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The Judicial Geography of Patent Litigation in Germany: Implications for the Institutionalization of the European Unified Patent Court

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Abstract: The Unified Patent Court (UPC) will be the pillar of a unified European patent enforcement system. Crucial to its success will be the harmonization of geographical variation in national jurisdictions. Germany offers a unique opportunity to explore such harmonization, as plaintiffs can choose between twelve regional courts to file a patent suit, resulting in different patent court practices within the same jurisdiction. Adopting a legal geography perspective, we examine the appellate process as a mechanism that reconciles regional variation in court practices. Based on more than 100 decisions from 34 contentious litigations that went through all instances up to the Federal Court of Justice between 2005 and 2019, we find that decision reversals, case citations and guiding principles are important tools to improve error correction and judicial consistency within an IP system. We see these instruments as crucial for national harmonization also in the upcoming European framework.

Keywords: courts; patents; litigation process; decision reversals; Unified Patent Court



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1. The Spatiality of Law: Harmonizing Regional Variation

As part of the European Union's competitiveness strategy, the promotion of innovation is at the top of the strategic objectives of the Lisbon Strategy adopted in 2000. The 2010 follow-up strategy, Europe 2020, further emphasizes this aspect through the flagship initiative of an 'Innovation Union', including enhanced protection of intellectual property rights (European Commission 2010). One way for economic actors to protect innovation in technology is to enforce intellectual property rights through patents. Yet, the 'Innovation Union' currently lacks a unifying character, because European patents, after being granted, are immediately split into national patents, and there is as yet no uniform European jurisdiction for patents. Although the EU patent was enshrined in the 1973 European Patent Convention (EPC), IP owners have had to enforce their patents separately for each individual country, and oftentimes with different litigation outcomes in front of the different national courts (Hatter 1994). In June 2023, fifty years after the introduction of the EU patent, the newly created Unified Patent Court (UPC) will become operational and finally offer the possibility of single enforcement of a unitary patent in front of one integrated European IP jurisdiction (Ackermann et al. 2019).

The UPC is a single court with its twenty local and regional chambers being spread across multiple locations in the participating European member states. Each chamber will be staffed with judges from different countries and legal cultures (Mahne 2012). The UPC comprises two judicial instances. The first instance is represented by a central chamber in Paris with a branch in Munich, and a federal system of local and regional chambers in the respective member states. Due to its high caseload in patent litigation, Germany will house four local chambers in Duesseldorf, Mannheim, Munich, and Hamburg (Zingg and Elsner 2020). The second instance consists of a Court of Appeal in Luxembourg,

which decides on all appeals from the first instance. Given the federal court structure, the UPC faces the challenge of how to harmonize the nationally varying legal cultures and practices and to establish a reliable and acceptable European jurisdiction. In the light of the challenge of creating a unitary IP regime in the European Union, today's reality is even more complex because differences in legal practice may evolve even *within* a single national jurisdiction. When it comes to enforcing patent rights, Germany is the only European country where patent infringement cases can be heard before twelve alternative regional courts, evoking geographical variation of patent litigation across regional court practices. Because Germany has become a globally renowned jurisdiction in which the world industry seeks reliable patent litigation, and because Germany is characterized by a federal system of parallel courts similar to the UPC, we use the opportunity to examine the mechanisms that help align different regional legal practices, as this is the goal of the upcoming European framework.

According to German patent law, the specialized civil chambers of the regional courts have first-instance jurisdiction over patent litigation, and plaintiffs can choose freely in which court to bring their case, a privilege called 'forum shopping' (Marshall 2000). The freedom of choice opens a space for reputational competition among twelve geographically scattered regional courts to attract lawsuits. These court locations create unique socio-spatial contexts, which in turn influence legal practice (Evrard 2022). Adopting a legal geography perspective (Holder and Harrison 2003), we contribute to this emerging field by following the scholarly call for an empirical focus on unravelling spatial patterns of law, "especially at the subnational level" (Economides et al. 1986, p. 163).

In this paper, we address the tension that arises from regional variations in judicial practices on the one hand, and from the harmonization of court decisions by means of the appellate process, on the other. Based on 34 particularly controversial patent infringement cases that were initially heard at the most important regional court in Europe (Fei 2014), the Duesseldorf Regional Court (RC), we follow these cases through all appellate instances up to the Federal Court of Justice (FCJ) to analyze the litigation process and possible events of judicial decision reversals. Decision reversals, the overturning of a judgment in favor of the previously adversely affected party, have received considerable attention in the legal literature (Moore 2000, 2005; Mullally 2010; Newman 1992; Surden 2011), and have been the source of controversy. Whereas many studies have primarily looked at the negative effects of high reversal rates, others have emphasized the benefits of reversals for error correction (Oldfather 2010) and their contributions to court rulings (Shavell 1995).

Our qualitative content analysis of the judgments conveys original findings. First, the Duesseldorf Regional Court (RC) tended to favor patent owners, i.e., the plaintiffs, over defendants in those contested cases. Second, a significant proportion of those cases had been overturned at least once on their way to the third instance before the Federal Court of Justice (FCJ). Third, most decision reversals in favor of the plaintiffs turned in favor of the defendants, thereby correcting the reputation of the Duesseldorf RC of being patent-friendly. Fourth, especially at the intermediate level of the higher regional courts (HRC), judges made rich use of citations to previous decisions to justify their decisions in more detail than the RC. Fifth, most FCJ decisions conveyed so-called guiding principles (Leitsatzentscheidung), which serve as a judicial tool to guide future first and second instance decisions across Germany.

The evidence suggests that the appellate process acts as a counterbalance to interregional variations in legal practices. The various ways in which the appellate process in general can contribute to institutional harmonization (Knieling and Othengrafen 2015; Van Rooij and Lo 2010) will matter in the forthcoming institutionalization of the European UPC at the supranational level. Throughout the paper we will raise questions about how international judges with different training and legal cultures, coming together to hear patent validity or infringement cases, will depend on the complex machinery of the appellate process in the light of consistency in judicial decision-making (Miller and Curry 2009).

In Section 2, we characterize some aspects of the legal field of patent litigation in Germany to identify sources of uncertainty, before proposing decision reversals as a mechanism to harmonize variation and to offer convergence in judicial practice. In Section 3, we present an original research design to trace back and analyze disputed litigation cases heard at the third instance level, before the FCJ in Germany. In Section 4, we present our results before we draw conclusions in Section 5.

2. The German Patent System

For scholars interested in the geography of law and institutional dynamics of harmonizing legal regulatory frameworks (Tofan and Bostan 2022), the German patent system is suited to look at two opposing processes for understanding the relationship between law and space (Orzeck and Hae 2020; Reiz and O’Lear 2016). On the one hand, it accounts for interregional differences in legal practice that result from the operation of multiple “spaces of legal proceedings” (Brickell et al. 2021, p. 559) in the form of regional courts, the right of plaintiffs to freely choose their preferred regional courts (forum-shopping), and the resulting incentives for competition among courts for plaintiff-friendly reputations. On the other hand, the German legal system includes two hierarchical levels of appeal, which enable litigation parties to seek reassessment of their interests by independent chambers of judges at different courts. The UPC will face the same opposing forces. Indeed, forum shopping will be limited in that plaintiffs can only choose the forum where the infringement occurred or where the defendant resides. Because the UPC is one single court with regional chambers in each member state (Gombos and Orbán 2022), the Court of Appeal will have to reassess interregional differences in legal practice under the umbrella of a transnational, harmonized system. In this respect, the German system is to some extent comparable with the UPC system. We will explore the tension as well as the interplay between diversity and convergence in judicial practice at the German national level, and we mainly focus on decision reversals and the mechanisms used to balance geographical differences in court rulings.

2.1. Forum Shopping and Interregional Reputational Advantage

Germany is the most important jurisdiction for litigating patent infringements within the European regime of intellectual property, both for German and international IP owners. Its twelve regional courts account for more than two-thirds of all patent infringement cases heard in Europe (Fei 2014). They are known for their friendliness toward intellectual property owners and for relatively fast proceedings compared to other European jurisdictions (Cremers et al. 2017). Two features are important in the German patent regime:

(a) *Bifurcation*. Due to the principle of bifurcation, the Federal Patent Court (Bundespatentgericht) litigates all cases of validity, whereas the ordinary jurisdiction, including RCs, HRCs, and the FCJ, exclusively litigates infringement cases (Cremers et al. 2017; Henkel and Zischka 2019; Khuchua 2019).

(b) *Forum shopping* (Cremers 2004; Gaessler and Lefouili 2017; Moore 2001b). It allows the plaintiff to choose freely among twelve regional courts with specialized chambers of IP and patent law (Kraßer and Ann 2016) as long as either the accused party resides (‘lex domicilii’), or the infringement was committed (‘lex loci delictus’) in the (national) jurisdiction (Cremers 2004). Hence, infringers domiciled in Germany or businesses that infringe a patent in the German patent market can be sued before one of the twelve regional courts.

Given this choice, the plaintiff will bring his case before the court “most suitable for his action” (Marshall 2000, p. 652). The practice of forum-shopping provides several incentives for competition between regional courts for attracting additional suits to their chambers. These chambers do not cover all civil law, but are specialized chambers for patent litigation at the regional courts. Since civil courts have to financially sustain their court business, patent litigation, with their high litigation costs compared to other areas of civil law, are an important source of income. The establishment of a third chamber at the

Munich Regional Court in 2021 has been considered as a successful measure to attract cases and as a reputation signal for competing courts. Moreover, judges benefit from a higher caseload to develop their expertise in this area. Naturally, plaintiffs facing high litigation costs would choose a court with experienced judges to receive a reliable trial. This, in turn, increases the reputation effect, which is why it is important for courts to attract cases.

This competition has led to a marked concentration of at least 80% of all patent cases litigated in Germany in only three out of twelve regional courts (Graham and van Zeebroeck 2014): Duesseldorf, Munich, and Mannheim, and the concentration has become even more pronounced in recent years (Table 1). Despite a slight decrease in 2021, the lion's share of 92.2% of all first-instance infringement proceedings were heard by these three courts.

Table 1. No. of patent litigation cases heard in Duesseldorf, Munich, and Mannheim regional courts 2017–2021.

Year	Duesseldorf	Munich	Mannheim	Top 3 Courts	Top 3 Share	Total GER
2021	371	262	142	775	92.2%	841
2020	353	202	128	683	95.7%	714
2019	361	183	164	708	89.7%	789
2018	425	144	175	744	94.7%	786
2017	499	181	215	969	n.a.	n.a.

Source: Design by authors (according to Richter and Klos 2022).

The competition between courts creates cumulative advantages. The higher the number of cases, the more experience the judges can gain, which makes the court not only more visible, but also increasingly reliable and competent. Lawyers and attorneys appraise the high quality of court trials and convince their clients to choose courts accordingly. For litigants, it makes a difference whether a judge tries their first patent case or draws on hundreds of previous cases. Apart from the expanded experience, the speed of proceedings is also crucial in growing the reputation of a regional court because litigants may lose money unnecessarily if a dispute drags on. Patent litigation proceedings in Germany are expeditious also because expert witnesses are rarely heard, resulting in hearings without delay and at a low cost (Cremers et al. 2016). The cumulative advantage of experience gained through case volumes is further supported by the fact that Duesseldorf RC established a third specialized chamber for patent litigation back in 2012 (Klos 2012) and, more recently, in 2021, the Munich RC also opened a third patent chamber (Richter 2021). As the literature shows, forum shopping, interregional reputational competition, and economies of scale enable interregional differences in legal practice to emerge. These differences do not originate from bias or normative discrimination but from formal local rules of procedure as well as informal procedural conventions among judges, e.g., types of schedules, speed of internal processes, restrictions in the number of hearings, the decision whether to consult experts, etc.

2.2. Legal Interpretation of Patent Claims

Apart from the differences in the application of procedural rules triggering reputational competition, another source of potential regional variation in legal practice is the sensitivity of patent law to the interpretation of patent claims (d'Amato 1983). It is the task of judges in patent litigation to interpret the scope of patent claims, which entails linguistic, technical, as well as legal challenges. Therefore, interpretation is fraught with uncertainty (Easterbrook 1984; Gruner 2010; Ost and van de Kerchove 1999) and patent law offers greater judicial discretion than other areas of civil law, as the drafting of patent claims as part of the patent specification is an act of speech and expression (Bender 2001; Mullally 2010). The following quotation from a disputed patent claim illustrates the scope of a patent as determined by a patentee with respect to technical details, the choice of words to describe the operation of the invention, and the specific limitations and ideas on

the scope of the patent introduced by the patentee. Here, the patentee asserts a claim for patent infringement against the defendant. The patent relates to a drum unit as part of a toner cartridge. To remanufacture these cartridges, the defendant replaces the used image drum with parts that have the same function but do not originate from the plaintiff. Based on this initial situation, the plaintiff sued for injunctive relief and additionally demanded that the defendant destroy and recall the parts in question:

An electrophotographic photosensitive drum unit (B) usable with a main assembly of an electrophotographic image forming apparatus, the main assembly including a driving shaft (180) to be driven by a motor, having a rotational force applying portion, wherein said electrophotographic drum unit is dismountable from the main assembly in a dismounting direction substantially perpendicular to an axial direction (L3) of the driving shaft, [...] wherein said electrophotographic drum unit (B) is adapted such that when said electrophotographic drum unit (B) is dismounted from the main assembly in the dismounting direction substantially perpendicular to the axis (L1) of said electrophotographic photosensitive drum (107) said coupling member (150) moves from said rotational force transmitting angular position to said disengaging angular position. (LG Düsseldorf 2015, p. 5)

Despite the invention's detailed descriptions and technical features, the language of the description may be insufficient, ambiguous, or limited (Surden 2011), resulting in a lack of definiteness in the description of the patent claims (Mullally 2010). The linguistic ambiguity opens leeway for interpretation of the claims by the court. In addition to linguistic understanding, determination of a patent claim calls for the technical understanding of a given invention within the context of the relevant industrial sector, which is equally challenging (Goodman 2016; Seuba 2018). The scientific difficulty of modern technologies, highlighted in the cited case, has even raised the dilemma of whether and how much judges should engage in independent research when deciding patent cases (Cheng 2006). The linguistic and technical apprehension of a specific case needs to be reconciled with the relatively general legal norms and notions to be able to adopt a decision that fits within the accepted legal framework. For example, determining the nature of an improvement by a competitor to an existing invention based on the linguistic and technical considerations of patent claims amounts to finding (or not) the 'novelty' of the allegedly infringing invention, which together constitutes a legal imposition with another essential legal requirement of 'inventive step'. Hence, the interpretative delineation of claims by the judges is crucial for patent infringement proceedings (Nard 2000). Some legal scholars have focused on how courts practically apply interpretation methods under the given uncertainty (Wagner and Petherbridge 2004); for example, by the utilization of dictionaries (Miller and Hilsenteger 2005). Others have put emphasis on the impact that interpretive uncertainty has on case law, such as examining the discrepancy in interpretation between regional and appellate courts (Bender 2001; Chu 2001; Lii 2013; Moore 2000, 2001a, 2005; Newman 1992; Schwartz 2008; Sichelmann 2009; Zidel 2003). Because of the possibility of alternative interpretations of the patent claim, the court of appeal may reverse the judgment of the first instance, which also applies to the case in Germany cited above, where the FCJ (third instance) overturned the decision of the HRC (court of second instance). The FCJ's interpretation differs as to whether the technical effects of the invention are reflected in the replaced parts, and thus constitute infringement, or whether this is not the case, and thus there is no infringement of the patent. The HRC's interpretation that the drum unit was a new manufacture was wrong, as the FCJ did not see any inventive step in the replaced parts:

The decisive factor in deciding the dispute is therefore whether the replacement of the photosensitive drum is to be regarded as the new manufacture of a drum unit within the meaning of patent claim 1. Contrary to the opinion of the Court of Appeal, this is not based on a fictitious conception of the market. Rather, the only decisive factor is whether the technical effects of the invention are reflected in the replaced parts. [...] In the above constellation, a new production can

only be affirmed if the technical effects of the invention are found in the replaced parts. [...] Against this background, the Court of Appeal wrongly regarded the replacement of the photosensitive drum and flange as the remanufacture of a drum unit. (BGH 2017, pp. 19, 22)

2.3. The Appellate Process: Decision Reversals, Case Citations, and Guiding Principles

In Germany, the appellate process includes up to two appeal instances. Litigants may appeal the decision of an RC to one of the twelve HRCs for patent disputes, each of which has jurisdiction over a specific RC. This second instance hearing builds on the facts already presented in the first instance with no further collection of evidence. With the decision of the HRC, the court provides information as to whether further appeal before the FCJ in third and final instance will be allowed. If the FCJ decides to allow the appeal, the proceedings are reviewed, considering possible previous errors of law, but grounded on the facts asserted at the RC (Harguth 2019). One possible consequence of contested cases being heard on appeal is the reversal of lower court decisions by the HRC or the FCJ in the second and third instance, respectfully. Regardless of its cause, a reversal means that a court decision is to the disadvantage of the previously prevailing party. Judgments partially upholding the first-instance courts' decisions are also categorized as reversals.

Reversals are essential not only for legal scholars but also for human geographers interested in the geography of law because the appellate system and the opportunity for decisions reversals are key mechanisms to balance variation in IP case law, both substantively and spatially, and to convey accountable and equal justice across the respective jurisdiction. Research on decision reversals has focused particularly on the United States (Moore 2005). It has confirmed high reversal rates in terms of the number of judgments issued and the type of reversal within a given period (Chu 2001; Moore 2001a, 2005; Schwartz 2008; Zidel 2003). Between 1996 and 2007, for instance, almost a third of all cases were reversed by the United States Court of Appeals for the Federal Circuit (Gruner 2010). Taking the reversal rate as an indicator of good or bad decisions and casting a critical light on predictability and certainty in patent litigation, these studies call for improved claim construction standards to reduce interpretation errors.

In contrast, Gruner (2010) argues that contested litigation is subject to a selection effect and a minority of exceptional cases is filtered out of the overall population of patent litigation cases. In other words, he criticizes the attention paid to reversal rates in the above studies as misguided, citing Priest and Klein (1984), who argue that cases that go to court are simply cases that result from failed settlement negotiations between the parties. They apply the selection argument more generally to all instances of court trials, which are thus subject to the same filtering process (Eisenberg 1988). Fraught with uncertainty, these cases are viewed as not representative of patent litigation but rather as a small proportion of cases with 'abnormal characteristics' (Gruner 2010, p. 1071; Priest and Klein 1984). Thus, improvements in claim construction standards, however desirable, will never be a sufficient solution to this problem, because the filtering process will continue to ensure that complex, uncertain cases are selected from successful settlements and brought to trial.

In addition, the appellate process is important because "[...] increasing trial court accuracy reduces the frequency with which the appeals process is needed but not its desirability when errors are made" (Shavell 1995, p. 387). The occurrence of errors and their correction by reversals on appeal are keys in ensuring the adaptability and accuracy of the judicial process. At the same time, one should acknowledge that the appellate process is not a panacea, as an adversely affected party is not always in the position to appeal a decision due to the financial or other constraints which might render the first-instance decision enforceable, even with an error without the possibility of reversal. However, beyond its specific application in a particular case, the multi-stage appellate process improves the justice system in general; i.e., appellate court decisions are seen as contributing to the development of court rulings (Drahozal 1997). Consequently, "rather than attempting to define what we mean by 'error' we might profitably focus on better delineating what

the process of error correction ought to look like” (Oldfather 2010, p. 52). In this context, especially in German patent law, multiple levels of appeal prove useful in checking the accuracy and consequently the efficiency of economic justice in detail (Shavell 1995), if both parties have the means to bring the process to this level. The appellate process thus serves two functions: correcting errors and advancing case law.

In this context, the question arises as to how the appeal procedure is maintained in the German patent system, apart from its inherent characteristic that decisions are likely to be overturned, and how the convergence mechanisms are to help balance regional diversity and improve legal coherence and guidance for further decisions. Concerning the latter, case citations by judges in their appellate decisions are an important feature, provided that these citations are themselves used in subsequent local, lower-level decisions. Citations of earlier decisions lend legitimacy to the underlying reasoning (Shulayeva et al. 2017) and are thus a principal tool for the realization of precedential legal principle, according to which the precedents are binding. Although this principle is a feature of the common law tradition (Pojanowski 2015), courts in civil law countries, which include German courts, increasingly rely on precedent in their daily practice by citing earlier decisions (Gaessler and Lefouili 2017). One can imagine that a reversal of a decision in the second or third instance, regardless of its content, requires a good reason. Therefore, we consider case citations not only as error correction but also as a source of mitigating the uncertainties mentioned above.

To provide guidance for the general application of law and legal principles in subsequent judicial decisions, guiding principles may also be used as a judicial tool, especially in the third instance. Guiding principles contain the substantive core of a judicial decision and are considered to provide guidance for lower instance decisions (Verwaltungsgerichtshof Baden-Württemberg 2013). This is also the case in the abovementioned final judgment of the FCJ in relation to the drum unit patent:

For the assessment of the question whether the replacement of parts of a device placed on the market with the consent of the patent proprietor belongs to the intended use or constitutes a new manufacture, the protected product is to be taken as the relevant reference point. This also applies if the person entitled to use a copy of the protected product (here: an image drum unit) is used as a component of a more comprehensive article (here: a process cartridge). (BGH 2017, p. 1)

Therefore, we view the appellate process as an additional alternative for improving first-instance standards, as well as an opportunity to focus on contested cases and their reversals, rather than sidelining them as outliers. Hence, if the interpretation of the law is fundamentally fraught with uncertainty, as has been argued (Mullally 2010), and claim construction is malleable rather than rigid, a consideration of the entire appellate process is necessary to illuminate the forces of uncertainty and the countervailing effects of patent litigation in Germany.

Moreover, the appellate process in the German system plays a crucial role regarding institution building at the transnational level. The UPC, expected to begin operations in June 2023, will bring together international judges rooted in different ideas and practices of legal cultures to hear infringement cases of European patents. The diverse international composition of the court chambers is likely to expose litigants to uncertainty about court-specific expectations for their case. Transnational institution building and harmonization processes rely on the negotiation of norms and recursive learning among the actors involved (Kuus 2018), and shared beliefs facilitate this process toward common grounds on judicial alignments (Braithwaite and Drahos 2000; Friedman 1996; Quack 2007; Halliday and Carruthers 2007). Because variation and its harmonization at the transnational level are based on similar dynamics, it will be helpful to understand the convergence mechanisms operating at the interregional level of German jurisdiction to assess how responsible, reliable, and consistent litigation potentially operates within the UPC.

3. Methodology

3.1. Data: Contentious Cases of Patent Litigation

The empirical analysis focuses on contentious patent infringement cases in Germany. Cases are defined as contentious if they went through the entire appellate process, including court decisions by each of the respective courts, including RC at the first instance, HRC at the second instance, and FCJ at the third instance. Judgments of these cases were publicly available through databases of the FCJ ([Bundesgerichtshof 2020a](#)) and the case law of North Rhine-Westphalia ([Ministerium der Justiz des Landes Nordrhein-Westfalen 2020](#)). The FCJ database contains all publicly available decisions back to the year 2000. Since 2005, all decisions include reference to prior instances, including their docket number, which enabled us to retrieve judgments issued by the respective RCs and HRCs. However, because only a minority of RC court decisions were published ([Hamann 2019](#)), we had to concentrate on those case origins that allowed us to compile full documentation of the appellate process from 2005 to 2019.

In 2021, the FCJ counted 152 judges serving on 19 different Senates ([Bundesgerichtshof 2020c](#)). The X. Civil Senate is the exclusive focus of this study, as it deals with issues of patent law in addition to travel contract law and property law. Thus, in addition to patent invalidity actions emanating from Federal Patent Court (*Bundespatentgericht*) due to bifurcation, all patent infringement disputes carried to the third instance appellate level are heard before the X. Civil Senate. From 2005 to 2019, this Senate took a total of 1357 invalidity and infringement decisions ([Bundesgerichtshof 2020a](#)), of which 135 were on patent infringement disputes that had gone through all three instances. The lion's share of 116 cases (86%) originated from the three RCs, Duesseldorf, Mannheim, and Munich (Table 2), yet complete documentation at the lower instances was only accessible for 37 cases, of which 34 originated from the RC Duesseldorf.

Table 2. Third-instance patent litigation in the Federal Court of Justice, 2005–2019.

Original Court (RC/HRC)	No. of Cases	No. of Cases Available
Berlin	2	-
Duesseldorf	51	34
Erfurt/Jena	1	-
Frankfurt	9	-
Hamburg	5	-
Leipzig/Dresden	1	-
Mannheim/Karlsruhe	27	1
Munich	38	2
Nuremberg	1	-
Total	116	37
Total	135	37

Source: Design by authors (according to [Bundesgerichtshof 2020a](#)).

The Duesseldorf cases predominate for two reasons. First, Duesseldorf attracts by far the most cases even when compared to the other prominent locations of Mannheim and Munich (Table 1). Second, the case law database of the state of North Rhine-Westphalia provides the most comprehensive documentation of cases. Since we do not aim to compare regional court locations but to shed light on the appellate process as a whole, this dominance does not negatively affect our results. Rather, it helps to understand the mechanisms that may be of interest to the future UPC framework. For this reason, the following analysis focuses on the 34 cases that went through all three instances.

3.2. Methods: Qualitative Content Analysis of Judgments

Written judgments are ‘standardized artifacts’ ([Wolff 2017](#), p. 503) that allow researchers to arrive at interpretations and draw conclusions. Our review of these documents is based on qualitative content analysis techniques ([Mayring 2017](#)). Using iteratively coding,

paraphrasing, and reducing the content of more than 100 decisions (3 instances multiplied by 34 cases), we inductively developed comparison criteria and categories that we perceived at all instance levels (Mayring 2017). For this purpose, we used the MAXQDA software (VERBI Software 2020). Through this iterative process, we developed a comprehensive understanding of the litigation procedure and were able to trace the structure of the available texts (Srivastava and Hopwood 2009). We then revisited and analyzed the previously processed documents with greater knowledge. This process led us to code three categories for each contentious case: decision outcome, case citations, and guiding principles.

For the first category, we developed a case scheme that registers the prevailing party for each instance (Table 3) and allowed us to identify whether cases were confirmed or reversed throughout the appellate process. The second category refers to case citations. Although as mentioned above, in Germany there is no obligation, judges often cite decisions in other cases in their judgments to justify their own decisions and demonstrate consistency of case-law. By tracing these citations, we can identify the location and instance of the courts to whose judgments a judge refers. This allows us to assess which courts are particularly important for case law and whether regional courts refer to decisions of other regional courts. The case citations in the documents are indicated differently depending on the place and instance, as they are sometimes published in case law reports or collections of court decisions. The online portal dejure.org comprises an extensive law and decision database with around two million court decisions in Germany (dejure.org Rechtsinformationssysteme GmbH 2020). Using this platform, we could assign case numbers to all citations in the judgments under study. As mentioned earlier, the FCJ assigns a designation to the document that relates to its subject matter. For ease of identification, we recorded this designation in addition to the case number. The third category concerns whether the judgment of the FCJ has declared a guiding principle. Guiding principles contain the essential, substantive core of a judicial decision and are therefore regarded as guidance for decisions of the lower instances (Verwaltungsgerichtshof Baden-Württemberg 2013).

Table 3. Potential case scenarios to be assumed for the cases under investigation ¹.

Category	RC	HRC	FCJ
Plaintiff prevails	○	○	○
Plaintiff loses in second appeal	○	○	⊗
Plaintiff loses in appeal	○	⊗	⊗
Plaintiff prevails despite appeal	○	⊗	○
Plaintiff prevails in appeal	⊗	○	○
Plaintiff prevails in second appeal	⊗	⊗	○
Plaintiff loses despite appeal	⊗	○	⊗
Plaintiff loses	⊗	⊗	⊗

○ = Plaintiff prevails; ⊗ = Defendant prevails. ¹ This scheme represents the logical combinations of decision outcomes including reversals at HRC and FCJ instances. In practice, procedures can be more complex; e.g., if the FCJ rejects the decision and refers the case back to the HRC.

4. Findings

4.1. Case Outcomes: Correction by Reversal

The results build on the need to understand better if and how the appellate process facilitates convergence between variations of decisions by lower-instance courts. Using the case scheme (Table 3), we created different categories of cases depending on which party prevailed. By prevailing, we mean that one party predominantly wins a case; i.e., by majority judgment success. We found that the appellate process led to confirming the decision of the first instance in half of all cases. The remaining 17 cases were reversed either by second- or third-instance court decisions. Depending on their spatial and temporal

occurrence, we distinguish three types of decision reversals (Table 4): HRC, FCJ, and double reversals.

Table 4. Decision reversals of the cases examined in their manifestation.

Case ID	RC	HRC	FCJ ¹	Type of Reversal	Category
12	☉	☉	∅	double reversal	Plaintiff loses in rejection
15	○	☉	○	double reversal	Plaintiff prevails despite appeal
28	○	☉	○	double reversal	Plaintiff prevails despite appeal
101	☉	○	☉	double reversal	Plaintiff loses despite appeal
9	○	○	☉	FCJ reversal	Plaintiff loses in second appeal
45	○	○	☉	FCJ reversal	Plaintiff loses in second appeal
50	○	○	☉	FCJ reversal	Plaintiff loses in second appeal
74	○	○	☉	FCJ reversal	Plaintiff loses in second appeal
84	○	○	☉	FCJ reversal	Plaintiff loses in second appeal
94	○	○	☉	FCJ reversal	Plaintiff loses in second appeal
1	☉	○	∅	HRC reversal	Rejection
3	○	☉	☉	HRC reversal	Plaintiff loses in appeal
18	☉	○	∅	HRC reversal	Suspension of the proceeding
21	○	☉	∅	HRC reversal	Rejection
62	☉	○	○	HRC reversal	Plaintiff prevails in appeal
89	○	☉	☉	HRC reversal	Plaintiff loses in appeal
120	○	☉	∅	HRC reversal	Plaintiff loses in rejection

○ = Plaintiff prevails; ☉ = Defendant prevails; ∅ = FCJ rejects decision. ¹ In five cases, the FCJ rejected the decision back to the HRC or suspended the decision due to parallel invalidity proceedings.

First, an HRC reversal is a reversal that occurs only at the second instance (HRC). A total of seven cases were reversed by the HRC. These reversals can be attributed to two circumstances caused by the RC. Errors in legal interpretation led to three cases being overturned in comparison to the previous decision. These differences of opinion included disputes over the literal meaning and interpretation of the written claims and statements of the disputing parties. In addition, there were errors that manifested themselves in erroneous findings of fact, such as insufficient evidence and inadequate reasoning in judgments. We call them procedural errors, which occurred in four cases because the requirements developed by case law were not sufficiently met (OLG Düsseldorf 2018).

Second, an FCJ reversal is a reversal that occurs only at the third instance (FCJ). Three of the six reversals by the FCJ were based on differing interpretations of the patent claims. One reversal was due to parallel invalidity proceedings. Two cases were challenging to classify. In both cases, the FCJ referred to an erroneous approach by the plaintiff that led to the lower courts' incorrect interpretation of the facts. Therefore, it was not possible to precisely delineate the two reversals in terms of their circumstances, whether interpretive or procedural errors caused them.

Third, a double reversal is a decision that is reversed at both instances of the appellate process, so that the original first-instance decision by the regional court is reinstated. All the double reversals of judgments, as corrected by the FCJ, were due to errors of law committed by the superior (second-instance) court in construing the cases before it. Case 12 was also a double reversal, because the plaintiff prevailed in the second instance. However, the table only shows the final decisions after possible rejections by the FCJ. Therefore, we cannot see the reversal in the second instance according to the legend. Obviously, a second correcting authority (FCJ) will also discover errors committed by a first correcting authority (HRC) and will therefore be relevant. This becomes even more relevant when we include the double reversals in the consideration of the FCJ reversals (Table 5), as a shift in the errors committed becomes apparent in terms of their meaning. Whereas the HRC corrects errors

of interpretation in the same way as procedural errors, the corrective function at the FCJ clearly shifts to aspects of interpretation.

Table 5. Reasons for reversal by instance of appeal.

Type of Error	HRC (2nd Instance)	FCJ (3rd Instance)	Total
Matter of interpretation	3	7	10
Matter of procedure	4	2	6
Nullity of patent	-	1	1
Total	7	10	17

Although our analysis focused only on the contentious cases—at the expense of the majority of regular cases—it supports the public perception that the Duesseldorf RC has a reputation for being patent-friendly, which is also confirmed by the literature (Gaessler and Lefouili 2017; Herr and Grunwald 2012). The results show a Duesseldorf RC win rate for plaintiffs of 70% (Table 6). Therefore, Duesseldorf RC remains attractive for first-instance proceedings concerning forum shopping for plaintiffs. Moreover, this reputation is further supported by those 17 cases (of the 34 cases analyzed in this study) that were not reversed in any court of appeal because, again, the plaintiffs prevailed in 70% of the cases. This is consistent with the statement that the plaintiff can obtain a quick judgment to his advantage in order to use this decision to enter into further out-of-court negotiations (Cremers et al. 2017).

Table 6. Winners and losers before and after the appellate process.

	x	%
Plaintiff prevails in first instance	24	70.6
... also prevailed in the final court	10	41.7
Defendant prevails in first instance	10	29.4
... also prevailed in the final court	5	50.0
Total	34	100.0

Turning back to the contentious cases that experienced at least one reversal during the appellate process, only 40% of the plaintiffs who had won in the first instance also prevailed in the final instance. Accordingly, this reputation effect and the supposed advantages for the plaintiff in the first instance (and beyond) are diminished by the appellate process. As a further corrective function, the balancing effect that appeal courts cause to RC decisions was also perceived in six of the reversal cases where the plaintiff lost on the second appeal (Table 4). All the reversals by the FCJ were decided in favor of the defendant after both the Duesseldorf RC and the HRC decided the case in favor of the plaintiff.

Hence, the general picture that indeed shows the Duesseldorf Regional Court's plaintiff-friendly approach, even though later balanced throughout the appellate process (Table 6) illustrates that the burden of bringing an appeal is heavy on the defendant's shoulders. This once again demonstrates that the appellate process is an important feature of the justice system as a balancing act. Therefore, the way it is organized in terms of its accessibility is essential to keep the parties' prospects relatively equal. However, the appellate process itself is not the only measure to correct errors and provide legal certainty which calls for a holistic approach towards the enforcement of patent rights straight from the first-instance level—something that is worth considering also for the UPC.

4.2. Guidance: Citing Previous Decisions and Guiding Principles

Apart from correcting decisions by reversals, the appellate process assumes another important function for harmonizing case law. While reversals look backward to correct errors already committed by lower-level courts, at the same time, they provide guidance for

future case law. Courts provide guidance for future case law by citing previous decisions with precedential value. These citations raise the legitimacy of the judgment (Lupu and Voeten 2012).

For the 34 continuous cases, we identified a total of 1009 citations, of which the largest share of 90% refers to the three courts of the FCJ, Duesseldorf HRC, and the Duesseldorf RC. The use of citations varies markedly, between zero and 113 citations in a single judgment, across the 34 cases under study, which can be explained by the fact that citing decisions of the same and/or other courts is neither mandatory nor regulated, though it is a common practice. After reviewing first-instance decisions and comparing them with other cases that justify its rulings, the Duesseldorf HRC cited twice as often as the RC and accounts for half of all citations made (Table 7). In these 544 citations, the HRC refers to decisions by the FCJ in 75% of the cases. A greater depth of reasoning, the need to correct a decision in certain circumstances, and the main function as an instance of correcting errors of interpretation therefore can explain the high number of citations made by the HRC as a means of legitimation and guidance.

Table 7. Number of citations made and received by type of court.

Citations	RC	HRC	FCJ	Total
Citations made	254	544	211	1009
Citations received	47	107	751	905 ¹

¹ The difference of 104 citations is due to references to other/foreign court locations in the 34 decisions.

More thorough appellate evaluation of litigation also applies to the FCJ, which has the requisite expertise of five judges who rule exclusively on errors of interpretation. This expertise results in fewer citations made and, at the same time, 75% of all citations received by the FCJ. The concentration of citations of the FCJ's decisions as well as the FCJ's focus on corrections of false interpretations (Table 5) empirically confirms its role as a guiding authority for the lower courts (Bundesgerichtshof 2020b). Although the decisions of the FCJ are not binding, the lower courts almost invariably refer to the FCJ's legal reasoning, citing it in a total of 70% of the present cases.

Apart from reversal and case citations, there is a third instrument that facilitates harmonization: the guiding principles. Nearly 75% of the FCJ decisions contain guiding principles, which serve as a roadmap for lower courts and provide guidance for future court ruling (BGH 1991). However, if an HRC classifies a case as individual, it impedes further appeal before the FCJ. This is justified by the fact that the proceedings are not of fundamental importance for the interpretation of the law or do not appear to be relevant for securing a uniform case law. It is remarkable in this context that out of the 25 cases that contained guiding principles, the HRC has previously classified 16 cases as individual case decisions. In our sample, individual cases could make it to the third instance only because one of the litigants had filed a complaint against non-admission in order to proceed to the appeal before the FCJ. In contrast to selection theory, which views contentious cases as exceptions selected from out-of-court settlements (Gruner 2010; Priest and Klein 1984), we infer that individual case decisions that produce guiding principles in the course of the appellate process are by no means irrelevant. Instead, it is precisely the selection process that may challenge existing case law and be a source of additional guidance for future case law. This is proven, once again, by the large share of decisions pertaining to individual cases that contain guiding principles. Therefore, this example sheds light on both the understanding and relevance of the appellate process as a potential guide for lower courts. The extent to which these processes do guide lower courts remains an issue for further research.

5. Conclusions

In this paper, we have addressed the tension between variation in judicial practice and its reconciliation through the appellate process, for parties who can afford it, within a single

jurisdiction. The evidence suggests that the appellate process, through decision reversals, case citations, and guiding principles, improves the quality of judicial interpretation and is particularly important in jurisdictions with multiple regional courts. The appellate process not only provides for correction of errors and clarification of ambiguities, but also serves as a source of guidance for the evolution of case law and convergence of legal interpretations.

The appellate process will also be crucial in the establishment of a transnational institution such as the UPC. The court will have a first-instance level with a central division in Paris and another section in Munich. In addition, each participating national jurisdiction will host a local court or will be affiliated with a regional chamber as part of the first-instance courts. Due to its reputation and outstanding number of cases, Germany will retain a special role by hosting four local chambers (Zingg and Elsner 2020) so that forum shopping will also play a role in the UPC system (Jacobsmeier 2018). Especially at the beginning, the heterogeneous composition of a group of international judges will add a certain unpredictability to the parties, as a complex mix of national law, international law, and European law will have to be harmonized in each local/regional court (Baldan 2022). Therefore, all eyes will be on the central Court of Appeal located in Luxembourg, which will hear all the appeals from the different first-instance courts.

The way in which actions are brought before one of the divisions of first instance and the Court of Appeal as the court of last instance could have similar effects at the European level as at the German level. With the UPC as the central decision-maker, a core group of increasingly specialized judges is expected to bring more predictability over time for litigants who can afford the UPC. This is because similar mechanisms will be put in place to harmonize different interpretations of the law (Richter and Klos 2022) and ensure consistent court decisions among judges. Apart from the appellate process, which has been the focus of this article, the literature has examined additional drivers of harmonizing interpretations of the law, taking into account panel effects (Engel 2022) such as collegiality (Yu and Sun 2022), which can promote mutual trust among panel judges and improve judicial deliberation over time (Swalve 2022). Rules and principles, by and large, are only truly harmonized if the institutional processes to implement them are similarly effectively designed (Leebron 1996).

However, it is not self-evident that the parties concerned can appeal against first-instance decisions. Therefore, at best, the problem of divergence should be addressed through a combination of different remedies, also beyond the appellate process. Amendments to law aimed at minimizing the scope of interpretation are one such means of providing better guidance to national judges in interpreting the scope of patents (Walsh 2019). The adoption of entirely new laws may also attempt to mitigate heterogeneous judicial practice. An obvious example is the adoption of the EU Directive on the enforcement of intellectual property rights in 2004 (European Union 2004; Mejer and van Pottelsberghe de la Potterie 2011). Beyond legislative mechanisms, actor-oriented tools to achieve homogeneity can include legal internships and training (Walsh 2019; Khuchua 2019). In preparation of its launch in June 2023, the UPC has organized several training sessions for the judges, with the most recent event held in Budapest in January 2023. The training focused on learning the Rules of Procedure, on conducting mock trials, and on building a common understanding among judges for reliable procedures and jurisprudence. However, these remedies focus on preventing heterogeneity and legal uncertainty rather than addressing “errors” that have already occurred during the judicial process. Therefore, the appellate process is a powerful tool because its guiding nature allows it to serve as both a preventative and remedial measure for an ongoing case, as illustrated in this paper.

At this point in the formation of the UPC, our reflections lead to further questions in two respects. First, given the internal variations within a jurisdiction highlighted in this paper, it will be important to determine how UPC judges will manage to adopt a set of criteria to deal consistently with interpretations and decide cases across instances and first-instance courts chambers due to forum shopping. There will be more sources of heterogeneity in the interpretation of the law at the UPC, and its judges will have a more

difficult time making their judgments than in a national court. For example, the extent to which judges cite other judges from different countries may vary. In France, judges are still prohibited from explicitly citing foreign decisions in their own decisions, and French judges are therefore less accustomed to this practice than other European judges. As previous work suggests, playing a central role in the judges' citation network is a source of influence. Since the UPC will consist of several local and regional divisions at the first-instance level staffed by national judges, it is likely that there will be different interpretations on substantive issues, such as what can constitute direct patent infringement, as different standards apply in different national courts (McDonagh 2016). Therefore, tensions between variations and harmonization within the UPC may increase, necessitating efficient convergence mechanisms (Baldan and Van Zimmeren 2015).

Second, it will be critical to observe what standards the UPC Court of Appeal will apply and whether it will be influenced by certain national judicial preferences. The importance of an efficient and sound appellate process, i.e., vertical guidance, is even greater in the case of such a diverse court, where international judges with different training and legal cultures come together to hear patent infringement cases. The way in which these judges hear patent infringement cases before the UPC, a new transnational institution, from plaintiffs who have adapted their behavior to well-established, but probably partly outdated, national court-specific expectations for their cases will depend heavily on the complex cogs of the appellate process described above.

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