D23 – Evaluation Report

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Introduction

The project **"Automated Legal Text Analysis based on Machine Learning"** (hereinafter "ALTAML") is a key initiative aimed at integrating innovative approaches in the field of data processing and subsequent analysis, with a focus on the field of law, which also includes information and communication technology law. The aim of this project is to develop and validate effective methods for the automated analysis of legal texts using machine learning techniques. This involves, in particular, the development of tools that facilitate the processing and analysis of large volumes of data in the form of various legal documents, as well as the extraction of relevant information (attributes) from such documents, including the identification of key terms, references to legislation and other attributes.

The aim of the ALTAML project is therefore to contribute to more efficient access to legal information and to the acceleration of legal processes, thereby ensuring a higher degree of legal certainty and improving the availability of legal texts, the results of their analysis and relevant legal information for both professionals and the general public.

As part of work package KPB5, deliverable **D23 – Evaluation Report** – was produced. This deliverable contains an analysis of methods and models based on standard empirical legal research methodology. The purpose of this document is to obtain feedback from legal research teams. Specific case studies (legal research topics) have been selected. In this report, the legal research teams provide assessments of the methodology used and its results, as well as recommendations and proposals for the further development of the methods and models employed.

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1. Introduction to legal research

Defining the methodological approach and specific methodological procedures used in the research is an essential part of any scientific investigation. Despite this, one may encounter insufficient specification of the research methods in legal academic literature, on the basis of which conclusions are formulated in relation to the analysed research questions, thereby undermining the scientific rigour of the specific study. Legal research may be based on various scientific methods. The standard approach to legal research is the so-called **doctrinal legal research** based on the normative analysis of law, the aim of which is to identify, analyse and synthesise the content of law[1], usually on the basis of an analysis of relevant legislation and case law enabling the interpretation of law,[2] as well as the identification of interrelationships, problematic areas and possible hypotheses regarding future legal developments.[3] A specific category **of empirical legal** research can also be distinguished, characterised by the implementation of various empirical scientific methods, the use of which within legal research is gaining importance.[4] A call for a greater incorporation of empirical research methods into the framework of legal research has been expressed in several studies.[5] Empirical legal research is regarded as an interdisciplinary form of legal research, in which methods typically borrowed from the social sciences are applied to legal studies.[6] Empirical legal research does not replace doctrinal legal research, but complements it, and both approaches can be used simultaneously to examine specific

[1] HUTCHINSON, Terry. Doctrinal Research: researching the jury. In WATKINS, Dawn, ed. Research Methods in Law. London: Routledge, 2013, pp. 7–33. https://doi.org/10.4324/9780203489352
[2] MCCONVILLE, Michael. CHUI, Wing Hong, eds. Research methods for law. Edinburgh: Edinburgh University Press, 2017. https://doi.org/10.1515/9781399515092
[3] HUTCHINSON, Terry. Doctrinal Research: researching the jury. In WATKINS, Dawn, ed. Research Methods in Law. London: Routledge, 2013, pp. 7–33. https://doi.org/10.4324/9780203489352
[4] MONAHAN, John. WALKER, Laurens. Twenty-Five Years of Social Science in Law. In *Law and Human Behavior*, 2011, vol. 35, no. 1, pp. 72–82. https://doi.org/10.1007/s10979-009-9214-8
[5] See, for example, 1) BALDWIN, John. DAVIS, Gwynn. Empirical Research in Law. In CANE, Peter. TUSHNET, Mark, eds. The Oxford Handbook of Legal Studies. Oxford: Oxford University Press, 2003. https://doi.org/10.1093/oxfordhb/9780199248179.013.0039; 2) LEEUW, Frans L. Empirical Legal Research: The Gap between Facts and Values and Legal Academic Training. In *Utrecht Law Review*, 2015, vol. 11, no. 2, pp. 19–33. https://doi.org/0.18352/ulr.315
[6] EPSTEIN, Lee. KING, Gary. The Rules of Inference. In *The University of Chicago Law Review*, 2002, vol. 69, no. 1, pp. 1–3. https://doi.org/10.2307/1600349

research questions.[7] A significant part of empirical legal research consists of the use **of quantitative research methods**, which aim at the systematic scientific examination of the quantitative characteristics of a phenomenon and their interrelationships. One of the relevant quantitative methods of empirical research, which is an application of contextual analysis in law, is the so-called **systematic content analysis**, which enables the systematic analysis of various types of texts in a standardised manner. This method provides a quantitative perspective on the research questions under analysis, reflecting the content of the legal texts under examination in a specific case, and enables the attainment of more precise and, above all, replicable and verifiable results, regardless of the person conducting the research. The use of this method appears particularly suitable for the analysis of a large number of legal texts, the comprehensive examination of which necessarily requires a specific approach enabling standardised analysis and uniform evaluation of the facts examined in a specific case.

[7] BALDWIN, John. DAVIS, Gwynn. Empirical Research in Law. In CANE, Peter. TUSHNET, Mark, eds. The Oxford Handbook of Legal Studies. Oxford: Oxford University Press, 2003. https://doi.org/10.1093/oxfordhb/9780199248179.013.0039

2. The method of systematic content analysis of law and its individual stages

The method of systematic content analysis of law represents a methodological, replicable technique for compressing legal text into a smaller number of content categories based on explicit coding rules.[8] This method enables the production of both qualitative and quantitative results by allowing the researcher to compress (legal) text into a smaller number of content categories based on explicit coding rules.[9] It thus provides objective and scientifically verifiable results derived from the analysis of various types of text, ranging from interview transcripts to legal texts including legislation and court decisions.[10]

The suitability of this research method for legal research is demonstrated by its similarity to traditional legal analysis, which involves examining a collection of legal texts, such as court decisions, with the aim of identifying common elements and assessing their relevance, whilst incorporating the rigour typical for the social sciences, which enables an understanding of the case law being analysed.[11,12] Another advantage of this research method is the possibility of applying it to any type of legal text, including legislation, court decisions, decisions of other relevant state authorities, contracts, terms and conditions, etc., provided the researcher has access to them.

The method of systematic content analysis of law comprises several interrelated stages. Hall and Wright distinguish three specific components of this research method, namely

1) the selection of court decisions,
2) the coding of court decisions and

[8] WEBER, Robert. Basic content analysis. Vol. 49. Newbury Park: Sage, 1990. https://doi.org/10.4135/9781412983488

[9] BURNS, Kylie. HUTCHINSON, Terry. The impact of "empirical facts" on legal scholarship and legal research training. In *The Law Teacher*, 2009, vol. 43, no. 2, pp. 153–178. https://doi.org/10.1080/03069400903004236

[10] SALEHIJAM, Maryam. The Value of Systematic Content Analysis in Legal Research. In *Tilburg Law Review*, 2018, vol. 23, no. 1–2, pp. 36–38. https://doi.org/10.5334/tilr.5

[11] HALL, Mark A. WRIGHT, Ronald F. Systematic content analysis of judicial opinions. In *California Law Review*, 2008, vol. 96, no. 1, pp. 63–79.

[12] HALL, Mark A. WRIGHT, Ronald F. Systematic content analysis of judicial opinions. In *California Law Review*, 2008, vol. 96, no. 1, pp. 63–79.

3) analysis of coded court decisions, often using statistical methods.[13]

Salehijam distinguishes the following stages of this research method:

1) formulation of appropriate research questions or hypotheses,
2) identification and collection of a suitable data sample for analysis,
3) coding of data, which has its own stages,
4) formulation of conclusions or observations, and
5) reporting the results in a manner comprehensible to the legal community.[14]

Figure 1 visually illustrates the procedure for applying the research method under consideration. We draw on Salehijam's classification of the individual stages of the systematic content analysis of law, with minor adjustments and additions. The method begins with the formulation of a suitable research question, the selection of appropriate sources of legal texts, and their subsequent screening. The method continues with the extraction of structured data, supplemented where necessary by external contextual information. The core of the method is the coding of legal texts, which requires the input of an expert in the specific domain or area of law. The code table created in this way is subsequently processed into a form suitable for automated processing. The method of processing depends on the choice of method. Unlike the original proposal by Salehijam, we have added a phase of data analysis and machine learning. The results from this phase are subsequently interpreted, formulated into conclusions and presented to both specialists and the general public.

[13] Ibid., p. 79.
[14] SALEHIJAM, Maryam. The Value of Systematic Content Analysis in Legal Research. In *Tilburg Law Review,* 2018, vol. 23, no. 1–2, pp. 36–38. https://doi.org/10.5334/tilr.5

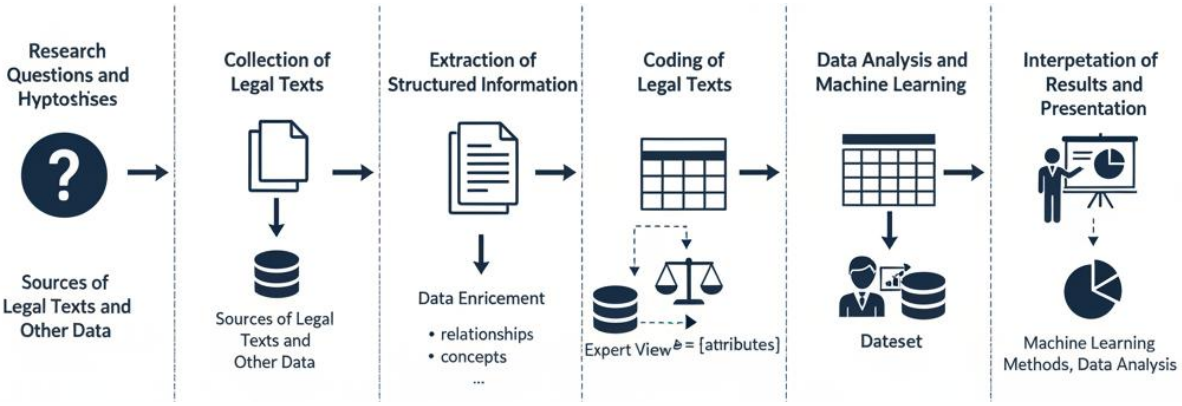


Figure1 Visualisation of systematic content analysis of law

3. Methodology for the preparation of the evaluation report

In this chapter, we outline the methodological procedure for conducting legal research and for the actual preparation of this evaluation report. This process consisted of the following steps, which we will examine in more detail in the following chapters:

1) formation of research teams and definition of research questions,
2) rough and fine-grained definition of the set of decisions,
3) determining attributes for coding decisions,
4) the creation of partial analyses of court decisions, and
5) feedback from the legal research teams.

1. Formation of research teams and definition of research questions

The first step in the methodology was to assemble specialised legal research teams covering four specialist areas: unfair competition, contractual fine, criminal seizure of computer data, and copyright. Each team consisted of academic legal experts from the Faculty of Law of Pavol Jozef Šafárik University in Košice (PravF UPJŠ) and the Faculty of Law of Comenius University (PravF UK), with each team formulating a specific research question that formed the basis for further work. The research questions focused on empirically verifiable phenomena in the decision-making practice of the Slovak courts. For example, how courts approach the moderation of contractual fines or for which criminal offences orders to secure electronic data are most frequently issued. A more detailed description of the legal research teams and their research questions is provided in Chapter 4 of this evaluation report.

2. Rough and fine-grained identification of the set of decisions

In the second step, a corpus of relevant court decisions was identified for each domain using a two-stage filtering process. At the initial screening stage, basic search criteria were established. These primarily involved references to specific statutory provisions (e.g. Section 301 of the Commercial Code, Section 544(2) of the Civil Code, Section 91 et seq. of the Code of Criminal Procedure) and relevant legislation, including European directives and international conventions. At the level of fine-grained definition, cumulative criteria combining several conditions simultaneously were applied. For example, a reference to a specific section was used in conjunction with the presence of a key legal term in the text of the decision (e.g. 'contractual penalty' and 'proportionality' or 'computer data' and 'mobile phone'). This two-tier selection enabled us to achieve thematic homogeneity in the dataset whilst covering a sufficiently broad range of decisions for subsequent analysis.

3. Determining attributes for coding decisions

The third step was the joint definition of a set of attributes for each dataset, i.e. the characteristics that were systematically extracted from each court decision. The attributes were proposed in collaboration between legal experts and data analysts so as to capture legally relevant information as accurately as possible. For example, the amount of the contractual fine, the outcome of the proceedings, the type of court, the applicable legal grounds, or the type of criminal offence. For each attribute, a description was drawn up of its content, range of values (e.g. binary, categorical, numerical) and the method of its identification and extraction from the text of the decision. This step also involved the preparation of a coding manual to ensure uniform and consistent coding across team members.

4. Creation of partial analyses of court decisions

Based on the datasets created in this way, a set of analytical methods was applied covering various aspects of the examined datasets of court decisions. Specifically, the following analytical methods were used (a more detailed description is provided in Chapter 7):

1) descriptive statistical analysis (frequencies, proportions, distributions of attributes),
2) comparative analysis (comparison of groups of decisions by court, region or period),
3) correlation analysis between attributes (interdependencies between attributes),
4) cluster analysis (discovering natural groups of decisions without predefined categories),
5) anomaly detection (identification of decisions that deviate significantly from typical practice),
6) association rules (patterns of co-occurrence of attributes in the form 'if X, then Y') and
7) predictive analysis (modelling the outcome of proceedings based on other attributes, identifying the most significant predictors).

The outputs of these analyses formed the basis for feedback to the legal teams.

5. Feedback from legal research teams

The final step of the methodology was the systematic collection of feedback from members of the legal research teams via a structured questionnaire. Its aim was to determine to what extent the outputs of the automated analysis are usable in legal research, where their limitations lie, and what would need to be changed for future projects. The questionnaire was divided into seven thematic areas:

- **Context and background of the research** – questions exploring what research questions legal research teams were pursuing before the introduction of automated methods, what their previous methodology looked like, and what limitations arose from the content of available legal texts.
- **Attribute coding and dataset creation** – this section focuses on the extent to which the selected attributes corresponded to legal reality and established terminology, whether certain categories were incorrect, unclear or misleading, and what changes research team members would propose for the future.
- **Evaluation of individual analytical outputs** – for each of the analytical methods used, respondents assessed the substantive contribution and limitations of the output (in the form of an open-ended response), as well as its comprehensibility and usefulness on a five-point scale. The aim of this section is to identify which methods are intuitively graspable for members of legal research teams and which require additional interpretative support.
- **Interpretation of results and connection to legal argumentation –** the questions examine whether and how the outputs can be directly integrated into legal text or argumentation, where the boundary lies between what is statistically interesting and what is legally relevant, and what role quantitative outputs play in traditional normative legal analysis.
- **Limitations of the method and manual coding** – this section focuses on identifying aspects of legal texts that are difficult or impossible to automate, on specific instances of misleading or incorrect conclusions drawn by automated analysis, and on assessing the consistency of coding across team members (inter-rater reliability).
- **Prospects and recommendations** – respondents proposed specific changes to the research process, identified legal areas with the greatest potential for this methodology, and commented on the use of large language models (LLMs). They also assessed whether they would be able to use the method independently without the support of a data analyst.

- **Concluding remarks** – an open space for any additional insights not covered by the previous questions, including ethical aspects, institutional barriers or a vision for the future development of the method.

The full text of the questionnaire is included in Appendix 1 of this evaluation report.

4. Legal teams and the formulation of appropriate research questions/hypotheses

The method of systematic content analysis of law can be used to answer research questions or to confirm or refute established scientific hypotheses from various areas of law. Research questions or scientific hypotheses may focus on narrowly defined legal issues or specific legal institutions and how they are applied in practice, or they may be formulated more broadly, for example with the aim of analysing the decision-making practice of a specific state authority in light of the defined provisions of a particular legal regulation or the applicable legal framework as such. This concerns the well-known problem of **'law in the book' versus 'law in action'**.[15]

The formulation of research questions or hypotheses is crucial for all subsequent stages of systematic content analysis of law. It is particularly decisive in relation to identifying the necessary sample of legal texts to be subjected to analysis. The research questions or hypotheses thus aim primarily to **examine the actual state of the application of the law** based on a detailed analysis of the sample of legal texts created. This is also linked to the main disadvantages of the research method under consideration, which lie in **the (un)availability of the required legal texts**[16] , as well as in **the quality of the legal texts obtained** that are to be subjected to closer analysis. The main problem that may be encountered in the practical application of this method is the need to adapt the originally formulated research questions in a way that allows for the actual content of the legal documentation under examination to be reflected. In many cases, it is simply not possible to find answers to the research questions within the sample of legal texts, or at least not to the required extent. As a general rule, it is not possible to seek an answer in data that do not contain the relevant knowledge or answer (for example, examining the method of proving the accused's guilt in court proceedings in the case of decisions that take the form of a plea agreement or a summary penalty order, which do not contain a full statement of reasons in accordance with Section 168(1) of Act No. 301/2005 Coll. Criminal Procedure Code. Put

[15] POUND, Roscoe. 'Law in books and law in action'. In *American Law Review*, 1910, vol. 44, p. 12; HALPERIN, Jean. 'Law in books and law in action: The problem of legal change'. In *Maine Law Review*, 2011, vol. 64, p. 45.
[16] More on this in the following chapter.

simply, **the limitation of the method of systematic content analysis of the law is the actual content of the legal texts analysed**, which can significantly restrict the research objectives set in a specific case. Concurrently, in some cases the absence of certain facts in the legal texts under examination will also be significant for drawing certain legal conclusions.

Within the project, four legal research teams were identified, whose expertise and involvement in the project influenced the creation of specific project outputs. These research teams focus on the following domains:

Domain No. 1: Unfair competition

A research team from the Faculty of Law at Pavol Jozef Šafárik University in Košice is examining the issue of unfair competition in the context of commercial law. The research focuses on the provisions of Sections 41 to 55d of Act No. 513/1991 Coll. of the Commercial Code (hereinafter referred to as the "Commercial Code"), which regulate various forms of unfair competition. Particular attention is paid to the general clause, misleading advertising, free-riding on reputation, disparagement and breach of trade secrets. The team also deals with the so-called judicial facts, i.e. cases of unfair competition that are not explicitly enshrined in law but have been developed through judicial practice. Team members also examine procedural legal remedies, such as interim measures, remedial measures and the publication of court decisions.

Area 2: Contractual Fines

The research team from the Faculty of Law at Pavol Jozef Šafárik University in Košice is examining the institution of contractual fines as a security measure in the context of Act No. 40/1964 Coll. of the Civil Code (hereinafter referred to as the 'Civil Code') and the Commercial Code. The research focuses on three key areas: the requirement of written form as a condition for the validity of a contractual fine agreement; the compliance of the amount of the contractual fine with good morals and fair business practices; and the court's discretionary power to reduce an unreasonably high fine under Section 301 of the Commercial Code. Decisions are analysed in which courts assess whether a contractual fine

fulfils its preventive and punitive function, or whether, on the contrary, constitutes an invalid legal act due to a conflict with public policy. The research team also examines the relationship between contractual fines and lump-sum damages, and their proportionality in relation to the value and significance of the obligation being secured.

Domain No. 3: Criminal Law – Seizure of Computer Data

A research team from the Faculty of Law at Comenius University is examining criminal law decisions in which law enforcement authorities deal with the seizure of electronic and computer data. The research question aims to identify the types of criminal activity for which orders to secure computer data are most frequently issued. The relevant legal framework includes provisions of Act No. 301/2005 Coll. of the Code of Criminal Procedure, Act No. 236/2017 Coll. on the European Investigation Order, and international instruments such as the 2001 Convention on Cybercrime. The team also monitors the application of European instruments for the cross-border gathering of electronic evidence, including the forthcoming EU Regulation 2023/1543, which will enter into force in August 2026. Key search terms include, for example, communication content, traffic and location data, data storage media and cloud environments.

Domain No. 4: Copyright – unauthorised use of works

A research team from the Faculty of Law at Comenius University is examining cases in which copyrighted works are publicly transmitted without a licence agreement having been concluded with a collective management organisation (CMO), thereby resulting in unjust enrichment on the part of the unauthorised user. The research question examines which categories of works are most frequently subject to such infringements of authors' rights, from the perspective of CMOs and end-users. The legal basis consists primarily of Act No. 185/2015 Coll. (the Copyright Act), the Civil Code, and relevant European directives on copyright in the information society and rental rights. The team focuses in particular on the institution of extended collective licensing agreements and on the case law of the Court of Justice of the European Union concerning the concept of public transmission. The issue of fair remuneration and the boundary between authorised and unauthorised use of protected works is also analysed.

Question 1 What research questions or hypotheses did you pursue as part of your legal research prior to employing automated analysis?

Please specify the specific research questions you were seeking to answer. It is important to understand to what extent these questions were sufficiently formulated before the analysis began or whether they evolved during the course of the project.

Example: *E.g.: I was interested in how courts in Slovakia approach the moderation of contractual fines – specifically: what factors they take into account.*

Domain No. 1 – Unfair competition	When formulating the research questions, I focused primarily on which means of evidence are most frequently used in proceedings, what claims the affected parties most frequently pursue and with what outcome, which elements of unfair competition are most frequently combined, and also which economic sector is most affected by unfair competition practices, and so on. Given that the collection of attributes was extensive, the dataset also provides scope for addressing other research questions that may prove relevant when evaluating the results.
Domain No. 2 – Contractual fine	The research focused on the decision-making practice of Slovak courts in the application of contractual fines in commercial law relationships. We examined in particular how courts assess the appropriateness of contractual fines, in which cases they reduce them pursuant to Section 301 of the Commercial Code, and what legal or factual circumstances they consider decisive. The research questions were formulated prior to the analysis but were refined during the course of the work. It became apparent that it is not sufficient to examine only the outcome of the dispute; it is also necessary to distinguish between the court's reasoning, the nature of the secured obligation, the amount of the contractual fine, the position of the parties, and whether the court actually exercised its discretion to moderate the fine or merely assessed its reasonableness in general terms.
Domain No. 3 – Criminal Law	We were interested in what digital data the courts use when proving cybercrime, what the legal basis is for obtaining it, and what types of penalties and their severity were imposed for computer-related offences.
Domain No. 4 – Copyright – unauthorised use of works	The research focused primarily on identifying decision-making trends in Slovak courts in disputes concerning copyright protection and the unauthorised public transmission of works. We were interested in what factors influence the success of claims brought by collective rights management organisations, how courts approach the issue of unjust enrichment, and what types of legal arguments recur in their decisions. The research questions evolved gradually over the course of the project. They were originally formulated in relatively general terms; however, after the dataset was created and we became familiar with the structure

	of the decisions, it was necessary to refine them based on the data actually available and the quality of the reasoning in individual decisions.

Prior to the analysis, the legal research teams established research questions of varying scope and degree of specificity, all of which were directed towards empirically verifiable phenomena in the decision-making practice of Slovak courts. A common feature across the research teams was a certain degree of iterative development of the research questions. None of these teams adhered strictly to the original formulation and adapted them on an ongoing basis to the content and structure of the available decisions.

Question 2 How did you typically conduct legal research in this area before using systematic contextual analysis methods?

Please describe your previous methodological approach – e.g. manual analysis of key decisions, doctrinal analysis, consultation with a team, comparative analysis. This will help us understand the context in which the new methods are being evaluated.

Example: *E.g.: I usually read 10–20 decisions, which I selected at my own discretion, and drew conclusions from them. Now, for the first time, I have worked with a dataset of 100 decisions.*

Domain No. 1 – Unfair competition	When working with case law, I usually carried out doctrinal research, through which specific decisions relating to the issue were analysed, or the development of case law in a particular area was examined.
Domain No. 2 – Contractual fine	Before utilising systematic content analysis, we conducted legal research primarily in the traditional manner. This involved manually searching for relevant decisions, reading selected judgments, conducting a doctrinal analysis of specialist literature, and comparing the courts' reasoning. The selection of decisions was to some extent influenced by the availability of case law and by which decisions appeared to be legally significant. This approach allowed for in-depth legal analysis, but was time-consuming and less suitable for identifying broader trends in judicial practice. Working with the dataset enabled us to examine a larger body of decisions in a more systematic manner.
Domain No. 3 – Criminal Law	Manual analysis of decisions based on keywords.
Domain No. 4 – Copyright – unauthorised use of works	Prior to the use of systematic content analysis, legal research was conducted predominantly using traditional doctrinal methods. Typically, this involved a manual analysis of a small number of decisions selected on the basis of legal relevance or citation in specialist literature. However, this methodology carried the risk of selective choice of decisions and limited representativeness of conclusions. Working with a larger dataset made it possible to identify broader decision-making trends and recurring patterns that might not have been apparent in manual research.

Before the introduction of automated methods, all legal research teams relied predominantly on traditional doctrinal research, i.e. the manual reading and analysis of a smaller number of decisions selected on the basis of legal relevance or citation in the specialist literature. The common denominator of all these approaches was the possibility of in-depth legal analysis, but also the time-consuming nature of the process and the limited representativeness of the conclusions. Research work with a larger dataset has, for the first time, made it possible to systematically track broader decision-making trends that might not be apparent in manual research.

5. Identification and collection of a suitable data sample

The selection of a suitable sample of legal texts to be subjected to closer examination is closely linked to the formulation of research questions or scientific hypotheses. In general, the method of systematic contextual analysis can be applied **to any type of legal documentation**. It is possible to analyse provisions of legislation, the text of court decisions or decisions of other relevant state authorities, concluded contracts, terms and conditions, and so on. The fundamental prerequisite in this regard is, above all, **the availability of the legal text.**

Legislation is required to be published and is easily accessible via official websites; specifically, in the domestic context, via the Slov-Lex public administration information system, which is administered and operated, pursuant to Section 8(1) of Act No. 400/2015 Coll. on the creation of legislation and on the Collection of Laws of the Slovak Republic, and, in relation to European Union law, on the EUR-Lex portal operated by the Publications Office of the European Union, which is available in all 24 official languages of the European Union.

As regards the availability of **court decisions**, these are generally published either by the judicial authority issuing the decisions itself or by another competent authority. In the Slovak context, this includes, for example, the Ministry of Justice of the Slovak Republic, which, pursuant to Section 82a(1) of Act No 757/2004 Coll. on Courts, ensures the publication on its website of final decisions on the merits of the case, decisions terminating proceedings, decisions on urgent measures and decisions postponing the enforceability of an administrative authority's decision in anonymised form, within 15 working days of the date on which the decision becomes final. Pursuant to Section 82a(5) of Act No. 757/2004 Coll. on Courts, courts are also obliged to make available to the public, upon a request for access to information under Section 14 of Act No. 211/2000 Coll. on Free Access to Information (hereinafter referred to as the "Freedom of Information Act"), **all court decisions, including non-final decisions and decisions that are not decisions on the merits of the case,** with the exception of:

- consent to the provision of data subject to telecommunications secrecy under a specific regulation,

- consent to the use of information technology and orders under the Code of Criminal Procedure;

however, they shall make the consent available to the person to whom it relates, provided that this does not jeopardise or frustrate the performance of the State's tasks. In doing so, the courts take measures to protect rights and legally protected interests.

In addition to the courts, other state authorities also have the power to make **decisions**, although gaining access to them may be problematic. Whilst some state authorities publish the decisions they make on their websites, others have not adopted such a transparent approach. However, access to such decisions is not *a priori* ruled out. It is possible to make use of the mechanism of a request for access to information under Section 14 of Act No. 211/2000 Coll. on Free Access to Information (the Freedom of Information Act) with the aim of making the decisions of the relevant authority available to the researcher. At the same time, however, it must be noted that the mere submission of a request for access to information does not automatically mean that the requested decisions will actually be made available. The publication of judicial or other decisions is not the norm, but rather a specific feature of the Slovak legal environment.[17] In other countries, it is primarily the decisions of higher courts that are regularly published, whilst the decisions of other courts are generally not freely accessible.

Contracts also constitute a relevant type of legal text that can be used for the purposes of systematic content analysis of the law; however**,** gaining access to them is very difficult. Generally speaking, there is no legal obligation to publish contracts concluded between private-law entities in a centralised database. The only exception in this regard are the so-called **'mandatorily published contracts**', which, pursuant to Section 5a(1) of the Freedom of Information Act, are concluded by obligated persons and contain information obtained using funds managed by public administration legal entities, including non-state special-purpose funds, or relates to the use of such funds, the disposal of state property, municipal property, the property of a higher territorial unit, or the property of legal entities established by or under the law , or the disposal of European Union funds. However, even in

[17] At the same time, however, it is true that in recent years initiatives to publish the decisions of all judicial authorities have also been identified in other countries, including the Czech Republic. Available at: https://msp.gov.cz/web/msp/rozhodnuti-soudu-judikatura-

the case of these contracts, the applicable legislation provides for a number of exceptions where, for example, service contracts, employment contracts, contracts relating to stock exchange transactions and their brokerage, contracts relating to securities or other financial instruments, etc., are not published in this manner. In general, the contracting parties are primarily interested in protecting the confidentiality of their contractual rights and obligations arising from the concluded contractual arrangements. For this purpose, provisions concerning the protection of the confidentiality of information (Section 271 of the Commercial Code), trade secrets (Section 17 et seq. of the Commercial Code), know-how, personal data, etc. are often included in contractual agreements. This does not automatically preclude the possibility of using the method of systematic content analysis in relation to contracts; however, a prerequisite will be gaining access to a sufficient sample of contracts to be analysed. At this point, it is also necessary to highlight the quality of the source data. Although contracts are stored in PDF (Portable Document Format), they are often saved as images or in a quality that is problematic for automated processing.[18] OCR (Optical Character Recognition) tools may have significant problems with such a quality of input documents.

In addition to the Central Register of Contracts, databases of contracts held by law firms or commercial companies may serve as a source of contractual arrangements, provided that authorised access to such contracts can be demonstrated and that they are thoroughly anonymised. However, in addition to contracts, **general terms and conditions** (Section 273 of the Commercial Code) may also be used as a basis for analysis; these are generally freely available on the websites of various companies, operators of e-commerce platforms or providers of intermediary services. Table 1 provides an overview of available sources of legal texts that can serve as a resource for the purposes of systematic contextual analysis of the law.

[18] According to Methodological Guideline No. 006408/2021/oMK-3 of the Ministry of Investment, Regional Development and Informatisation of the Slovak Republic dated 25 March 2021 on the implementation of guaranteed conversion, a range of between 200 and 300 DPI is permitted for black-and-white text.

	Portal name	Available
Legislation		
European Union legislation	EUR-Lex	https://eur-lex.europa.eu/
National legislation	Slov-Lex	https://www.slov-lex.sk/domov
Court rulings		
European Court of Human Rights	HUDOC	https://hudoc.echr.coe.int/
Court of Justice, General Court and Civil Service Tribunal	Curia	https://curia.europa.eu/
Supreme Court of the Slovak Republic (103,238 decisions)	Decisions	https://www.nsud.sk/rozhodnutia/
Constitutional Court of the Slovak Republic (50,103 decisions)	Decisions	https://www.ustavnysud.sk/decision-making_activity/decisions
Supreme Administrative Court of the Slovak Republic (15,430 decisions)	Decisions	https://www.nssud.sk/#
Decisions of district courts, regional courts, the City Court, the Supreme Court of the Slovak Republic, the Administrative Court and the Specialised Criminal Court (4,509,025 decisions)	Decisions	https://www.justice.gov.sk/sudy-a-rozhodnutia/sudy/rozhodnutia/

Table1 – Overview of available sources of legal texts (as at 14 September 2025)

In addition to the availability of legal texts, other factors that may influence the practical application of the method of systematic content analysis of law must also be taken into account. These primarily include the ability to search for relevant legal texts in available databases, the structure of the available data, the technical processing of documentation, the method of downloading the identified legal text from the database, and so on. In this regard, it is worth highlighting several specific features of Slovak legislation. Pursuant to Section 21g(1) of the Freedom of Information Act, the obligated person shall make information available for the purposes of its re-use in a form and manner permitted by their technical capabilities, preferably in electronic form as open data enabling automated

processing, together with its metadata. Formats and metadata must, to the greatest extent possible, comply with the formal open standards of the Freedom of Information Act. In other words, where possible, the obligated body shall make available a so-called API (application programming interface), which allows researchers to access the data in the future as well, without having to constantly request access to new legal texts. The second aspect concerns the structure, format of the data and its management by public bodies. This is regulated by Decree No. 78/2020 Z. z. of the Office of the Deputy Prime Minister of the Slovak Republic for Investment and Informatisation on standards for public administration information technology. The decree in question also addresses the issue of open data (Section 39), which can be used in research as supplementary, contextual information. A list of open datasets can be found in the National Open Data Catalogue.[19]

Another important requirement in this regard is the ability **to justify the selection of a specific sample of legal text** for detailed analysis. In traditional legal research, the selection of legal sources to be examined is determined solely by the researcher, since *'legal experts who interpret decisions primarily examine cases that interest them, often without any discussion of where they found these cases or why they chose them rather than others. The reader must rely on the author's judgement as to which decisions are worth reading, i.e. which decisions are 'definitive', i.e. best illustrating the legal problem in the case in question."*[20] It can be problematic to identify all legal texts relevant to answering the research questions set, or to define a representative sample of legal texts. The rationale for selecting a specific sample of legal sources may be based on various factors, most commonly the definition of a specific time period (for example, the decision-making activity of the relevant authority over its entire period of operation, or exclusively from a specific decisive point in time, e.g. following the adoption of new legislation), the relevant authorities (in the case of copyright infringement, decisions may be analysed according to the remedies applied – civil, administrative or criminal), the level of decision-making (decisions of first-instance courts, or decisions adopted by higher courts), and so on. The very identification of relevant legal texts from the entire set (population) of legal texts is an interesting research

[19] Available at: https://data.slovensko.sk/
[20] HALL, Mark A. WRIGHT, Ronald F. Systematic content analysis of judicial opinions. In *California Law Review*, 2008, vol. 96, no. 1, pp. 63–79.

question. For example, when selecting decisions relating to cybercrime from the total set of all criminal case decisions, this will involve hundreds of thousands of decisions. For this reason, an automated or semi-automated selection of these decisions is essential.

The following question and the responses from legal research teams were relevant for identifying and collecting a suitable data sample.

Question 3 Did you encounter any limitations arising from the content or availability of legal texts in your dataset? If so, how did these limitations affect your research questions?

The method of systematic content analysis is limited by the actual content of the analysed texts. We would like to know whether you had to adjust or narrow your research questions due to the absence of certain information in decisions, contracts or other legal texts.

Example: *For example: I wanted to investigate what evidence the courts considered when assessing digital evidence, but most decisions did not contain detailed reasoning. These were abbreviated forms (summary judgments, plea agreements).*

Domain No. 1 – Unfair competition	In decisions on commercial law matters, or civil cases, I find the structure of the reasoning to be the most problematic, as some decisions are 'more systematic' than others – for example, in terms of summarising the evidence presented and describing the facts arising from it.
Domain No. 2 – Contractual fine	Yes. The greatest limitation was the varying quality and level of detail in the reasoning of court decisions. Not all decisions contained sufficient information on why the court considered the contractual fine to be proportionate or disproportionate. In some decisions, the contractual fine was addressed only marginally, even though it was formally the subject of the dispute. This affected the ability to accurately code the reasons for moderation or refusal of moderation. The research questions therefore had to be narrowed down from the ambition of assessing the quality of legal argumentation to identifying visible indicators that could be reliably captured in the text of the decision.
Domain No. 3 – Criminal Law	Yes, as a rule, the relevant sample was not suitable for quantitative research methods, as the number of decisions was statistically insignificant. Alternatively, the number of decisions in the relevant sample was too high.
Domain No. 4 – Copyright – unauthorised use of works	Yes. A significant limitation was the quality and scope of the reasoning in individual decisions. Several decisions contained only brief or formulaic reasoning, with no detailed consideration by the court of the parties' legal arguments or of the grounds for granting or refusing the claim. Limitations were also evident in certain attributes that could not be reliably identified from every decision. Consequently, it was

	necessary to narrow down some research questions, particularly to those aspects that were sufficiently captured in the dataset.

All research teams that provided a response encountered these limitations and consider them to be one of the main practical problems in applying this method. The most frequently identified limitation was the variable quality and level of detail in the reasoning of court decisions. Many decisions contained only brief or formulaic reasoning without deeper legal argumentation. It is therefore clear across the teams that the actual content of the analysed legal texts is a key limitation of the entire method, and research questions must be adapted to what is included in the decisions. In other words, the methods cannot answer questions that are not contained in the legal texts.

6. Coding of legal texts

The most important phase of the method of systematic content analysis of legal text is the coding of the text itself. The aim of this coding is to create a suitable representation of individual legal texts in a code that represents defined **attributes (properties)**. The code represents a set of individual elements, which we refer to as attributes. These are specific properties of a legal text which may represent the legal text as such (so-called metadata) or be derived from the content of the legal text.

Metadata includes information used to identify a specific legal text; in the case of court decisions, this would include, for example, information identifying the court that issued the decision, the date the decision was made, the type of decision, the case reference number, and so on. **Attributes based on the content** of the legal texts themselves may include, for example, information on the presence of a reference to a specific legal provision or its individual provisions, a discussion of a specific legal institute, the type of sanctions imposed, etc., reflecting both the factual and legal aspects expressed in the legal text under examination. An alternative to these attributes are external (contextual) attributes, which supplement the context of the decision in question or the legal relationship. Examples include an entity's revenue for a given year, the number of employees, or information on the place of business or permanent residence.

Individual attributes can also be categorised based on the format in which they represent data. In this context, a distinction can be made, for example, between **numerical**

attributes (the amount of a monetary fine imposed, the number of mitigating or aggravating circumstances), **categorical attributes** (the nature of the offender, the method of payment for the subject matter of the contract – one-off, monthly, etc.), or **binary attributes**, which indicate the presence or absence of certain information in the legal text under examination (the type of penalty imposed in criminal proceedings, e.g. the imposition of a custodial sentence, the occurrence of a specific legal institution in a contract – YES/NO attributes).

In addition to the above, we also distinguish between **independent and dependent attributes**. Independent (explanatory) attributes represent the inputs we use to analyse or explain a given issue (e.g. a specific mitigating circumstance within criminal proceedings). On the other hand, dependent (target) attributes represent the output that we analyse or explain (e.g. a court verdict – guilty/not guilty). Dependent attributes are essential for analysis where we require labelled data (labels). This is known as supervised learning, and these labels enable the method to learn. For example, based on the 'guilty/not guilty' labels, the model can learn which combination of independent (explanatory) attributes influences the determination of the court's verdict on the merits of the case. The opposite of supervised learning is unsupervised learning. This does not require dependent attributes for the analysis itself. However, these are essential for verifying and evaluating the accuracy of the results.

Hall and Wright distinguish the following categories of information that can be encoded:

a) the identity of the individual parties and their characteristics,
b) the type of legal issues raised in a specific case and the circumstances in which they arose,
c) the manner in which the case or problem was resolved,
d) the grounds for the decision in question.[21]

[21] HALL, Mark A. WRIGHT, Ronald F. Systematic content analysis of judicial opinions. In *California Law Review*, 2008, vol. 96, no. 1, pp. 63–79.

Generally speaking, the categories designated for coding purposes may be varied, given the diversity of questions posed by researchers.[22] In certain cases**,** they may also include **information that does not follow directly from the legal text**, but whose presence can be inferred implicitly (for example, the application of a particular principle).

Identifying the attributes to be extracted from the legal text presents a relatively challenging task for the researcher. The selected attributes must be sufficient for the purposes of answering the defined research questions, or for confirming/refuting the defined scientific hypotheses. In each individual case, it is necessary to assess **the completeness of the attributes**. Failure to include relevant attributes in the analysis may lead to distorted results that do not take the legal problem into account in its entirety. The researcher must consider whether an individual legal source provides a sufficient basis (contains the necessary information) for examining the research questions set out or verifying the research hypotheses.

Once the list of attributes has been finalised, it is necessary to examine individual legal texts in order to identify the information recorded in the chosen method of data representation. There are various methods for extracting attributes from the legal sources under examination. In most cases, the researcher manually reads the selected legal sources and records their description of the attributes in an objective and reproducible manner. To speed up this process and facilitate the examination of a larger set of legal sources, automated attribute extraction methods can be used. Similarly diverse are the data representation models that a researcher may choose to record information extracted from selected legal sources. In most cases, the extracted information is stored in the form of a data table. The rows of this table represent individual objects (e.g. court decisions, contracts) and the columns represent the relevant attributes.

The following questions and answers from legal research teams were relevant for identifying and collecting a suitable data sample.

Question 4 To what extent did the selected attributes capture legally relevant information for your research question?

[22] Ibid.

The coding of legal texts stands or falls on the choice of attributes. You carried out the coding following prior discussion. Please state which attributes you think you would have defined differently, or which you ultimately found to be missing.

Example: *E.g.: The attribute 'amount of the contractual fine' was very important, but I missed an attribute distinguishing whether the penalty was imposed ex offo or on the basis of a party's proposal – this distinction has legal implications but was not captured.*

Domain No. 1 – Unfair competition	I found the 'coding' of the economic sector related to unfair competition somewhat problematic, as I had expected a higher degree of standardisation of sectors; however, these were relatively diverse and I am still considering how to categorise them.
Domain No. 2 – Contractual fine	The selected attributes captured a significant portion of the legally relevant information, in particular the amount of the contractual fine, the outcome of the proceedings, the type of court, the legal basis of the claim and the possible application of Section 301 of the Commercial Code. It proved legally important to distinguish whether the court awarded the contractual fine in full, reduced it, dismissed the claim, or dealt with the issue of proportionality only indirectly. However, we lacked a finer distinction between the grounds for moderation, such as the disproportion between the amount of the fine and the secured obligation, the length of the delay, fault, the economic position of the parties, or repeated breaches of the obligation. These factors are legally significant but often cannot be easily captured by a single attribute.
Domain No. 3 – Criminal Law	Yes, they were captured; greater internal interconnection between individual attributes and their analysis would have provided greater added value (e.g. linking location data or operational data to the scene of the offence, or linking specific location data to a specific title of acquisition, which was missing in many of the analysed decisions.
Domain No. 4 – Copyright – unauthorised use of works	The selected attributes generally captured the basic legally relevant information necessary for the analysis of copyright disputes. I consider the attributes relating to the type of claim, the existence of a licence relationship, the outcome of the proceedings and the type of copyright infringement to be the most significant. On the other hand, the dataset lacked some of the finer qualitative aspects of legal argumentation, such as the manner of interpreting the concept of public transmission or the intensity of the plaintiff's burden of proof. These aspects are captured only to a very limited extent.

The legal research teams agreed that the selected attributes captured the basic layer of legally relevant information; however, upon closer examination, several gaps became apparent. Across the research teams, the prevailing conclusion is that the attributes covered the formal level of decisions sufficiently, but the substantive, value-based layer of the legal text remained out of reach.

Question 5 Have you encountered cases where an attribute was defined in a way that did not correspond to legal reality or established legal terminology?

In the automated processing of legal text, legal concepts may be simplified or distorted. We are interested in whether the attribute categories corresponded to the actual legal content, or whether some classifications were incorrect, unclear or misleading.

Example: *For instance, the attribute 'type of proceedings' had the category 'civil', but some proceedings were, by their nature, more administrative. This depended on interpretation. Or: the category 'suit upheld' was binary, although in reality courts rule across a spectrum (partial upholding, amendment of wording, etc.).*

Domain No. 1 – Unfair competition	Yes. In one decision, it was not specified whether it was a judgment or a ruling, but it was stated that it was a decision. I don't think I came across any other anomalies.
Domain No. 2 – Contractual fine	Yes. In some cases, it became apparent that the categories were too simplistic for the legal reality. For example, simply labelling the outcome as 'granted' or 'dismissed' does not capture situations where the court awarded part of the contractual fine, reduced it under Section 301 of the Commercial Code, or assessed the claim on a different legal basis. Similarly, the attribute relating to the application of Section 301 requires a legally sensitive interpretation, as the court may refer to proportionality without expressly invoking its discretionary power. It is therefore necessary to supplement such attributes with methodological explanations and examples of borderline situations.
Domain No. 3 – Criminal Law	No.
Domain No. 4 – Copyright – unauthorised use of works	Yes. In some cases, the attributes were defined too generally or in binary terms, even though the legal reality was considerably more complex. For example, the outcome of proceedings was often reduced to the success or failure of a claim, even though in practice there were also partial successes or procedural decisions with different implications. Similarly, when categorising the legal bases of claims, it was sometimes difficult to distinguish clearly between claims based on unjust enrichment and those based on licensing, as the courts often intermingled these issues in their reasoning.

Most legal research teams encountered cases where the set of attributes did not correspond to legal reality, albeit to varying degrees. The common conclusion is that legal reality is generally more complex than binary or categorical classification allows, and that coding categories must be supplemented with methodological explanations and examples of borderline situations.

Question 6 If you could propose changes to the list of attributes for your dataset, what would they be? What would you add, remove or rephrase?

This question is crucial for future research. Your expert knowledge of the field of law is indispensable in identifying what truly distinguishes legally relevant cases from what is legally insignificant.

Example: *For instance, I would add the attribute 'application of the general clause of unfair competition versus specific factual circumstances', as these two approaches have diametrically opposed procedural consequences, yet in the dataset they were merged into a single category.*

Domain No. 1 – Unfair competition	I would add one more attribute, namely whether, in the case of interim measures or provisional measures (under the previous Civil Procedure Code), the claimant was required to bring an action on the merits, or perhaps other attributes that would capture what claims the affected parties most frequently seek through interim measures, what the court ultimately grants them, and what they seek through the action on the merits.
Domain No. 2 – Contractual fine	We would propose adding the following attributes in particular: the explicit application of Section 301 of the Commercial Code, an implicit assessment of reasonableness without explicit reference to Section 301, the ratio between the amount of the contractual fine and the secured obligation, the length of the delay or duration of the breach, the type of secured obligation, the grounds for moderation stated by the court, the party's procedural initiative in raising an objection of disproportion, and the nature of the parties. It would also be useful to distinguish between a commercial law context and, where applicable, a consumer or mixed context, as the legal assessment of a contractual penalty may vary depending on the nature of the relationship.
Domain No. 3 – Criminal law	No.
Domain No. 4 – Copyright – unauthorised use of works	We would add attributes capturing: • the quality and scope of the reasoning behind the decision, • the type of legal reasoning used by the court, • the existence of established case law, • the extent of the collective management organisation's activity in presenting evidence, • and the distinction between individual and collective rights management. At the same time, it would be appropriate to refine the categorisation of the outcome of proceedings and to establish a finer distinction between the various types of copyright infringement.

Legal research teams propose, above all, the addition of more nuanced, legally meaningful attributes that would better capture the substantive level of decisions. Across the research teams, there is a recurring call for a more precise categorisation of the outcome

of proceedings and for the addition of attributes that would allow for a distinction between the formal and actual application of specific legal institutions.

7. Formulation of conclusions or observations based on data analysis

The output of the legal text coding phase is the representation of the extracted information in the created dataset, which serves as the basis for further analysis, in which various methods may be employed. These may range from simple statistical data analysis to more complex machine learning methods. However, the use of complex statistical or other methods is not a prerequisite,[23] as even simple counts representing the occurrence of the phenomenon under investigation can have relevant informative value.[24] The choice of methods used in a specific case rests with the researcher, who must take into account several factors, including the volume of coded legal text (machine learning methods often require datasets containing a larger volume of legal text), the nature of the research questions posed (for example, if the author's aim is to identify the main trends in decision-making, it will be necessary to create certain groups of decisions based on identified common characteristics), and so on.

According to Sarker[25] , we classify machine learning methods according to the task they perform within the machine learning framework. The individual tasks that also relate to the analysis of legal texts include:

a) **classification of objects** – the relevant machine learning methods enable objects (e.g. court decisions) to be classified according to a chosen criterion (e.g. according to the court's decision – guilty/not guilty).

b) **clustering of objects** – relevant machine learning methods enable the separation of individual objects of interest (e.g. decisions, contracts) into distinct groups without knowing the resulting group (unsupervised learning). This allows us, for example, to determine the trends in the decision-making of courts.

c) **detection of outliers** – relevant machine learning methods identify those objects that represent the greatest deviation from an imaginary average across all examined objects and attributes. The identification of outliers aids more accurate clustering,

[23] HALL, Mark A. WRIGHT, Ronald F. Systematic content analysis of judicial opinions. In *California Law Review*, 2008, vol. 96, no. 1, pp. 63–79.
[24] SALEHIJAM, Maryam. The Value of Systematic Content Analysis in Legal Research. In *Tilburg Law Review*, 2018, vol. 23, no. 1-2, pp. 36–38. https://doi.org/10.5334/tilr.5
[25] SARKER, Ihsan H. Machine learning: Algorithms, real-world applications and research directions. In *SN Computer Science*, 2021, vol. 2, no. 3, art. 160. https://doi.org/10.1007/s42979-021-00592-x

but at the same time provides a means of identifying those elements (e.g. decisions, contracts) that are furthest removed from established legal practice (e.g. from the established practice of a decision-making body).

d) **creation of association rules –** the relevant methods enable the identification of certain patterns in the behaviour of attributes based on objects (court decisions, contracts) and their attributes. If attribute 1 occurs and attribute 2 occurs at the same time, then attribute 3 will occur with a certain probability. For example, if a contract contains a certain type of disclaimer and its subject matter relates to a specific performance, then with a certain probability the contract is concluded for an indefinite period.

To select appropriate methods, outputs and conclusions, we have chosen methods which we describe in more detail in the following sub-chapters. For each method, we also provide relevant responses from legal research teams.

7.1 Descriptive statistical analysis

Brief description: A basic analysis of frequencies, proportions, means, medians, ranges and temporal trends of individual attributes in the dataset. It is suitable for binary, categorical and numerical attributes. It represents the first step for any dataset, as it enables an understanding of its structure, quality and basic distribution of features.

Objective of the analysis: To gain a basic overview of the dataset under investigation, to identify dominant patterns, the frequency of occurrence of selected legal concepts, decision-making patterns, sanctions, types of contractual clauses or other relevant attributes.

Question 7 Descriptive statistical analysis (frequencies, proportions, averages, distributions of attributes)

This output shows which attribute values occur, how often, and in what proportions. For example: what percentage of decisions were upheld, what was the average fine amount, and how are the types of proceedings distributed.

Example: *For instance: I found that 73% of decisions on contractual fines resulted in the claim being upheld, at least in part – this provided an interesting starting point for further questions. But the figure itself did not tell me why this was the case.*

Domain No. 1 – Unfair competition	I found that the success rate in disputes between plaintiffs and defendants is roughly 50% to 50% – as claims are sometimes partially upheld. Usefulness of results: 5
Domain No. 2 – Contractual fine	Descriptive statistics were very useful as an initial overview of the dataset. They made it possible to determine how often contractual fines appear in decisions, what the outcome of the proceedings is, how many decisions rely on Section 301 of the Commercial Code, and in what types of disputes contractual fines occur most frequently. This provides a good foundation for legal research, as it shows whether this is an isolated phenomenon or a more established decision-making practice. The limitation is that the figures themselves do not explain the legal grounds for the decision. The percentage of reduced contractual fines must therefore always be supplemented by reading the reasoning. Comprehensibility of results: 5 Usefulness of results: 4
Domain No. 3 – Criminal law	Comprehensibility of results: 4 Usefulness of results: 4
Domain No. 4 – Copyright – unauthorised use of works	The descriptive analysis was very useful from a practical point of view. It provided a basic overview of the structure of the dataset, the frequency of individual types of disputes and the success rate of individual types of claims. It helped to identify the dominant types of proceedings and the most common legal issues. A limitation was that the frequencies themselves did not explain the reasons behind the judicial practice. Comprehensibility of results: 5 Usefulness of results: 5

The descriptive statistical analysis was rated extremely positively by the legal research teams and received the highest usefulness ratings of all analytical methods. The common conclusion across the teams is that descriptive statistics represent an essential and natural first step in any analysis, which is also the most intuitively graspable from a legal perspective; however, it must always be supplemented by a deeper normative analysis, as frequencies alone do not explain the causes of the phenomena under study.

7.2 Analytical method – Comparative analysis of groups

Brief description: Comparison of differences between predefined groups of documents, for example between decisions of different courts, different authorities, different periods, different types of proceedings or different categories of contracts.

Aim of the analysis: To determine whether individual groups of legal texts systematically differ from one another, and if so, in which attributes and to what extent.

Question 8 Comparative analysis (differences between groups – courts, regions, periods, types of proceedings)

This analysis compares groups of documents based on metadata and looks for systematic differences. For example: do the decisions of regional courts differ from those of district courts? Are there regional differences in decision-making?

> **Example:** *E.g.: The output showed that the Regional Court in Bratislava had a significantly higher proportion of dismissed claims in the area of unfair competition than other regional courts – this would be worth further research, but I do not know whether this is due to the methodology or some other factor.*

Domain No. 1 – Unfair competition	Clarity of results: 3 Usefulness of results: 3
Domain No. 2 – Contractual fine	The comparative analysis was particularly useful in comparing the decisions of different courts and periods. It made it possible to identify whether the application of Section 301 or the success rate of claims for contractual penalties varies according to the type of court or the time period. The output helped to formulate further questions, such as whether certain differences are related to the type of disputes brought before specific courts or to differing argumentation practices. Comprehensibility of results: 4 Usefulness of results: 4
Domain No. 3 – Criminal law	The analysis provided only partial insight into the comparative analysis, given the selected attributes. The conclusions were predictable. Comprehensibility of results: 4 Usefulness of results: 4
Domain No. 4 – Copyright – unauthorised use of works	The comparative analysis enabled a comparison of judicial practice across different courts and time periods. Of particular interest were the differences in the approach taken by individual panels regarding the amount of compensation or the assessment of public

	transmission of works. However, the results had to be interpreted with caution given the varying number of decisions and the quality of the dataset. Comprehensibility of results: 4 Usefulness of results: 4

The comparative analysis was evaluated predominantly positively. Some legal research teams encountered issues with the completeness of the outputs. Overall, comparative analysis is perceived as a tool suitable for formulating hypotheses and identifying areas worthy of further investigation, rather than as a method capable of providing definitive legal conclusions.

7.3 Analytical method – Correlation analysis between attributes

Brief description: Examining relationships between two or more attributes, for example between the type of proceedings and the outcome of a decision, between the type of infringement and the level of penalty, or between the subject matter of a contract and the duration of the contract. For binary and categorical data, contingency tables, Pearson's correlation coefficient for binary data, the chi-square test of independence, or Cramer's V may be used.

Objective of the analysis: To identify legal or factual relationships between attributes and determine which characteristics typically occur together.

Question 9: Correlation analysis (interdependencies between attributes)

Correlation analysis measures the extent to which different attributes are related. For example: is there a relationship between the amount of the contractual fine and the outcome of the proceedings? Is there a link between the type of breach and the type of sanction?

Example: *The analysis revealed a strong positive correlation between the attribute 'application of the general clause' and 'dismissal of the claim'. This was legally surprising to me and led me to a further hypothesis.*

Domain No. 1 – Unfair competition	Several interrelated aspects were confirmed – for example, that in decisions based on applications for interim measures, there are no hearings of witnesses and parties. Clarity of results: 5 Usefulness of results: 5

Domain No. 2 – Contractual fine	Correlation analysis was useful in identifying relationships between attributes, such as between the amount of the contractual fine, the outcome of the proceedings, the application of Section 301, and the type of secured obligation. For a lawyer, it is particularly beneficial that correlations can highlight connections that might not be apparent when reading individual decisions manually . At the same time, however, this is an output that requires great caution. Correlation does not imply causation, and a legal conclusion cannot be based solely on a numerical relationship. The result is more suitable as a basis for formulating hypotheses. Comprehensibility of results: 3 Usefulness of results: 4
Domain No. 3 – Criminal Law	Given the selected attributes, no correlation analysis was performed. Comprehensibility of results: 4 Usefulness of results: 4
Domain No. 4 – Copyright – unauthorised use of works	Correlation analysis helped to identify certain relationships between attributes, for example between the existence of a licence agreement and the success of a lawsuit. It was useful in formulating further hypotheses. Comprehensibility of results: 3 Usefulness of results: 4

Correlation analysis was assessed as useful for uncovering unexpected connections, but at the same time as the most methodologically challenging for legal interpretation. Across legal research teams, the prevailing conclusion is that correlation analysis is valuable for generating new research hypotheses, but requires a strong filter for legal relevance and cannot be used as a standalone source of legal conclusions.

7.4 Analytical method – Cluster analysis

Brief description: An unsupervised learning method that divides legal texts into groups based on the similarity of attributes. For categorical and binary data, K-means is suitable, or alternatively hierarchical clustering with an appropriate distance metric.

Objective of the analysis: To discover natural groups of legal texts without predefined classes, such as typical lines of reasoning, standard contract templates or recurring combinations of legal features.

Question 10 Cluster analysis (discovering natural groups of legal texts/decisions)

Clustering without predefined categories seeks out similar legal texts/decisions and groups them together. The aim is to discover recurring patterns and typical cases without the researcher knowing in advance what groups exist.

Example: *For instance: Clustering revealed three recurring 'types' of decisions on unfair competition, which I had previously perceived more intuitively. Now I can see their specific attribute characteristics.*

Domain No. 1 – Unfair competition	The cluster analysis did not produce clusters that formed homogeneous groups, but rather a large number of small clusters of 2–3 decisions each. I interpret this to mean that individual disputes exhibit a high degree of specificity and cannot be easily categorised. Comprehensibility of results: 5 Usefulness of results: 5
Domain No. 2 – Contractual fine	Clustering helped to identify typical groups of decisions. In the case of contractual fines, it emerged that decisions could be divided, for example, into cases of standard award of a claim, cases of mitigation under Section 301, cases of dismissal on procedural or evidential grounds, and cases in which the contractual fine was assessed alongside other claims. The output was particularly interesting in that it revealed similarities between decisions that a lawyer would intuitively perceive as separate. A limitation is that the naming of clusters is already a legal interpretation and cannot be done by the algorithm alone. Comprehensibility of results: 3 Usefulness of results: 3
Domain No. 3 – Criminal law	Cluster analysis demonstrated the possibility of clustering decisions according to individual attributes. Comprehensibility of results: 4 Usefulness of results: 4
Domain No. 4 – Copyright – unauthorised use of works	Clustering was particularly useful in identifying recurring types of disputes and decisions. It helped to uncover similar cases that might not have been immediately apparent during manual reading. On the other hand, interpreting individual clusters was more legally complex and required additional manual reading of the decisions. Comprehensibility of results: 3 Usefulness of results: 3

Cluster analysis proved to be a methodologically interesting but interpretatively challenging method, which provided the team with insights into similarities between decisions that would otherwise have remained hidden. The comprehensibility and usefulness of this method were rated lower than for descriptive statistics, suggesting that it is a method more suitable for a more advanced stage of research.

7.5 Analytical method – Anomaly detection

Brief description: Searching for decisions that differ significantly from others. Methods such as LOF, Isolation Forest, ECOD, COPOD or PCA-based detection can be used. This analysis is particularly suitable where we wish to identify non-standard decisions, atypical contracts or unusual cases.

Objective of the analysis: To identify outlier cases that may represent either an error or a legally significant exception to established practice.

Question 11 Anomaly detection (identification of deviations from typical practice)

This method identifies legal texts/decisions that differ significantly from others. These may include atypical decisions, extreme penalty amounts, non-standard contractual arrangements, or decisions deviating from established practice.

Example: *For example: The analysis flagged one decision on a contractual fine as anomalous. Upon reading it, I found that the court had used unusual reasoning directly referencing the doctrine of another state. I would otherwise have overlooked this.*

Domain No. 1 – Unfair competition	In the context of anomaly detection, the attribute relating to the economic sector proved to be the most anomalous, as did the presence of evidence other than that identified (recognised) by the CSP. Comprehensibility of results: 4 Usefulness of results: 5
Domain No. 2 – Contractual fine	Anomaly detection was particularly useful as a tool for identifying decisions that warrant closer manual scrutiny. In the case of contractual fines, this may involve an extremely high fine, an unusual ratio to the secured obligation, atypical reasoning, or non-standard application of Section 301 of the Commercial Code. Such cases are valuable for research purposes, as they often reveal the limits of established decision-making practice. A limitation is that an anomaly in the data may not be legally anomalous. Sometimes it is merely a technical consequence of coding or an incompleteness in the text of the decision. Comprehensibility of results: 4 Usefulness of results: 4
Domain No. 3 – Criminal law	The analysis identified a relatively large number of anomalies due to missing data, which will be supplemented. In the Excel file provided, there was no data for certain attributes. Comprehensibility of results: 5 Usefulness of results: 5
Domain No. 4 – Copyright – unauthorised use of works	Anomaly detection proved very useful in identifying decisions that differed significantly from standard decision-making practice. Such decisions often contained specific reasoning or atypical procedural steps.

	Comprehensibility of results: 4 Usefulness of results: 4

Anomaly detection, together with descriptive statistics, was among the highest-rated methods, and the teams perceive it primarily as a navigational tool directing the researcher's attention to decisions worthy of closer examination. The common conclusion of the legal research teams is that anomaly detection is most valuable as an input filter for deeper qualitative analysis, rather than as a method that directly produces legal conclusions.

7.6 Analytical method – Association rules

Brief description: Searching for patterns of the type "if attribute A occurs and attribute B occurs at the same time, then attribute C often occurs as well". Particularly suitable for larger binary or categorical datasets. Methods such as Apriori or FP-Growth can be used.

Objective of the analysis: To uncover recurring combinations of attributes and identify rules that characterise decision-making or contractual practice.

Question 12 Association rules (patterns of the form: IF x → THEN y, e.g. if long sentence → unconditional)

Association rules seek patterns in what co-occurs in texts. The output consists of rules with measures of support, confidence and lift.

> **Example:** *E.g.: The rule "if IP address + long duration of the offence → unconditional custodial sentence" was statistically strong, but I had to interpret it cautiously from a legal perspective. Correlation is not causation.*

Domain No. 1 – Unfair competition	These results have been presented very clearly. However, their interpretation will require further clarification to ensure they are applicable (and suitable for publication). Clarity of results: 5 Usefulness of results: 5
Domain No. 2 – Contractual fine	The association rules were useful in identifying recurring combinations of features, for example where a certain type of breach or a specific fine amount is frequently associated with the claimant's success or with moderation. Legally, however, this is a method that must be interpreted with great caution. A rule of the form 'if x, then y' may give the impression of an automatic legal consequence, which is not the case in judicial decision-making. For legal research, these rules are more useful as a navigational tool to indicate which combinations of cases should be analysed manually.

	Comprehensibility of results: 3 Usefulness of results: 3
Domain No. 3 – Criminal law	The association rules confirmed their own empirical findings, both in terms of the attributes of penalties and the procedural attributes of individual pieces of digital evidence. Comprehensibility of results: 4 Usefulness of results: 4
Domain No. 4 – Copyright – unauthorised use of works	The association rules were particularly interesting in identifying recurring combinations of attributes. However, not all rules had real legal relevance, and several results interpreted with great caution. Comprehensibility of results: 3 Usefulness of results: 3

The teams evaluate the association rules differently. For some domains, they were very clear and confirmatory; for others, they require careful interpretation and are of more of a navigational value. The ratings for clarity and usefulness range from 3 to 5, reflecting the heterogeneity of experience across domains.

7.7 Analytical method – Predictive analysis

Brief description: A supervised learning method in which the model learns to predict a target attribute based on other attributes. For example, the outcome of proceedings, the type of sanction, or the category of decision. Decision trees, logistic regression, random forests, or other interpretable models may be used. Target attributes according to datasets, for example:

- the severity of the penalty imposed
- the amount of the contractual fine following the exercise of the court's discretion
- application of the general clause or one of the elements of unfair competition

Objective of the analysis: To identify which attributes have the greatest influence on a particular outcome and to verify whether it is possible to model decision-making or other legal practice on the basis of the identified characteristics.

Question 13 Predictive analysis (predicting the outcome of proceedings or another target attribute based on other attributes)

The machine learning model attempts to predict the outcome of proceedings or the nature of the sanction. At the same time, it shows which attributes have the greatest influence on the outcome (feature importance).

Example: *For instance: The model predicted the outcome of proceedings with an accuracy of F1=0.72. For me as a lawyer, it was not the prediction itself that was interesting, but the list of the most important attributes: 'amount of damage' and 'repeated violation' were key, which corresponds to legal intuition.*

Domain No. 1 – Unfair competition	NA
Domain No. 2 – Contractual fine	The predictive analysis was methodologically interesting, but from a legal perspective we view it more as a supplementary tool. It was not so much the prediction of the outcome of the proceedings itself that was useful, but rather the identification of the attributes that the model considered important. In the case of contractual fines, this can help verify whether the model is working with legally relevant variables, such as the amount of the fine, the type of obligation, or the application of Section 301. The limitation is that a court's decision is not a mechanical result of the attributes. Prediction therefore cannot replace legal analysis and must be explained in legal terms. Comprehensibility of results: 3 Usefulness of results: 3
Domain No. 3 – Criminal law	Given the selected attributes, the predictive analysis was more of an *ad informandum* nature. Usefulness of results: 5
Domain No. 4 – Copyright – unauthorised use of works	The predictive analysis was of interest more from a methodological than a practical perspective. The greatest benefit was not the predictive model itself, but the identification of the attributes that had the greatest influence on the outcome of the proceedings. Comprehensibility of results: 3 Usefulness of results: 4

Predictive analysis was assessed as methodologically interesting, but from a legal perspective it was seen as a supplementary method, with its main value lying not in the prediction itself, but in the identification of key attributes. The comprehensibility of predictive analysis is rated lower than that of simpler methods, suggesting that for legal research teams without statistical training, it presents an interpretative barrier that must be overcome through rigorous legal translation of the outputs.

8. Communicating the results in a manner comprehensible to the legal community

The final phase of systematic content analysis focuses on interpreting and discussing the results achieved in a legally comprehensible manner. The results must be interpreted in relation to the defined research questions and/or scientific hypotheses within the context of the relevant field of legal research, as results obtained through statistical analysis or various machine learning methods represent specific values that cannot be examined without providing the relevant context. These methods do not specify the meaning of the figures obtained or how they should be interpreted; legal expertise is essential in this regard.

Question 14 **Could you use the outputs of data analysis directly in your legal research? If so, in what way?**

We are interested in whether the analysis outputs can actually be integrated into legal text, arguments or conclusions, or whether they remain separate. Please describe a specific case, if possible.

Example: *E.g.: I could use descriptive statistics in an article as an empirical basis for a claim regarding the dominant type of decision. Clustering helped me structure the chapters according to the identified types of cases.*

Domain No. 1 – Unfair competition	I certainly plan to use the individual outputs in my publishing activities across multiple outputs, reflecting on the formulation and answering of various research questions.
Domain No. 2 – Contractual fine	Yes. The outputs of the data analysis can be used primarily as an empirical basis for legal research. Descriptive statistics can be utilised in the initial mapping of decision-making practice regarding contractual fines. Comparative outputs can support claims regarding differences between groups of decisions. Clustering and anomaly detection can assist in structuring a chapter on typical cases or in selecting decisions for deeper qualitative analysis. However, I would not use the outputs in isolation. Their value only emerges when they are linked to a normative analysis of Section 301 of the Commercial Code and to the specific reasoning of the courts.
Domain No. 3 – Criminal Law	Provided a larger number of decisions and a sample are included, certainly yes.
Domain No. 4 – Copyright – unauthorised use of works	Yes. The outputs could be used as an empirical basis for legal argumentation and for formulating general conclusions about the decision-making practice of Slovak courts.

	Descriptive and comparative analyses were particularly useful in practice. At the same time, the analytical outputs helped to identify areas that required more detailed manual examination.

All legal research teams answer in the affirmative, albeit with important conditions and reservations. The common conclusion is that the outputs are usable in legal research, but not as autonomous sources of conclusions. The value of the outputs lies in supplementing, not replacing, classical normative analysis.

Question 15 **Are there any analysis outputs that you would be unable to interpret meaningfully in a legal context? Describe why.**

Not every statistical result automatically has legal significance. We are interested in where the boundary lies between what is statistically interesting and what is legally relevant, and where you encounter difficulties in interpretation.

Example: *E.g.: The correlation matrix as a whole was difficult for me to read. I didn't know which correlations to take seriously and which to ignore. I lacked a 'legal relevance' filter.*

Domain No. 1 – Unfair competition	As I mentioned earlier in this questionnaire, for example, the result regarding the correlation between witness examination as evidence and a motion for an interim order may have looked 'good' statistically, from a legal perspective, this result is natural and obvious.
Domain No. 2 – Contractual fine	Yes. The most difficult outputs to interpret are those that are statistically interesting but legally unclear. A typical example is a correlation matrix or association rules without an explanation of why a given correlation should have legal significance. Another problem arises when an attribute captures a formal characteristic but not the legal substance. For example, the outcome of proceedings alone may not indicate whether the court actually addressed the appropriateness of a contractual fine. For legal interpretation, therefore, a filter for legal relevance is required, along with the ability to quickly return to the specific decisions on which the outcome is based.
Domain No. 3 – Criminal Law	Of those not included in the questionnaire, I do not rule out the existence of quantitative methods of analysis that are more difficult to interpret legally, or impossible to interpret at all.
Domain No. 4 – Copyright – unauthorised use of works	Some more complex analytical outputs, particularly extensive correlation matrices or certain cluster analysis outputs, were only interpretable in legal terms to a limited extent. They lacked a clear filter for legal relevance. In practice, it was necessary to combine analytical outputs with manual reading of decisions and legal expertise.

Legal research teams agree that interpretative difficulties arise particularly with more complex outputs that lack a 'legal relevance filter'. A common requirement of all legal research teams is the need to link analytical outputs with the ability to refer back to specific decisions and to supplement the results with a legally formulated interpretation.

Question 16 Can the outputs of the analysis replace legal argumentation, or are they merely a supplement to it? Explain your position.

This is a fundamental methodological question. We want to know how legal researchers perceive the role of quantitative outputs in relation to traditional normative legal analysis.

Example: *E.g.: In my opinion, the outputs will never replace legal argumentation. They can identify a problem, but not explain it. A court will not understand an 'F1 score of 0.7'. I have to translate this into legal language.*

Domain No. 1 – Unfair competition	I believe that this type of research has fundamental complementary significance, perhaps also given that not all lawyers are accustomed to this form of interpreting results, and it will likely require a more in-depth discussion when presenting the findings.
Domain No. 2 – Contractual fine	The outputs of the analysis cannot replace legal argumentation. They can significantly support, clarify and empirically ground it, but the legal conclusion must be based on the interpretation of the legal norm, case law, doctrine and the specific factual context. In the case of contractual fines, the algorithm can show in which cases courts are more likely to reduce the fine, but it cannot explain whether the court's approach was legally correct. We therefore view the outputs as a supplement to legal argumentation, not as a substitute for it. Their main function is to identify patterns, deviations and questions for the lawyer to interpret further.
Domain No. 3 – Criminal Law	I do not believe that the analysis's findings will replace legal argumentation; they are a supplement to it, or its foundation (the argumentation is based on them).
Domain No. 4 – Copyright – unauthorised use of works	In my view, the outputs of data analysis cannot replace legal argumentation. However, they can significantly complement legal research and help identify trends, patterns or problematic areas that would go unnoticed in traditional research. The analytical results themselves, however, always require legal interpretation and placement within a normative context.

All legal research teams unequivocally reject the notion that the outputs of automated analysis could replace legal argumentation. They unanimously define these outputs as a supplement to, rather than a substitute for, traditional legal research. The common conclusion is that the main function of automated analysis is to identify patterns, anomalies and research questions, which the lawyer must then interpret further.

Question 17 **In your view, which aspects of a legal text are difficult or impossible to automate and necessarily require the manual input of an expert?**

Some legal information is implicit, contextual or requires interpretation. It cannot be captured by a binary or categorical attribute. We are interested in where, in your view, the limits of automation lie in a legal text.

> **Example:** *For example, no attribute can capture the quality of a court's legal reasoning, the application of discretionary law, or the assessment of the proportionality of a sanction. This always requires reading the entire decision.*

Domain No. 1 – Unfair competition	With regard to my specific dataset and the question that, in practice, resonates most strongly in matters of unfair competition, it is which specific conduct is capable of fulfilling the specific elements of unfair competition. It might also be problematic to 'codify' which specific facts led the court to conclude that unfair competition had taken place – simply put, this is still permitted within the bounds of fair competition, but this conduct is no longer permitted and will be sanctioned.
Domain No. 2 – Contractual fine	The evaluative and contextual aspects of a legal text are particularly difficult to automate. These include, for example, the quality of legal argumentation, the assessment of proportionality, the court's discretion in moderating a contractual fine, the implicit assessment of good competitive practice or fair business conduct, and the significance of factual circumstances which the court does not describe explicitly. Automation can detect the occurrence of a particular term or category, but it cannot reliably determine whether the court has used persuasive legal reasoning. It is precisely in the case of Section 301 of the Commercial Code that a human legal perspective is essential, because it is not merely a question of the outcome, but of the reasons and the extent of the court's reasoning.
Domain No. 3 – Criminal Law	Discretionary assessment of evidence, the reasoning behind a decision, the fairness of a decision, the right to a fair trial, etc.
Domain No. 4 – Copyright – unauthorised use of works	We consider the following to be particularly difficult to automate: • the quality of legal argumentation, • the interpretation of vague legal concepts, • assessment of proportionality, • the court's implicit reasoning, • and the significance of the context of the specific case. In most cases, these aspects require manual reading and expert legal judgement.

Legal research teams agree that automation has clear limitations when it comes to capturing the evaluative, contextual and discretionary aspects of legal text. Across research

teams, the consensus is that automation can reliably capture the occurrence of terms and formal categories, but the value-based and argumentative layers of legal text inevitably require manual reading and expert legal judgement.

Question 18 **Did you encounter any instances during coding or the interpretation of results where automation produced a misleading or incorrect conclusion? Please describe the case.**

We want to know about specific failures or distortions so that we can improve future methods. Not every error is significant. We are also interested in minor discrepancies that may have had legal implications.

Example: *E.g.: The analysis classified the proceedings as 'civil', even though they were administrative proceedings. The coding was based on the formal classification without taking into account the substantive nature of the proceedings. The results of the comparative analysis were therefore distorted.*

Domain No. 1 – Unfair competition	During my initial examination of the results, I did not encounter any distortion of the results. However, for the purposes of publication, I will certainly select which results have added value and which can be considered a form of 'notoriety'.
Domain No. 2 – Contractual fine	During interpretation, situations arose in which an automated or overly formal approach could have led to a misleading conclusion. For example, a decision might have been classified as a case applying Section 301 simply because the section was mentioned in the text, even though the court did not actually exercise its discretionary power. Conversely, some decisions assessed the appropriateness of a contractual fine without explicit reference to Section 301. Such cases demonstrate that the mere presence of words or provisions is insufficient. Legal data requires review by a lawyer and clear coding rules.
Domain No. 3 – Criminal Law	No.
Domain No. 4 – Copyright – unauthorised use of works	Yes. In some cases, automation produced an overly simplified picture of the decisions. For example, cases that were formally similar could have different legal significance, which could not be captured solely through attributes. Problems also arose with decisions containing very brief reasoning, where it was difficult to correctly identify the legally relevant factors.

Legal research teams report misleading conclusions, particularly where the formal presence of a legal concept in the text was mistaken for its actual application. The overall conclusion is that the occurrence of words or legal provisions is insufficient as an indicator

of their actual application. For legal data, verification by a lawyer and clear coding rules are essential.

Question 19 How would you rate the reliability and reproducibility of attribute coding within your team (so-called inter-rater reliability)? Was there a procedure in place to resolve discrepancies?

Replicability is one of the key advantages of the systematic content analysis method. We are interested in how you ensured consistent coding in practice and how you resolved cases where multiple coders could not agree.

Example: *E.g.: We had a coding guide, but some attributes (e.g. 'severity of the breach') were nevertheless coded inconsistently. Each of us had a different legal intuitive understanding of what constitutes 'serious'.*

Domain No. 1 – Unfair competition	As I processed the dataset myself, the problems described did not arise.
Domain No. 2 – Contractual fine	NA
Area 3 – Criminal Law	No such case has arisen.
Domain No. 4 – Copyright – unauthorised use of works	The reliability of the coding was generally good, as the team worked according to pre-agreed rules and a coding guide. Nevertheless, differences in interpretation arose for some attributes, particularly in the case of qualitative legal categories. We resolved these discrepancies through joint discussion within the team and subsequent harmonisation of the coding methodology.

Legal research teams report quite different experiences, which is also related to the fact that some domains worked with a single coder, whilst others used several. The common conclusion is that coding by individual experts does eliminate inconsistencies, but at the same time limits consistency checks. In multi-member teams, a coding guide is essential but insufficient for attributes with value-based or interpretative content, where active discussion and ongoing harmonisation of rules are required.

Question 20 What changes to the process (selection of decisions, definition of attributes, analytical methods, presentation of results) would increase the usability of the outputs for your legal research?

This is a key question for improving the methodology. Your specific recommendations will be directly incorporated into the conclusions of the ALTAML project output. Please provide as specific suggestions as possible.

Example: *E.g.: I would welcome an iterative process. First, present the results of the descriptive analysis, discuss them with legal experts, and only then proceed with the predictive analysis. A lawyer could thus correct the coding before the final results are generated.*

Domain No. 1 – Unfair competition	To improve the results, I would probably move on to annotating more decisions, using a larger dataset.
Domain No. 2 – Contractual fine	The usability of the outputs would be enhanced in particular by an iterative process. First, a smaller test sample of decisions should be created, on which the legal team would verify the attributes and coding rules. Only then should the entire dataset be coded. It would also be useful to link each statistical output to specific decisions so that a lawyer could verify the basis for the conclusion. When presenting the results, brief legal interpretations of the graphs, warnings about small sample sizes, and a clear distinction between statistical relationships and legal conclusions would be helpful. It is also important to retain the option of manually correcting attributes following the initial analysis.
Domain No. 3 – Criminal Law	Increase the number of decisions included in the analysis to ensure a statistically relevant sample, so that conclusions can be formulated for the entire decision-making system. Use Bayesian probability, e.g. for evaluating evidence and making predictions. Entropy theory in the social sciences, applicable particularly in the legislative process (analysis of factors that increase or decrease disorder – the number of interpretations of a given norm within the system).
Domain No. 4 – Copyright – unauthorised use of works	We consider the following to be most important: • an iterative process between lawyers and data analysts, • a more precise definition of attributes, • ongoing validation of the dataset, • and better visualisation of results for lawyers. Legal experts should be more closely involved right from the design of attributes and the interpretation of analytical outputs.

Legal research teams are converging on specific, complementary recommendations. The common thread running through all recommendations is the closer involvement of legal experts from the very stage of attribute design and the interpretation of results.

Question 21 **In which specific areas of law or types of research do you see the greatest potential for the use of this methodology in Slovakia?**

The method appears particularly suitable for a large volume of homogeneous legal texts. We are interested in which areas of law you see the greatest added value from the perspective of your research interests.

Example: *E.g.: In my opinion, it has the greatest potential in the areas of consumer protection (a large number of standardised cases), public procurement (mandatorily published decisions) and criminal law (available decisions).*

Domain No. 1 – Unfair competition	This is a challenging question, as in my view there is no single specific area, or areas of law, for which this methodology would be suitable. I believe that the methodology is applicable to (almost) all areas of law and types of decisions; however, it is crucial to refine the research questions and appropriately define the attributes to be collected.
Domain No. 2 – Contractual fine	We see the greatest potential in areas where there is a large number of relatively homogeneous decisions or documents. In commercial law, this primarily concerns contractual fines, unfair competition, commercial obligations, liability for damages and disputes arising from commercial contracts. Consumer law, employment law, public procurement, administrative penalties and data protection also hold great potential. The methodology is particularly suitable where a researcher does not wish to analyse just a few well-known decisions, but needs to identify broader trends in judicial practice.
Domain No. 3 – Criminal Law	Decisions and case law in general, taking of evidence and evaluation of evidence.
Domain No. 4 – Copyright – unauthorised use of works	We see the greatest potential particularly in areas with a large number of relatively homogeneous decisions, for example: • consumer protection, • copyright, • administrative penalties, • public procurement

Legal research teams differ significantly in the degree of specificity of their recommendations, but they agree that the methodology is applicable across legal disciplines provided there is sufficient availability of texts. The prevailing conclusion across the research teams is that the methodology has the greatest potential where a researcher needs to track broader trends in legal practice, rather than merely analysing a few key decisions.

Question 22 How would you view the integration of large language models (LLMs, e.g. GPT, Gemini) into the process of analysing legal texts? What advantages and risks do you see compared to traditional machine learning methods?

The project authors have deliberately focused on traditional machine learning (ML) methods. The results can be explained in terms of attributes. However, we are interested in lawyers' views on generative AI and large language models in this context.

Example: *For instance: An LLM could automate coding, but I fear it will not be consistent and its responses will not be verifiable. On the other hand, it could capture nuances that binary attributes simply cannot handle.*

Domain No. 1 – Unfair competition	I am not sure to what extent this is feasible, but presumably if annotation were to take place in the Docano system, it would be desirable for the AI to be able to auto-annotate a larger sample of decisions based on a specific template, following the provided example. I consider large language models to be more suitable for information retrieval than for this kind of analytical work, as I personally would not be able to check it and fully rely on it.
Domain No. 2 – Contractual fine	LLMs could be particularly useful for preliminary reading of decisions, proposing attributes, summarising the facts of the case, and identifying passages relating to contractual fines or Section 301 of the Commercial Code. The advantage over traditional machine learning is the ability to work with linguistic context and legal nuances. However, the risks include inconsistency, the possibility of hallucinations, and lower verifiability of answers. Therefore, LLMs should not make independent decisions regarding legal categories. The most suitable model is a combination: LLMs as assistants in pre-processing and information extraction, traditional ML and statistics for explainable outputs, and a lawyer as the final checker of legal interpretation.
Domain No. 3 – Criminal Law	The clear disadvantage is the black-box nature of the model's operation. As a partial solution, I see limiting functionality solely to research and analysis via attributes that must be included in the prompt.
Domain No. 4 – Copyright – unauthorised use of works	LLM models could significantly assist with text pre-processing, automatic summarisation of decisions, or preliminary coding of attributes. Their advantage lies in their ability to capture a broader linguistic and argumentative context. However, the risks include lower explainability, inconsistent responses, and problematic verifiability of conclusions. In legal research, therefore, I believe it is necessary to combine LLMs with traditional, transparent analytical methods

Legal research teams appreciate the potential of LLMs for pre-processing and summarisation, but at the same time express concerns about the consistency, verifiability and transparency of the outputs. The common conclusion is that LLMs represent a promising supplementary tool, not an autonomous decision-making system. Their integration requires a clear definition of roles and the maintenance of legal control over the outputs.

Question 23 Would you use the systematic cointent analysis method in your future research even without the support of a data analyst? What would a legal researcher need in terms of skills or tools?

The question concerns the sustainability of the methodology. We are interested in whether legal researchers would be able and willing to use these methods independently, and what they would lack to do so.

Example: *E.g.: Yes, but I would need a simple coding tool (Excel is not sufficient), basic statistical software with legally comprehensible output, and a step-by-step methodological guide (not code in the Python programming language).*

Domain No. 1 – Unfair competition	To be honest, I can't quite picture it myself, as I consider it quite challenging. Perhaps if I were to carry out those steps under supervision first, from which I would make my own notes (procedure) and then, in theory, I might know how to proceed, but I probably wouldn't be able to manage it entirely on my own, given my lack of knowledge in the fields of statistics, graph theory and the like.
Domain No. 2 – Contractual fine	We would also use the method in further research, but not entirely without methodological and technical support. A legal researcher would need a simple tool for coding decisions, a clear methodological manual, a coding guide template, basic training on interpreting statistical outputs, and visualisations prepared in a legally comprehensible form. Excel may suffice to begin with, but it is limiting when dealing with larger datasets. It is crucial that the tool allows users to return to the specific text of the decision and that the outputs are not presented solely in technical language.
Domain No. 3 – Criminal Law	Definitely yes. Simple processing of attributes across a large number of decisions without the need to annotate each decision individually.
Domain No. 4 – Copyright – unauthorised use of works	Yes. The method could be used even without the direct support of a data analyst, although a legal researcher would need: • simpler user tools, • basic methodological training, • visualisations that are comprehensible to lawyers, • and a methodological manual explaining the individual analytical outputs

Legal research teams differ in their level of confidence in using the method independently, but they agree that some form of methodological and technical support remains essential. The common conclusion is that legal researchers are willing to adopt the method, but its autonomous use requires a significant reduction in technical barriers and the development of legally oriented tools and materials.

Question 24 **Are there any other issues or aspects relating to the use of automated legal text analysis that you would like to highlight or add?**

This open space is for any thoughts not covered by the previous questions. From ethical issues, through institutional barriers, to visions for the future development of the method.

> **Example:** *E.g.: I would like to draw attention to the issue of anonymisation. We work with decisions where personal data is anonymised, but certain attributes may allow for de-anonymisation (e.g. the combination of 'fine amount + region + year'). This is an ethical issue that the project does not address.*

Domain No. 1 – Unfair competition	I would like to thank all the team members who took part in this process for their work on my dataset.
Domain No. 2 – Contractual fine	We consider it important to emphasise that automated analysis of legal texts has great potential, but its quality depends on the quality of the input data, attributes and legal review. When deciding on contractual fines, it is particularly important to distinguish between the formal presence of a legal provision and its actual application. The method should not be presented as a substitute for a lawyer, but as a tool that enables lawyers to see broader patterns and ask more precise research questions. Looking ahead, it will also be important to address ethical issues, data protection, model transparency and the sustainability of the methodology after the project ends.
Domain No. 3 – Criminal Law	NA
Domain No. 4 – Copyright – unauthorised use of works	The project has demonstrated that systematic content analysis holds significant potential for empirical legal research in Slovakia as well. At the same time, however, it has become clear that the quality of the results depends primarily on the quality of the dataset, a properly designed methodology, and close collaboration between lawyers and data analysts. In future, it would be advisable to focus more on issues such as the standardisation of legal datasets, the interpretability of analytical models, and the ethical aspects of working with decisions and legal data.

The legal research teams used the concluding section to outline the broader context and provide systemic recommendations. For example, the idea that automated analysis has great potential, but its quality depends on the quality of the input data, attributes and legal oversight. The method should not be presented as a replacement for a lawyer, but as a tool enabling the lawyer to see broader patterns.

Conclusion

The method of systematic content analysis of law enables a different approach to legal research involving the analysis of legal texts. The distinctive feature of this method lies primarily in its foundation on the identification of the presence of specific attributes through the coding of legal texts (*data-based approach*) by legal experts, or through the use of automated attribute extraction methods, for the purpose of subsequently analysing the identified attributes using various empirical methods, ranging from simple statistical methods to more sophisticated machine learning methods, reflecting both the nature and quantity of individual attributes. A particular advantage of this method is, above all, its precision and the possibility of verifying the results obtained by a third, independent party on the basis of the created dataset of attributes. Among the identified disadvantages of this method are, in particular, the availability of legal texts to be analysed, as well as their content and quality, which can significantly determine and limit the research questions or scientific hypotheses for which this method can be used. Another aspect that requires particular attention when using this method is the comprehensiveness of the defined attributes, as the exclusion of relevant attributes from the analysis may lead to distorted results that do not reflect the legal problem in its entirety. The researcher must therefore consider whether an individual legal source provides a sufficient basis (contains the necessary information) for examining the research questions set out. We consider the use of this methodological framework to be particularly suitable in relation to the analysis of a large number of legal texts of various kinds with the aim of illustrating the actual state of the application of the law in the case under consideration. The methodology examined may also serve to complement classical doctrinal legal research, for example by identifying problems arising in practice that require deeper examination. In this context, the increasingly popular generative artificial intelligence and large language models was not addresses. Automation in law, including the automation of legal texts, has its own rules and requirements. One of the essential requirements is the ability to explain the result produced by a given method. In this respect, 'classical' machine learning methods still have the upper hand, as in most cases we can explain the method's result through code or attributes.

The final findings of the evaluation report, based on feedback from four legal research teams working in the fields of unfair competition, contractual fines, criminal law and copyright law, confirm these theoretical foundations whilst enriching them with a practical dimension. Prior to the introduction of automated analysis, the legal research teams relied exclusively on traditional doctrinal research involving the manual reading of a limited number of decisions; systematic content analysis enabled them, for the first time, to track decision-making trends on a larger scale and with a higher degree of replicability. None of the teams, however, retained the research questions in their original formulation. All were continuously adapted to the actual content of the available decisions, which in itself confirms one of the method's key tenets: the limits of the method are the limits of the legal texts themselves.

In terms of evaluating individual analytical methods, descriptive statistical analysis and anomaly detection proved to be the most accessible and useful; legal research teams regard these as the natural starting point for any analysis and as a tool for directing the researcher's attention to decisions worthy of deeper manual examination. Comparative and correlation analysis were evaluated positively as tools for generating new hypotheses, though with an emphasis on the necessity of a legal relevance filter when interpreting the outputs. Cluster analysis and association rules yielded interesting insights, but require a higher degree of interpretative skill and ongoing collaboration with a legal expert. Predictive analysis was viewed more as a methodological stimulus than as a final tool, with its main contribution lying in the identification of attributes with the highest explanatory power.

All legal research teams agreed on several key conclusions regarding the future use of the method. Firstly, the outputs of automated analysis cannot replace legal argumentation. They are a valuable but strictly supplementary tool, as the value-based, discretionary and argumentative layers of a legal text necessarily require the manual scrutiny of an expert. Secondly, the quality and completeness of attributes are crucial to the informative value of the results. Legal research teams have identified the need for more nuanced attributes that capture not only the formal presence of legal institutions but also their actual application. Thirdly, legal research teams unanimously recommend the introduction of an iterative process in which a legal expert is closely involved from the very outset of attribute design and continuously refines the coding before the final results are generated. Fourthly, large language models are seen as a promising supplementary tool, primarily for text pre-processing and attribute design, but not as an autonomous analytical system. Their use requires the maintenance of legal oversight and transparency of outputs. The methodology was identified by the teams as particularly valuable in areas with a higher number of homogeneous decisions, which include consumer law, public procurement, administrative penalties, commercial obligations and criminal law. A prerequisite for its wider and sustainable use in Slovak legal research is the reduction of technical and barriers

through legally oriented tools, methodological manuals and basic training for legal researchers in the interpretation of statistical outputs.

Appendix 1

QUESTIONNAIRE

The applicability of the outputs of automated analysis of legal texts in legal research and practice

Project: Automation of Legal Text Analysis (ALTAML) funded by the EU – NextGenerationEU / Slovak Republic Recovery Plan (No. 09I05-03-V02-00049)

Research**:** Systematic content analysis in law

Intended for: Members of the project's legal teams who have received data analysis outputs and work with legal datasets

This questionnaire is intended for members of the ALTAML project's legal teams who work with the outputs of automated analysis of legal datasets (descriptive statistics, correlation analysis, clustering, anomaly detection, predictive analysis, association rules and other methods applied to datasets from the areas of contractual penalties, unfair competition, data protection, digital footprints and others).

The aim of the questionnaire is to determine to what extent these outputs are useful for your legal research, what helps you, what is missing, and what the limitations of this methodology are from a legal expert's perspective. Your answers will form part of the ALTAML project's output and will help improve the applicability of these methods in future research projects.

Estimated time to complete: 90 minutes. Most questions are open-ended. Please provide specific answers.

First name and surname (optional):	
Area of law in which you work:	
Dataset(s) you have worked with:	
Date completed:	

A. Context and background of legal research

What are you investigating, and what were your research questions and approaches before using automated methods?

Question 1 What research questions or hypotheses did you pursue in your legal research before employing automated analysis?

Please specify the specific research questions you were attempting to answer. It is important to understand to what extent these questions were sufficiently formulated before the analysis began or whether they evolved during the course of the project.

> **Example:** *E.g.: I was interested in how courts in Slovakia approach the moderation of contractual fines – specifically: what factors they take into account.*

Question 2 How did you typically conduct legal research in this area before using systematic content analysis methods?

Describe your previous methodological approach – e.g. manual analysis of key decisions, doctrinal analysis, consultation with a team, comparative analysis. This will help us understand the context in which the new methods are being evaluated.

> **Example:** *E.g.: I usually read 10–20 decisions, which I selected at my own discretion, and drew conclusions from them. Now, for the first time, I have worked with a dataset of 100 decisions.*

Question 3 Have you encountered limitations arising from the content or availability of legal texts in your dataset? If so, how did these limitations affect your research questions?

The method of systematic content analysis is limited by the actual content of the analysed texts. We would like to know whether you had to adjust or narrow your research questions due to the absence of certain information in the decisions, contracts or other legal texts.

Example: *For instance: I wanted to investigate what evidence the courts took into account when assessing digital footprints, but most decisions did not contain detailed reasoning. These were abbreviated forms (summary judgments, plea agreements).*

B. Attribute coding and dataset creation

Quality, completeness and relevance of attributes from a legal expert's perspective

Question 4 To what extent did the selected attributes capture legally relevant information for your research question?

The coding of legal texts stands or falls on the choice of attributes. You carried out the coding following a prior discussion. Please state which attributes you think you would have defined differently, or which you ultimately found to be missing.

Example: *E.g.: The attribute 'amount of the contractual fine' was very important, but I missed an attribute distinguishing whether the fine was imposed ex offo or on the basis of a party's proposal – this distinction has legal implications but was not captured.*

Question 5 Have you encountered cases where an attribute was defined in a way that did not correspond to legal reality or established legal terminology?

When legal texts are processed automatically, legal terms may be simplified or distorted. We are interested in whether the attribute categories corresponded to the actual legal content, or whether some classifications were incorrect, unclear or misleading.

Example: *For instance, the attribute 'type of proceedings' was categorised as 'civil', but some proceedings were, by their nature, more administrative. This depended on interpretation. Or: the category 'suit upheld'*

was binary, although in reality courts rule across a spectrum (partial upholding, amendment of wording, etc.).

☐ YES	☐ NO	*Comment:* _____

Question 6 **If you could suggest changes to the list of attributes for your dataset, what would they be? What would you add, remove or rephrase?**

This question is key to future research. Your expert knowledge of the field of law is indispensable in identifying what truly distinguishes legally relevant cases and what is legally insignificant.

Example: *For instance, I would add the attribute 'application of the general clause of unfair competition versus specific factual circumstances', as these two approaches have diametrically opposed procedural consequences, yet in the dataset they were merged into a single category.*

C. Evaluation of individual analytical outputs

What helped you and what did not – specifically for each type of analysis

For each analytical method you worked with, please state:

(1) what specifically the analysis output provided you with and what its limitations were (please elaborate in the text field),

(2) to what extent the analysis results are comprehensible to a legal scholar without in-depth knowledge of statistics or machine learning (select from options 1–5),

(3) How useful the output is/was to you (select from options 1–5)

Question 7 **Descriptive statistical analysis (frequencies, proportions, averages, attribute distributions)**

This output shows which attribute values occur, how often, and in what proportions. For example: what percentage of decisions resulted in a successful claim, what was the average fine amount, and how the types of proceedings are distributed.

> **Example:** *For example: I found that 73% of decisions on contractual fines resulted in at least a partial upholding of the claim – this was an interesting starting point for further questions. But the figure itself did not tell me why this was the case.*

Comprehensibility of results:

1	2	3	4	5
Not at all	Not very	Partly	Mostly	Completely

Usefulness of results:

1	2	3	4	5
Not at all	A little	Partly	Mostly	Completely

Question 8 Comparative analysis (differences between groups – courts, regions, periods, types of proceedings)

This analysis compares groups of documents based on metadata and looks for systematic differences. For example: do the decisions of regional courts differ from those of district courts? Are there regional differences in decision-making?

> **Example:** *E.g.: The output showed that the Regional Court in Bratislava had a significantly higher proportion of dismissed claims in the area of unfair competition than other regional courts – this would be worth further research, but I do not know whether this is due to the methodology or some other factor.*

Comprehensibility of results:

1	2	3	4	5
Not at all	Not very	Partly	Mostly	Completely yes

Usefulness of results:

1	2	3	4	5
Not at all	A little	Partly	Mostly	Completely

Question 9 Correlation analysis (interdependencies between attributes)

Correlation analysis measures the extent to which different attributes are related. For example: is there a relationship between the amount of the contractual fine and the outcome of the proceedings? Is there a link between the type of breach and the type of sanction?

> **Example:** *For example: The analysis showed a strong positive correlation between the attribute 'application of the general clause' and 'dismissal of the claim'. This was legally surprising to me and led me to a further hypothesis.*

Comprehensibility of results:

1	2	3	4	5
Not at all	Not very	Partly	Mostly	Completely yes

Usefulness of the results:

1	2	3	4	5
Not at all	A little	Partly	Mostly	Completely

Question 10 Cluster analysis (identifying natural groups of legal texts/decisions)

Clustering without predefined categories searches for similar legal texts/decisions and groups them together. The aim is to discover recurring patterns and typical cases without the researcher knowing in advance what groups exist.

Example: *For instance: Clustering revealed three recurring 'types' of decisions on unfair competition, which I had previously perceived more intuitively. Now I can see their specific attribute characteristics.*

Comprehensibility of results:

1	2	3	4	5
Not at all	Not very	Partly	Mostly	Completely

Usefulness of results:

1	2	3	4	5
Not at all	A little	Partly	Mostly	Completely

Question 11 Anomaly detection (identification of deviations from typical practice)

This method identifies legal texts/decisions that differ significantly from others. These may include atypical decisions, extreme penalty amounts, non-standard contractual arrangements, or decisions deviating from established practice.

Example: *For example: The analysis flagged one decision on a contractual fine as anomalous. Upon reading it, I found that the court had used unusual reasoning directly referencing the doctrine of another state. I would otherwise have overlooked this.*

Comprehensibility of results:

1	2	3	4	5
Not at all	Not very	Partly	Mostly	Completely yes

Usefulness of results:

1	2	3	4	5
Not at all	A little	Partly	Mostly	Completely yes

Question 12 Association rules (patterns of the form: IF x → THEN y, e.g. if long sentence → life imprisonment)

Association rules look for patterns in what co-occurs in texts. The output consists of rules with measures of support, confidence and lift.

> **Example:** *E.g.: The rule 'if IP address + long duration of the offence → unconditional custodial sentence' was statistically strong, but I had to interpret it cautiously from a legal perspective. Correlation is not causation.*

Comprehensibility of results:

1	2	3	4	5
Not at all	Not very	Partly	Mostly	Completely

Usefulness of results:

1	2	3	4	5
Not at all	A little	Partly	Mostly	Completely yes

Question 13 Predictive analysis (predicting the outcome of an action or another target attribute based on other attributes)

The machine learning model attempts to predict the outcome of proceedings or the nature of the sanction. It also shows which attributes have the greatest influence on the result (feature importance).

> **Example:** *E.g.: The model predicted the outcome of the proceedings with an accuracy of F1=0.72. For me as a lawyer, it was not the prediction itself that was interesting, but the list of the most important attributes: 'amount of damage' and 'repeated violation' were key, which corresponds to legal intuition.*

Comprehensibility of results:

1	2	3	4	5
Not at all	Not very	Partly	Mostly	Completely yes

Usefulness of results:

1	2	3	4	5
Not at all	A little	Partly	Mostly	Completely

D. Interpretation of results and connection to legal argumentation

How do you work with the outputs in relation to legal research

Question 14 Would you be able to use the outputs of data analysis directly in your legal research? If so, in what way?

We are interested in whether the analysis outputs can actually be integrated into legal text, argumentation or conclusions, or whether they remain separate. Please describe a specific case, if possible.

> **Example:** *E.g.: I could use descriptive statistics in an article as an empirical basis for a claim about the dominant type of decision. Clustering helped me structure the chapters according to the identified types of cases.*

Question 15 **Are there any results of the analysis that you would be unable to interpret meaningfully in a legal context? Describe why.**

Not every statistical result automatically has legal significance. We are interested in where the boundary lies between what is statistically interesting and what is legally relevant, and where you encounter difficulties in interpretation.

> **Example:** *E.g.: The correlation matrix as a whole was difficult for me to read. I did not know which correlations to take seriously and which to ignore. I lacked a 'legal relevance' filter.*

Question 16 **Can the outputs of the analysis replace legal argumentation, or are they merely a supplement to it? Explain your position.**

This is a fundamental methodological question. We want to know how legal researchers perceive the role of quantitative outputs in relation to traditional normative legal analysis.

> **Example:** *E.g.: In my opinion, the results will never replace legal argumentation. They can identify a problem, but not explain it. A court will not understand an 'F1 score of 0.7'. I have to translate this into legal language.*

E. Limitations of the method and manual coding

Where does automation have its limits, and what necessarily requires a human perspective

Question 17 **Which aspects of legal text do you think are difficult or impossible to automate and necessarily require the manual input of an expert?**

Some legal information is implicit, contextual or requires interpretation. It cannot be captured by a binary or categorical attribute. We are interested in where, in your view, the limits of automation lie in legal texts.

Example: *For example, no attribute can capture the quality of a court's legal reasoning, the application of discretionary law, or the assessment of the proportionality of a sanction. This always requires reading the entire decision.*

Question 18 Did you encounter any instances during coding or interpreting the results where automation produced a misleading or incorrect conclusion? Please describe the case.

We want to know about specific failures or distortions so that we can improve future methods. Not every error is significant. We are also interested in minor discrepancies that may have had legal implications.

Example: *E.g.: The analysis classified the proceedings as 'civil', even though they were administrative proceedings. The coding was based on the formal classification without taking into account the substantive nature of the proceedings. The results of the comparative analysis were therefore distorted.*

☐ YES	☐ NO	*Comment:* _____

Question 19 How would you rate the reliability and repeatability of attribute coding within your team (so-called inter-rater reliability)? Was there a procedure in place to resolve discrepancies?

Replicability is one of the key advantages of the systematic content analysis method. We are interested in how you ensured consistent coding in practice and how you resolved cases where several coders could not agree.

Example: *E.g.: We had a coding guide, but some attributes (e.g. 'severity of the breach') were nevertheless coded inconsistently. Each of us had a different legal intuitive understanding of what constitutes 'serious'.*

F. Outlook and recommendations

The way forward – what would make the method more valuable

Question 20 What changes to the process (selection of decisions, definition of attributes, analytical methods, presentation of results) would increase the usability of the outputs for your legal research?

This is a key question for improving the methodology. Your specific recommendations will be directly incorporated into the conclusions of the ALTAML project output. Please provide as specific suggestions as possible.

> **Example:** *E.g.: I would welcome an iterative process. First, present the results of the descriptive analysis, discuss them with legal experts, and only then proceed with the predictive analysis. A lawyer could thus correct the coding before the final results are generated.*

Question 21 In which specific areas of law or types of research do you see the greatest potential for applying this methodology in Slovakia?

The method appears particularly suitable for large volumes of homogeneous legal texts. We are interested in which areas of law you see the greatest added value from the perspective of your research interests.

> **Example:** *E.g.: In my opinion, it has the greatest potential in the areas of consumer protection (a large number of standardised cases), public procurement (mandatorily published decisions) and criminal law (available decisions).*

Question 22 **How would you view the integration of large language models (LLMs, e.g. GPT, Gemini) into the process of analysing legal texts? What advantages and risks do you see compared to traditional machine learning methods?**

The project authors have deliberately focused on traditional machine learning (ML) methods. The results are explainable through attributes. However, we are interested in lawyers' views on generative AI and large language models in this context.

> **Example:** *E.g.: An LLM could automate coding, but I fear it won't be consistent and its answers won't be verifiable. On the other hand, it could capture nuances that binary attributes simply cannot handle.*

Question 23 **Would you use the method of systematic content analysis in your future research even without the support of a data analyst? What would a legal researcher need in terms of skills or tools?**

The question concerns the sustainability of the methodology. We are interested in whether legal researchers would be able and willing to use these methods independently, and what they would lack to do so.

> **Example:** *E.g.: Yes, but I would need a simple coding tool (Excel is not sufficient), basic statistical software with legally comprehensible output, and a step-by-step methodological guide (not code in the Python programming language).*

☐ YES	☐ NO	*Comment:* _____

G. Final remarks

Space for your additional thoughts

Question 24 **Are there any other questions or aspects you would like to highlight or add regarding the use of automated legal text analysis?**

This open space is for any thoughts not covered by the previous questions. From ethical issues, through institutional barriers, to visions for the future development of the method.

> **Example:** *E.g.: I would like to highlight the issue of anonymisation. We work with decisions where personal data is anonymised, but certain attributes may allow for de-anonymisation (e.g. the combination of 'fine amount + region + year'). This is an ethical issue that the project does not address.*

Thank you for your responses. Your experiences and recommendations will be directly incorporated into one of the outputs of the ALTAML project.

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