Acta Historica Tallinnensia 32/2 https://doi.org/10.3176/hist.2026.2.03

From Manuscript to Visualisation: A Digital Approach to Medieval Livonian Craft Ordinances

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Abstract. Medieval Livonian craft ordinances have often been reproduced and examined by researchers, but they have not previously been compiled into a single edition. The digitisation of these sources is not just a matter of access and preservation; it also offers an opportunity for further scholarly analysis by transforming dispersed manuscripts into a structured corpus of data. This corpus enables new forms of comparison, corpus analysis, and visualisation, while also exposing the limits of interpretation in data-driven approaches to the normative sources of medieval towns.

Keywords: Medieval Livonia, Riga, Tallinn, craft guilds, Transkribus, digital history, Nodegoat

INTRODUCTION

Medieval Livonian craft ordinances have attracted legal and scholarly interest since at least the seventeenth century, when medieval documents were copied into manuscripts reflecting the writing practices of the time.[1] Printed editions subsequently made these texts accessible to a

1 For example, the 1459 craft ordinances of Tallinn masons and sculptors survive in a seventeenth-century copy: Kivi- ja kujuraidurid / Stein- und Bildhauer, Schragen, 1459, 17th-century copy. Tallinna Linnaarhiiv (Tallinn City Archives, TLA), Tallinn, 190-2-651.

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wider scholarly readership. In a way, the digitisation initiatives of the twenty-first century continue this process of transmission, transforming medieval documents into structures and formats usable by today's researcher. Printed editions are now increasingly supplemented, and in some cases replaced, by digital source editions containing images of original sources and digital transcriptions of those texts.

The digitisation of medieval Livonian craft ordinances, as part of the global digitisation trends, first improves access to scattered sources. However, the process also allows the transformation of manuscripts, later copies and printed editions into a reusable corpus that enables new forms of scholarly comparison, corpus analysis, and visualisation. This article introduces methodological opportunities through a case study in digitising and analysing digitised medieval sources.

The central research question of the article is: How does the digitisation of medieval Livonian craft ordinances change the possibilities for analysing this source group, and what methodological limits must be considered when normative texts are transformed into searchable and visualisable data? To answer this question, the article examines the source group and its digital transformation within the Digital Livonia project[2] and presents case studies of applying digital analytical approaches: corpus analysis and visualisation.

A digital source edition makes it possible to compile manuscripts and their fragments that are defined not only by their location in specific archives and collections, but also by new types of collections defined by their relevance to particular topics that reach across several centuries and modern national borders. This idea underlies the Digital Livonia collection "Craft guild statutes of medieval Livonia" that contains digitised and transcribed craft ordinances from Riga and Tallinn, dating from the early fourteenth century to the year 1550, thereby compiling these sources in a single collection for the first time.[3] Such a source edition, including materials preserved at the Tallinn City Archives (TLA) and the Latvian State Historical Archive (LVVA), makes it possible to treat the many individual medieval craft ordinance documents as a joint corpus, which supports access for traditional history research, while allowing new approaches through data analysis.

The craft ordinances are especially suitable for this kind of methodological reflection because they contain several levels of

2 Digital Livonia. About the Project. https://dl.tlu.ee/en/project/about (accessed 20/09/2026).

3 R. Bruževica. Craft Guild Statutes of Medieval Livonia, 2025. https://dl.tlu.ee/en/source-editions/gildide-skraad (accessed 20/09/2026).

information, including legal, economic, religious and social regulations for urban and craft life. The artisan ordinances often regulated not only economic activity and work, but also the social life of the organisation, relations between members, and religious life and practice, which was an important aspect in the life of medieval townspeople. These ordinances, which primarily hold information about the craft organisations and communities that compiled and observed them, also include reflections of customs observed in medieval towns, including traditions that stretched across the landscape of the city, and social customs that were advisable or inappropriate during social interaction.

The application of digital history tools to the corpus of craft ordinances will enhance the study of the craft community as a place of sociability in the Livonian towns, allowing comparison between towns, crafts, and centuries, based on concordances, connections and networks in the digitised manuscript collection. During research work with the craft ordinance corpus, a traditional approach based on qualitative source reading and analysis has been combined with experiments and case studies performed with digital humanities methods. The opportunities and limitations encountered through this process form the basis of the article's methodological argument: digital tools can widen the scope of analysis and help locate patterns, but they do not produce historical interpretation automatically.

To address this topic, this article includes a historiographical overview and an analysis of the specific character of medieval craft ordinances in the Livonian manuscript material, followed by a description of the concepts, opportunities and the process of the transformative and reflective approaches imposed on the manuscript collection by digitisation. Based on the main outcomes from the initial digitisation process and opportunities of applying digital history tools, two methods are examined in detail to evaluate their contribution to the analysis of medieval sources. These examples of corpus analysis and visualisation through network analysis introduce the accessible tools for a historian of medieval sources and highlight the strengths, challenges, and limits of application. Finally, the discussion summarises the contribution of digitised medieval craft ordinances to research and the role of source-critical analysis as a critical feature paired with future analysis opportunities at the present stage of digital medieval history research on Livonia.

CRAFT ORDINANCES OF MEDIEVAL LIVONIA

In my ongoing research about crafts as spaces of sociability in the towns of medieval Livonia,[4] craft ordinances from Riga and Tallinn have been explicitly chosen as the main source group. The focus on source material from these two towns is largely connected to the survival of craft sources from these towns in reasonable quantity, whereas comparable sources from Tartu have not survived to the present. In many smaller Livonian towns, the population, and therefore the number of artisans, was too limited to sustain independent craft guilds. For this reason, the digitisation process and further analysis concentrate on Tallinn and Riga, where the documentary record and institutional craft life were more fully developed and remain accessible today, although the state and survival of sources from these two towns is diverse.

With regard to the available source material from Tallinn, the Tallinn City Archives hold 33 craft ordinances, comprising both original documents and contemporary or later copies. An overview of the Tallinn ordinances, including archival references and earlier editions, has been compiled by Maija Ojala in Table 3.1 of her study of craft trade culture in the Baltic Sea region.[5] For the present project, 30 of these manuscripts constitute the digitised corpus. The remaining items were omitted because suitable digital images were unavailable or their survival as later copies made them less suitable for inclusion in the present digital edition. Although several statutes had been digitised previously and published via the Saaga[6] platform, given the rapidly changing possibilities of digitisation, their quality did not meet the goals of digitisation in the Digital Livonia project. Digital photographs of Tallinn craft ordinances were made by photographer Stanislav Stepashko in 2010 and were made available to the author for digitisation. Several transcriptions of the ordinances exist; however, they remain dispersed across books and other publications and have not been compiled into a single collection.

For the study of Riga's craft guilds, scholars have mainly relied for more than a century on a single foundational edition: the transcribed compilation of the statutes of Riga's craft and merchant guilds until

4 PhD thesis in preparation at Tallinn University, provisionally titled "Craft Guild as a Place of Sociability in Medieval Livonian Towns: Religious and Everyday Practices".

5 M. Ojala. Protection, Continuity and Gender: Craft Trade Culture in the Baltic Sea Region (14th–16th Centuries). Tampereen Yliopisto, Tampere, 2014. 319–320, Table 3.1.

6 Saaga: Digiteeritud arhiiviallikad. https://www.ra.ee/dgs/explorer.php (accessed 16/09/2026).

Table 1. Overview of the medieval Livonian craft ordinance corpus. The table summarises the source material by craft, survival in Riga and/or Tallinn, number of ordinances, date scope, available archival originals, and printed-edition basis. It shows the mixed character of the corpus, which combines archival manuscripts, later copies, and nineteenth-century printed editions. Table prepared by the author.

Craft	Survival (R/T)	No. of ordinances	Date scope	Archival originals available	Printed edition
Bakers	R, T	5	1235–1527	Bäcker Schragen 1438 TLA.190.2.281, 1r–7v; Bäcker Schragen 1527 TLA.230.1.Ac5, 98r–103r	Stieda, Mettig 235; Stieda, Mettig 239; Stieda, Mettig 242
Barbers	R	1	1494	—	Stieda, Mettig 248
Beer carters	R, T	2	1456–1466	Bierträger Schragen 1456 TLA.190.2.680, 1r–3r	Stieda, Mettig 252
Blacksmiths	R, T	6	1382–1459	Schmiede Schragen 1382 LNA_LVVA, F4038_2_1117, 41r; Schmiede Schragen 1382 LNA_LVVA, F8_1_15, 2r–4r; Schmiede Gesellen Schragen ~1399 LNA_LVVA, F8_1_15, 17r–18r; Schmiede Schragen 1415–1437 TLA.190.2.554, 1r–4v; Schmiede Schragen 1459 TLA.190.2.555, 1r–7v	Stieda, Mettig 463
Boatmen	T	2	1506–1531	Mündriche Schragen 1506 TLA.190.2.663, 1r–3v; Mündriche Schragen 1531 TLA.190.2.664, 1r–11r	—
Brewers	T	2	1498–1505	Brauer Schragen 1498 TLA.190.2.666, 1r–3r; Brauer Schragen 1505 TLA.190.2.667, 1r–2v	—
Butchers	T	4	1394–1528	Fleischer Schragen 1394 TLA.190.2.118, 1r–11r; Fleischer Schragen 1509 TLA.190.2.121, 1r–8r; Knochenhauer Schragen 1509 TLA.230.1.Ac5, 45r–48r; Knochenhauer Schragen 1528 TLA.230.1.Ac5, 61r–63v	—
Carpenters	T	1	1508	Zimmerleute Schragen 1508 TLA.190.2.668, 1r–7r	—
Carvers	R	2	1436/1536–1541	Schnitzer Schragen 1436 or 1536 LNA_LVVA, F4038_2_1117, 127r–136v	Stieda, Mettig 515
Coopers	R, T	4	1375–1556	(Bodeker) Bottcher Schragen 1375 LNA_LVVA, F8_1_15, 12r–14r; Bottcher Schragen 1435 TLA.190.2.472, 1r–4r; Bottcher Schragen 1515 TLA.190.2.473, 1r–7r; Böttcher Schragen 1556 TLA.190.2.474, 1r–7r	—
Dockers	R	1	1463	—	Stieda, Mettig 407
Fabric cutters	R	1	1383	Lakenschrerere Schragen 1383 LNA_LVVA, F4038_2_1117, 40r	—
Fishers	R	1	1403	—	Stieda, Mettig 275
Furriers	R, T	3	1397–1553	Kürschner Schragen 1397 LNA_LVVA, F8_1_15, 6v–8v; Kürschnere Schragen 1553 TLA.230.1.Ac5, 68r–70v	Stieda, Mettig 383
Girdler and Belt makers	R	1	1512	—	Stieda, Mettig 338

Continued on the next page

Table 1. Continued

Craft	Survival (R/T)	No. of ordinances	Date scope	Archival originals available	Printed edition
Glaziers	R	2	1541–1542	Glaser Schragen 1541 LNA_LVVA, F224_1_2472, 1r–4v	Stieda, Mettig 289
Goldsmiths	R, T	5	1360–1542	Goldschmiede Schragen 1360 LNA_LVVA, F8_1_15, 4v–6r; Goldschmiede Schragen 1393 TLA.190.2.069; Goldschmiede Schragen 1453 TLA.190.2.070, 1r–5r; Goldschmiede Schragen 1537 TLA.230.1.Ac5, 64r–67v; Goldschmiede Schragen 1542 LNA_LVVA, F4038_2_1117, 1r–15r	—
Hemp spinners	R, T	2	1436–1462	Hanfspinner Schragen 1462 TLA.190.2.642, 1r–6v	Stieda, Mettig 346
Linen weavers	R	1	1458	Leineweber Schragen 1458 LNA_ LVVA, F4038_2_1117, 45r	—
Masons	R	2	1390–1546	Maurer Schragen 1390–1459 LNA_ LVVA, F4038_2_1117, 118r–122r	Stieda, Mettig 428
Masons, Sculptors	T	1	1459	Maurer, Steinhauer Schragen 1459, 17th century copy TLA 190-2-651, 1r–7r	—
Painters (wood carvers, glaziers, box-makers)	T	1	1513	Maler, Glaser, Schnitker und Kontor-macher Schragen 1513, TLA.230.1.Ac5, 5r–11v	—
Porters	R, T	2	1450-1529	Träger Schragen 1529 TLA.190.2.641, 1r–3r	Stieda, Mettig 414
Saddle makers	T	1	1459–1543	Sattel- und Gürtelschmiede Schragen 1459 & 1543 TLA.190.2.549, 1r–8r	—
Sculptors	T	1	1402	Steinhauer Schragen 1402 TLA.190.2.650, 1r–5r	—
Shoemakers	R, T	4	1399–1536	Schuhmacher Schragen ~1399 LNA_ LVVA, F8_1_15, 9r–11v; Schuhmacher Schragen 1416–1477 TLA.190.2.023, 1r–9v; Schuhmacher Schragen 1481–1536 TLA.190.2.024, 1r–12r	Stieda, Mettig 532
Tailors	R, T	4	1399–1519	(Schrodere) Schneider Schragen ~1399 LNA_LVVA, F8_1_15, 14v–16r; Schneider Schragen 1413–1594 TLA.190.2.511, 1r–8r; Schneider Gesellen Schragen 1519 TLA.190.2.522, 22r–24v	Stieda, Mettig 482
Town servants	R	1	1415	—	Stieda, Mettig 655
Wagoners	T	2	1435–1545	Führleute Schragen 1435 TLA.190.2.678, 1r–4v; Führleute Schragen 1545 TLA.190.2.679, 1r–2v	—
Workers, Porters	R	1	1535	—	Stieda, Mettig 233

1621, edited by Wilhelm Stieda and Constantin Mettig and published in 1896.[7] An overview of the Riga ordinances, including archival references

7 Schragen der Gilden und Aemter der Stadt Riga bis 1621. Bearb. von W. Stieda, C. Mettig. Alexander Stieda's Buchhandlung, Riga, 1896.

and editions, has also been compiled by Maija Ojala in Table 2.1 of her study of craft trade culture in the Baltic Sea region.[8] The present research sought to return, wherever possible, to the surviving originals and integrate them into a digital edition. Fourteen ordinances were located in the fonds of the Latvian State Historical Archive (LVVA), digitised, and provided with revised semi-diplomatic transcriptions; Stieda and Mettig's transcriptions were used as a starting point where available. The transcription preserves manuscript u/v distinctions and capitalisation, represents punctuation with modern Unicode characters, and expands most abbreviations. The nineteen other statutes, whose manuscripts are no longer available, are based on the nineteenth-century edition and consequently retain more of its editorial characteristics. This mixed-source basis makes the available Riga ordinances accessible as a large corpus but also means that transcription and editorial differences must be considered in digital comparison and term-count analysis (see Table 1).

CRAFT ORDINANCES AS A SOURCE

The craft ordinances from Riga and Tallinn belong to a normative and legally descriptive source type with a relatively stable external structure: first identifying the craft concerned and the date of confirmation, then referring to approval by the town council, and often mentioning the type of organisation and its dedication to a patron saint. Through these formulae, the opening and closing paragraphs of the documents often present the structure of formally authorised texts, with the main body of the statute consisting of a sequence of listed regulations. They regulate admission to apprenticeship and mastership, workshop practice, production standards and prices, relations between members, expected conduct during meetings and feasts, participation in religious ceremonies, and the obligations of members in cases of sickness, death, or poverty. Often, the regulations are accompanied by a sanction, usually a fine, although other forms of punishment, such as exclusion, may also occur. Most of the texts included in the corpus follow a similar structural and thematic convention, which, together with the use of penalties, suggests the normative character of these sources.

The normativity of the craft ordinances is one of the main methodological challenges in using them as historical sources. Although

8 M. Ojala. Protection, Continuity and Gender, 315–316, Table 2.1.

it would be misleading to read the ordinances as direct reflections of the functioning of these communities, the normative character of these documents does not make them detached from the social reality. The repeated confirmation of ordinances, the presence of different hands, additions inserted into the text, corrections, cancellations, marginal notes, and later supplements all indicate that these documents remained active within the institutional life of the craft community. Regulations could establish a formal framework that was approved by the town council and the community, while actual practice could develop in more varied ways.

Research in combination with other sources concerning artisans has suggested the flexibility of craft ordinances, which does not necessarily contradict the surviving regulations. This can be seen, for example, in recent research on cases of widows' rights within craft communities.[9] Ordinances might allow a widow to continue the workshop for a limited time period, but individual cases could extend this right beyond what the regulatory content of the statute suggested. Such cases suggest that statutory restrictions could be relaxed in practice while remaining grounded in written regulations.

Other types of evidence, such as fine and account books, also suggest that statutory regulations were not merely theoretical. The late fifteenth-century fine and account book of the Riga Porters' guild records offences and links them to specific individuals, showing that at least some regulations were actively monitored and enforced within craft communities.[10] Even when such parallel evidence survives only exceptionally, it is important as it demonstrates the practical administrative context in which statutory rules could operate and offences could be addressed within the late medieval town.

A further indication of the connection between statutes and lived practice is the specificity of some regulations. Many additions or later clauses address very particular situations: forms of inappropriate conduct, disputes between members, obligations during specific rituals or gatherings, or procedures for circumstances not covered by earlier regulations. Such clauses are often too precise to be understood only as abstract legal formulae and their specificity suggests that the craft ordinances could respond to concrete problems that had arisen within the community and that written regulation was a tool to adjust, change, or redefine existing practices.

9 M. Ojala. Protection, Continuity and Gender.

10 G. Strenga. Donations, Discipline and Commemoration: Creating Group Identity in the Transport Workers Guilds of Mid Fifteenth-Century Riga. – Journal of Medieval History, 2022, 48, 1, 103–128. https://doi.org/10.1080/03044181.2021.2012502.

The craft ordinances of medieval Riga and Tallinn are best approached as legal texts that hold formal frameworks of institutional practice but were influenced by the practices of the craft communities and urban traditions. The value of craft ordinances as sources of medieval urban life lies in the duality between their normativity and practicality that reveals what craft communities and town councils considered necessary to regulate, what kinds of behaviour required sanction, which relationships needed formal definition, and how written rules were revised over time. These features of the ordinances make them suitable material for digitisation, since recurring regulations and terms can be studied with comparative analysis tools, while prioritising qualitative interpretation for specific regulations that reveal particularities of the crafts under study.

FROM MANUSCRIPT TO DATA

One of the aims of the Digital Livonia project is to create a comprehensive online portal that brings together written sources related to medieval Livonia.[11] The craft ordinances of Riga and Tallinn are among the source editions, combining the diverse formats that are today found in different archives and collections across Latvia and Estonia, both as original manuscripts and as physical and digitised printed editions.[12] This source edition brings together sources from different towns, centuries and organisations, regardless of their belonging to separate or common collections in the archives.[13] The work with this collection was planned according to modern standards and the practices of the most recent theoretical developments in the field of cultural heritage and manuscript digitisation.[14] To achieve the most diverse possibilities of the digital edition, it should include a high-quality photograph of the object and a layer of data, including a transcription that lets the

11 See the article by Marek Tamm and Hembo Pagi in this issue.
12 R. Bruževica. Craft Guild Statutes of Medieval Livonia.
13 For example, the Riga craft statutes – six were a part of the compiled book of "Olde Renthebock" (Olde Renthebock, 1382. Latvian National Archives, Latvian State Historical Archive (LNA_LVVA), Riga, 8-1-15); several others were found in the records of compiled documents from the corresponding crafts, (Glaser 1541 LNA_LVVA 224-1-2472) several were found sewn into a collection of many different late medieval and early modern pieces of handwritten documents of different conditions and materials, (LNA_LVVA 4038-2-1117) not to mention all of these sources being part of different archival fonds.
14 M. Terras, J. Nockels, S. Ames, P. Gooding, A. Stauder, G. Mühlberger. On Automating Editions: The Affordances of Handwritten Text Recognition Platforms for Scholarly Editing. – Scholarly Editing, 2024, 41. https://doi.org/10.55520/5V92VK9A.

researcher use the prepared transcription, while being able to observe the state of the original.

The transformation of the manuscripts into digital objects and data can be viewed as part of the tradition of reproducing text-based documents. In reality, this process produces new versions of sources and is never purely technical. As highlighted by Lars Björk[15], the reproduction of a document is adapted by the goals of use and standards of preservation of the producer – the historian or the institutional staff, meaning that the producer of the digital version also takes part in shaping the source as a digital object. This is also to be considered in the source editions of craft ordinances: the digitised transcription of the document is created through work with original manuscripts, but includes editorial decisions concerning layout, uncertain readings, strikethroughs and additions, and the degree of character normalisation for the digital format. These decisions also shape the conditions under which the digitised source material can be accessed, compared and interpreted. As a result, the digital format of the source represents the original object through data that preserves or suppresses certain features, while enabling different possibilities for scholarly work through digital humanities methods.

The digitised versions of craft ordinances were created by using Transkribus,[16] a research infrastructure for producing line-based transcriptions and automated recognition of handwritten text.[17] The Transkribus platform allows manuscript images to be divided into text regions and lines, which are then linked to corresponding transcription lines. These image-text pairs can also be used as "ground truth" for training Handwritten Text Recognition (HTR) models, which produce automatic transcriptions of visually and textually similar material.[18]

In the case of the Livonian craft ordinances, Transkribus was used as the main environment for transforming original manuscript images into structured digital text. Images of the ordinances were uploaded to the platform, segmented into text regions and lines, and then transcribed, corrected, or, if earlier transcriptions existed, aligned with

15 L. Björk. How Reproductive Is a Reproduction? Digital Transmission of Textbased Documents. University of Borås, Borås, 2015, 36.

16 Transkribus. READ-COOP. https://readcoop.eu/transkribus/ (accessed 20/09/2026).

17 J. Nockels, K. Gooding, M. Terras, M. Berlinska. Understanding the Application of Handwritten Text Recognition Technology in Heritage Contexts: A Systematic Review of Transkribus in Published Research. – Archival Science, 2022, 22, 3, 367–392, here 368. https://doi.org/10.1007/s10502-022-09397-0.

18 G. Muehlberger, L. Seaward, M. Terras, S. Ares Oliveira, V. Bosch, M. Bryan, S. Colutto, et al. Transforming Scholarship in the Archives through Handwritten Text Recognition: Transkribus as a Case Study. – Journal of Documentation, 2019, 75, 5, 954–976. https://doi.org/10.1108/JD-07-2018-0114.

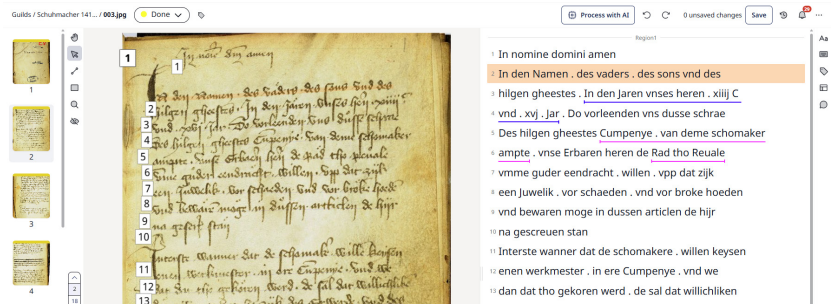


Figure 1. Manuscript image, layout segmentation, and line-based transcription of Shoemaker ordinances in Transkribus. The screenshot shows how the digitisation environment connects the manuscript layout with the corresponding transcription line, creating a layered digital object. Screenshot by the author; manuscript image from Tallinn City Archives (TLA), Shoemakers' ordinances [Schuhmacher Schragen] 1416–1477, 190.2.023, fols. 1r–9v.

the relevant manuscript images. The use of Transkribus as a digitisation environment has made it possible to connect the manuscript layout with the corresponding line in the transcription. The result is not only a readable text, but a layered digital object in which image, layout, and transcription remain linked (see Figure 1). For the study of Livonian craft ordinances, this changes the working conditions of the source: the transcription can be searched and exported for analysis, while the manuscript image remains available for verification and correction.

Creating the digital version of craft ordinances with Transkribus keeps the original source within close reach for any researcher who would re-approach it through the digital edition. If a reading is uncertain or open to correction, the image remains directly accessible, does not require a physical visit to the archive, and if the platform is maintained, corrections can also be added later. This accessibility of the source material can be used by researchers who want to examine the statutes of a specific craft, century or city, as well as approach craft guild history more broadly through search engines or data analysis. The material can also be used in teaching palaeography and reading Middle Low German in university curricula, especially for students planning to advance in medieval studies.

When a digitised version of the craft ordinances moves beyond the simple online display of manuscript images and offers a critically produced, usable, and documented representation of the sources, it can be understood as a digital scholarly edition. As highlighted by Melissa Terras and others,[19] images and machine-readable transcriptions can already form the basis of online scholarly editions, especially when they

19 M. Terras, J. Nockels, S. Ames, P. Gooding, A. Stauder, G. Mühlberger. On Automating Editions.

allow browsing, reading, searching, and further analysis; at the same time, such editions gain scholarly value through editorial intervention, quality control, metadata, statements on provenance, language, temporality, editorial practice, technical method, and links to related data. In the case of the Livonian craft ordinances, the Digital Livonia version fulfils the basic conditions of such an edition because manuscript image, line-based transcription, archival context, and structured metadata are brought together in one environment.

Work with the sources and their transcriptions on the Transkribus platform also created an opportunity to train HTR models on local source material. Since late medieval Livonian handwriting has not been the focus of many existing models, the project drew on comparable work with fifteenth-century German-language material, including models based on Hanseatic diet protocols[20] and Viennese property registers[21] from the fifteenth century. Early in the digitisation process the craft ordinance data was also included in the creation of a broader HTR Generic Model for fifteenth and sixteenth-century German.[22] The model was based on late medieval German manuscripts from Austria and the Hanseatic Baltic region and included both Middle Low German and Early New High German texts and was later used as a base model[23] for the creation of the now public Medieval Livonia DL[24] HTR model, which included data from transcriptions of the craft guild ordinances, civic ordinances from Livonian towns and probate inventories from medieval Tallinn.

The application of digitisation and HTR models to the craft ordinances resulted in digital source versions that enabled export in XML formats and implementation of the digital editions in the Digital Livonia platform (see Figure 2). Yet not all data produced during the digitisation process can be included in the public edition due to technical restrictions and the risk of sharing database or descriptive data without the context

20 I. Lange. Hanserezesse 15th Century v.2.0. – Transkribus / READ-COOP SCE, 2024. https://www.transkribus.org/models/hanserezesse-15th-century-v20 (accessed 20/09/2026).

21 J. Helmchen. Die Digitalisierung der spätmittelalterlichen Grundbücher Wiens mit Transkribus. – Mittelalter, 12 June 2025. https://doi.org/10.58079/143DO.

22 J. Helmchen. Generic Model 15th–16th Century German (prototype). Transkribus / READ-COOP SCE, 2022. https://www.transkribus.org/models/generic-model-15th-16th-century-german-prototype (accessed 20/09/2026).

23 H. Prokop. Should I Use a Base Model When Training a Custom Model? Transkribus, 7 February 2025. https://www.transkribus.org/blog/using-base-model-when-training-a-custom-model (accessed 20/09/2026).

24 Rūta Bruževica, 'Medieval Livonia DL', Software, Transkribus, Transkribus / READ-COOP SCE, 18 March 2024, https://www.transkribus.org/models/medieval-livonia-dl (accessed 20/09/2026).

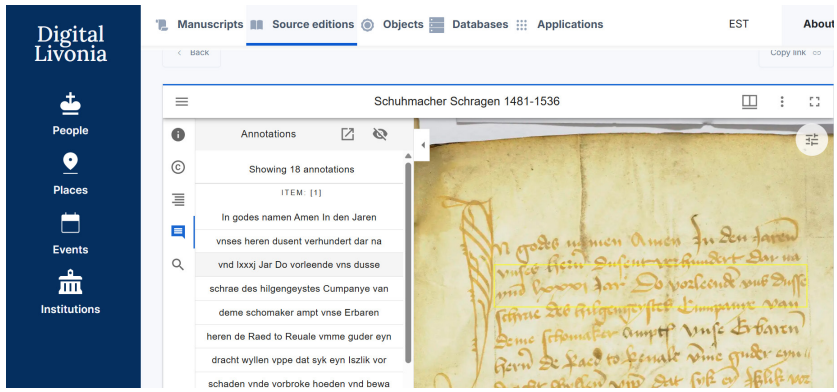


Figure 2. Digital edition of Shoemaker ordinances in the Digital Livonia platform. The screenshot shows the implementation of the digitised source as a source edition, where the manuscript image, transcription, and annotation environment are connected within the same interface. Screenshot by the author; manuscript image from Tallinn City Archives (TLA), Shoemakers' ordinances [Schuhmacher Schragen] 1481–1536, 190.2.024, fols. 1r–12r.

in which the researcher created it.[25] Such data, in the form of XML files, text files, databases, and encodings remains in the private administration of the researcher, and can be applied in other analysis tools for further insights based on specific, data-driven research questions that span the corpus of the now digitised manuscripts.

TEXT CORPUS AS A DATA ANALYSIS SOURCE

Apart from the digital edition and its display on the Digital Livonia website, another valuable result of the digitisation of the craft ordinances is the textual corpus of the source collection. This body of textual data on a common topic can be a starting point for several research directions that are possible with the tools of the digital humanities field and allow research in other disciplines beyond history. The text files, exported from transcriptions of each ordinance separately, hold information about the period, town and craft that they correspond to. The corpus, which consists of more than 400 transcribed pages and the additional texts from the previously published edition,[26] forms the basis for the following case studies.

25 M. Terras, J. Nockels, S. Ames, P. Gooding, A. Stauder, G. Mühlberger. On Automating Editions, 6–8.
26 Schragen der Gilden und Aemter der Stadt Riga bis 1621.

Corpus analysis, a method originally developed in linguistics, has recently been adapted for historical research,[27] especially in work with large bodies of similar texts from the same period, such as historical newspapers. For the present corpus, two especially useful methods, borrowed from corpus linguistics, are concordance and term-count analysis. Concordance allows the researcher to trace how a selected word appears in different textual contexts and alongside which other terms, making it possible to study recurring associations and to identify the meanings a term acquires within particular regulations.[28] Another simple method, term-count analysis, measures how often specific words or phrases occur across the corpus and can therefore indicate which themes, roles, or forms of regulation are especially prominent.[29] In the case of medieval craft ordinances, both methods are valuable as exploratory tools: concordance helps to interpret usage in context, while term counts help to detect broader textual patterns.

Corpus analysis tools can be used to reveal patterns of specific topics in the texts, and to visualise the results of these quantitative approaches. Although these methods could be applied to the whole corpus of craft ordinances, the clearest comparisons can be produced by choosing a smaller set of documents for a focused case study. To demonstrate the possibilities of corpus analysis, this section presents visual results based on four Shoemaker ordinances from Riga and Tallinn, with attention to terms referring to women in the ordinance texts. The free text analysis software CATMA was used to analyse and visualise both term distribution and concordance.[30]

In medieval ordinances, one of the challenges of applying corpus analysis is the inconsistency of words, not only in the variety of the terms used to denote the concepts mentioned, but also different versions of writing the same word or its inflectional forms. The application of Natural Language Processing (NLP) and lemmatisation of text content can reduce this problem for modern texts in many languages, where NLP pipelines are available for easy use, although Middle Low German is

27 L. Gauthier. Digital Humanities and the Notion of Corpus in Ancient History. – Digital Studies / Le Champ Numérique, ahead of print, 9 July 2025, 4, https://doi.org/10.16995/dscn.18169.

28 S. Hunston. Methods in Corpus Linguistics: Interpreting Concordance Lines. – Corpora in Applied Linguistics, Cambridge Applied Linguistics. Cambridge University Press, Cambridge, 2002, 38–66. https://doi.org/10.1017/CBO9781139524773.004.

29 C. Tumbe. Corpus Linguistics, Newspaper Archives and Historical Research Methods. – Journal of Management History, 2019, 25, 4, 533–549, here 536. https://doi.org/10.1108/JMH-01-2018-0009.

30 E. Gius, J. C. Meister, M. Meister, M. Petris, D. Gerstorfer, M. Akazawa, S. Messner. CATMA. – Zenodo, 10 March 2025. https://doi.org/10.5281/zenodo.15000951.

not among these languages. However, recent developments of Artificial Intelligence tools and specifically Large Language Models (LLMs) have advanced the accessibility of lemmatisation for historical languages.[31] Researchers can use LLMs to assist this process by supplying historical context, dictionaries, and text examples.

To enhance the quality of corpus analysis and reduce variation in the text, the four ordinance transcriptions were processed with an LLM. As UTF-8 text files, they were automatically tokenised, lightly normalised, and lemmatised using Middle Low German (MLG) dictionary-style lemma forms. The original spellings were preserved in the XML attributes, while separate CATMA-oriented outputs were created with either the original token or the lemma as the running text. The lemma-based version was used for the CATMA analysis presented in this article. Each token was enriched with basic linguistic metadata, including normalised form, lemma, part of speech, and a confidence marker distinguishing straightforward forms from linguistically or contextually uncertain ones requiring verification. After automated processing, the terms retrieved for the CATMA queries and their immediate KWIC contexts were checked manually against the transcriptions. This checking verified the retrieved occurrences rather than constituting a systematic search for forms potentially missed during automated lemmatisation. The lemmatised files should therefore be understood as a controlled working layer for exploratory corpus analysis, not as a complete linguistic annotation or critical normalisation of the ordinances. The precise prompt and lexical resources used during this experimental LLM-assisted processing were not preserved as part of the research documentation and cannot be reconstructed reliably; this limits the reproducibility of this stage and is one reason why the resulting data is not used for independent philological conclusions. The lemmatisation and XML structuring were produced with GPT-5.5 Thinking.[32]

After lemmatisation, the four Shoemaker ordinances from Riga[33] and Tallinn[34] were uploaded to CATMA and analysed with two tools:

31 C. Vidal-Gorène, B. Kindt, F. Cafiero. Under-Resourced Studies of under-Resourced Languages: Lemmatization and POS-Tagging with LLM Annotators for Historical Armenian, Georgian, Greek and Syriac. – arXiv, 17 February 2026. https://doi.org/10.48550/arXiv.2602.15753.

32 OpenAI. ChatGPT-5.5 Thinking. ChatGPT, May 2026. https://chatgpt.com/.

33 Schuhmacher Schragen, ca. 1399, Riga. Latvian National Archives, Latvian State Historical Archive (LNA_LVVA), Riga, F8-1-15, fols. 9r–11v; Schuhmacher Gesellen Riga 1414–1480. – Schragen der Gilden und Aemter der Stadt Riga bis 1621, 532–537.

34 Schuhmacher Schragen 1416–1477, Tallinn. TLA, 190.2.023, fols. 1r–9v. https://dl.tlu.ee/en/source-editions/gildide-skraad (10/05/2026); Schuhmacher Schragen 1481–1536, Tallinn. TLA, 190.2.024, fols. 1r–12r. https://dl.tlu.ee/en/source-editions/gildide-skraad (accessed 20/09/2026).

Distribution to visualise term occurrence, and Keyword in Context (KWIC) for concordance analysis. Lemmatisation substantially reduced the spelling and inflectional variation visible in the original transcriptions, but did not eliminate it completely. For example, a form such as *vrowenn* could be reduced to *vrowen*, while related forms could remain separate in the lemma-based text. This residual variation reflects both the difficulties of automatically lemmatising historical MLG and the mixed textual basis of the corpus, which combines semi-diplomatic manuscript transcriptions with an edition-derived text. The CATMA searches therefore used nine known forms referring to women: *junckvrowen*, *suster*, *susterne*, *vrouwe*, *vrowen*, *wif*, *frouw*, *frowen*, and *frouwenn*. These represent four broader lexical groups – *junckvrowe*, *suster*, *vrowe*, and *wif* – while retaining residual spelling and inflectional variants. The forms were queried separately, using their known word beginnings where necessary to capture remaining variants, and their occurrence counts were not pooled into a single category. This distinction was retained because the lexical groups can refer to different social positions or relationships, including unmarried women, wives, and women described as members or 'sisters' of the community.

Figure 3 demonstrates how corpus analysis can be used to compare the occurrence and position of selected terms across a small group of related ordinances. Each panel represents one ordinance separately, while its horizontal axis divides the document into ten equal sections, each corresponding to 10% of its character length. CATMA calculates positions through character offsets, including spaces and punctuation, but displays them here as relative positions from 0 to 100, which makes texts of different lengths comparable. The vertical axis shows the number of occurrences of a queried form within each 10% section rather than a cumulative count for the whole corpus. Each colour represents a separate queried form; points of the same colour are connected across sections for visual clarity, but the connecting lines do not indicate a relationship between individual occurrences.

The distribution graph does not in itself explain the role of women in the craft community, nor can the number of occurrences be treated as a direct measure of social importance. It does, however, make it possible to compare where different terms occur within the four ordinances and whether their occurrences are dispersed or concentrated in sections. For example, forms of *suster* are concentrated in particular parts of the ordinances, whereas forms belonging to the *vrowe* lexical group occur at several positions. Such differences provide a reason to return to

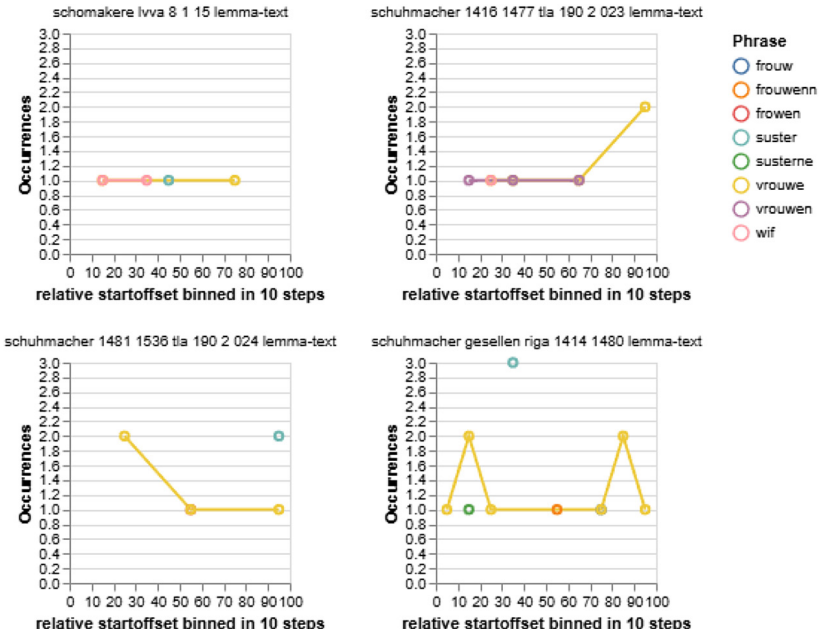


Figure 3. Distribution of selected Middle Low German terms referring to women in four sampled Shoemaker ordinances. Each panel represents one ordinance divided into ten sections of equal relative character length; the vertical axis shows the number of occurrences within each section. Colours represent individual queried forms, while connecting lines link occurrences of the same form across sections for visual clarity. The queried terms were *junckvrowen*, *suster*, *susterne*, *vrouwe*, *vrowen*, *wif*, *frouw*, *frowen*, and *frouwenn*. The graph was generated with the CATMA Distribution tool after lemmatisation of the ordinance texts. Graph prepared by the author.

the relevant passages: the concentration of *suster*, for example, can be examined in relation to clauses addressing the community as brothers and sisters, while other terms may occur in different regulatory contexts. The distribution visualisation therefore functions primarily as a means of locating textual patterns and identifying passages for subsequent qualitative reading.

While the Distribution tool visualises where selected terms occur within the sampled ordinances, the Keyword in Context tool provides a closer view of their immediate textual surroundings. The KWIC table (see Figure 4) lists each occurrence by document name, queried keyword, and a brief surrounding context, making it possible to examine how terms referring to women appear within specific clauses. This is important because concordance analysis moves corpus work closer to qualitative reading: the searched word is no longer treated only as a countable item, but as part of a regulation whose meaning depends on its legal and textual context. Using KWIC analysis, it is possible to follow the use of specific terms and compare their positions in text qualitatively. The term *suster*,

Document Name	Keyword	KeyWord In Context
schomakere lvva 8 1 15	junckvrowen	welk man unse werk ein ***junckvrowen*** nympth de in unse werk
schomakere lvva 8 1 15	suster	mogen item welk broder edder ***suster*** de olderman ofte de bisitter
schomakere lvva 8 1 15	vrouwe	vd denen item wesen ein ***vrouwe*** in de werk de er
schomakere lvva 8 1 15	vrouwe	wesen willen al ein bederv ***vrouwe*** . vortmer se scholen he
schomakere lvva 8 1 15	vrowen	werk al ein par knopeder ***vrowen*** scho . ein par wyve
schomakere lvva 8 1 15	vrowen	ein kost beyde man unde ***vrowen*** unde he scholen geven ein
schomakere lvva 8 1 15	wif	komen van buten to de ***wif*** unde kind mit sik brengen
schomakere lvva 8 1 15	wif	jemant he wesen man edder ***wif*** ofte kind se scholen de
schuhmacher 1416 1477 tla 190 2 023	vrouwe	ampt sterven . dat si ***vrouwe*** edder man se scholen man
schuhmacher 1416 1477 tla 190 2 023	vrouwe	de vesper de gelik de ***vrouwe*** item vart up de dag
schuhmacher 1416 1477 tla 190 2 023	vrouwe	. he edder sin wif ***vrouwe*** offt ymant anders van er
schuhmacher 1416 1477 tla 190 2 023	vrouwe	vortmer se ein scholen ne ***vrouwe*** in de bod stan .
schuhmacher 1416 1477 tla 190 2 023	vrouwe	ge wesen dat mans unde ***vrouwe*** er besten ledder scholen an
schuhmacher 1416 1477 tla 190 2 023	vrouwen	edder bu Ķ¦ ten sunder ***vrouwen*** schol vortmer wenick werkckmester to
schuhmacher 1416 1477 tla 190 2 023	vrouwen	solde de man vor de ***vrouwen*** betalen ein ber ber j
schuhmacher 1416 1477 tla 190 2 023	vrouwen	man se scholen man unde ***vrouwen*** . van unse ampt dar
schuhmacher 1416 1477 tla 190 2 023	wif	wesen . he edder sin ***wif*** vrouwe offt ymant anders van
schuhmacher 1481 1536 tla 190 2 024	frowen	se scholen de man unde ***frowen*** van unse ampt dar wesen
schuhmacher 1481 1536 tla 190 2 024	suster	dat ein jewelik broder unde ***suster*** de amptes scholen weszen to
schuhmacher 1481 1536 tla 190 2 024	suster	crispinian ein jewelik broder unde ***suster*** scholen antheen sin besten kledere
schuhmacher 1481 1536 tla 190 2 024	vrouwe	unse ampt sterven de si ***vrouwe*** ofte man se scholen de
schuhmacher 1481 1536 tla 190 2 024	vrouwe	dar to offerende id si ***vrouwe*** edder man item de dar
schuhmacher 1481 1536 tla 190 2 024	vrouwe	solden de man vor de ***vrouwe*** betalen j mark vortmer wesen
schuhmacher 1481 1536 tla 190 2 024	vrouwe	brode id he edder sin ***vrouwe*** edder yemant anders van er
schuhmacher gesellen riga 1414 1480	vrouwe	in de ehre unse leven ***vrouwe*** sante maria to holden .
schuhmacher gesellen riga 1414 1480	frouw	kompanie , de ein echt ***frouw*** hebben , unde de thovornn
schuhmacher gesellen riga 1414 1480	frouwenn	de pelende1 ferding unse levenn ***frouwenn*** elendigheidt allmiszen wesen .
schuhmacher gesellen riga 1414 1480	suster	, se scholen wi unnse ***suster*** unde broder laten beghann ,
schuhmacher gesellen riga 1414 1480	suster	scholen de gemeinen broder unde ***suster*** to komen to d .
schuhmacher gesellen riga 1414 1480	suster	) item welk broder edder ***suster*** sterven van unse elendigheidt ,
schuhmacher gesellen riga 1414 1480	susterne	scholen ne vrouwe nemen to ***susterne*** , se wesen de uthem
schuhmacher gesellen riga 1414 1480	vrouwe	brödern de werde , de ***vrouwe*** edder er gesinde vordret edder
schuhmacher gesellen riga 1414 1480	vrouwe	werdenn , de ein echt ***vrouwe*** hebben . 27) item
schuhmacher gesellen riga 1414 1480	vrouwe	bröderschop de elendigheit unse levenn ***vrouwe*** van wesen to wesen ,
schuhmacher gesellen riga 1414 1480	vrouwe	) item men scholen ne ***vrouwe*** nemen to susterne , se
schuhmacher gesellen riga 1414 1480	vrouwe	geselle de compenye unse leven ***vrouwe*** elendigheidt willen avergevenn mit hogmode
schuhmacher gesellen riga 1414 1480	vrouwe	unnsen geselle ginge to hovescher ***vrouwe*** hus , unde dar jenig
schuhmacher gesellen riga 1414 1480	vrouwe	unde schuldig bleve unse leven ***vrouwe*** elendigheidt unde darna wedder to

Figure 4. Keyword in Context concordance of selected Middle Low German terms referring to women in four sampled Shoemaker ordinances. The table was generated with the CATMA Keyword in Context tool and contains the columns "Document Name", "Keyword", and "Keyword In Context", showing the immediate textual context around each queried term. The queried terms correspond to those used in Figure 3: *junckvrowen*, *suster*, *susterne*, *vrouwe*, *vrowen*, *wif*, *frouw*, *frowen*, and *frouwenn.* Table prepared by the author.

for example, is paired with the masculine *broder*, defining the addressed community as brothers and sisters. In the Tallinn Shoemaker ordinance of 1481–1536, a regulation associated with the feast of St Crispinian states that "ein jewelik broder unde suster scholen antheen sin besten kledere" (every brother and sister shall put on their best clothes).[35] In other contexts, by contrast, *vrouwe* is the principal term used to refer to women, demonstrating why differences between these terms require contextual rather than purely quantitative analysis.

Even though it could be argued that the same analysis could be done through qualitative reading, using corpus analysis tools for visualisation and concordance analysis allows one to grasp a wider picture of the selected manuscripts through the approached question. The value of such analysis is not that the data becomes a research result automatically, or that the number of occurrences can be treated as a direct measure of historical importance. Rather, it helps the historian move across a larger body of sources and identify where closer reading should begin. The present comparison uses absolute occurrences rather than frequencies normalised according to document length. Differences in the number of hits between the four ordinances should therefore not be interpreted as direct quantitative evidence of the relative prominence of women in one text or craft community.

In the case of the Shoemaker ordinances, the searches reveal differences between the sampled texts: in absolute terms, references to women occur more often in the Journeymen's ordinance and in the later statutes, while the Distribution visualisation additionally shows whether these occurrences are concentrated in particular parts of a text or dispersed across several regulations. This does not yet prove the role of women in the craft, but it does lead to a more precise hypothesis: in the Shoemaker material, women appear in contexts that should be examined further in relation to apprenticeship, craft membership, and the regulation of the craft community. The KWIC table makes it possible to return directly to the relevant clauses and examine the legal and textual context in which these terms occur. The examples discussed above show the advantage of corpus analysis in a qualitative approach, revealing where terms may function differently depending on their location and direct context in the clause. The method therefore works best as a bridge between data and interpretation. Lemmatisation can reduce some problems caused by Middle Low German spelling variation, but it does

35 Schuhmacher Schragen 1481–1536, Tallinn. TLA, 190.2.024, fol. 10r. https://dl.tlu.ee/en/source-editions/gildide-skraad (accessed 20/09/2026).

not remove the difficulties of synonyms, semantic nuance, context, or the normative character of the statutes. Corpus analysis is thus most useful not as a substitute for qualitative reading, but as a way of locating patterns, passages, and comparisons that would be difficult to keep in view across the whole source group.

FROM DATA TO VISUALISATION

The transformation of the craft ordinances into searchable text creates the conditions for another form of analysis: the visualisation of source content through tagging and relational modelling. While corpus analysis works through selected terms in their original contexts, visualisation requires the source material to be structured in a specific way. People, organisations, events and topics found among regulations must first be identified and encoded before they can be compared or represented as networks. This means that the visualisation is not produced directly from the manuscript or even from the transcription alone. It is produced from a second analytical layer created on the basis of the transcribed text.

The tool used for visualising craft ordinance data is Nodegoat, a research environment that allows the creation of relational databases for humanities data.[36] In this case, the database includes source references, original images, transcriptions, and manually encoded entities or attributes, such as craft organisations, people, events, and thematic factors. The advantage of such a platform is that the database can be modelled according to specific research questions, not only according to archival or bibliographical structure. Through tagging, a regulation can be linked to a person, office, organisation, event, or thematic category, allowing relations to be traced that are not always visible through concordance analysis alone. At the same time, the resulting data is not extracted neutrally from the digital edition: it is shaped by the researcher's reading of the ordinance, the chosen categories, and the questions being asked. Nodegoat then makes it possible to visualise these encoded relations within the same environment, for example as links between sources, people, crafts, institutions, or thematic categories. The same data can also be exported for further analysis in Gephi, R, or Python, but for this article Nodegoat is sufficient as a tool for preparing, modelling, and visualising data without requiring advanced programming skills.

36 P. van Bree, G. Kessels. Nodegoat: Enabling Explorative Research. Paper presented at DH2017, 2017.

Database building for historical documents is most valuable when prosopographical information is available.[37] The information concerning specific people can be structured in objects that hold personal information, including family and given names, gender and ethnicity, occupations, ties to organisations and other available data. These, then, through common categories, can be visualised, highlighting their connections through organisations, time frames, or appearance in the same documents.

The craft ordinances of late medieval Riga and Tallinn contain a relatively small amount of prosopographical data and only a few ordinances list personal names. The named individuals are usually town council members who were included in the composition and approval of the statute, and the acting aldermen or assessors of the craft. For example, the Riga councillor Johan van Lynden appears in the ordinances of several crafts, including the Furriers, Coopers, and Smiths, providing a named example of an individual connecting otherwise separate craft records.[38] Some ordinances also mention other names of members, with the mention usually being connected to their position in the craft, a milestone in professional life or donations made to the guild. However, some identifications remain uncertain, and visualising the prosopographical networks can help to resolve them. Comparing variant name forms and recorded affiliations helped identify the roles of some of the people mentioned, usually highlighting town councillors and craft members with long-term positions who were therefore repeatedly mentioned by the same craft. Figure 5 visualises people mentioned in the medieval craft ordinances of Riga and Tallinn, connecting them to the relevant statutes and, where possible, to their affiliation with a craft, town council, or other organisation.

The visualisation shows that most craft ordinances contain no, or only very few, personal names. When names do appear, they are often connected with the approval, confirmation, or administration of the statutes. In the Riga material especially, town councillors form an important part of the network, since they are frequently mentioned in connection with the formal approval of craft ordinances. The density of this part of the network suggests that some council members appeared repeatedly in relation to different crafts and over several years. This may

37 C. Raffensperger. Visualizing Prosopography through Digital Humanities. – Medieval Prosopography, 2019, 34, 207–220.

38 Kürschner Schragen 1397. LNA_LVVA, F8-1-15, fols. 6v–8v; Böttcher Schragen 1375. LNA_LVVA, F8-1-15, fols. 12r–14r; Schmiede Riga 1426–1530. – Schragen der Gilden und Aemter der Stadt Riga bis 1621, 463.

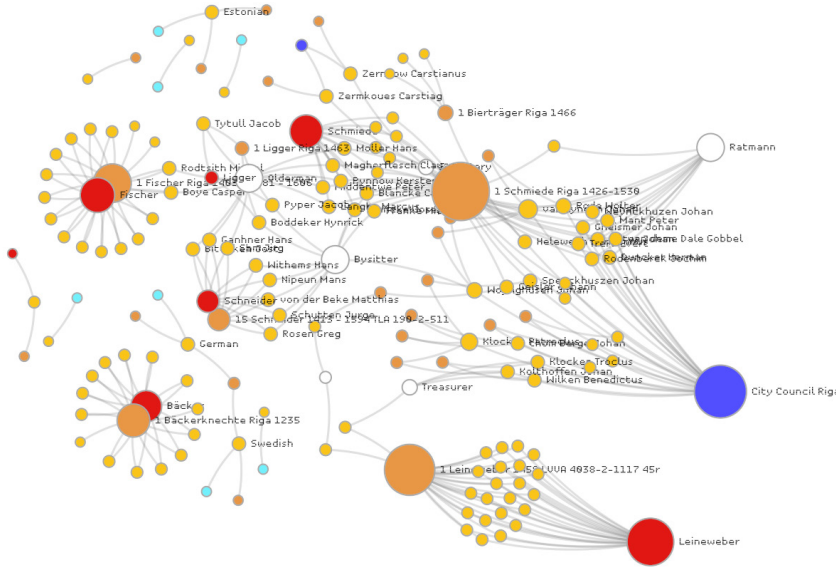


Figure 5. Network visualisation of people mentioned in medieval Livonian craft ordinances. The graph connects named individuals (yellow nodes) to the ordinances in which they appear (orange nodes) and, where possible, to their craft, position (white nodes), town council (blue nodes), or other organisational affiliation. The visualisation highlights the limited but significant presence of prosopographical data in the ordinance material, especially the role of craft office holders and town council representatives in the approval and regulation of craft statutes. Visualisation created by the author in Nodegoat.

indicate a stronger administrative connection with the craft communities, although such a conclusion requires further research. Other council representatives appear only in a few ordinances or alongside more frequently mentioned figures, which may point to a more limited or temporary role in the regulation of the crafts.

The same visualisation also makes visible the difference between ordinances that mention only external authorities and those that preserve more information about members of the craft community itself. The figure does not prove personal relationships in a strict sense, but it indicates where repeated interactions between crafters, aldermen, and councillors may be studied more closely.

The second visualisation example in Figure 6 concerns thematic factors encoded in the ordinance texts that are chosen for analysis. These factors include responsibility, behavioural, work, legal, religious, economic, personal, and social regulations. “Responsibility” was used for clauses concerning obligations of members and duties of members elected in positions; “behavioural” for rules regulating acceptable or unacceptable conduct; “work” for regulations connected with craft practice, production, tools, competition, or labour; “legal” for clauses

concerning confirmation, procedure, or formal regulation; "religious" for references to worship, saints, masses, processions, candles, and church as a space; "economic" for fixation of prices, payments, wages, and provision of material; "personal" for references to individual status, to personal achievements, family relations, illness, death; "social" for feasts, gatherings, communal meals, and participation in the collective life of the craft.

Unlike named people, these categories are not entities found directly in the text in a simple form. They have been created by the researcher through manual interpretation of individual regulations. In the Nodegoat data model, each ordinance forms an object containing individual manuscript pages as sub-objects, while transcription lines within these pages are encoded with relevant categories, including the thematic factors used here. A passage may therefore receive more than one factor: for example, a regulation concerning attendance at a feast may be encoded as religious, social, and responsibility related, while a rule describing craft production standards may be linked to work, legal, and economic factors. Figure 6 does not count individual clauses as mutually exclusive units. Its visual unit is the manuscript page: a factor is connected to a page when the transcription on that page contains material encoded with that category, and the page is in turn connected to its parent ordinance. Multiple coding therefore allows the same page to be connected to several factors.

Figure 6 visualises the presence of these manually encoded factors across the Shoemaker ordinances. The categories are analytical constructs created to compare the thematic orientation of the statutes rather than objective divisions inherent in the sources. The size of a factor node reflects how many pages in the selected material are linked to that factor: a larger node indicates that the category occurs across more encoded pages, not a greater number or proportion of individual regulations. The figure should therefore be read as an exploratory overview of the distribution and co-presence of thematic factors rather than as an exact quantitative measurement of ordinance content. It can reveal which factors recur across more pages and how these pages connect to the four ordinances, directing attention towards differences that can subsequently be examined through close reading. It should not, however, be read as a direct measure of what mattered most in the craft community, but as a visualisation of how the written regulations appear and were classified within the database.

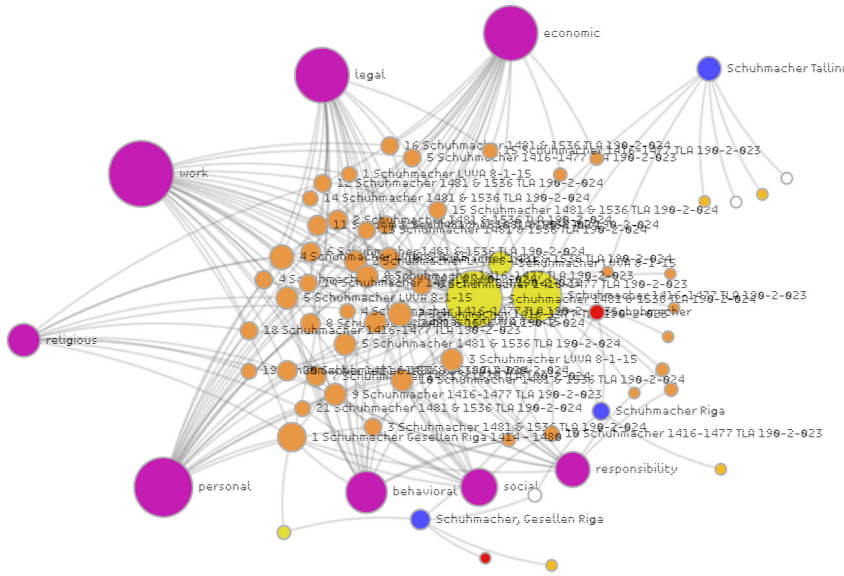


Figure 6. Visualisation of manually encoded thematic factors in four selected Shoemaker ordinances from Riga and Tallinn. The factors (pink nodes) include responsibility, behavioural, work, legal, religious, economic, personal, and social regulations. The visualisation shows how often regulations connected to these factors appear in the selected ordinance texts (orange nodes) and allows cautious comparison between these factors in the sampled ordinances. Visualisation created by the author in Nodegoat.

This visualisation of the thematic factors in Shoemaker ordinances suggests that among all four documents from both Riga and Tallinn, the most common themes in all regulations combined are connected to work, personal, economic and legal factors. The behavioural, religious, social and responsibility factors are represented less frequently, but hold a similar frequency among each other. If this visualisation is used for quantitative analysis, it can suggest that the medieval Livonian shoemakers, based on their normative documents, devoted more clauses to work and economic life than to religious and social events and responsibilities. However, these results must be read cautiously, as the data reflects both the source material and the author's decisions about classification. This observation can be formulated as a hypothesis for closer reading, as the figure shows the relative frequency of encoded factors, not practical importance and so must be combined with close reading of the context.

Apart from analysing the results of factor-based encoding in several ordinances of the same craft, the same visualisation strategy can be used for other encoded ordinances. Comparing the thematic coding results with those for other crafts might reveal which crafts had

a stronger emphasis on clauses related to social or religious factors in their ordinances. Such results do not reveal the full reality of craft life, but they do reveal what different craft communities chose, or needed, to formalise in writing. The factors revealed in the visualisation can be paired with close reading and corpus analysis tools not only to approach these factors, but also to question the type of the craft guild and its main goals. Depending on terms used to describe the craft, its members and the visualisation of revealed factors, there can be an argument as to whether some of the craft communities placed greater written emphasis on work-related issues, or managed the craft as a guild with a strong religious and social component. Such combined approaches can be used as case studies when approaching specific craft guilds, their events or overall traditions in the addressed town or region.

The usefulness of this form of visualisation lies in its ability to make a large and internally varied corpus more navigable. This helps the researcher to approach the data visually to identify clusters, absences, and contrasts between ordinances. For example, one craft may appear to place greater emphasis on religious and social obligations, while another may be more strongly represented through work-related or economic regulations. Such patterns do not become conclusions in themselves. They are indications that direct the researcher back to the relevant clauses and to the specific legal and social context of each ordinance.

Visualisation is the next level of working with extracted and digitised data. The network visualisations discussed here depend on an additional layer of information encoded by the researcher, whereas the corpus analysis visualisations represent patterns in the transcribed text. This layer consists of encoded objects and topics selected in relation to the research questions. The strength of such visualisations, based on network analysis in the created database, lies in showing visual patterns, clusters, and topical or personal relations and makes these easier to perceive across a larger body of material. Their main value is exploratory as they help locate concentrations, repeated relations, and unexpected connections that can then be tested through renewed close reading. A limiting argument is the researcher's bias in the collected database and therefore the visualisation, since the output reflects the author's categories, interests and interpretation of the source. However, historians in their work are always subject to choices, and the digital condition of sources shapes the research and interpretation practices.[39] The critical

39 S. Schwandt. Opening the Black Box of Interpretation: Digital History Practices as Models of Knowledge. – History and Theory, 2022, 61, 4, 77–85, here 80. https://doi.org/10.1111/hith.12281.

question is not whether the visualisation is fully objective, but whether its categories, links, and limits are made clear enough for the reader to understand how the pattern was produced. Digital visualisation of such data should therefore be treated not as a final representation of social reality in craft communities, but as a structured way of identifying patterns and showing relations that are traceable across many manuscripts of similar source material.

DISCUSSION: PRODUCING HISTORICAL KNOWLEDGE THROUGH DIGITISATION?

For a scattered source group preserved across different archives, manuscript units, digital photographs, printed editions, and previous transcription practices, digitisation creates conditions for approaching the ordinances as a whole. The Digital Livonia platform, and craft guild ordinances as part of it, does not aim to replace the archive but to create an accessible, research-oriented digital version of the source, in which manuscripts can be approached through a common framework. The craft ordinance, as a normative document with similarities across the region and several centuries, becomes a possible object of comparison when digitised as part of a larger corpus. Such a corpus makes it possible to compare regulations across crafts, towns, and periods, and to ask whether some occupational communities produced more detailed normative texts than others. Research into these questions depends on access to several digital layers of the source, such as the manuscript image, transcription, metadata, archival reference, and information about earlier editions. The transcribed ordinances, structured by layout and transcription, form a corpus that allows the historian to explore the material in ways that are difficult through linear reading alone. Terms can be traced across ordinances, their distribution can be visualised, and their immediate context can be examined. The corpus can also be exported into other research environments, where it may be tagged, visualised, and compared with other source groups.

The examples of visualised data suggest that digitisation itself involves interpretive decisions by the researcher or author of the digital editions. As discussed by Silke Schwandt with reference to Michel

de Certeau, history writing can be understood as an interpretative practice. From this perspective, the digital corpus likewise does not simply reproduce the past,[40] it makes explicit how the sources have been selected, arranged, transcribed, and prepared for analysis. The corpus is therefore both a representation of medieval documents and a product of present scholarly practice. However, the data and questions selected for visualisation should also be carefully chosen by the researcher. Bruno Latour warns that images, diagrams, lists, archives, files, collections, and other forms of inscription can explain "almost everything or almost nothing", depending on how they are brought into focus. Their importance does not lie simply in being visual, written, or printed.[41] They become analytically powerful when they allow resources to be mobilised, compared, recombined, and brought into new relations. When applied to medieval ordinances, this idea suggests that the visualisations based on quantitative data cannot replace traditional historical research and qualitative reading, but can introduce new questions and suggest patterns that have to be explored with combined methods.

Quantitative approaches to medieval ordinances introduce specific technical challenges and amplify some difficulties also encountered in qualitative research. Among these are the terminological inconsistencies, imperfect textual data and metadata, software limitations and the level of proficiency required to use digital tools. However, the increasing availability of LLMs can assist humanities researchers in organising data and carrying out case studies with the source corpus. As a digital body of data, the medieval text corpus also creates possibilities for research beyond the interests of the author and, when shared among researchers, can assist studies in legal and economic history, historical linguistics and other fields. The digital editions can also be approached in connection with other source groups, such as account books, town council records, or other available urban sources from medieval Riga and Tallinn.

Future developments in digital humanities and tools designed for humanities researchers could further improve the computational analysis opportunities of such sources. In addition to the development of HTR for source transcription and NLP for lemmatisation, opportunities with Named Entity Recognition[42] tools could make historical language

40 Ibid., 79.

41 B. Latour. Visualization and Cognition: Thinking with Eyes and Hands. – Knowledge and Society, 1986, 6, 1–40, here 4.

42 T. Hiltmann, S. Dumont, L. Körfer, A. Monroy, S. Thode. NER4all or Context Is All You Need: Using LLMs for Low-Effort, High-Performance NER on Historical Texts: A Humanities Informed Approach. – arXiv, 4 February 2025. https://doi.org/10.48550/arXiv.2502.04351.

more accessible for digital analysis, with automated identification of people, places, and other named entities in medieval documents. Even so, automatic encoding may become accessible in the future, but manual classification still has the advantage of keeping the researcher close to the text. The requirement to read the text and assign categories through interpretation makes the digital version of the source serve both as a basis for advanced quantitative and visual analysis, and as a corpus that represents the medieval document and allows traditional approaches to the study of medieval history.

CONCLUSION

From accessibility to visualisation, the digitisation of medieval manuscripts produces and reintroduces several layers of historical knowledge. This article has asked how the digitisation of medieval Livonian craft ordinances changes the possibilities for analysing this source group, and what methodological limits must be considered when normative texts are transformed into searchable and visualisable data. Based on the source work and case studies, it can be concluded that digitisation improves access, enables comparison, and supports exploratory analysis, but only when it remains connected to source-critical reading. Quantitative methods and visualisation can suggest patterns and raise new questions for the researcher who has access to the corpus and the skills to pair the data with qualitative interpretation of the original sources. As the digitised corpus of ordinances becomes an established digital source, it can continue to support the exploration of specific questions of medieval craft practices, with visualisations that reflect patterns and suggest associations in support of historical analysis.

Acknowledgements

This research has received funding from the Estonian Research Council grant PRG1276. All figures included in this article are either screenshots or graphics created by the author. The reproduced manuscript images are based on digitised material from the Latvian State Historical Archive (LVVA) and the Tallinn City Archives (TLA).

KÄSIKIRJAST VISUALISEERINGUNI: DIGITAALNE LÄHENEMINE KESKAJA LIIVIMAA KÄSITÖÖLISTE SKRAADELE

Rūta Bruževica

Artikkel käsitleb keskaja Liivimaa käsitööliste skraade digiteerimist ja uurib võimalusi, mida digiteerimine avab selle allikarühma analüüsimiseks, arutledes ühtlasi metodoloogiliste piirangute üle, mis kaasnevad normatiivsete tekstide muutmisel otsitavaks ja visualiseeritavaks andmestikuks. Artikkel tugineb keskaja Liivimaa tsunftide skraade allikakollektsioonile, mis on osa „Digitaalse Liivimaa" projektist ning kuhu on esmakordselt ühtseks korpuseks koondatud Riia ja Tallinna digiteeritud ja transkribeeritud käsitööliste skraad 14. sajandi algusest kuni 1550. aastani.

Käsitööliste skraad on normatiivsed dokumendid, mis reguleerisid keskaegses linnas nii majanduslikke ja õiguslikke tsunftiküsimusi kui ka tsunftikogukonna sotsiaalset ja religioosset elu. Skraad sisaldavad teavet käitumisnormide kohta koosviibimistel ja pidustustel, usutalitustel osalemise kohta ning kohustustest kogukonnaliikmete ees haiguse, surma või vaesuse korral. Kuigi skraad on ametlikult kinnitatud tekstid, näitab nende korduv kinnitamine, hilisemad täiendused ja üksikjuhtumeid käsitlevad erisätted, et need ei olnud kogukonnaelust lahutatud jäigad õigustekstid, vaid kasutusel olevad dokumendid, mida kujundas ja muutis tsunftikogukonna igapäevane elu.

Tsunftide käitumispraktika uurimine tugineb digitaalsele tekstikorpusele, mis on koostatud Tallinna Linnaarhiivis ja Läti Riiklikus Ajalooarhiivis asuvate originaalkäsikirjade digiteerimise käigus. Lisaks on kaasatud korpusesse skraade transkriptsioonid, mis on kättesaadavad üksnes Wilhelm Stieda ja Constantin Mettigi 1896. aastal ilmunud trükiväljaandes, kuna originaalkäsikirjad ei ole säilinud. Arhiivides asuvate käsikirjade digitaalseid fotosid töödeldi platvormil Transkribus, kus need jaotati tekstiväljadeks ja ridadeks ning seoti vastavate transkriptsiooniridadega, luues sel moel mitmekihilise digitaalse väljaande, kus käsikirja kujutis ja transkribeeritud tekst jäävad omavahel püsivalt seotuks. Töö Transkribusega Liivimaa käsitööliste skraade ning sama piirkonna ja perioodi teiste allikatega toetas keskaja Liivimaa alamsaksakeelsete allikate käsikirjatuvastusmudeli (HTR-mudeli) väljatöötamist. Valminud digitaalne editsioon ühendab käsikirja kujutise, transkriptsiooni ja

metaandmed ühtses keskkonnas, vastates seega tänapäevase teadusliku digiväljaande põhitingimustele.

Artiklis esitatud juhtumiuuringud illustreerivad ajalooliste dokumentide transkribeeritud tekstikorpuseks muutmise interdistsiplinaarseid võimalusi. Korpuslingvistika meetodite rakendamist käsitööliste skraade analüüsimisel tutvustatakse tööriistaga CATMA loodud visualisatsioonide kaudu. Selline analüüs andis terminijaotuse visualisatsiooni, millest ilmneb näiteks, kuidas naisi tähistavate terminite kobardumisi konkreetsetes skraades saab nende esinemissageduse alusel ära tunda ja esile tõsta. Teine CATMA analüüsitööriist, mis koostab märksõnade konteksti loendi (KWIC), võimaldas terminid koos nende vahetu ümbritseva kontekstiga eraldada, et neid seejärel kvalitatiivselt analüüsida.

Käsitööliste skraade sisu visualiseerimise juhtumiuuringud on koostatud andmebaasitööriista Nodegoat abil. Nende juhtumiuuringute tulemusena valmis kaks visualisatsiooni: esiteks skraades nimeliselt mainitud isikute võrgustik, mis peegeldab olemasolevat, kuigi piiratud prosopograafilist teavet tsunftiliikmete ja raehärrade kohta; ning teiseks valitud skraade rühma temaatiliste tegurite ülevaade, mis hõlmab selliseid kategooriaid nagu töö, majandus, õigus, religioon, sotsiaalne elu, käitumine, vastutus ja isiklikud asjaolud. Mõlemad visualisatsioonid sõltuvad uurija määratud kategooriatest ning on esitatud uurimist suunavate vahenditena: need ei kinnita järeldusi, vaid aitavad uurijal tuvastada mustreid, kobardumisi ja lünki, mille põhjal saab sõnastada edasisi uurimisküsimusi nii kvantitatiivse kui ka kvalitatiivse analüüsi jaoks.

Artiklis jõutakse järeldusele, et keskaja Liivimaa dokumentide digiteerimine parandab hajutatud allikmaterjali kättesaadavust uurijatele ning võimaldab seda käsitleda tervikliku korpusena. Juhtumiuuringute põhjal võib digiteerimine toetada võrdlusi eri linnade, tsunftide ja ajastute vahel ning võimaldada uusi analüüse. Samas ei saa kvantitatiivne analüüs ega visualiseerimistehnikad kunagi asendada allikakriitilist lugemist ega originaalallikate kvalitatiivset tõlgendamist. Kuna ajalooliste tekstide transkribeerimise, lemmatiseerimise ja nimeüksuste tuvastamise tööriistad arenevad edasi ning võivad aidata püstitada uusi uurimisküsimusi, jääb teksti lähilugemine jätkuvalt uue ajaloolise teadmusloome keskmesse.