

Network analysis in legal history

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Network analysis in legal history: an example from the Court of Friesland

Remarks on the benefits

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Summary

This article focuses on the references (allegations) made by the lawyers in a selected number of cases to Roman and customary law as well as to court decisions when arguing their case. The analysis focuses on three similar civil litigation records from the Court of Friesland from 1716, 1718 and 1720. Network analysis was used to examine whether certain sources were more dominant (i.e. more central) in the network than others and to explore the relationship between the references. The lawyers in the three cases from the Court of Friesland appear to have used some references in common when arguing whether security rights (i.e. mortgages) included a right of pursuit and whether the auctioneer could recover the object if the buyer failed to pay.

Keywords

Court of Friesland – security rights – arguments – network analysis

1 Introduction

Civil court records are interesting for the legal historian, specifically from a perspective of law and its development over the centuries. The references to Roman and customary law that these records show demonstrate, for example, how the reception of Roman law functioned in legal practice in Friesland in the early modern period. Such cases are commonly analysed by intensive reading and note-taking and by identifying commonalities, differences and relationships between documents or elements of documents.

This article focuses on the relationships, and more specifically on the allegations (citations, references), in a selected number of cases. We use these cases to explore whether human analysis can be improved, or at least complemented, by applying network analysis. The latter is a computer science method that allows for the mapping, measuring and visualising of relationships between individuals, groups and other types of information¹. In this form of analysis, nodes are connected through edges, with the nodes being individuals, groups or information, and the edges being used to link the nodes. By treating court decisions as nodes, and linking the allegations in those cases to legislation and to other cases or scholarly work, network analysis can create a citation network that signals how information flows or has flown, and the extent to which certain nodes in the network are authoritative². Network analysis has been used for several purposes in the legal field: for analysing criminal behaviour³ and terrorist networks⁴; for finding authoritative cases at courts

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- 1 J.H. Fowler *et al.*, *Network analysis and the law: measuring the legal importance of precedents at the U.S. Supreme Court*, *Political Analysis*, 15 (2007), p. 324-325. See also M.G.H. Schaper, *A computational legal analysis of acte clair rules of EU law in the field of direct taxes*, *World Tax Journal*, 6 (2014), p. 77 and 80, which provides references.
 - 2 Fowler, *Network analysis and the law* (*supra*, n. 1), p. 325.
 - 3 R. Whalen, *Legal networks: the promises and challenges of legal network analysis*, *Michigan State Law Review*, 539 (2016), p. 553-554. This article provides an overview.
 - 4 J. Qin *et al.*, *Analyzing terrorist networks: a case study of the Global Salafi Jihad Network*, in: 3rd IEEE Conference on Intelligence and Security Informatics, Atlanta, Georgia, USA, 18 May 2005-19 May 2005, Berlin – New York 2005, p. 287-304. This work illustrates the effectiveness and usefulness of network analysis in research on terrorists.

such as the European Court of Human Rights (ECtHR)⁵, the Court of Justice of the European Union (CJEU)⁶ and the International Criminal Court, as well as in US⁷ and Canadian case law⁸ and Italian constitutional cases⁹; and for

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- 5 Y. Lupu and E. Voeten, *Precedent in international courts: a network analysis of case citations by the European Court of Human Rights*, *British Journal of Political Science*, 42 (2012), p. 413-439. In this article, the ECtHR cites precedent based on the legal issues in the case instead of on the country of origin and states that it is more careful to embed judgments in its existing case law when it rules against a domestic court's decision than when it confirms the domestic court's decision.
 - 6 M. Derlén and J. Lindholm, *Goodbye van Gend en Loos, Hello Bosman? Using network analysis to measure the importance of individual CJEU judgments*, *European Law Journal*, 20 (2014), p. 667. This article found the importance of judgments such as those in *Van Gend en Loos*, *Costa v. ENEL*, *Brasserie du Pêcheur* and *United Brand* to be overestimated, while the importance of other judgments, such as those in *Bosman*, *PreussenElektra* and *Schumacker*, was underestimated. Different conclusions may be drawn if sub-topics, instead of the body of CJEU case law, are investigated. See also Derlén and Lindholm, *Characteristics of precedent: the case law of the European Court of Justice in three dimensions*, *German Law Journal*, 16 (2015), p. 1073-1098. This article confirms the view that CJEU case law is particularly important in preliminary reference rulings concerning fundamental freedoms and competition law, and demonstrates that the number of Member States submitting an observation in a preliminary reference procedure is associated with how frequently the particular case is referred to in subsequent decisions.
 - 7 See, for example, R. Whalen, *Bad law before it goes bad: citation networks and the life cycle of overruled Supreme Court precedent*, in: R. Winkels, N. Lettieri and S. Faro (eds), *Network analysis in law*, Naples 2014; R. Whalen, *Modeling annual Supreme Court influence: the role of citation practices and judicial tenure in determining precedent network growth*, *Studies in Computational Intelligence*, 424 (2013), p. 169-176; Fowler, *Network analysis and the law* (*supra*, n. 1). See also J.H. Fowler and S. Jeon, *The authority of Supreme Court precedent*, *Social Networks*, 20 (2008), p. 16, applying authority scores while identifying the most important court precedents in U.S. Supreme Court cases. For a similar analysis of Dutch case law, see W. Radboud, J. de Ruyter and H. Kroese, *Determining authority of Dutch case law*, *Frontiers in Artificial Intelligence and Applications*, 235 (2011), p. 103.
 - 8 T. Neale, *Citation analysis of Canadian case law*, *Journal of Open Access to Law* <<https://ojs.law.cornell.edu/index.php/joal/article/view/20>>.
 - 9 T. Agnoloni and U. Pagallo, *The case law of the Italian Constitutional Court, Its power laws, and the web of scholarly opinions*, ACM Press, 15th International Conference, San Diego, California (2015.06.08-2015.06.12).

examining legal social networks¹⁰, networks of statutes and regulatory codes¹¹ and patent citations¹².

Volkaert argues that network analysis can be both conceivable and useful in legal history. His recent article provides an overview of research in digital legal history using network analysis and focusing on case citation networks and what he refers to as ‘*digital-dogmatic* legal history’. According to Volkaert, network analysis can complement dogmatic and contextual legal history, although qualitative juridical interpretations for understanding law remain necessary¹³. By applying network analysis to a selected number of cases of the Court of Friesland¹⁴, we further explore its potential for legal history research purposes¹⁵.

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- 10 J.P. Heinz and E.O. Laumann, *Chicago lawyers: the social structure of the Bar*, Chicago 1982; J.V. Beaverstock, *Managing across borders: knowledge management and expatriation in professional service legal firms*, *Journal of Economic Geography*, 4 (2004), p. 157; E. Lazega, *The collegial phenomenon: the social mechanisms of cooperation among peers in a corporate law partnership*, Oxford – New York 2001; E. Lazega and D. Krackhardt, *Spreading and shifting costs of lateral control among peers: a structural analysis at the individual level*, *Quality & Quantity*, 34 (2000), p. 153; E. Lazega and M. van Duijn, *Position in formal structure, Personal characteristics and choices of advisors in a law firm: a logistic regression model for dyadic network data*, *Social Networks*, 19 (1997), p. 375.
- 11 R. Boulet, P. Mazzega and D. Bourcier, *A network approach to the French system of legal codes, part I: analysis of a dense network*, *Artificial Intelligence and Law*, 19 (2011), p. 333. This article provides information on a group of influential codes, a group of codes relating to social issues and a group of codes concerning territories and natural resources; D.M. Katz and M.J. Bommarito II, *Measuring the complexity of the law: the United States Code*, *Artificial Intelligence and Law*, 22 (2014), p. 337, measuring and ranking the complexity of the U.S. Code’s Titles; M.J. Bommarito II and D.M. Katz, *A mathematical approach to the study of the United States Code*, *Physica A: Statistical Mechanics and its Applications*, 389 (2019), p. 4195, indicating that, over time, the structure, interdependence and language of the United States Code has grown; M. Koniaris, I. Anagnostopoulos and Y. Vassiliou, *Network analysis in the legal domain: a complex model for European Union legal sources* (v3), <https://arxiv.org/abs/1501.05237>, finding that the ‘Legislation Network [of the European Union] becomes denser over time, with the number of edges growing faster than the number of nodes’.
- 12 Whalen, *Legal networks* (*supra*, n. 3), p. 550-551. This article provides an overview.
- 13 F. Volkaert, *OK computer? The digital turn in legal history: a methodological retrospective*, *Tijdschrift voor Rechtsgeschiedenis*, 89 (2021), p. 1-46, especially p. 37 *et seq.*
- 14 For the Court of Friesland, see B.S. Hempenius-van Dijk, *Hof van Friesland, De hoofdlijnen van het procederen in civiele zaken voor het Hof van Friesland zowel in eerste instantie als in appel*, Hilversum 2004, p. 11-13.
- 15 Cf. N. Hakim and A. Monti, *Histoire de la pensée juridique et analyse bibliométrique: l'exemple de la circulation des idées entre la France et l'Italie à la Belle Époque*, *Clio@Themis* [Online], 14 (2018), <https://publications-prairial.fr/cliothemis/index.php?id=763>.

We conducted the analysis using Gephi, an open source software for exploring and manipulating networks¹⁶. Regarding the data, we focused on three similar civil litigation records from the Court of Friesland from 1716, 1718 and 1720. These documents consisted of the litigation documents available for both parties, with most of these documents being available in their entirety¹⁷. The court records included the linen bag in which the files were submitted, the judgment, the plaintiff's claim, the defendant's response, various testimonies of witnesses and documents of a purely procedural nature such as a document granting leave to appeal or one inviting a witness to be present at the lawyer's office in Leeuwarden at 10 o'clock for an interrogation.

The focus of our examination was on the references (allegations) made by the lawyers in these cases to Roman and customary law as well as case law when arguing their case. Our research concentrated on the references and on establishing whether certain sources were more dominant (i.e. more central) in the network than others. Another question concerned the relationship between the references. References could be expected generally to concern Roman law, given that Friesland – in contrast to the other provinces in the Dutch Republic – chose Roman law to be applicable insofar as it was not set aside by the province's statutes¹⁸. Whether this expectation holds true will become apparent from the network visualisation.

The contents of the three court records and their coherence are briefly described in section 2. The legal question, the simple interrelationships and any more complex relations between the references in the three cases are also addressed, while the references to Roman law, customary law and case law are categorised. Section 3 visualises the network, as well as mapping and further

16 M. Bastian, S. Heymann, and M. Jacomy, *Gephi: An open source software for exploring and manipulating networks*, International AAAI Conference on weblogs and social media 2009 (<https://gephi.org/publications/gephi-bastian-feb09.pdf>). The software can be downloaded at <https://gephi.org/>. For research in other fields using Gephi, see, for example, E.N. Maleka, P. Currie and H. Schneider, *Research collaboration on community health worker programmes in low-income countries: an analysis of authorship teams and networks*, *Global Health Action*, 12-1 (2019); M. Pazhouhandeh *et al.*, *A systems medicine approach reveals disordered immune system and lipid metabolism in multiple sclerosis patients*, *Clinical and Experimental Immunology*, 192 (2018), p. 18-32.

17 This is not always the case. In the archives of the Court of Holland, Zeeland and West-Friesland, for example, the civil court records are handed down for each party separately. For each litigation, therefore, two court records are needed. See M.-Ch. le Bailly, P.J.M. van den Heuvel *et al.*, *Inventaris van het archief van het Hof van Holland 1428-1811*, The Hague 2008, inv. no. 9001-12436.

18 *Statuten, ordonnantiën ende costumen van Frieslandt* of 1602, also referred to as the *Landsordonnantie* (L.O. 1602). A new, modified version of this *Landsordonnantie* (i.e. L.O. 1723) was promulgated in 1723.

exploring the references in the three similar litigations and discussing the relations visualised between the cases. The results, and broader remarks on network analyses in legal history, are discussed in section 4, followed by the conclusion in section 5.

2 Three similar Frisian court cases

2.1 *Recovery from a third party*¹⁹

For the purposes of the examination, three civil court records with similar cases were selected dealing with the same legal question²⁰. Two of these cases could be joined by close reading the court records, while the third was found in a footnote in one of the other case studies²¹. The facts in these three cases were broadly similar in that all three involved an object being sold at an auction. In the first two cases, the object was a black mare, whereas in the third case it was a red spotted cow. All three objects sold were encumbered with a mortgage and all three buyers failed to pay the purchase price, even after being reminded. The auctioneer who had sold the object subsequently had to recover it from a third party. In all three cases, the latter refused to surrender the object, claiming that it had been sold to him in a legally valid way and that he was therefore an (unassailable) possessor in good faith. Each time, the corresponding legal question was whether the security right (i.e. the mortgage) was valid only if the object was still with the debtor. Or could it also be valid and invoked if the object had been sold to a third party? In other words: did the security right include a right of pursuit, and could the auctioneer recover the object from the possessor in good faith?

Although the facts in the three cases were largely the same, the conditions of the sales were not. In the first case (inventory number 10099: *Abbema/Douwes*), the auctioneer had added the auction condition *clausula constituti* (*bezit-accoort*) and two sureties²², which the plaintiff initially failed to call

19 For a detailed explanation of the three cases, see H. de Jong, 'Copy-paste' in *processen aan het Hof van Friesland, Over de noodzaak van archiefontsluiting*, De Vrije Fries, 102 (2022) (in preparation).

20 ACF, inv. no. 10099 (final judgment no. 11), inv. no. 10415 (final judgment no. 22) and inv. no. 10705 (final judgment no. 23).

21 See chapter VI in J.H.A. Lokin, C.J.H. Jansen and F. Brandsma, *Het Rooms-Friese recht: de civiele rechtspraktijk van het Hof van Friesland in de 17e en 18e eeuw*, Hilversum 1999, p. 87-104 and De Jong, 'Copy-paste' in *processen aan het Hof van Friesland* (*supra*, n. 19).

22 The *clausula constituti* was a 'possession agreement', whereby the debtor (the buyer) stated that he possessed the object he had bought on behalf of his creditor (the auctioneer). See U. Huber, *Heedendaegse rechtsgeleertheit, soo elders, als in Frieslandt gebruikelijk*

upon. As a result, and as far as we can reconstruct²³, the claim was rejected by the court on 18 February 1716. In the second case (inventory number 10415: *Fenema/Heringa*), the auction condition *clausula constituti* was not added, but a specific mortgage was taken out, and there was no surety. Here, it would appear, the security right included the right of pursuit. In the final judgment on 22 February 1718, therefore, the defendant was ordered to hand over the black mare or pay the purchase price to the plaintiff (the auctioneer). The conditions in the third case (inventory number 10705: *Coehoorn/Symons*) were the same as in the second case, with the exception of the mortgage. In this case, the mortgage was not a specific mortgage, but a general one, which implied the privilege of the right of eviction (*voorrecht van uitwinning*). The plaintiff should, therefore, have first sued the non-paying buyer, which he had neglected to do. The Court of Friesland thus rejected the claim on 6 February 1720.

2.2 *Simple interrelationships*

Both the second and third case contains references to one of the preceding cases. In his reply, the plaintiff in the second case, Fenema, copied 26 articles – the claim, the reply etc. were enumerated – verbatim from the first case. Indeed, he explicitly mentioned this first case at the end of his reply. In the third case, the plaintiff, Coehoorn, copied 11 articles verbatim from the second case²⁴. These articles also happened to correspond with articles in the first case, although Coehoorn mentioned only the second case. The three lawyers would appear to have considered their cases to be similar and may have thought they could benefit from the earlier case(s). This interrelationship between the cases was found coincidentally, through close reading. New questions arise from this

(Leeuwarden 1699 (tweede druk)), part 1, book 2, cap. 48 no. 11. Cf. E. Koops, *Vormen van subsidiariteit: een historisch-comparatistische studie naar het subsidiariteitsbeginsel bij pand, hypotheek en borgtocht*, The Hague 2010, p. 155-156.

23 The reconstruction is based on commentaries by Zacharias Huber (1669-1732) and Dominicus Aggaeus Hamerster (1689-1774). See Z. Huber, *Observationes rerum forensium ac notabilium, in suprema Frisiorum curiâ judicatarum*, Leeuwarden 1723, part 1, *Observatio* 27, p. 95 and D. Hamerster, *Naukeurige en duidelyke verklaring over de statuten, ordonnantien, reglementen, en costumen van rechte in Frieslandt, volgens staats resolutie van den 12 Maart 1722 gedrukt en gepubliceert*, Leeuwarden 1741, part 1, 114 *et seq.* (no. 2). These authors, discussing similar cases, indicated the direction in which the Court's reasoning may have gone when assessing the disputes in question. This enabled the Court's reasoning in *Abbema/Douwes* to be reconstructed.

24 '(...) fuit lepidia disputatio de non ente a parte actoris proposita, (cuius defensio maximam partem erat verbotenus descripta ex actis prioris litis modo a nobis discussae) quod ad clausulam constituti, de qua continuo fabulabantur actor eiusque patronus ad nauseam usque (...)' from Huber, *Observationes rerum forensium* (*supra*, n. 23), p. 95. See Lokin *et al.*, *Het Rooms-Friese recht* (*supra*, n. 21), p. 103 n. 47.

finding, including how did the lawyers acquire procedural documents from the other cases? Did they have access to them in some way? Was it common to refer verbatim to articles from other court cases? Interestingly, and even without going into the cases in depth, we can also identify another simple interrelationship: the auctioneers from the first two cases and the red spotted cow from the third case all came from Marrum, a village in the north of Friesland. Did the lawyers then work together? Did they exchange procedural documents? Linking more cases of a similar nature could provide new answers to questions about legal practice in the early modern period.

Problematic in the study of court records is that it takes a long time to identify allegations in the text and to find relationships between them. One has to be both conscientious and lucky to recognise interrelationship between litigations. Moreover, based on the sample used for the present study it is hard to draw conclusions. And although the interrelationships mentioned in the three cases studies here were easy to recognise, recognition will be more difficult where the numbers of entities are higher.

2.3 *Relations between references: Roman law, customary law and case law*

Since the facts and the legal questions in the three cases under consideration are similar, it would not be surprising if the references to the sources also prove to be similar. And, indeed, this turned out to be true. The three cases contain a total of 55 references; of these, 30 were unique references, not including the two references to the other two cases studied here. There is thus an overlap: more than once, the lawyers used the same reference. It is difficult to identify patterns of references through close reading. Instead, therefore, we labelled the nodes (i.e. information entities) and analysed the relationships between them by using network analysis. Before applying this analysis, however, we first had to categorise the various sources to which the allegations referred, given that conclusions can only be drawn on well-defined entities.

For this article, we distinguished three categories of references, defined more or less by content, Roman law (15 times)²⁵, customary law (10 times) and case law (5 times). The three cases are separated from these categories. We are aware that this categorisation is not exhaustive and can be more accurately expanded in future studies, focusing more on the defining of the information entities. Some shortcomings arising from the use of inadequate definitions are that the legal commentaries and works on Roman-Frisian law

25 Fragments referring to Roman law originated from the Institutes, the Digest, the *Codex*, the Novels and the *authenticae*.

were classified – for the sake of convenience – under customary law²⁶. We also did not take the classification of the use of allegations into consideration, for example, are they copied or are they used by analogy? In addition, no distinction was made between data pertaining to the plaintiff and data pertaining to the defendant. The extent to which references were used at different stages in the legal proceedings was also neglected. However, the three categories chosen were considered sufficient for the purposes of this article, which sets out only to demonstrate the benefit of network analysis for this dataset.

3 Visualisation of relations

Visualising connected nodes leverages humans' perceptual abilities to discover patterns from data associated with nodes and edges. The network data in this article were acquired from external data sources²⁷. The network is represented by nodes and edges: the nodes are the relational data such as sources (cases on the one hand, and Roman law, customary law and case law on the other hand), while the edges represent the citations between these nodes. On all occasions, the cases records are the sources because only these records contain references.

The visualisation of the references in the three cases is presented in figure 1. The layout of the network is based on the *Force Atlas 2* algorithm²⁸, with the three cases illustrated in orange as set out below. As mentioned above, the first case has inventory number 10099 (1716), the second 10415 (1718) and the third 10705 (1720). The figure should be read chronologically, from left to right, with

26 Seven works are referred to: i) Paulus Christinaeus, *De Mechlinensium legibus, sive in leges municipales civium Mechlinensium notae*, Antwerp 1625; ii) B. van Zutphen, *Practycke der Nederlantsche rechten, van de dagelijksche soo civile als crimineele quaestien*, Groningen 1680; iii) Antonius Perezus, *Praelectiones in Codicem Justinianaeum*, Amsterdam 1645; iv) U. Huber, *Heedendaegse rechtsgeleertheyt, soo elders, als in Frieslandt gebruikelijk*, dl. 1, Leeuwarden 1686; v) J. Voet, *Commentarius ad Pandectas: in quo praeter Romani juris principia ac controversias illustriores, jus etiam hodiernum, & praecipuae fori quaestiones excutiuntur*, dl. 1, Lugduni Batavorum 1698; vi) A. Faber, *Codex Fabrianvs definitionvm forensivm et rervm in sacro Sabavdie senatv tractatarvm: ex ordine titvlorvm codicis Jvstiniani, quantum fieri potuit, accommodatè ad vsum forensem, in novem libros distribvtvs*, Lugduni 1616; vii) Placaat, tegens de groote ontrouw en simulaate handelingen omtrent levendige en andere roerlijke goederen tot groot nadeel der crediteuren (21 February 1685).

27 Bastian *et al.*, 'Gephi' (*supra*, n. 16).

28 For *Force Atlas 2*, see M. Jacomy, T. Venturini, S. Heymann and M. Bastian, *ForceAtlas2, a continuous graph layout algorithm for handy network visualization designed for the Gephi software*, PLOS ONE, 9-6 (2014): <https://doi.org/10.1371/journal.pone.0098679>.

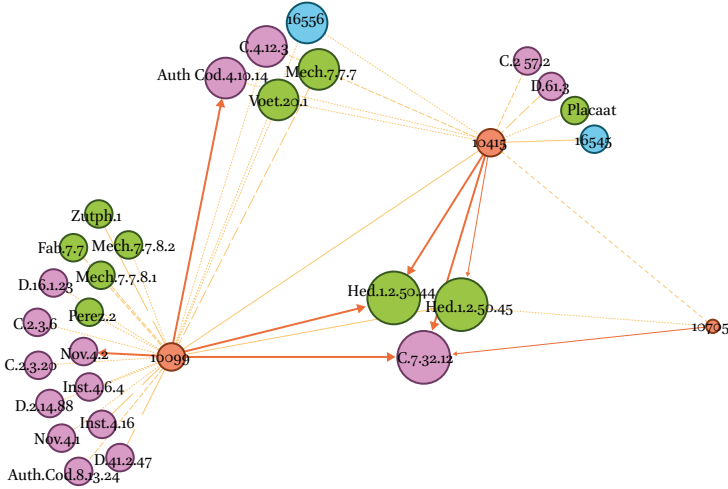


FIGURE 1 Network visualisation

references to Roman law being shown in purple, references to customary law in green and those to case law in blue. The node size depends on the incoming references: the more incoming references, the larger the node size (or, in network analysis terms, the larger the in-degree value). The same applies in respect of the thickness of the arrows: the thicker the arrow, the more often the lawyer referred to the particular source.

What can we generally deduce – despite the limited categories – from the network? The three nodes in the middle are the largest and therefore have the highest number of incoming references. All three cases refer to these fragments. The high (in-degree) centrality of these nodes suggests that these fragments are authoritative in this kind of legal issue. Two fragments from the *Heedendaegse rechtsgeleertheyt* by Huber are important, while one from the *Codex* is. The first case in time (10099) contains the most references, while the second case contains substantially fewer references. This second case refers to the first case, as the third case does to the second one. In its references, the third case is limited to the most important references, while the first two cases have some references in common, as shown at the top left. Both these cases refer to other case law in blue (16556). This case is from 20 December 1687. The second case also refers to other case law, specifically the judgment issued on 1 February 1676 (shown as 16545).

References to Roman law account for 50.0% of the references, those to customary law for 33.3% and those to case law for 6.7%, with the remainder comprising references to either or both of the other two cases. It is not surprising that most of the references are to Roman law, given that the Frisians chose

Roman law to be applicable. If customary law could be further specified within the category, for example, of Roman-Frisian law, the reception of Roman law could be calculated more precisely. The more accurate the definitions of information entities are, the more specific the information generated will be. However, qualitative juridical research will continue to be necessary.

4 Future of network analysis in legal history

For what other legal questions may network analysis be useful? As well as identifying meaningful relations between entities within a dataset, it could be helpful for combining similar sets of entities²⁹. If other court archives in the Dutch Republic were to be unlocked, relations between these courts could also be revealed. Since each province was autonomous in its private law, litigation in each court is likely to have had its own character. References in litigation before the Court of Holland, Zeeland and West-Friesland sometimes contain references to Frisian case law³⁰. But was this common? Did lawyers from the province of Holland refer to Frisian jurists? If so, why and when? Can we find lawyers practising in more than one court? What can we discover about the reception of Roman law in other provinces' courts? What differences in this respect can be discovered in the judgements of different courts? What developments can be identified based on these judgments? Are these differences expressions of identity? And what if we were to combine the set of entities with case law and consultation books³¹? Not to mention questions pertaining to other disciplines such as history, sociology and economics.

Today, entire archives of centuries-old material are available digitally and have been made searchable. Although such initiatives have commonly been undertaken in (digital) history departments, initiatives in the legal domain are under development. Fortunately, important initiatives are taken to change this situation. In, for instance, a pilot study, focusing on legal history, at the

29 Cf. Volkaert, *OK computer?* (*supra*, n. 13), p. 37 *et seq.*

30 H. de Jong, *Over het nut van digitale archiefontsluiting. De civiele procesdossiers van het Hof van Holland en het Hof van Friesland*, Pro Memorie, 24-1 (2022), 97-111, 108 e.v.

31 See, for example, J. Naeranus (ed.), *Consultatien, advysen en advertissemerten, gegeven ende geschreven bij verscheijden treffelijcke rechts-geleerden in Hollandt*, vol. 1-6, Rotterdam 1645-1666; J. van Poolsum and A. Schoonenburg (eds.), *Consultatien, advysen en advertissemerten, gegeven en geschreven by verscheide treffelyke rechts-geleerden in Holland en elders*, vol. 6, Amsterdam – Utrecht 1728-1747; R. van Zyll *et al.* (eds.), *Utrechtsche consultatien, dat is, decisoire ende andere advisen ... gemaect by de vermaertste rechts-geleerden*, vol. 3, Utrecht 1671-1700.

Department of Legal Theory and Legal History at VU Amsterdam, 48 metres of archives from the Court of Friesland (1499-1811) are being made accessible. The resultant data will be from 2273 civil cases from the period 1716-1730 (all documents in manuscript)³². This will be the first time that such a large amount of historical material from legal practice will be available.

A challenge resulting from the increased availability of data is that identifying relationships between documents or parts of documents become unmanageable if only human analysis is applied. While a citation analysis, as conducted in this article, may be feasible with three cases and around 50 references, it would be impossible to conduct such an analysis with 100, 500 or 2,000 cases (nodes) or references (edges). Computational methods can assist in analysing historical data by, for instance, automatically recognising references in the text. This can then result in more data becoming available metadata; that is, data about the data (e.g. citations). The availability of more digitalised documents in the field of legal history will also allow leveraging of computational methods and techniques for *analysing* the documents, with network analysis then being used, for instance, to explore relationships between large numbers of cases and between references to and from those cases. However, this type of research requires new (digital) skills and implies a transformation, at least in part, of academic research in the sense that the very nature and scope of historical research will change³³. Moreover, although promising, network analysis has its limitations. For example, particularly in large networks it becomes possible to group nodes (e.g. decisions, cases, arguments, sources) together based on their position in the network. Several algorithms exist for conducting such community detection, yet there is a lack of clarity as to precisely which algorithm is the most optimal one in which type of network. The same holds for determining the centrality of nodes. In-degree (incoming references) and out-degree (outgoing references) are intuitive measures, but a wide variety of additional measures exist, for instance algorithms that take into consideration the centrality of the nodes where references come from or go to (e.g. HITS, PageRank) or that give more weight to references from or to nodes that are younger or published more recently compared to other nodes.

32 Tresoar, Leeuwarden, Archive of Court of Friesland (ACF), inv. no. 10089-12361 (ca. 48 metres). As each metre of archives contains ca. 4,080 images, 48 metres will contain ca. 195,840 images. These records comprise only part of the total of 196 metres of archives: 17,030 inventory numbers (ACF, inv. no. 7599-16470).

33 See G. Mühlberger *et al.*, *Transforming scholarship in the archives through handwritten text recognition, Transkribus as a case study*, *Journal of Documentation*, 75-5 (2019), p. 954-976.

5 Conclusion

This article discusses three similar cases, in which the legal question at stake was whether security rights (i.e. mortgages) included a right of pursuit. Could the auctioneer recover the object if the buyer failed to pay? The answer to this question depended on the contractual conditions. The lawyers in the three cases from the Court of Friesland appear to have used some of the same references. Network analysis of these references was used to visualise the relationships between these three cases, with the most important references also being made visible. A network can also be customised to suit specific purposes: the more entities (big data) that are defined, the more information that can be generated.

What will the future of network analysis in legal history bring us? Once the 48 metres of civil court records have been labelled, network analysis can be used to expose patterns and trends that cannot be observed by the naked eye, including, for example, relations between legal problems, geographical locations, lawyers and clients. It can then be further leveraged, particularly if references can be detected automatically, to detect relationships between cases, references and actors that cannot be detected by means of human analysis. By comparing legal practice in civil court records in various provinces, or even internationally, network analysis will also make it possible to explore the mode of operation in these courts. This type of research in legal history will then generate new information that will add knowledge to historical legal practice, as well as uncovering information about daily life in early modern history and possibly also leading to a new understanding of the identities of the various provinces.