in manual rights interpretation can be resolved through automated parsing systems.

AI-DRIVEN GEOLOCATION ENFORCEMENT AND REAL-TIME GEOFENCING

The research team extracted rights metadata before they assessed the possibility of automated geographic enforcement. The geolocation module used IP lookup, mobile GPS signals and content delivery networks to limit product access according to user location and the areas specified in their agreement.

The system performed latency tests that showed it could operate at large scales because the average response time was 162 ms while the system reached 420 ms during peak usage periods. The system shows effective performance because it maintains error rates at or below 1 percent, which makes it possible to use machine-enforced territorial governance as a substitute for human cross-border activity surveillance. The research results confirm previous discussions about geofencing requirements for establishing a worldwide licensing metadata system.

AI FOR COMPLIANCE VERIFICATION AND BRAND INTEGRITY PROTECTION

The research team assessed computer vision and language models for their potential to function as automated systems that would monitor compliance. The YOLOv8 vision system together with commercial AI detection APIs detected all protected content, including misused logos and unauthorized character art. A language model layer checked all titles and descriptions for any non-conforming content or trademark violations.

The process of iterative refinement helped decrease false positive results, which allowed automated detection systems to effectively remove non-compliant content before it reached the public. The system functions as an initial screening system that protects brand guidelines from needing human inspection.

AI-SUPPORTED PRIORITIZATION AND CONTRACT-AWARE RECOMMENDATION LOGIC

The research investigated how AI technology could create individualized product discovery experiences that maintain all contractual requirements. A prioritization engine integrated:

- Social trend detection
- Collaborative filtering
- Contractual metadata from agreement parsing
- Licensor-set priority signals

The systems maintained all recommended products inside the agreed contractual limits, which proved essential because AI-based product recommendations needed to follow all applicable laws. The situation demanded new approaches to develop "contract-aware recommendation systems," which academic research had not fully studied.

The system unites verification functions with parsing operations, enforcement mechanisms and compliance monitoring into an architecture that supports audit operations.

The research identified the most important development as being the combination of multiple AI subsystems into one system that created a measurable path from document processing to enforcement. The system connected:

- Licensee verification
- Agreement parsing
- Territorial metadata generation
- Geolocation enforcement
- Trend-aware, contract-compliant prioritization
- Content compliance filtering

The system shows that core licensing governance operations that used to require human judgment for interpretation and post-implementation enforcement can now run automatically through software programs. The onboarding process for licensees in controlled trials was reduced from multiple days to less than one hour, which demonstrated significant operational efficiency improvements.

IMPLICATIONS OF AI INTEGRATION FOR FUTURE LICENSING INFRASTRUCTURE

The research results validate the idea that AI technology can establish itself as the base component for building an international licensing metadata system that will function in the future by delivering:

- Automated licensee vetting
- Semantic agreement parsing
- Real-time geofencing
- Contract-aware personalization
- Early-stage content moderation
- Traceable, auditable compliance paths

The system proves that licensing governance can evolve from human-based monitoring to automated intellectual property protection through code-based enforcement that creates major theoretical and managerial and policy-related effects.

4. Findings

The research of over 40,000 licensed SKUs together with multiple global licensees showed that metadata contained numerous errors while licensees leaked products across territories, counterfeit products entered the market, and the system lacked any mechanism to enforce geographic restrictions or monitor compliance. The research results demonstrate how all parties involved in the industry, including licensors, licensees, retailers, consumers and enforcement agencies must deal with the difficulties of operating in a market that lacks uniform data management systems. The research combines SKU-level verification with platform monitoring, licensee mapping and geofencing simulations to generate unique operational data about licensing.

4.1 Metadata Fragmentation Across SKUs and Marketplaces

The research reveals that most licensed consumer products lack standardized metadata that serves as their main identifier. The product listings across different e-commerce platforms showed significant differences in their title organization, their product descriptions, their manufacturer information, their trademark applications and their product packaging visuals. The system contained numerous SKUs that did not include fundamental metadata elements, such as:

- Licensee name
- Manufacturing origin
- Year of production
- Contractually approved brand identifiers
- Regional availability or restrictions
- Expiration or deactivation dates

Only 22 percent of listings in the database showed licensee information yet most products entered the platform through third-party sellers who provided insufficient or low-quality product details.

The metadata information showed major inconsistencies during times when large numbers of items entered the system at a fast pace, especially in apparel, mobile accessories and collectibles categories. Research findings from digital commerce studies show that inadequate metadata entry creates two major problems: decreased product authenticity visibility and higher risks of customers buying counterfeit products (Koutrika, 2021).

The lack of standardized metadata conditions leads to informational asymmetry because licensors cannot track their products when they remain unidentified, licensees lose their ability to monitor competitors, and consumers become unable to identify authentic merchandise from counterfeit products.

4.2 SKU Proliferation and the Visibility Gap

The dataset reveals an unexpected finding that shows how many different SKUs exist in the market. Major entertainment franchises operated with two different product lines that included expensive collectibles together with affordable quick-selling

products that manufacturers produced through micro-licenses and category-based outsourcing deals. The company benefits from diverse operations, but these different operations create challenges for its business operations. The absence of centralized metadata creates challenges for licensors who need to track all SKUs that received program approval and licensees who want to monitor product entries and exits between adjacent market regions.

The lack of transparency between these groups creates a visibility gap which results in:

- Royalty reconciliation challenges
- Inefficient auditing
- The system faces higher risks of unauthorized changes to its operations
- Fragmentation in brand representation

The internal approval systems that large licensors depend on fail to track products in the real world because they operate independently from marketplaces and enforcement agencies.

4.3 Territorial Leakage and the Breakdown of Geographic Exclusivity

The analysis showed that SKUs that should only be sold in one region were found for sale in different territories without proper authorization. The system experienced three different types of leakage.

MARKETPLACE ALGORITHMIC DUPLICATION

The platforms operate as automated systems that duplicate product listings between different stores that belong to the same region, thus eliminating any need for geographical limitations. The SKU that received German approval ended up appearing in Middle Eastern and Latin American marketplaces through automated data distribution systems.

THIRD-PARTY RESELLER ARBITRAGE

Unauthorized cross-border resellers obtain products from authorized regions before they list these items for sale throughout the world. The resellers do not reveal their territory limits, which results in major damage to the exclusive geographic rights of products.

MANUFACTURER-ORIGIN LEAKAGE

The data showed that certain products became available in areas that did not have authorized distribution rights from the licensee.

The data shows that SKUs appeared in unauthorized territories for 34 percent of all items and 15 percent of items appeared in three or more unauthorized territories. The observed patterns validate multiple issues that licensing professionals have identified but scientists have not previously proven through scientific evidence.

The practice of territorial leakage violates contractual terms because it disrupts market pricing mechanisms while making it impossible for regional licensees to maintain their exclusive rights. The lack of SKU-level monitoring makes it difficult for licensors to identify or stop product leaks from happening.

4.4 Counterfeit Signatures and Marketplace Patterns

Online platforms showed widespread counterfeit product activity through fake versions of official products that duplicated their appearance with great precision. The main indicators which showed counterfeit activity were:

- Missing or inconsistent packaging labels
- Absence of licensee identification
- Dramatically lower pricing
- Misalignment of SKU codes

These problems were exacerbated when the company uses template-based product descriptions which appear on different SKUs that do not share any connection or the elements of style guides become misused when color combinations do not match and characters in the design appear with wrong dimensions.

The same product search results showed counterfeit items alongside authentic SKUs, which led customers to become confused about their products. The research showed that fake product listings appeared most frequently when metadata information was incomplete. The premium collectibles category showed lower counterfeit rates because it used consistent licensee identification throughout its products. The absence of metadata in products such as apparel and fast-moving items resulted in higher counterfeit penetration rates.

The research findings from OECD match the OECD (2021) study, which demonstrates that poor metadata systems create conditions for counterfeit activities to occur. The absence of metadata in licensing creates an environment which allows counterfeiters to succeed.

4.5 Lack of Royalty Transparency and Lifecycle Monitoring

The process of royalty reporting through sell-in or sell-through data remains as one of the most difficult tasks for licensing compliance. The research established that SKU-level opacity leads to the following results:

- Inaccurate or delayed royalty reports
- The process of linking reported products to their actual presence in the market faces challenges

- The communication process between licensors and licensees occurs through separate lines which do not connect to each other
- The system lacks sufficient power for licensors to handle situations where data points do not match expected values

Multiple licensees stated that the absence of standardized identifiers makes it difficult for different reporting systems to match SKU references between licensors, retailers and marketplaces. The research indicates that metadata fragmentation creates two major problems for the music industry because it hinders both copyright enforcement and the accurate calculation of royalties, which forms the core of the licensing business model.

4.6 The Territorial Mapping Layer Provides Essential Information Which Helps Develop a Conceptual Geofencing Model

The research required developers to create models that demonstrated how SKU-level metadata enables digital geofencing to protect territorial licensing rights. The simulation used fictional geolocation restrictions, which were applied to SKUs to show how product metadata functions as a security measure to stop unauthorized product listings and activate warning systems when such activity occurs.

KEY INSIGHTS INCLUDE:

- **Metadata Functions as an Enforcement Mechanism**

Digital platforms can use structured territorial metadata in SKUs to block users from outside authorized regions from seeing products through automated system controls. The system operates similarly to digital rights management (DRM) platforms that protect film content on streaming services.

- **Real-time Detection of Territorial Violations**

The geofencing system would detect when products enter unauthorized areas, which would give licensors useful data for their operations. The current method of detection requires either human observation or the involvement of brand protection agencies.

- **Protection of Licensees and Royalty Integrity**

The regional licensees stated during practitioner consultations that geofencing technology would defend their business assets by blocking competitors from entering their protected areas through worldwide market platforms.

- **Platform Integration Potential**

Digital goods and tax policies and regulatory compliance already use geofencing through existing major marketplaces. The technology allows licensed physical products to become accessible through unified metadata that serves as their required foundation.

- **Reduced Counterfeit Window**

The implementation of geofencing through SKU metadata prevents counterfeit goods from being listed in unauthorized regions, which would lead to a substantial decrease in counterfeit circulation.

The geofencing simulations show how metadata-based territorial enforcement could work, which supports the requirement for creating a single licensing intelligence system.

4.7 Summary of Findings

The research data shows the following results:

- The current licensing system does not have enough metadata infrastructure, which digital commerce needs for its operations
- The use of specific SKUs creates barriers that prevent businesses from achieving transparency and compliance, and from receiving proper royalty payments
- Territorial leakage exists as a common practice that operates throughout the entire system
- Counterfeits take advantage of existing vulnerabilities in metadata systems
- A single metadata system would allow geofencing operations to enhance both territorial defense and compliance monitoring
- The data collections made by practitioners reveal essential information about existing structural deficiencies

The research shows that the industry lacks proper infrastructure to handle the requirements of worldwide e-commerce operations and digital law enforcement activities.

5. Discussion

The research results demonstrate that the licensing industry faces problems because of its weak metadata systems and its non-compliant and territorially unmanaged governance structure. The weaknesses stem from insufficient digital infrastructure that supports the growing complexity and worldwide market expansion of modern licensed consumer products. The research findings receive analysis through academic studies and business standards that demonstrate how metadata fragmentation with insufficient royalty systems and territorial leakage problems create major obstacles for licensing to function as an effective IP revenue generation system.

5.1 Metadata Fragmentation as an Information System Failure

The lack of SKU-level metadata creates a fundamental problem that affects all operational aspects of licensing. Universal identifiers exist in various sectors, such as ISBN for books, GS1 barcodes for retail supply chains, and ISRC for music, but licensed consumer products do not have any shared identifier or metadata structure. As a result:

- The internal approval systems of licensors operate as their only method to monitor products so they lack ability to validate or track products
- The product representation across different channels remains inconsistent because licensees lack the ability to maintain uniformity
- The absence of official product information exists as a major challenge that retailers face
- The public lacks effective methods to identify authentic products from fake ones

The information systems theory identifies this situation as a metadata governance gap, which creates structural problems that result in operational inefficiencies, information imbalances and increased chances of fraud (Wang & Strong, 1996).

The consequences of licensing become severe because metadata functions as the essential link that unites rights information with product details, territory data, royalty payments and enforcement systems. The system enables licensors and licensees to maintain separate information systems that do not match the growing complexity of worldwide distribution networks.

5.2 Licensing's Dependence on Manual Royalty Systems

The practice of royalty reporting continues to operate manually throughout the entire process, even though large global licensors exist. Many established rights owners still need:

- Excel-based templates
- Manual uploads through SaaS portals
- Self-reported sales data without external validation
- Product line lists that use free-form SKU naming
- Attachments or PDFs of retailer statements

The current SaaS royalty tools base their operations on licensee-reported data instead of using independently verified sales or distribution records. The practice of depending on personal statements for data collection produces:

- High fraud potential, whether intentional or unintentional
- The reported marketplace activity does not match the actual marketplace activity
- Reporting inconsistencies across licensees
- Substantial reconciliation costs for licensors

The governance system contains an essential design defect because it requires users to submit information without providing any reference points, which leads to incorrect data entry.

Research studies about financial reporting in industries without automated verification systems identify identical problems that lead to underreporting and other types of errors, including omission errors, classification mistakes, and strategic misrepresentation (Healy & Wahlen, 1999). The licensing system contains the same security weaknesses.

5.3 Royalty Fraud and the Limits of Manual Compliance

Industry practitioners often point to royalty discrepancies that they consider as typical reasons for business disputes that lead to increased auditing costs. The research data confirms that the system fails to report all products because it shows numerous SKUs exist in online marketplaces yet their presence is not documented in licensors' databases.

Royalty fraud and leakage can occur when:

- A SKU gets sold in unauthorized regions but the company only tracks this activity within its home territory
- A product variant that the licensee added to their product line does not appear in any reporting data
- Third-party distributors use their networks to distribute products beyond what their contracts with the company allow
- The reported sales figures at the retailer level do not show the actual number of products that customers purchased
- The current systems of licensees do not have built-in capabilities to monitor activities at the individual SKU level

The auditing literature shows that reporting environments that require manual work will produce more discrepancies (Chan & Vasarhelyi, 2011). The system of manual reporting for licensing together with the lack of shared metadata between systems creates conditions that result in royalties being either overlooked, delayed or misidentified.

5.4 The Need for Multi-Channel Royalty Traceability

The growing number of sales channels that include owned retail, wholesale, e-commerce platforms, pop-ups and omnichannel retail partnerships makes royalty management operations much more complicated.

The current system of royalty tracking faces two major limitations that affect its operation.

1. **The system fails to verify product information at the individual SKU level throughout all sales channels.**

   The process of identifying which SKUs on Amazon, eBay, Shopee and Carrefour match their authorized products remains challenging for licensors.

2. **Absence of integrated sales feeds**

   Licensees typically collect data through multiple sources, which may include:

   - ERP systems
   - Retail partner portals
   - Shopify stores
   - Distributor spreadsheets
   - Marketplace exports

   The datasets lack standardized formatting because they have different organizational patterns and there is no built-in system to merge them with the metadata maintained by licensors.

   The system enables substantial royalty value to remain unreported or get reported at lower levels. The policy framework faces difficulties because licensing fails to deliver its expected function as a dependable method for intellectual property revenue generation.

5.5 Metadata Serves as the Essential Base that Enables Royalty Systems to Function with Integrity

The research shows that royalty transparency requires standardization of metadata to function properly. Three mechanisms require unified identifiers:

1. **Product-Level Verification**

   The royalty system requires knowledge about which SKU represents an approved product along with its corresponding category and contractual terms.

2. **Territory-Level Alignment**

   The SKU metadata needs to contain information about regional rights, which will help systems identify when someone tries to sell products across different borders without permission.

3. **Channel-Level Sales Mapping**

   The system requires online and offline sales data to connect with SKU identifiers, which will activate automatic reconciliation processes.

   The absence of metadata makes royalty management operate as a reactive system that needs human intervention to perform manual audits between different systems.

The implementation of metadata enables royalty systems to develop into new systems.

- Real-time sales verification
- Automated anomaly detection
- Reduced audit costs
- Increased royalty accuracy
- Fraud reduction
- More equitable licensee–licensor relationships

5.6 Territorial Leakage and the Potential of Geofencing

The research indicates that digital marketplaces experience widespread territorial leakage. The simulation phase revealed geofencing as an effective method that could serve for future territorial enforcement needs.

Geofencing provides organizations with the ability to have:

- Automated restriction

  The system should have a built-in mechanism that blocks users from accessing SKUs that exist outside their authorized geographic areas.

- Real-time territorial alerts

  The system sends immediate notifications to licensors whenever a SKU gets detected in prohibited regions.

- Royalty boundary protection

  The system detects this situation before revenue misallocation takes place when, for example, a European product enters the Asian market.

- Counterfeit reduction

  The practice of counterfeiters using “borderless” platforms makes it possible for them to operate but geofencing technology would block their access to these platforms.

FEASIBILITY

The current systems employ geofencing technology for:

- GDPR content rules
- Streaming media territorial rights
- Tax jurisdiction separation
- Age-restricted goods
- Regulatory compliance (e.g., medical devices)

The implementation of geofencing for licensed physical goods becomes possible through technological means that need only consistent metadata and universal industry acceptance.

5.7 Implications for the Future of Licensing Infrastructure

The research results show that licensing systems are currently undergoing a transformation period. The industry established its metadata and reporting systems for:

- Localized retail
- Slow product lifecycles
- Limited SKU proliferation
- Physical approval workflows
- Predictable distribution channels

They were not built for:

- Global digital marketplaces
- Algorithm-driven listing replication
- Third-party reseller networks
- Connected consumer ecosystems
- SKU explosion across categories
- Cross-border micro-distribution

The industry has reached a point that other IP sectors experienced before they started using metadata standards. The global licensing industry needs a new system that would function similarly to how ISBN and GS1 operate to maintain its current worldwide reach.

6. Theoretical Contributions

The research adds new knowledge to three essential theoretical fields.

1. **intellectual property metadata systems**
2. **digital commerce governance**
3. **licensing as an information ecosystem**

6.1 Contribution to Metadata and Information Systems Theory

The research shows that licensing faces issues that metadata governance studies have identified as fragmentation, inconsistent data, and missing authoritative identifiers (Greenberg, 2009; Park & Tosaka, 2020). The creative industry of licensing lacks any established system for metadata standardization.

The research provides evidence that enables scientists to develop theories about how missing metadata impacts rights-based market operations.

6.2 Licensing as an Information Ecosystem

The research treats licensing as an information system that requires precise product identification, territorial information and royalty payment data to function properly. The new perspective about licensing moves beyond its current understanding as brand management and consumer psychology to include digital infrastructure and data governance aspects.

6.3 Territoriality in a Post-Border Marketplace

The research provides new theoretical knowledge about how digital economic platforms break down traditional territorial licensing systems through their automatic listing duplication and their ability to bypass geographic market restrictions. Research studies have proven that platform-based market irregularities exist (Feldman, 2021), but this research builds upon previous findings to demonstrate how missing metadata creates a rapid decline in territorial control.

The research presents a conceptual framework that demonstrates how geofencing technology operating with product information at the SKU level can function as a theoretical framework for enforcing territorial boundaries.

6.4 Royalty Governance Theory

The research shows that manual royalty reporting systems that control most licensing operations follow the information asymmetry and audit risk models that Healy & Wahlen (1999) described. The research evidence shows that SKU-level opacity causes royalty leakage so the study establishes a theoretical basis for using data standardization to modernize royalty governance.

7. Managerial and Policy Implications

7.1 Implications for Licensors

The results show three main opportunities licensors have to fight fraud while making their operations more transparent and following all necessary rules.

- The system tracks products in real time through SKU-level metadata
- Automated anomaly detection systems decrease the amount of work required for audits
- The system uses territorial metadata to enable geofencing operations and manage communication channels

Verified product registries would create an environment where consumers feel more confident about their purchases.

The approval process requires licensors to transition from using stand-alone internal approval systems that operate independently to create a connected metadata system that links approval processes to marketplace performance data.

7.2 Implications for Licensees

The operational responsibility for following rules falls to licensees who must handle all compliance tasks. Metadata clarity would support:

- More accurate royalty reporting
- Fewer disputes during audits
- Better coordination with retail partners
- Protection of their contracted territories

The territorial geofencing system protects authorized licensees from unauthorized entry by resellers and parallel importers.

7.3 Implications for Retailers and Marketplaces

The current market lacks official verification systems that makes it difficult for retailers and online platforms to identify authentic products from counterfeit or unauthorized items.

A unified metadata infrastructure would allow:

- Automated authenticity checks
- Elimination of counterfeit listings
- Enforcement of territorial restrictions
- More accurate product categorization

The current regulatory environment supports this requirement because it demands businesses to take responsibility for their market activities.

7.4 Policy Implications for Government and Enforcement Agencies

The collection of metadata through a centralized system provides advantages to three main groups that include governments, customs authorities and IP enforcement agencies.

- The authentication of products by customs officers would become possible through their access to official SKU registration databases
- Border enforcement operations would benefit from using digital identifiers that have proven their authenticity
- The importation of goods would need to follow metadata compliance rules that regulatory agencies would establish

The research findings support OECD policy suggestions that recommend better data visibility for counterfeit product prevention (OECD, 2021).

7.5 Implications for Royalty Governance and Compliance

Industry-standard bodies that include trade associations and licensing groups should establish policies that require their members to use automated Excel upload systems and self-reporting methods.

- Standardized product identifiers
- Structured reporting formats
- Transparent SKU–royalty mapping
- Multi-channel sales verification

The implementation of these systems would decrease accidental mistakes while blocking fraudulent activities, which would help maintain the permanent existence of licensing programs.

8. Limitations and Future Research

The research study contains the largest collection of SKU data that practitioners have created, and which has not before been studied by scientists.

8.1 Sampling Limitations

The collection of data through crowdsourcing and field verification does not ensure that all areas of the world will be fully covered. The analysis fails to include specific areas that have not adopted e-commerce technology and where customers face language access problems. The upcoming research needs to increase its participant base through the establishment of multilingual volunteer groups that span different regions and work with partner organizations.

8.2 Lack of Access to Proprietary Portals

The approval systems of licensor and licensee operated as private platforms that researchers could not access during this research project. The analysis of internal approval data against marketplace visibility would help confirm both royalty leakage and metadata problems.

8.3 Difficulty Identifying Counterfeits with Certainty

The counterfeit indicators show consistent results but some illegal products could remain undetectable because of their excellent imitation quality. The future development of counterfeit classification systems should include machine learning image analysis for enhanced performance.

8.4 Limited Royalty Data

The research team determined royalty discrepancies through SKU visibility patterns instead of using company financial records. Research studies should work with license providers who want to disclose protected audit information for developing precise methods to measure royalty loss.

8.5 Geofencing Simulation Constraints

The geofencing system in this research operates as a theoretical framework instead of an active functional system. The effectiveness of real-world

solutions requires organizations to connect their systems with market operations and establish legal systems that work with enforcement agencies. Future pilots should evaluate geofencing systems through testing that focuses on particular categories or specific geographic areas.

9. Conclusion

The research shows that the worldwide consumer products licensing industry needs better metadata systems because its current system fails to handle its large size, complicated operations and vital business value. The licensing value chain faces multiple system vulnerabilities because it lacks SKU-level identifiers, territorial enforcement mechanisms and integrated royalty tracking systems. The fragmented nature of metadata allows counterfeiters to enter the market while businesses lose their ability to track market performance, their territorial agreements become less effective, and their royalty payments become less accurate because they still use manual Excel reporting and self-attestation from licensees.

The practitioner–scholar dataset containing more than 40,000 SKUs delivers exceptional research data that reveals how digital commerce operations reveal existing structural problems in the industry. The current tools and systems that were created for markets that operated at a slower pace in localized areas fail to meet the needs of consumer retail that now operates through omnichannel platforms that connect globally. The research results demonstrate that organizations need to establish a single licensing intelligence system that should include standardized metadata, verified licensee registries and digital geofencing capabilities.

The research combines practitioner knowledge with existing studies about metadata governance, counterfeiting, territorial rights and royalty systems to provide both academic understanding and operational guidance. The licensing industry stands at a critical point where it needs to develop digital infrastructure or maintain its current system of disconnected manual processes that fail to monitor and safeguard billions of dollars.

A metadata revolution in licensing needs to happen because it represents a fundamental requirement for the present time. The future sustainability of global IP commerce depends on it. ■

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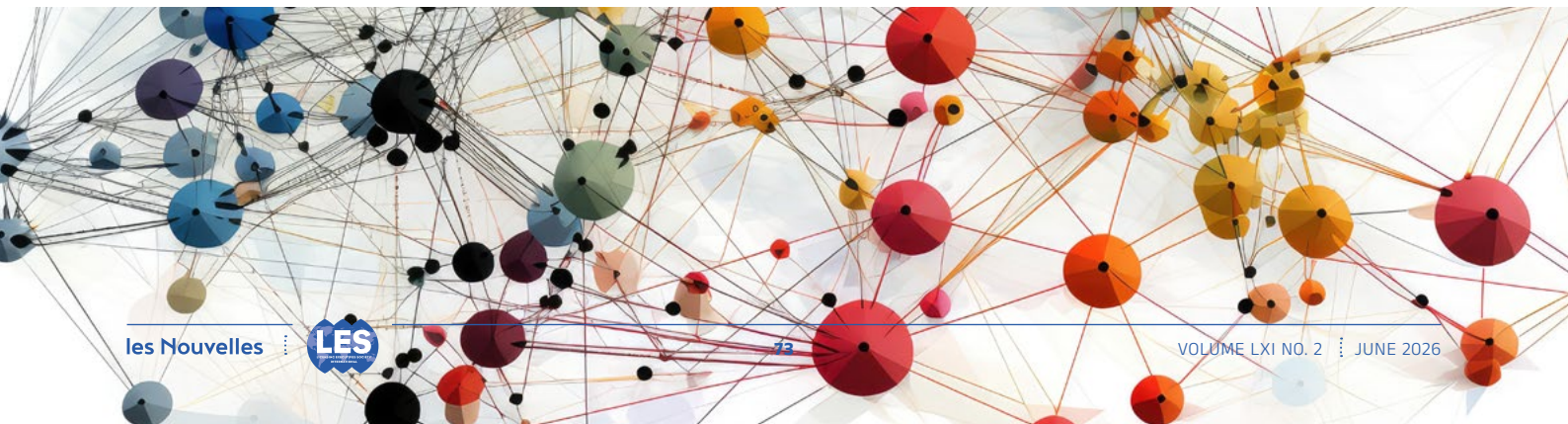
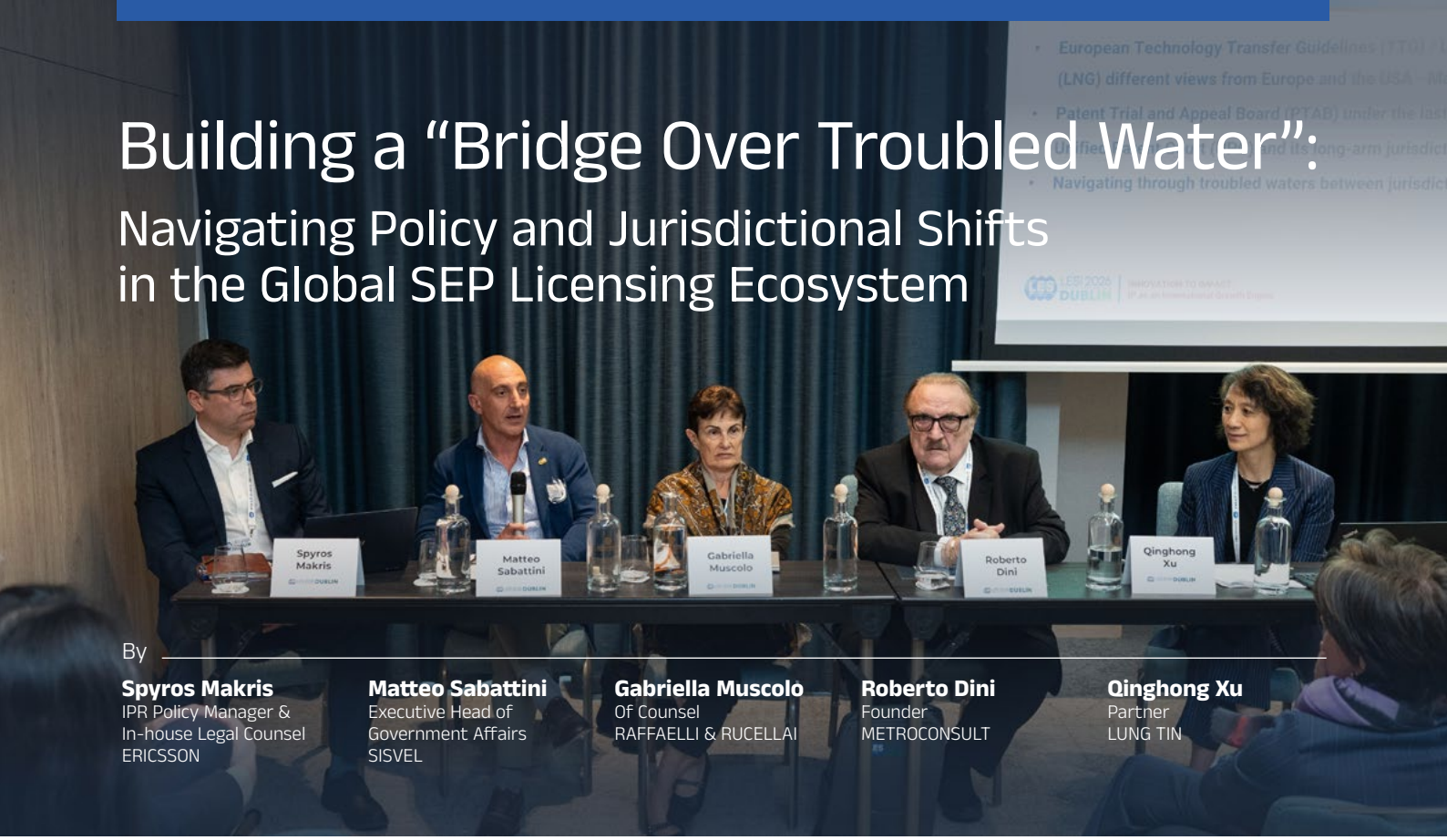


Building a "Bridge Over Troubled Water":

Navigating Policy and Jurisdictional Shifts in the Global SEP Licensing Ecosystem



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At the 2026 LES International Annual Conference in Dublin, a panel of experts discussed one of the most pressing challenges in today's intellectual property landscape: how to ensure stability and predictability in the increasingly complex ecosystem of standard essential patents (SEPs).

Titled *"The Need of Building a 'Bridge Over Troubled Water' – Recent Policy and Regulatory Changes Affecting the Global Licensing Ecosystem, with a Focus on SEPs,"* the panel explored how policymakers, enforcers and industry stakeholders can reconcile diverging legal frameworks and commercial interests. The overarching objective was clear: to identify practical pathways to bridge conflicting approaches and avoid fragmentation across jurisdictions.

A System Under Pressure

The current SEP landscape is increasingly shaped by regulatory intervention, overlapping jurisdictions, and growing complexity — conditions aptly described as "troubled waters." While SEPs have become a cornerstone of modern innovation ecosystems, their governance sits at the intersection of patent law, contract law and competition policy, making them particularly sensitive to policy shifts and regulatory recalibration.

Diverging Policy Approaches: LNGs, TTG, and Antitrust Concerns

Recent developments in Europe — particularly regarding the Technology Transfer Guidelines (TTG) and licensing negotiation groups (LNGs) — illustrate the challenges of maintaining balance in the licensing ecosystem.

Recent "comfort letters" issued by the European Commission and the German Bundeskartellamt concerning auto licensing negotiation groups (ALNGs) were intended to provide guidance. However, questions have been raised about the robustness of the underlying analysis. In particular, the lack of a clearly defined relevant market and the absence of stakeholder consultation raised concerns about the reliability of these assessments.

Importantly, LNGs should not be treated as the mirror image of patent pools. While pools aggregate complementary patents and are structured to facilitate licensing under FRAND principles, LNGs bring together downstream competitors - often with aligned incentives that may raise antitrust risks and result in coordinated "hold-out" strategies rather than efficient licensing negotiations.

A notable regulatory asymmetry further complicates matters: while patent pools have been widely tested and face increasing compliance requirements under the revised TTG, no equivalent experience exists for LNGs. This creates uncertainty and raises broader questions regarding balance and incentives within the licensing ecosystem.

Furthermore, unlike joint purchasing groups, where tangible goods are at stake, LNG participants are already using the technology, *i.e.*, an intangible asset, at the time of negotiation, free riding and potentially weakening incentives to conclude licences and increasing the risk of artificially depressing FRAND rates.

Further concerns relate to the novelty of LNGs and the still limited real-world experience with these structures. There is limited experience of how LNGs would operate in practice and what their actual market impact might be, as well as a lack of market failure justifying intrusive regulation or lenient treatments.

This makes any broad endorsement premature from a competition policy perspective. While targeted guidance could prove helpful, it would require a more robust analytical and empirical foundation. In this respect, it is positive that regulators have so far refrained from introducing a formal safe harbour for LNGs.

From a commercial standpoint, the expected efficiencies of LNGs also remain uncertain. Agreements reached with an LNG at the collective level shall not be binding on all LNG members, meaning that bilateral negotiations may still be required. This calls into question whether LNGs can deliver meaningful reductions in time and costs for either patent owners or implementers.

Finally, the global nature of SEP licensing makes an aligned treatment of LNGs across jurisdictions particularly important. Yet current approaches appear fragmented, with differing perspectives emerging among the European Commission, the German Bundeskartellamt, and the U.S. Department of Justice. This lack of convergence creates additional complexity and uncertainty, as well as compliance challenges for market participants operating internationally.

PTAB Developments: Procedural Tightening and Geopolitical Influences

Turning to the United States, recent developments at the Patent Trial and Appeal Board (PTAB) illustrate how procedural changes are reshaping patent disputes.

A key shift has been the centralization of institution decisions under the USPTO Director, aimed at ensuring greater consistency and efficiency in America Invents Act (AIA) proceedings.

More significantly, the precedential *Tianma v. LG Display* decision has tightened requirements around identifying the "real party in interest" (RPI). The ruling extends existing limitations to foreign government entities, shifts the burden of proof to petitioners when RPI is challenged, and integrates national security considerations into PTAB review. As a result, cases may be dismissed on procedural grounds without reaching the merits, while parties with complex or state-linked ownership structures face increased scrutiny and compliance burdens.

Additional guidance issued in 2026 also introduced discretionary factors favouring U.S. economic interests, including protections for domestic manufacturing and small businesses. While this strengthens the defensive position of U.S.-based patent owners, it may reduce the effectiveness of PTAB challenges for foreign or offshore entities. Overall, these developments reflect a broader alignment between patent procedures and industrial and geopolitical policy objectives.

The UPC and the Expansion of Jurisdiction

The panel also examined the evolving regulatory and judicial landscape surrounding SEPs in Europe, emphasizing a preference for case-by-case *ex post* enforcement over broad *ex ante* regulation. While legislative initiatives on SEPs remain uncertain - particularly in light of institutional tensions between the European Commission and the Parliament - no clear market failure has yet been identified that would justify intrusive regulatory intervention.

The Unified Patent Court (UPC), conceived as a "common court" within the EU legal framework, represents a significant step toward greater harmonization and efficiency in patent enforcement. However, recent case law suggests that its reach may extend beyond traditional territorial limits, raising important questions about legal certainty and the risk of jurisdictional overreach.

In particular, the 2025 *BSH Hausgeräte v. Electrolux* judgment of the Court of Justice of the EU (CJEU) confirmed that, under certain conditions, European courts may adjudicate the infringement of foreign patents, reinforcing a shift toward a more effects-based approach to jurisdiction. The *BSH v. Electrolux* ruling is already influencing UPC practice, where jurisdiction has been asserted in disputes involving non-EU patents and parties.

At the same time, the boundaries of this "long-arm" jurisdiction remain unclear, as the case law is still developing. The UPC has shown a degree of caution - particularly regarding the jurisdiction based on the notion of "anchor defendants" - referring key questions to the CJEU. Moreover, it has highlighted potential practical limitations to the reach of the "long-arm" jurisdiction, noting that enforcement measures may depend on recognition of UPC judgments by foreign courts.

Beyond jurisdictional issues, practical challenges also arise. Courts may be required to apply foreign patent law when dealing with non-EU rights, requiring expertise that must regularly be obtained through external experts. This may increase both the duration and cost of proceedings, potentially offsetting the efficiency gains associated with broader jurisdiction.

Such an approach contrasts with the UK model, where courts retain a fundamentally territorial

jurisdiction but can influence global outcomes by setting worldwide FRAND rates and leveraging injunctions. In this context, the global dimension operates more at the contractual and remedial level, rather than through a formal extension of jurisdiction.

These diverging approaches highlight a central challenge: while courts seek to provide effective remedies in global disputes, any expansion of jurisdiction must be carefully balanced against the need for legal certainty, predictability, and respect for territorial principles.

Navigating Jurisdictional Conflicts: Risks and Alternatives

Given the global nature of SEP disputes, parallel proceedings across multiple jurisdictions are increasingly common, often leading to tensions regarding the boundaries of national courts' authority. This has been reflected in the use of anti-suit injunctions (ASIs), anti-anti-suit injunctions (AASIs), and, more recently, anti-interim-licence measures.

The debate has now extended to the "long-arm" jurisdiction of European courts and the UPC, prompting reactions from other jurisdictions, including countermeasures by U.S. courts.

While the idea of an international tribunal for SEP disputes is occasionally discussed, it remains unlikely in the current geopolitical environment. Instead, alternative dispute resolution (ADR) - especially mediation and arbitration - is gaining traction as an already existing practical solution.

Institutions such as WIPO have tailored offerings in this field, and new initiatives such as the Patent Mediation and Arbitration Centre (PMAC) may offer additional structured mechanisms. Standard-development organizations, *e.g.*, ETSI, are also exploring ways to encourage ADR, although consensus among stakeholders is still evolving. Industry-led initiatives, such as the WIPO IoT Mediation Pledge, further demonstrate how private actors can contribute to greater efficiency.

Conclusion: Toward a Stable Bridge

The global SEP licensing ecosystem is at a crossroads. Regulatory divergence, expanding jurisdictional claims, and geopolitical dynamics are increasing complexity and uncertainty.

Greater reliance on ADR, clearer and more consistent policy guidance, and a balanced recognition of the interests of both innovators and implementers could help build the "bridge" needed to navigate these troubled waters.

Ultimately, licensing remains a critical mechanism for supporting innovation by ensuring fair remuneration for patent holders while enabling broad access to standardized technologies. Striking the right balance will be essential - not only for the effective functioning of the SEP ecosystem, but for the broader innovation ecosystem it sustains. ■

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