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MASTER
DIGITAL LEGAL PRACTICES

Modelling Online Dispute Resolution Processes in the European Union

Marta Sofia da Silva Ribeiro

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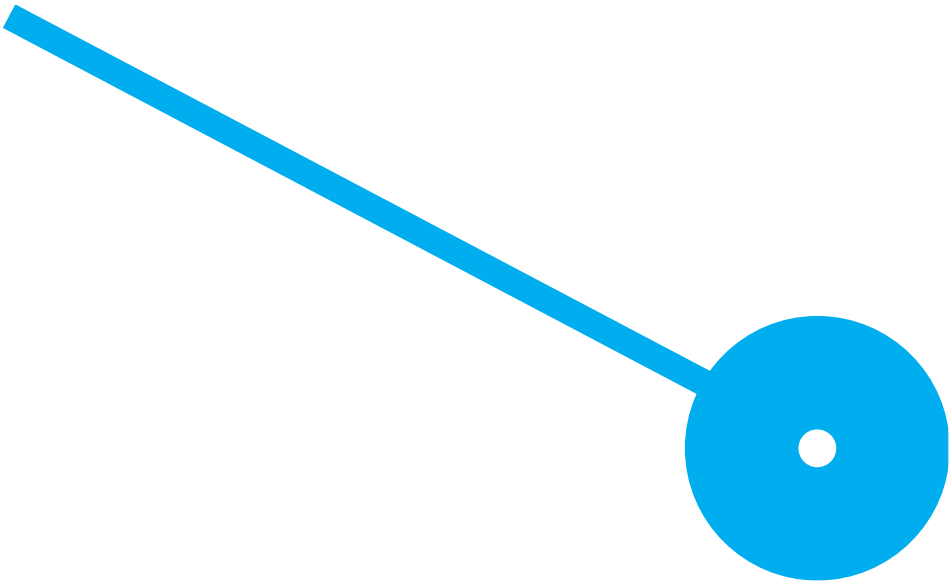

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Modelling Online Dispute Resolution Processes in the European Union

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Dissertation submitted in fulfilment of the requirements for the Master's degree in Digital Legal Practices in the School of Management and Technology of the Polytechnic of Porto.

10/**2024**

Integrity Statement

I, Marta Sofia da Silva Ribeiro, student nº 8180220, of the Master's Degree in Digital Legal Practices of the School of Management and Technology of the Polytechnic of Porto, declare that I have not plagiarized or self-plagiarized, therefore the work entitled "Modelling Online Dispute Resolution Processes in the European Union" is original and of my own authorship, not having been used previously for any other purpose. I further declare that all sources used are cited, in the text and in the final bibliography, according to the referencing rules adopted in the institution.

To my father and grandfather:
for the values you instilled in me and
the dreams you encouraged me to pursue.

Acknowledgments

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To my colleagues, I owe a sincere thank you for your camaraderie and encouragement throughout a year that tested the balance between work and academic commitments. Your support made this challenging journey far more manageable.

To my friends, thank you for your unwavering support and for bringing lightness and joy to this experience. Your companionship has been a source of strength and balance.

Finally, I dedicate my deepest thanks to my mother, whose boundless love, care, and encouragement have been the cornerstone of my resilience. Your support has been the driving force that carried me through every challenge to this moment of achievement.

Resumo

O aumento dos litígios transfronteiriços sublinha a necessidade crescente de plataformas que facilitem a sua resolução. À medida que o número de prestadores de serviços de Resolução de Litígios em Linha (RLL) se expande, torna-se crucial desenvolver mecanismos que apoiem o seu funcionamento, especialmente no contexto da modelação de processos de Resolução Alternativa de Litígios (RAL) e RLL. A presente dissertação aborda o papel da modelação de processos ao utilizar Business Process Model and Notation (BPMN) e a sua importância na integração da Inteligência Artificial (IA) nos processos de RLL na União Europeia (UE).

O BPMN oferece uma descrição precisa e pormenorizada de todas as etapas, partes e dados envolvidos nos processos de RAL e RLL, representada num formato estruturado que é percetível tanto por humanos, como interpretável por sistemas de IA. Esta capacidade não só facilita a integração de IA, como também oferece inúmeras vantagens. Estas incluem a capacidade de efetuar análises preditivas, identificar oportunidades de melhoria contínua, aumentar a eficiência operacional e reduzir custos e tempo. Além disso, tal oferece uma maior acessibilidade aos litigantes que se autorrepresentam, facilitando-lhes a navegação no processo de resolução de litígios.

A transparência proporcionada pelo BPMN, quando combinada com a IA, promove uma compreensão mais clara dos processos, o que apoia uma melhor gestão e uma tomada de decisões mais informada. Um fator crítico para garantir a adoção generalizada e a eficácia das plataformas ODR é a interoperabilidade - a capacidade de diferentes sistemas, prestadores de serviços e tecnologias trabalharem em conjunto, sem problemas, para além das fronteiras e jurisdições. A BPMN desempenha um papel fundamental na promoção da interoperabilidade através da normalização dos fluxos de processos, o que permite que diversos sistemas RLL comuniquem e funcionem em harmonia, garantindo uma experiência de utilizador mais coesa.

No entanto, é essencial abordar as questões éticas associadas à integração da IA, como a parcialidade algorítmica, a justiça e as preocupações com a privacidade, para garantir que estas tecnologias sejam utilizadas de forma responsável e equitativa.

Palavras-Chave: Business Process Model and Notation; Inteligência Artificial; Resolução Alternativa de Litígios; Resolução de Litígios em Linha; União Europeia

Abstract

The rise in cross-border disputes underscores the growing need for effective platforms that ease their resolution. As the number of Online Dispute Resolution (ODR) service providers expands, it becomes increasingly crucial to develop mechanisms that support their efficient functioning, especially in the context of designing Alternative Dispute Resolution (ADR) and ODR processes. This dissertation delves into the role of process modelling using Business Process Model and Notation (BPMN) and its importance in integrating Artificial Intelligence (AI) into ODR processes within the European Union (EU).

BPMN offers a precise and detailed depiction of all steps, stakeholders, and data involved in ADR and ODR processes, presented in a structured format that is both human-readable and interpretable by AI systems. This capability not only facilitates the seamless integration of AI but also provides numerous advantages. These include the ability to perform predictive analysis, identify opportunities for ongoing improvement, enhance operational efficiency, and reduce both costs and time. Furthermore, this improves accessibility for self-represented litigants, making it easier for them to navigate the dispute resolution process.

The transparency afforded by BPMN, when combined with AI, fosters a clearer understanding of processes, which supports better management and more informed decision-making. A critical factor for ensuring the widespread adoption and effectiveness of ODR platforms is interoperability – the ability of different systems, service providers, and technologies to work seamlessly together across borders and jurisdictions. BPMN plays a pivotal role in promoting interoperability by standardizing process flows, enabling diverse ODR systems to communicate and function in harmony, ensuring a more cohesive user experience.

However, it is essential to address ethical issues associated with AI integration, such as algorithmic bias, fairness, and privacy concerns, to ensure that these technologies are used responsibly and equitably.

Keywords: Alternative Dispute Resolution; Artificial Intelligence; Business Process Model and Notation; European Union; Online Dispute Resolution

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Abbreviations and Acronyms

AAA – American Arbitration Association

ADR – Alternative Dispute Resolution

AI – Artificial Intelligence

APIs – Application Programming Interfaces

BPM - Business Process Model

BPMN – Business Process Model and Notation

CBR - Case-Based Reasoning

DL – Deep Learning

DSD – Dispute System Design

DTD - Document Type Definitions

EU – European Union

ES – Expert System

HTTP - Hypertext Transfer Protocol

ISPs - Internet Service Providers

JOs - Justice Officers

JSON - JavaScript Object Notation

ML – Machine Learning

NLP – Natural Language Processing

ODR – Online Dispute Resolution

OMG – Object Management Group

RL – Reinforcement Learning

SGML - Standard Generalized Markup Language

US – United States

XML – Extensible Markup Language

XSD – XML Schema Definition

1. Introduction

In recent decades, the rapid pace of digitalization and the exponential growth of e-commerce have reshaped numerous sectors of the economy, significantly influencing the emergence and resolution of disputes. Within the EU, which actively promotes cross-border trade, particular challenges have surfaced regarding dispute resolution, especially in transactions conducted in digital environments. In this context, traditional dispute resolution methods, often perceived as slow and costly, fall short of meeting the needs of the fast-evolving digital economy. As a result, ODR is gaining traction as an effective alternative specifically tailored to address conflicts in the digital realm.

ODR presents an innovative solution that leverages technology to enable the resolution of disputes in a timely, accessible, and cost-effective manner. These online platforms enable parties to resolve their disputes without the need of physical travel, thereby streamlining mediation, negotiation, and arbitration processes even when the parties are located far apart. Recognizing the potential of ODR, the EU has actively promoted it as a means to enhance consumer protection and foster cross-border e-commerce while ensuring equitable access to justice for all parties involved.

This dissertation, titled '*Modelling Online Dispute Resolution Processes in the European Union*', aims to explore the design and evolution of ODR processes within the European context. It will focus on the challenges and opportunities associated with the implementation of emerging technologies, such as AI, and the application of standards like BPMN, Extensible Markup Language (XML), and JavaScript Object Notation (JSON). The objective is to provide a thorough examination of ODR mechanisms, analysing both technical and social dimensions to contribute to the development of more efficient and equitable ODR systems.

1.1. Research Objectives and Expected Contributions

This dissertation aims to investigate, model, and analyse ODR processes within the EU, focusing on the complexities of digital dispute resolution in modern legal systems. The primary purpose is to assess the current state of ODR platforms and the supporting legal frameworks, while also addressing the challenges faced by users. This research will propose innovative solutions to enhance the effectiveness, accessibility, and efficiency of ODR mechanisms.

A significant focus will be on technologies such as AI and standards like BPMN, XML and JSON. The study will explore how these frameworks can model ODR processes and enable the AI integration into conflict resolution, improving decision-making, user experience, and fairness in outcomes. Ethical considerations regarding AI implementation in dispute resolution, including compliance with the Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 (AI Act), will also be addressed.

Furthermore, this research aims to develop a comprehensive model for designing adaptable ODR processes within the European Union. This model will cover key stages of dispute resolution, from selecting the most suitable ODR platform to implementing decisions or settlement agreements.

The expected contributions extend beyond academia, aiming to inform policymakers, legal practitioners, and technology developers about effective ODR practices. Ultimately, this research seeks to foster the development of more efficient and equitable dispute resolution systems within the EU.

1.2. Planning of the Dissertation

This dissertation is structured into five key phases: (1) Research and Literature Review, (2) Interoperability and Accessibility Analysis, (3) Development of a Practical Example, (4) Identification of Improvement Opportunities, and (5) Review and Conclusion. These phases are illustrated in the Gantt Chart in Figure 1.

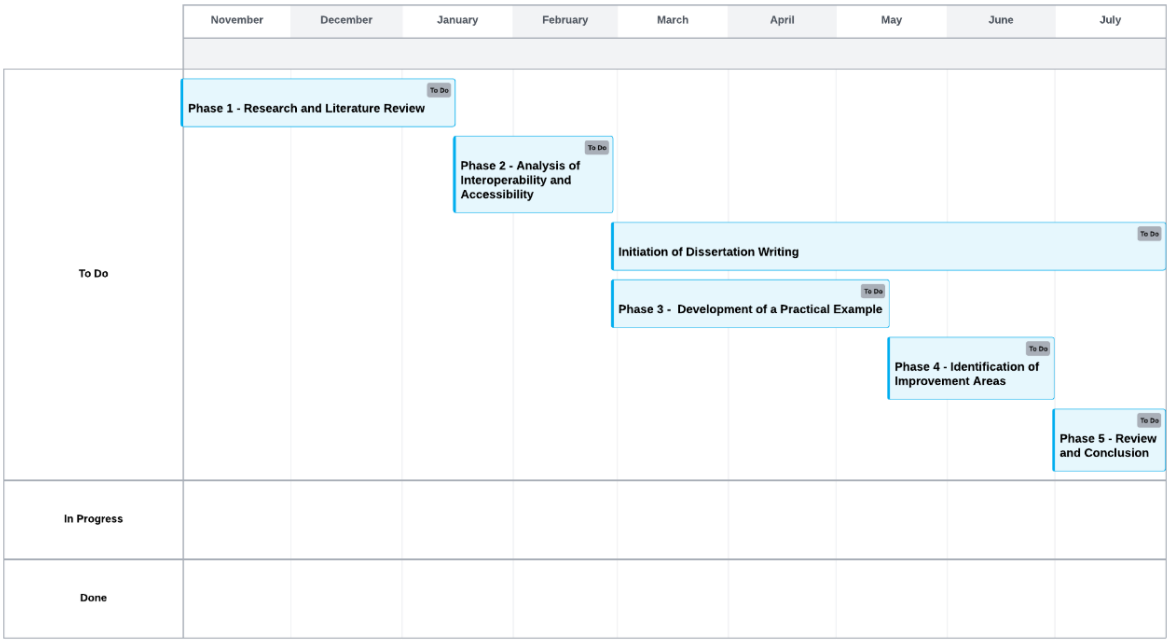

Figure 1 – Gant Chart of the Dissertation Planning

The first phase, 'Research and Literature Review', establishes the foundation for the study through a comprehensive examination of existing knowledge regarding BPMN, XML, JSON, and AI in the context of ODR. This review explores theoretical frameworks and practical applications, setting the stage for subsequent phases.

In the second phase, 'Interoperability and Accessibility Analysis', the focus shifts to how BPMN and AI enhance interoperability and accessibility in ODR systems. This analysis aims to understand how these technologies can streamline processes for individuals without legal representation, emphasizing the role of BPMN in standardization and AI in user guidance.

The third phase, 'Development of a Practical Example', involves creating a real-world ODR process modelled with BPMN, XML, and JSON on the Camunda platform. This serves as a proof of concept, demonstrating how these technologies can yield an efficient and accessible ODR system. Detailed documentation will explain the structure of each step in relation to the goals established in the previous phase.

Once the model is implemented, the dissertation moves to the fourth phase, 'Identification of Improvement Opportunities'. Here, a critical evaluation identifies potential enhancements in efficiency, complexity reduction, and user experience for self-represented litigants. This phase provides insights for optimizing future ODR platforms.

Finally, the fifth phase, 'Review and Conclusion', includes a comprehensive evaluation of the research findings. It assesses the contributions of this study to the fields of legal technology and ODR, reflecting on the effectiveness of BPMN and AI in addressing interoperability, accessibility, and efficiency challenges.

1.3. Dissertation Layout

This dissertation is organized into seven sections, each serving a specific purpose to enhance the reader's understanding of the research topic.

Introduction establishes the context and relevance of the study, emphasizing the growing significance of ODR in enhancing access to justice and improving the efficiency of digital dispute resolution mechanisms.

Section 2, titled 'Dispute Resolution', explores the evolution of dispute resolution practices. Subsection 2.1 introduces the concept of ADR, covering 'Negotiation' (2.1.1), 'Mediation' (2.1.2), and 'Arbitration' (2.1.3). Subsection 2.2 defines ODR, while subsection 2.3 situates ODR within the European Union, addressing relevant legal frameworks and challenges.

Transitioning into section 3, the discussion shifts to 'Standards Supporting ODR', examining essential technical standards for effective implementation. Subsections 3.1 and 3.2 address JSON and XML, while subsection 3.3 delves into BPMN, breaking it down into 'Elements' (3.3.1), 'Expressions' (3.3.2), and 'Forms' (3.3.3). Subsection 3.4 further explores the relationship between BPMN and ODR, emphasizing security and privacy considerations. Continuing the exploration, section 3.5 discusses 'Systems Interoperability and AI Integration', focusing on challenges and solutions for effective communication among ODR platforms.

This discussion naturally leads to section 4, which introduces Artificial Intelligence. Subsection 4.1 provides the concept of AI, while subsection 4.2 discusses its applications in ODR. Subsection 4.3 examines ethical considerations and the implications of the AI Act.

Following this, section 5 presents a framework for 'Designing an ODR Process', outlining a high-level framework that includes stages from platform selection to complaint initiation, response, negotiation, and monitoring implementation.

Additionally, in section 6 the results, and finally, section 7 synthesizes research findings.

2. Dispute Resolution

Since the beginning of human history, people have been understood as inherently social creatures. Aristotle famously described humans as 'political animals', highlighting how their existence and growth are deeply connected to life within a community. This social nature means that individuals not only desire interaction but also must establish norms and systems to govern their relationships, ensuring peaceful coexistence (Justo, 2009).

Living together in society inevitably leads to conflicts. Competition for resources, differing interests, and contrasting opinions have driven individuals throughout history to find ways to resolve disputes. This pursuit reflects a fundamental need for order and harmony in a world where violence and conflict could endanger survival and collective well-being.

As Susskind (2019) notes, civil disputes arise when a party who has suffered a loss seeks a remedy from another. To manage and resolve these conflicts effectively, societies must establish institutions dedicated to dispute resolution. These institutions form the foundation of social order, ensuring that conflicts are addressed in ways that prevent escalation and promote mutual understanding, ultimately safeguarding the well-being of the community.

Over the past several decades, there has been a significant shift from traditional court systems to the emergence of ODR. This transformation can be traced back to the foundational principles of ADR, which aimed to provide more accessible and effective means for resolving conflicts outside of traditional courtroom settings.

ADR itself emerged as a flexible alternative to court systems, with roots in informal practices by religious and community groups seeking to resolve conflicts outside formal courts.

A key milestone in ADR's institutionalization was the establishment of the American Arbitration Association (AAA) in 1926, which helped standardize arbitration practices (McManus & Silverstein, 2011). It gained momentum in the 1970s when government agencies, like the Department of Health, Education, and Welfare, began adopting ADR techniques, further legitimizing its role (Rule, 2020). Dissatisfaction with the adversarial nature of litigation, which often escalated conflicts, led to widespread advocacy for ADR. The 1976 Pound Conference, led by Chief Justice Warren Burger, emphasized the inefficiencies of traditional legal systems, cementing ADR as a necessary alternative (Stone, 2004).

Throughout the 1980s, its popularity grew within academic and legal circles. Law school's began integrating ADR into their curricula, and the US Supreme Court expanded arbitration to include statutory claims, embedding ADR deeper into the legal landscape (Rule, 2020). By the 1990s, it had become widely adopted across multiple sectors, with businesses committing to explore ADR before resorting to litigation (Stone, 2004). Community mediation centers also emerged during this time, offering accessible conflict resolution services.

By the end of the 20th century, it had become a well-established alternative to litigation, offering more efficient, and collaborative approaches to dispute resolution (Anderson, 2019).

The 1990s saw the emergence of ODR as an extension of ADR into the digital realm. During this period, the integration of new information and communication technologies (ICT) into the justice system became a significant development. These technologies aimed to enhance the administration of justice, improve access to legal resources, and help alleviate court congestion—transforming the way justice was delivered (Mesquita, 2022).

One of the first initiatives was the Virtual Magistrate Project, which aimed to resolve disputes between Internet Service Providers (ISPs) and users. However, it failed to gain traction due to limited promotion and reach, characterizing the 'amateur stage' of ODR (Bakhramova, 2022).

ODR began to evolve more dynamically between 1997 and 1998, with the launch of commercial platforms. The Online Ombuds Office, founded by Ethan Katsh and Janet Rifkin, was an early success, resolving disputes entirely through email (Katsh, 2001). This success laid the foundation for other ODR platforms like SquareTrade, which became a major player in resolving consumer disputes on platforms like eBay (Mania, 2015).

Another notable platform was CyberSettle, founded in 1998, which introduced blind bidding to confidentially settle monetary disputes. Despite its innovation, CyberSettle and other early platforms faced challenges, primarily high operational costs, which led to a decline in ODR providers post 2000.

The 'institutional phase' began in 2001, as courts and formal institutions embraced ODR technologies. A standout platform from this period is Modria, founded in 2011, which offered mediation and arbitration tools and partnered with eBay and other organizations. Modria's success, including handling over 100,000 cases annually in collaboration with the AAA, highlights ODR's expansion into more complex disputes (Mania, 2015).

This evolution from traditional litigation to ODR naturally leads us to explore the foundational concept of ADR, which encompasses various methods designed to provide more accessible and effective conflict resolution outside of conventional court settings.

2.1. Concept of Alternative Dispute Resolution

As discussed in the previous section, the rise of ADR signifies a major transformation in conflict resolution strategies. This shift moves away from traditional courtroom litigation, known for its lengthy and adversarial nature, toward more flexible and efficient methods aimed at amicable resolutions. It encompasses a diverse array of practices that allow parties to settle legal disputes outside formal court settings. According to Mnookin (2000), this approach enables solutions tailored to the specific needs and interests of the parties, circumventing rigid legal formalities.

ADR methods are extrajudicial mechanisms designed to resolve disputes, serving as complementary solutions to traditional justice systems, such as courts (Cruz, 2021). Bear (1992) emphasizes

the informal nature of ADR, which fosters a collaborative environment that encourages open negotiation and mutually beneficial outcomes.

This is increasingly appealing as many seek alternatives to the adversarial system that often prioritizes winning over collaboration (Rule, 2020). Ibrahim et al. (2022) note that ADR includes various methodologies designed to resolve disputes without confrontation, enhancing overall effectiveness by addressing each dispute's unique context.

Moreover, as highlighted by Brown and Marriott (Frade, 2003), ADR methods involve consensual procedures and often engage a neutral third party to guide negotiations, fostering cooperation and enhancing the credibility of the outcomes.

The continuum of ADR methodologies ranges from direct negotiations to structured processes like mediation and arbitration (Ibrahim et al., 2022). Advocates emphasize the benefits of these alternatives, such as reduced costs and quicker resolutions compared to traditional litigation (Mnookin, 2000).

ADR also offers a simple, fast, and low-cost out-of-court solution for disputes between consumers and traders, as outlined in recital 5 of Directive 2013/11/EU of the European Parliament and the Council (2013) on alternative dispute resolution for consumer disputes. The directive defines an 'ADR procedure' as one that complies with the requirements set forth and is conducted by an ADR entity (Directive 2013/11/EU, 2013, Article 4(1-g)).

Additionally, Regulation (EU) No 524/2013 defines an 'ADR procedure' as one designed for the out-of-court resolution of disputes as described in Article 2 of the regulation. An 'ADR entity' refers to any entity established on a durable basis that offers dispute resolution through an ADR procedure and is officially listed (Regulation (EU) No 524/2013, 2013, Article 4(1-h)).

In the following sections, we will explore the specific concepts of negotiation, mediation, and arbitration, providing a comprehensive understanding of this methodologies.

2.1.1. Negotiation

Negotiation is a discussion process aimed at reaching an agreement among the involved parties, typically focusing on two disputants (Carnevale & Pruitt, 1992). In unfacilitated negotiations, these parties engage in direct and voluntary exchanges of information until they reach a resolution (Goltsman et al., 2009). This process is applicable across various contexts, including legal disputes, divorce settlements, parental disagreements, and hostage situations.

This ADR method is characterized by a straightforward definition, representing 'one of the most fundamental forms of interaction' within a social context. It encompasses the process of concessions and progress that parties make in their communication efforts as they work toward achieving a specific objective (Mirante et. al., 2019).

According to Walton and McKersie (1991), negotiation can be divided into two main approaches: distributive and integrative. The distributive approach views the disputed items as divisible resources that parties seek to allocate for their maximum benefit. In contrast, the integrative approach encourages parties to explore a wider range of potential solutions, thereby enhancing the possibilities for mutually beneficial outcomes (Carneiro et al., 2014).

Finally, it can also be improved with the involvement of a neutral third party, who facilitates communication and collaboration among the disputants.

In the next section, we will delve into mediation, examining its principles and practices and how it fosters satisfactory outcomes while maintaining the parties' autonomy.

2.1.2.Mediation

Mediation is a structured process in which a neutral third party facilitates discussions between disputing parties to help them reach a consensual agreement.

According to Cruz (2021), in mediation, a neutral and impartial third party, the mediator, plays a vital role in helping the parties find common ground. The mediator facilitates communication and dialogue, guiding the parties toward reaching a mutually agreeable consensus.

As defined in the Portuguese Law n.º 29/2013, of April 19, mediation is an ADR method conducted by public or private entities, where two or more parties in conflict voluntarily seek to reach an agreement with the assistance of a mediator.

Unlike other conflict resolution methods, mediators do not make formal decisions; instead, they promote dialogue and collaboration, allowing the parties to maintain control over the outcome (Menkel & Meadow, 2015).

It can be seen as a specialized form of negotiation, where external facilitators, referred to as 'third parties', assist in the discussions. This approach is grounded in negotiation literature, emphasizing its foundational principles and strategies (Carnevale & Pruitt, 1992).

According to Brown and Marriott (1999), mediators guide the parties toward mutually satisfactory resolutions by keeping discussions focused and ensuring that each party's interests are articulated.

While mediation focuses on collaboration and party autonomy, arbitration offers a distinct conflict resolution method. The next section will examine the principles and practices of arbitration, emphasizing its formal nature and the binding nature of its decisions.

2.1.3.Arbitration

Arbitration is, first and foremost, an ADR method, which means that, alongside state courts, it represents another avenue for parties to seek resolution of their conflicts. According to Mirante et. al (2019),

it is understood to be an ADR method in which the parties voluntarily confer—through the signing of a contract known as the arbitration agreement—the authority to resolve their dispute to arbitrators.

Goltsman et al. (2009) state that arbitration is a conflict resolution method in which a neutral third party, known as the arbitrator, evaluates the evidence and arguments from each side and renders a binding decision. Although entering arbitration and presenting arguments are voluntary, the outcome is enforceable, meaning parties must comply with the arbitrator's ruling.

It can involve a single arbitrator or a panel, with parties often choosing their preferred neutral party. The process is generally less formal than court proceedings, culminating in a written award that details the arbitrator's decision (Menkel & Meadow, 2015). Nonetheless, and as noted by Carneiro et al. (2014), the arbitrator acts as an impartial adjudicator, resolving disputes based on the information presented rather than facilitating ongoing discussions.

Lastly, and unlike mediation, where the mediator guides parties toward a mutual resolution, the arbitrator's role is limited to listening to the presentations and deciding based on the arguments and evidence provided. This distinction highlights arbitration's definitive nature as a resolution method (Bennett, 2002).

2.2. Concept of ODR

Having discussed the concept of ADR and its corresponding dispute resolution methods, it is now important to examine the concept of ODR. Mesquita (2022) emphasizes that ODR is an accessible, informal, and expedited process that empowers parties to take control of resolving their disputes on their own terms.

On the other hand, Schultz (2002) raises a critical question: Does ODR simply extend traditional ADR methods online, or does it represent a fundamentally new approach to resolving disputes? This inquiry has sparked significant debate in academic and professional circles.

Some experts argue that ODR is an evolution of traditional ADR, enhanced by digital technology (Loebl, 2019). They suggest that ODR retains the core principles of ADR while improving the efficiency and accessibility of dispute resolution, allowing parties to engage in negotiation, mediation, or arbitration more effectively, regardless of geographical barriers.

Conversely, a growing number of scholars contend that technology acts as a transformative "fourth party" in disputes (Loebl, 2019). Pioneering thinkers like Ethan Katsh and Orna Rabinovich-Einy assert that technology reshapes dispute resolution dynamics by introducing new mechanisms for engagement and decision-making (Katsh & Rifkin, 2001).

Additionally, it is important to recognize the role of 'fifth parties'—the service providers who develop and implement the technological components of ODR. Their involvement adds complexity to the ODR framework, creating a multifaceted approach to conflict resolution that can be faster and more cost-effective for all parties (Carneiro, 2014).

According to Carneiro et al. (2014) and Peruginelli et al. (2002), ODR systems can be classified into generation categories based on their functionality. First generation systems, such as instant messaging and video conferencing, primarily facilitate communication. In contrast, second generation systems actively participate in solution creation and decision-making, moving beyond mere information exchange.

This shift reflects a new paradigm where technological tools serve as active facilitators in the dispute resolution process. Building on this concept, Schmitz and Zeleznikow (2021) propose the creation of intelligent agents — advanced programs that autonomously assist individuals and organizations in dispute resolution. These agents are expected to enhance the effectiveness of the process, particularly in contexts lacking technological support (Wing et al., 2021).

This ongoing debate underscores the dual nature of ODR: while it builds on traditional ADR frameworks, it also introduces new dynamics through technological innovation. Understanding these aspects is crucial for effectively integrating ODR across various dispute resolution contexts.

2.3. ODR in the European Union

The EU acknowledges the critical role of effective dispute resolution mechanisms in managing cross-border conflicts, especially within its single market. This ensures the free movement of people, goods, services, and capital, necessitating accessible means for resolving disputes in this dynamic environment (Gonçalves, 2022). To foster investment, enhance economic competitiveness, and protect consumers, the EU has implemented key initiatives in ADR and ODR.

Notably, Directive 2013/11/EU and Regulation (EU) No. 524/2013, adopted on May 21, 2013, significantly impact the regulation of dispute resolution processes. The Directive provides a framework for resolving consumer disputes outside traditional court systems, while the Regulation introduces an online platform to facilitate the online resolution of these disputes.

These legislative measures aim to enhance the efficiency, transparency, and accessibility of dispute resolution across the EU, supporting consumers and businesses while contributing to a more integrated single market for cross-border disputes.

Recitals 3 and 4 of the Directive emphasize that market fragmentation adversely affects the EU's competitiveness and economic growth. They stress the need for accessible, efficient, and cost-effective dispute resolution mechanisms for both national and cross-border issues to promote a dynamic internal market.

The Directive also addresses concerns about the uneven distribution and quality of ADR services across member states, which can discourage consumers from engaging in cross-border transactions. As noted in Recital 6, inconsistencies in ADR coverage create barriers that undermine consumer confidence and impede the single market's potential.

To address this, the Directive requires traders to inform consumers about available ADR mechanisms, as stipulated in Article 13(1). This includes providing clear information about affiliated ADR entities, including website addresses (Article 13(2)). Furthermore, ADR bodies must maintain user-friendly websites that offer comprehensive information about their procedures and facilitate electronic submission of complaints (Article 5(1) and (2)).

These platforms should efficiently handle both domestic and cross-border disputes, ensuring that ADR services are accessible and transparent. According to the Regulation, online traders must prominently display a direct link to the European Commission's dedicated dispute resolution platform, which helps strengthen the safety of online transactions and directs consumers to accredited ADR providers in their countries.

Despite these advancements, many consumers may remain unaware of the EU's ODR platform if the link is not easily visible on traders' websites. Among those who do provide a link, 83% embed it within legal terms and conditions, which consumers typically overlook (Poblet & Ross, 2021).

Moreover, the effectiveness of existing ODR services is hindered by their limited availability and underdevelopment, despite the advanced technology that could enhance their functionality. As demand for effective ODR services grows in Europe, it is crucial to not only digitize existing processes but also continuously improve them through advanced technological solutions.

3. Standards Supporting ODR

The concept of Dispute System Design (DSD) has gained prominence as emerging technologies enhance flexibility and complexity in information and communication processes. DSD systematically structures dispute resolution mechanisms to create an effective and fair framework that facilitates timely conflict resolution (Einy & Katsh, 2012).

When developing an ODR platform, the design team must consider several critical factors, including defining objectives, understanding stakeholder needs, and accounting for the specific context and cultural nuances of users. Additionally, the team should evaluate available process options, resources, and success metrics.

As a result, standardized frameworks and protocols have become increasingly important for ensuring efficiency and adaptability. Structured data formats and modelling languages are vital for designing, implementing, and operating ODR platforms. These standards streamline communication, automate processes, and enhance interoperability with various technologies.

Key structured languages like JSON and XML, along with process modelling standards such as BPMN, play crucial roles in ODR system development. They enable systematic information structuring, efficient data exchange, and task automation within the dispute resolution process.

3.1. JSON

JSON is a lightweight, human-readable, data interchange format that is easily parsed by machines. Its simplicity and ease of use have made it the preferred format for transmitting structured data in web applications, allowing efficient exchange of information (Pezoa et al., 2016). Although JSON is derived from JavaScript, it is language-independent, with parsers available for nearly all modern programming languages (Lennon, 2009).

In recent years, JSON has become the dominant format for data interchange on the internet, largely due to its compatibility with Application Programming Interfaces (APIs), which facilitate communication between remote systems. APIs define structured protocols for sending and receiving requests and responses, and JSON's lightweight nature makes it ideal for this purpose over the Hypertext Transfer Protocol (HTTP) (Pezoa et al., 2016). Its readability enhances its applicability in web-based applications.

Lennon (2009) emphasizes JSON's language independence and its functionality across various environments, including C, Python, and Java. This versatility has contributed to its status as the primary format for web-based data exchange, supported by a wide availability of parsers. While both sources highlight JSON's simplicity and universality, Pezoa et al. (2016) focus on its structural flexibility in modern web development,

particularly through APIs, whereas Lennon (2009) discusses its accessible syntax, which resembles languages like C, C++, and PHP.

Additionally, JSON's familiar syntax has made it the standard format for data interchange in APIs, especially among web services and feed providers. Many modern web browsers also offer built-in support for native JSON encoding and decoding, further streamlining client-server communication (Lennon, 2009).

3.2. XML

XML, on the other hand, is a versatile, structured data format that standardizes information models and facilitates data exchange across various systems (Bikaki et al., 2024). Its flexibility is particularly valuable in ODR platforms, where communication with external systems, such as legal databases and government registries, is essential. XML's widespread adoption promotes interoperability through its standardized approach to data representation.

As a widely recognized web standard, XML has fostered the creation of numerous tools for delivering, storing, and querying XML-based data, making it fundamental for web-based information exchange (Bikaki et al., 2024).

A key feature is the XML Schema Definition (XSD), which regulates structure, syntax, and data types, ensuring consistency and reliability across systems (Bikaki et al., 2024). This enhances data accuracy and validation, particularly in ODR contexts.

Almeida (2002) describes XML as a simplified version of SGML (Standard Generalized Markup Language), capable of storing both data and its structure through Document Type Definitions (DTD). This dual functionality allows XML to represent complex data and its relationships more easily than SGML.

However, Bourret (1999) points out that XML's verbosity can slow data access due to extensive parsing requirements, although its Unicode portability ensures compatibility across various systems.

In ODR systems, XML's capacity to manage complex, hierarchical data structures is critical for exchanging and validating legal documents, ensuring data integrity among diverse systems (Almeida, 2002). Its adaptability through custom tags and elements enables XML to cater to various data representation needs while maintaining schema validation to ensure data quality (Loebl et al., 2023). So, despite some limitations, XML remains indispensable for structured, platform-independent data exchange.

3.3. BPMN

Finally, BPMN, or Business Process Model and Notation, is a standardized diagramming language for representing business process flows, maintained by the Object Management Group (OMG). Launched in 2004, BPMN has become a robust method for aligning business and IT through graphical process modelling, ensuring consistency across modelling tools and facilitating communication between IT and business

professionals (Silver, 2011). While other visual modelling languages, like flowcharts, exist, they lack BPMN's comprehensive and standardized approach.

BPMN utilizes flowchart-like diagrams to visually represent processes through various symbols that denote activities, events, and decisions. These elements are connected by arrows, or 'Sequence Flows', which indicate the order of operations, ensuring logical coherence in workflows (Andaloussi, 2021). This clear representation enhances the analysis and design of business processes for both human users and automated systems.

As an example, figure 2 shows a BPMN process. It starts when the user is hungry and is directed to a user task where they have to fill in a form and choose between chicken or salad. Once the form has been filled in, the process moves on to an exclusive gateway. Depending on the user's choice, they are directed to the corresponding user task, either 'Prepare chicken' or 'Prepare salad'. Once this task has been completed, the process goes back to an exclusive gateway and ends with the user happy.

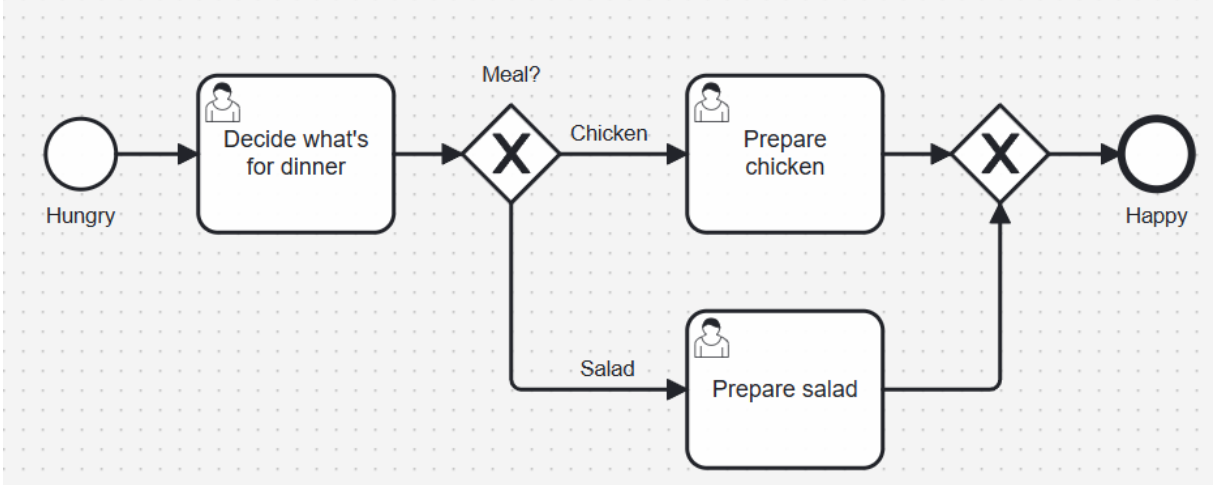

Figure 2 - Example of BPMN Process

In addition to its graphical representation, BPMN can be encoded as an XML file, allowing for structured data interpretation by computer systems. This dual visual and data-driven approach enhances BPMN's functionality and utility in process design and implementation (Loebl et al., 2023). Figure 3 presents the XML file corresponding to the BPMN process described and illustrated in Figure 2.

It fundamentally serves as a standardized language designed to model business processes with precision and clarity (Compagnucci et al., 2023). Its primary application lies in the realm of business process management, where it facilitates the depiction of complex workflows and interactions in a structured and understandable format.

However, BPMN's applications extend beyond traditional business contexts. Oliveira et al. (2022) note its adoption in public administration, enhancing process modelling within the sector. Additionally, Mamrot (2023) suggests BPMN could improve legislative drafting by providing a clear, systematic framework for

outlining and analysing legislative procedures, showcasing its broad utility for developing efficient and transparent legislative processes.

```
<?xml version="1.0" encoding="UTF-8"?>
<bpmn:definitions xmlns:bpmn="http://www.omg.org/spec/BPMN/20100524/MODEL" xmlns:bpmndi="http://www.omg.org/spec/BPMN/20100524/DI" xmlns:dc="http://www.omg.org/spec/DD/20100524/DC" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:di="http://www.omg.org/spec/DD/20100524/DI" xmlns:zeebe="http://camunda.org/schema/zeebe/1.0" xmlns:modeler="http://camunda.org/schema/modeler/1.0" xmlns:camunda="http://camunda.org/schema/1.0/bpmn" id="Definitions_1" targetNamespace="http://bpmn.io/schema/bpmn" exporter="Camunda Web Modeler" exporterVersion="3baa5d2" modeler:executionPlatform="Camunda Cloud" modeler:executionPlatformVersion="8.4.0" camunda:diagramRelationId="dd3bb858-30cd-4f85-8d20-0b75762fbdf6">
  <bpmn:process id="template-human-task-tutorial-074nxxb" isExecutable="true">
    <bpmn:extensionElements>
      <zeebe:userTaskForm id="userTaskForm_0pjtr0l">{
  "components": [
    {
      "text": "# What's for dinner",
      "type": "text",
      "id": "Field_1j1elge"
    },
    {
      "values": [
        {
          "label": "Chicken",
          "value": "chicken"
        },
        {
          "label": "Salad",
          "value": "salad"
        }
      ],
```

Figure 3 - Part of the XML file of BPMN Process Example

In the following sections, the essential components for developing a BPMN process will be described, focusing on Elements, Expressions, and Forms. These components are crucial for creating a comprehensive and effective business process model, ensuring clarity and precision in representing workflows.

3.3.1.Elements

At its core, BPMN serves as a fundamental framework that provides essential elements for modelling business processes, which include tasks, gateways, events, and subprocesses. Mastery of these components is crucial for creating models that are not only easy to understand but also executable in workflow engines. Each element plays a unique role in shaping process dynamics, adaptability, and interactions with various stakeholders.

Tasks represent actions taken by individuals or systems, with various types accommodating a wide range of activities. For example, user tasks, as we can see in the example represented in fig. 2, emphasize the need for human involvement in a process. These tasks typically require users to review, approve, or input data, highlighting the importance of manual oversight in certain scenarios. For instance, on the example provided, the user needed to choose between 'chicken' or 'salad'. They create a clear inter-face between automated process components and human decision-making, ensuring a balance between efficiency and oversight.

On the other hand, send tasks dispatch messages to external systems, and receive tasks wait for input before proceeding, while manual tasks are performed without automation, emphasizing human involvement.

Gateways are critical for routing tokens through processes, allowing for complex flow patterns. The exclusive gateway is one of the most commonly used in BPMN, playing a vital role in decision-making within a process.

When the workflow reaches an exclusive gateway, it assesses a set of predefined conditions or criteria. Based on the outcome of this evaluation, the gateway selects a single sequence flow from multiple available paths, ensuring that only one branch is executed at a time. This allows the process to continue along the most appropriate route according to the data or decision rules in place. Figure 2 illustrates the use of two exclusive gateways.

Additionally, while the parallel gateway allows multiple paths to execute simultaneously, the inclusive gateway offers flexibility by enabling one or more paths to activate based on specific conditions.

Events are vital components that trigger actions or respond to occurrences within the process. They are categorized into start events, which initiate processes; intermediate events, which can catch or throw signals during execution; and end events, which signify process completion.

A key feature of intermediate events is their capacity to serve as boundary events, which are linked to specific activities and allow for potential interruptions. Interrupting boundary events terminate the attached activity immediately upon triggering, effectively managing situations such as timeouts or errors. Conversely, non-interrupting boundary events permit the process to continue its regular flow while simultaneously handling additional tasks, ensuring that primary activities remain unaffected.

Lastly, subprocesses act as modular containers for grouping related tasks and activities, enhancing workflow organization and reusability. Expanded subprocesses allow for detailed visibility into contained activities, while call activities reference pre-defined processes, promoting consistency and clarity in process design. Together, these elements, gateways, events, and subprocesses provide a comprehensive toolkit for accurately and intuitively representing real-world workflows in BPMN.

3.3.2. Expressions

Expressions are vital for enhancing the functionality and flexibility of business process models by enabling dynamic evaluation of conditions and data manipulation during execution. This section categorizes expressions by their operational data types, demonstrating their effective application.

Boolean expressions are essential for decision-making, as they evaluate conditions to yield true or false outcomes, guiding process flow through gateways for conditional routing based on real-time data. String expressions facilitate message generation or logging information.

In BPMN, expressions are constructed from the constant values and keys of form elements, which will be discussed in the next section. They significantly impact the workflow by influencing decisions based on user choices and inputs. Expressions enhance personalization and efficiency in workflows, leading to a more intuitive user experience. Therefore, accurately defining and applying these expressions is crucial for the effectiveness of the BPMN model, ensuring responsive and relevant processes.

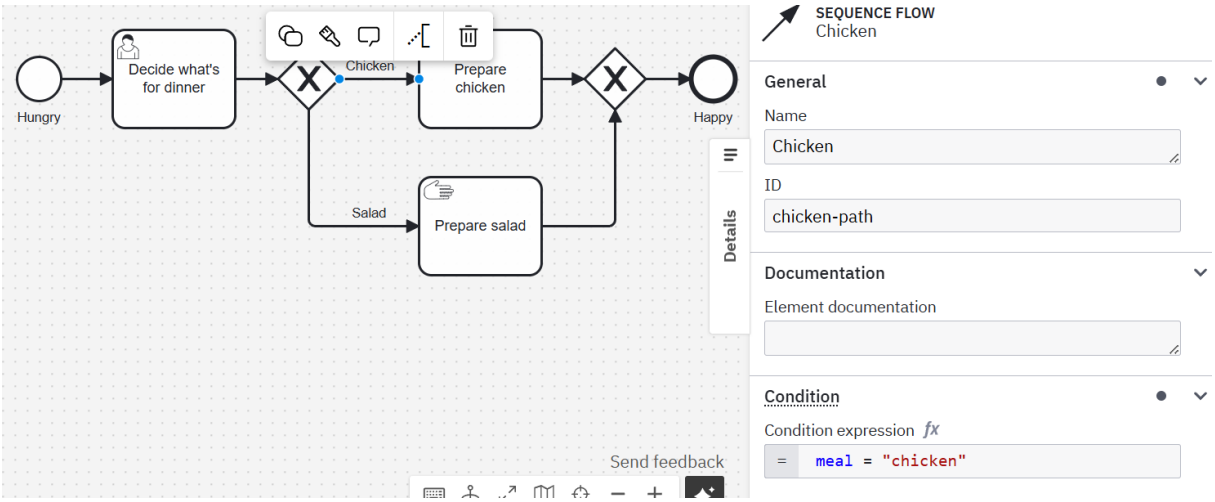

Figure 4 – Condition Expression

For example, in Figure 2, within the form for the task 'Decide What's for Dinner', the user selects either 'Chicken' or 'Salad'. To align the process with the user's preference, two expressions are embedded in the conditions of the sequence flows following the exclusive gateway. Specifically, as shown in Figure 4, if the condition 'meal = "chicken"' is met, the process advances to 'Prepare Chicken.' Conversely, if 'meal = "salad"' is satisfied, the process moves to 'Prepare Salad.'

3.3.3. Forms

Forms play a crucial role in BPMN, as each component is represented by key-value pairs that define its properties and values. The input users provide is stored as values and passed to the process, enabling the creation of condition expressions in BPMN's exclusive gateways, where a single course of action is selected among multiple options.

Essentially, BPMN forms are designed to capture specific data needed for process execution. They can include various input fields, such as text boxes, drop-down menus, check boxes, and radio buttons, tailored to the requirements of each task or subprocess.

For example, in the task 'Decide What's for Dinner', the form presents meal options, ensuring the process can proceed based on user input. Figure 5 illustrates the user interface of the form, while Figure 3 shows how the JSON data related to this task integrates into the XML file of the associated process.

BPMN forms also seamlessly integrate within the broader BPMN framework. They can be linked to specific tasks or events, allowing for the automatic flow of information throughout the process. For instance, when a user submits a form, the data can trigger subsequent actions, such as advancing to the next task or notifying other stakeholders. This integration is vital for maintaining coherence and efficiency in business processes.

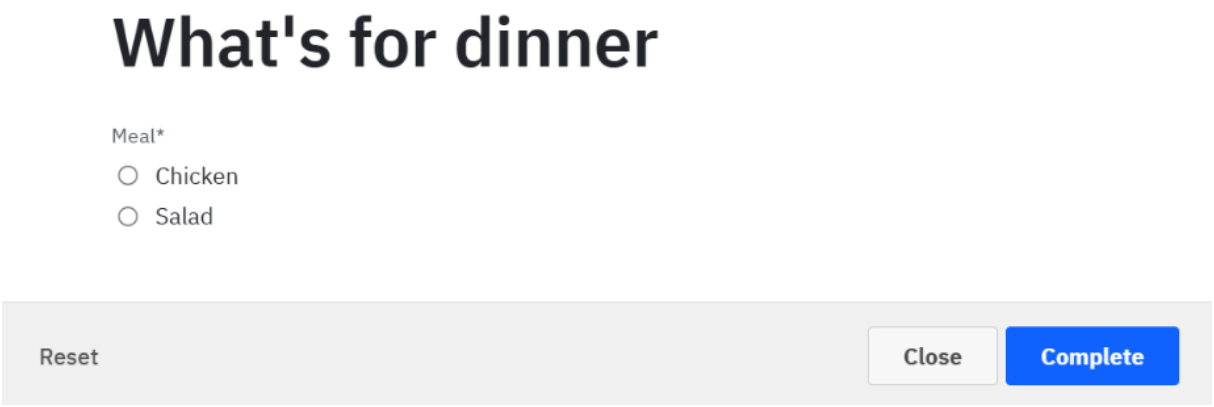

Figure 5 - Form 'What's for dinner'

Moreover, forms can be customized to meet the unique needs of different organizations or industries, ensuring they are adaptable for various contexts, from simple workflows to complex business scenarios. This ability to design tailored forms enhances user experience and aligns with organizational requirements.

3.4. BPMN and ODR

In the field of ODR process modelling, Loebl et al. (2023) emphasize the urgent need for a comprehensive and adaptable open standard. Such a standard is crucial for developers aiming to create innovative ODR platforms and AI-driven services. It should specifically define data-driven e-justice processes and fulfil several key criteria: it must be open and flexible to address diverse needs, promote interoperability among various platforms, prioritize privacy and digital security, and allow for easy implementation across different systems.

In this regard, BPMN stands out as an ideal solution. It provides a standardized language that enhances communication not only between individuals but also between people and machines. This functionality makes BPMN an effective tool for modelling complex ODR processes, facilitating the smooth integration of new technologies and supporting the development of AI-driven services. With the use of BPMN, developers can align their platforms with established standards, leading to more effective and secure dispute resolution.

Additionally, it plays a vital role in streamlining interdisciplinary collaboration (Mamrot, 2023). In scenarios where legal and IT professionals must work together, BPMN's standardized notation serves as a common language that bridges the gap between technical and legal realms.

This shared framework fosters mutual understanding, enabling both legal experts and IT developers to clearly express their requirements and expectations. Consequently, BPMN promotes smoother

communication and coordination, ensuring that both technical functionalities and legal considerations are effectively integrated into the solution.

Experts working on ODR processes can utilize BPMN's standardized language to meticulously craft and detail each component. It is essential that every step of the process is explicitly described, covering all relevant aspects and nuances. This thorough documentation is critical, as it ensures a clear and shared understanding among all stakeholders involved, from those designing the process to those implementing and monitoring it. Such detailed and precise process modelling guarantees that every participant is well-informed, facilitating the seamless and efficient operation of the ODR system. As highlighted by Chinosi and Trombetta (2012), this comprehensive approach not only enhances clarity but also bolsters effective communication and coordination throughout the process lifecycle.

Also, the legal landscape is inherently complex, with numerous requirements that can affect the course of a dispute resolution process based on the specifics of each case (Loebl et al., 2023). This complexity is further amplified by the legal diversity within the European Union, where each Member State has its own set of national laws and regulations.

This diversity adds layers of complexity to the implementation of ADR methods. While overarching European directives guide ADR approaches, they are incorporated into the national legal systems of individual countries, resulting in variations in implementation.

Thus, there is a pressing need for standardized processes that provide a clear and consistent framework for ODR providers. Such processes would offer a foundational blueprint, ensuring consistency and coherence across different jurisdictions. This way, ODR providers can design and implement solutions tailored to the specific legal and procedural requirements of each country, which in turn facilitates smoother integration and operation of ODR services and promotes a more unified approach to dispute resolution across the EU.

As mentioned in the previous sections, BPMN enables intricate process features through a variety of specialized tasks, each designed to perform distinct functions within the process framework. These tasks can be connected to various events (Silver, 2011), such as notifications, deadlines, document submissions, and form completions.

This capability allows BPMN to capture and illustrate every critical aspect of the process, ensuring a detailed and actionable representation of the workflows involved. With the integration of these elements, it enhances both clarity and functionality, facilitating a thorough understanding and management of complex processes.

Moreover, the precise and transparent depiction of processes through tools like BPMN is essential for identifying potential procedural deficiencies during the development phase (Mamrot, 2023). Visual diagrams enable process designers to clearly visualize the flow of activities and interactions, making it easier

to spot inconsistencies, redundancies, or inefficiencies, which allows for more straightforward troubleshooting and refinement.

In addition to manual reviews, recent advancements in AI have introduced sophisticated techniques for analysing BPMN diagrams. AI systems can efficiently analyse these diagrams using machine learning algorithms and data-driven insights to detect patterns, highlight potential issues, and suggest improvements. This integration of AI enhances the scrutiny of complex process models, providing deeper insights into areas that may require optimization.

3.5. Systems Interoperability and AI Integration

BPMN has emerged as a critical tool for enhancing system interoperability and fostering AI integration, particularly within organizational and operational frameworks. BPMN's capacity to clearly model business processes not only support the seamless exchange of data across systems but also provides a foundation for integrating advanced AI technologies.

This dual capability is key in optimizing business processes and decision-making systems, particularly in contexts like ODR platforms, where communication between various external systems is crucial.

The importance of structured knowledge capture in organizations cannot be overstated, as knowledge is a vital asset for organizational success (Ligeza & Potempa, 2012). BPMN plays a key role in the structured representation of this knowledge, particularly through its use of formats like XML. As a widely recognized web standard, XML enables the creation of standardized information models that promote seamless data exchange across various systems (Bikaki et al., 2024). This capacity for interoperability is critical in environments such as ODR platforms, which depend on external data sources, including legal databases and government registries, to make accurate, real-time decisions. XML's ability to encapsulate complex, hierarchical data structures ensures smooth communication between otherwise incompatible systems (Almeida, 2002).

BPMN diagrams, encoded in XML, provide a structured representation of system processes that can be consistently interpreted and executed across different platforms. This consistency is essential for platforms requiring compliance with legal or regulatory standards, as it ensures that data remains interoperable while adhering to defined structural and syntactical rules (Loebl et al., 2023). XSD further enhances data accuracy and validation, guaranteeing that the exchanged data is reliable, secure, and structurally sound (Bikaki et al., 2024).

Beyond facilitating system interoperability, BPMN also plays a crucial role in AI integration. Through its structured capture of process data, BPMN offers transparency, making it easier for AI systems to access and analyse process variables (Andaloussi, 2021). The use of XML to represent BPMN processes ensures that all relevant data is not only interpretable by humans but also by AI systems, making it suitable for

integration into AI-driven analyses (Loebl et al., 2023). This structure is fundamental for AI, which relies on large, well-organized datasets to uncover meaningful patterns and insights (Silver, 2011).

In terms of AI-driven automation, BPMN's clear depiction of workflows supports the identification of repetitive tasks that AI systems can automate. Moreover, AI can analyse BPMN workflows to pinpoint inefficiencies and suggest improvements (Mamrot, 2023).

For instance, AI systems can be deployed to monitor BPMN workflows for potential privacy vulnerabilities or to ensure compliance with data protection regulations such as the General Data Protection Regulation (GDPR) (Palmirani & Governatori, 2018). This integration enhances both accountability and traceability within organizational processes, as AI systems provide insights into every step of a workflow, often identifying risks and opportunities that may not be immediately visible to human operators.

While XML plays a crucial role in BPMN's system interoperability, the integration of AI is further strengthened by the use of JSON. JSON's key-value structure makes it particularly suited for capturing real-time user inputs within BPMN workflows. This structured approach is critical in contexts requiring dynamic user interaction, such as ODR platforms, where BPMN forms modelled using JSON files enhance AI's ability to interpret and act upon user inputs (Pezoa et al., 2016). JSON files serve as comprehensive repositories for documenting interactions and decisions, providing AI systems with the structured data necessary for process analysis and optimization (Loebl et al., 2023).

In practice, JSON files are used within BPMN workflows to catalog all procedural steps and user interactions, which AI can analyse to ensure transparency, accuracy, and accountability. This is particularly important in contexts like ODR systems, where maintaining a transparent and traceable record of decisions is critical to the process's legitimacy and reliability.

Moreover, the synergy between BPMN and AI extends beyond routine automation. AI can be employed to perform strategic analyses of BPMN models, ensuring that processes adhere to predefined standards and ethical guidelines (Loebl et al., 2023).

AI-driven tools can validate process annotations, check for mandatory fields, and verify data types, improving the overall consistency and integrity of business processes. Additionally, AI's ability to simulate BPMN workflows enables organizations to assess the feasibility and performance of various process configurations before full implementation, enhancing operational efficiency and decision-making (Mamrot, 2023).

AI's real-time analysis of BPMN workflows can also detect privacy risks and verify compliance with legal frameworks, such as GDPR, offering continuous monitoring and reducing the risk of regulatory violations (Palmirani & Governatori, 2018). This capability is especially valuable in sectors where strict adherence to legal and ethical standards is paramount, as AI can flag potential issues before they escalate into significant problems.

4. Artificial Intelligence

The primary framework for evaluating trends in ODR is access to justice (Anderson, 2019). This concept is essential for understanding the challenges individuals face when engaging with the civil justice system. Access to justice is often hindered by the high costs and lengthy durations of litigation, making it prohibitively expensive and time-consuming for many.

Additionally, a lack of awareness about legal processes and available resources further complicates matters. We explore how ADR and ODR can reduce these barriers, making dispute resolution more affordable, timely, and comprehensible, ultimately enhancing equity and effectiveness in legal redress.

Some scholars argue that technology's role in improving access to justice goes beyond merely digitizing existing practices (Schmitz et al., 2022). They propose that AI integration can fundamentally transform the justice system, especially for self-represented litigants.

Rather than just automating processes, AI can offer innovative solutions that enhance accessibility, streamline procedural complexities, and provide personalized assistance.

This advanced integration can address barriers like high costs, delays, and information gaps, fundamentally improving how individuals interact with the legal system and enhancing overall justice delivery.

Taking this into consideration, it is essential to first provide context on what Artificial Intelligence is before exploring its role in ODR and the services it can offer.

4.1. Concept of AI

Artificial Intelligence is a complex and evolving field aimed at replicating and simulating human intelligence in machines. Its roots trace back to mid-20th century research, where pioneers like Newell and Simon (2007) proposed that intelligent action in AI should emulate adaptive human behaviours. They defined AI as the ability to behave appropriately in real situations, achieving goals while adapting to environmental demands within constraints like speed and complexity.

Intelligence has often been characterized as the 'ability to solve hard problems' (Minsky, 1958), a defining trait of AI systems today. AI's primary goal is to tackle complex tasks traditionally requiring human cognition, such as reasoning, learning, and decision-making.

McCarthy (2022) expanded this view by noting that AI focuses on methods for achieving goals in environments with complex and incomplete information, highlighting the universality of problem-solving across human and machine intelligence.

Despite decades of research, there is still no consensus on definitive AI characteristics or standards, as Hernández-Orallo (2017) notes. The lack of universally accepted benchmarks complicates the establishment of clear developmental milestones, leading to fragmented growth in the field.

According to Copeland (2024), AI can be practically defined as machines, specifically computers or robots, performing tasks traditionally associated with intelligent beings, including reasoning, learning from experience, and generalizing across contexts. Although AI systems have excelled in specialized areas like medical diagnosis, chess, and voice recognition, none have yet achieved the full breadth of human intelligence across varied tasks.

Within the Regulation (EU) 2024/1689 of the European Parliament and of the Council, dated June 13, 2024, which establishes harmonized rules for the governance of artificial intelligence and amends various existing regulations and directives, an 'AI system' is precisely defined as a machine-based framework designed to function with varying degrees of autonomy. These systems possess the capability to adapt after deployment and, driven by both explicit and implicit objectives, utilize input data to determine methods for generating outcomes. Such outcomes may include predictions, content creation, recommendations, or decisions that can significantly influence both physical and virtual environments.

A significant advancement in AI has come from machine learning (ML) and deep learning (DL). Xu et al. (2021) assert that these subfields are fundamental to AI's progress, enabling machines to learn from data and improve over time, mimicking human learning processes. AI research encompasses various techniques, including search algorithms, expert systems, and natural language processing, making it essential for both scientific inquiry and practical applications.

As AI continues to evolve, it increasingly influences both academic research and real-world applications. The ultimate goal is to develop systems that exhibit human-like cognition—machines capable of thinking, perceiving, reasoning, and adapting in ways closely resembling human intelligence. However, the field still faces significant challenges in creating systems with the same flexibility and depth of understanding as humans in unpredictable environments.

4.2. ODR and AI Services

The integration of AI into ODR is a well-established practice, not a recent innovation. Research from the ODR team for the White Book on Mediation in Catalonia (Poblet & Ross, 2021) highlights how AI technologies enhance various aspects of dispute resolution. Key AI tools include automated workflows for case progression, messaging systems for efficient communication, secure case registries for managing dispute information, and structured forms for standardized data collection.

Since the Covid-19 pandemic began in 2020, the use of videoconferencing and messaging platforms like Zoom has surged, enabling both synchronous and asynchronous communication without physical meetings (Gonçalves, 2022). Although these changes were implemented quickly, courts have since relaxed many of the restrictions imposed during the pandemic. However, remote technology has become an essential part of court operations today and is likely to remain so (Susskind, 2019).

While these platforms are not inherently AI-driven, they increasingly incorporate AI functionalities. For example, modern videoconferencing tools offer real-time translation features, enhancing multilingual communication, while AI transcription services convert spoken dialogue into text and provide automated meeting summaries. These advancements leverage Natural Language Processing (NLP) and Large Language Models to revolutionize language handling.

NLP is particularly useful for document summarization, analysing lengthy texts to extract critical information and generate succinct summaries, thereby improving efficiency and decision-making (deeplearning.ai, 2023).

Additionally, sentiment analysis tools assess the tone of communication in disputes, identifying overly aggressive language and suggesting adjustments to foster constructive dialogue. Westermann et al. (2023) emphasize the importance of managing emotions in dispute communications, recommending the use of OpenAI's GPT-4 API to reformulate messages while maintaining their core content, thus encouraging cooperation.

AI-driven chatbots represent a significant advancement in user support within ODR platforms. These chatbots provide real-time interactions, serving as initial contact points to offer detailed information about ODR services, guide users through processes, and answer frequently asked questions. They can also recommend solutions and insights during dispute resolution. For instance, in Portugal, a service utilizing GPT technology addresses predefined queries, showcasing the potential for more sophisticated support.

Proposal generation is another critical tool in conflict resolution, assisting parties and facilitators in identifying effective solutions. Expert systems use a vast knowledge repository to replicate human expertise, while rule-based systems apply predefined rules to evaluate disputes. Both systems enhance efficiency in conflict resolution by providing actionable recommendations (Carneiro et al., 2012; Schmitz & Zeleznikow, 2022).

Case-based reasoning (CBR) also leverages historical case data to guide dispute resolution, especially in common law systems that emphasize legal precedent (Lorenzi & Ricci, 2005). However, CBR faces challenges in civil law systems prevalent in Europe, where the emphasis on codified statutes reduces reliance on past case law.

Optimization techniques, such as genetic algorithms, provide a sophisticated approach to finding effective solutions. These algorithms evolve potential solutions through a process of selection and refinement, enhancing the personalization of proposals in conflict resolution (Carneiro et al., 2012).

This section has illuminated the vast and diverse array of applications for AI within the realm of ODR. While the potential for AI to revolutionize ODR is clear, it is important to acknowledge that many of the advanced techniques and concepts discussed are still primarily in the research phase. They have not yet been integrated into commercial ODR solutions, resulting in a practical implementation that is less advanced than what the literature might suggest.

A significant barrier to the integration of AI in ODR appears to be the existing divide between the fields of law and computer science. Experts in these disciplines often have disparate educational backgrounds, conceptual frameworks, and terminologies, which complicates cross-disciplinary collaboration. This gap impedes the seamless application of AI innovations to real-world legal challenges.

We believe that BPMN could serve as a vital bridge to overcome these obstacles. Through it, different disciplines can work together more efficiently towards the development of innovative ODR solutions. These advancements have the potential to significantly enhance access to justice and improve the efficiency of dispute resolution processes. BPMN can help translate cutting-edge research into practical, accessible, and effective ODR services by aligning the goals and capabilities of both legal and technological experts.

4.3. AI Act and Other Ethical Considerations

In recent years, the rapid evolution of AI has posed significant ethical challenges that necessitate regulatory frameworks to ensure the responsible deployment of AI technologies. Among these, the AI Act proposed by the EU stands out as a comprehensive effort to regulate AI systems, particularly those classified as high-risk.

This section delves into the ethical considerations surrounding the AI Act, specifically focusing on its transparency and human oversight requirements. This discussion highlights the intent and implications of these provisions in the context of ODR processes in the EU by analysing Articles 13 and 14 of Chapter 2, Title III of the AI Act.

Transparency is a central tenet of the AI Act, particularly concerning high-risk AI systems. Article 13 of the Act delineates the requirements for transparency, mandating that high-risk AI systems must be designed and developed in a manner that allows users to interpret and utilize the system's outputs effectively.

This requirement is supported by Recital 47, which emphasizes the need for transparency to mitigate the opacity that may render certain AI systems incomprehensible to users. The complexity of high-risk AI systems often leads to a lack of understanding among users, raising concerns about their ability to make informed decisions based on AI-generated outputs.

To ensure transparency, Article 13(2) and (3) mandate that AI systems must be accompanied by clear instructions for use. These instructions must provide concise, complete, and correct information, detailing the characteristics, capabilities, and limitations of the AI system's performance. Such documentation is crucial in fostering trust and enabling users to navigate the intricacies of AI systems, especially in ODR processes where decisions can significantly impact individuals' rights and interests.

Furthermore, transparency is not solely about the provision of information; it is also about the nature and format of that information. The AI Act requires that the information be accessible and comprehensible to users, addressing the challenge of technical jargon that can alienate non-expert users. By ensuring that users can easily interpret the outputs and functionalities of high-risk AI systems, the AI Act aims to promote

accountability and responsible usage in ODR contexts, where stakeholders must understand the rationale behind AI-driven decisions.

While transparency is critical, it is equally important to ensure that human oversight is integrated into the operation of high-risk AI systems. Article 14 of the AI Act outlines the requirements for human oversight, stipulating that AI systems must be designed to allow effective monitoring by natural persons during their use. This requirement addresses the ethical concerns surrounding automation bias, wherein users may overly rely on AI-generated outputs, potentially leading to detrimental consequences in decision-making processes.

Human oversight entails more than just passive monitoring; it requires users to possess a comprehensive understanding of the capabilities and limitations of the AI system. Article 14(1)(a) emphasizes that individuals assigned to oversee high-risk AI systems must be equipped to monitor their operation and interpret their outputs accurately. This emphasis on informed oversight is particularly pertinent in ODR scenarios, where decisions made by AI systems could affect individuals' access to justice and their fundamental rights.

Moreover, the requirement for human oversight underscores the importance of accountability in AI applications. The AI Act seeks to mitigate the risks associated with automation bias and foster a culture of ethical responsibility by ensuring that human operators remain engaged in the decision-making process.

In the context of ODR, where fairness and transparency are paramount, the presence of human oversight serves to enhance the legitimacy of AI-driven decisions, reinforcing users' confidence in the integrity of the process.

The AI Act further emphasizes the significance of comprehensive documentation and risk management in the development and deployment of high-risk AI systems. Article 11 mandates that providers of high-risk AI systems must prepare technical documentation that includes critical elements such as design specifications, the general logic of the system, and performance characteristics. This documentation not only serves as a reference for users but also plays a vital role in risk management throughout the AI system's lifecycle.

Risk management is a key component of ethical AI deployment, as it allows providers to identify and mitigate potential harms associated with AI systems. The AI Act requires that providers establish, implement, and maintain a risk management system to identify risks and adopt appropriate measures to address them. This proactive approach to risk management aligns with ethical principles that prioritize the safeguarding of individuals' rights and interests, particularly in sensitive areas such as ODR.

So, we can affirm that the AI Act reinforces the importance of accountability and responsibility in AI development. Providers are not only obligated to ensure compliance with legal requirements but also to adopt ethical practices that prioritize the well-being of users and stakeholders. In ODR processes, where the stakes are high, the integration of robust risk management practices is essential to uphold the principles of justice and fairness.

The intersection of the AI Act and ODR processes highlights the ethical implications of AI deployment in legal contexts. ODR systems increasingly leverage AI technologies to facilitate conflict resolution, streamline processes, and enhance access to justice. However, the integration of AI into ODR raises important ethical considerations regarding transparency, accountability, and the protection of individuals' rights.

AI systems used in ODR must comply with the transparency requirements set forth in the AI Act to ensure that users understand how decisions are made. This is particularly critical in scenarios where AI-generated outputs influence the resolution of disputes. ODR providers can foster trust among users, thereby enhancing the legitimacy of the process by adhering to the AI Act's transparency and documentation requirements

Moreover, the emphasis on human oversight in the AI Act is especially pertinent in ODR contexts, where users may be vulnerable and require additional support in navigating the complexities of the system. Human oversight can help mitigate the risks associated with automation bias, ensuring that users are not solely reliant on AI-generated outputs in their decision-making processes. By maintaining a human touch in ODR, stakeholders can enhance the overall experience and promote a more equitable resolution of disputes.

While the AI Act provides a robust framework for regulating AI systems, several challenges remain in its implementation, particularly in the context of ODR. One of the key challenges lies in the diverse landscape of AI and their applications, which may require tailored approaches to compliance and risk management. The dynamic nature of AI development necessitates continuous adaptation of regulatory frameworks to keep pace with technological advancements.

Additionally, the effectiveness of the AI Act in addressing ethical considerations will depend on the collaboration between regulators, AI providers, and stakeholders in the ODR ecosystem. Engaging in interdisciplinary dialogue and cooperation will be essential in identifying best practices and ensuring that AI technologies are deployed responsibly and ethically.

5. Designing an ODR Process

In light of the discussion presented in the previous sections and recognizing that this constitutes the core objective of the current dissertation, we will now delineate an ODR process utilizing BPMN, XML, and JSON. Additionally, we will offer recommendations for integrating AI into this framework.

Designing an ODR process with BPMN is pivotal for effectively illustrating its practical application. This analysis follows the methodology proposed by Dumas et al. (2018). Historically, research in Business Process Management (BPM) has predominantly focused on the design, analysis, monitoring, and enhancement of business workflows within organizations. Various methodologies have emerged, categorized by their respective stages and managerial dimensions (Dumas et al., 2018).

The BPM lifecycle comprises six distinct phases, each contributing to a comprehensive understanding and management of business processes. The first phase, 'Process Identification', entails the delineation of an organization's business processes and their boundaries by a BPM team. This initial step results in the development of a process architecture that visualizes key processes and their interrelations (Dumas et al., 2018).

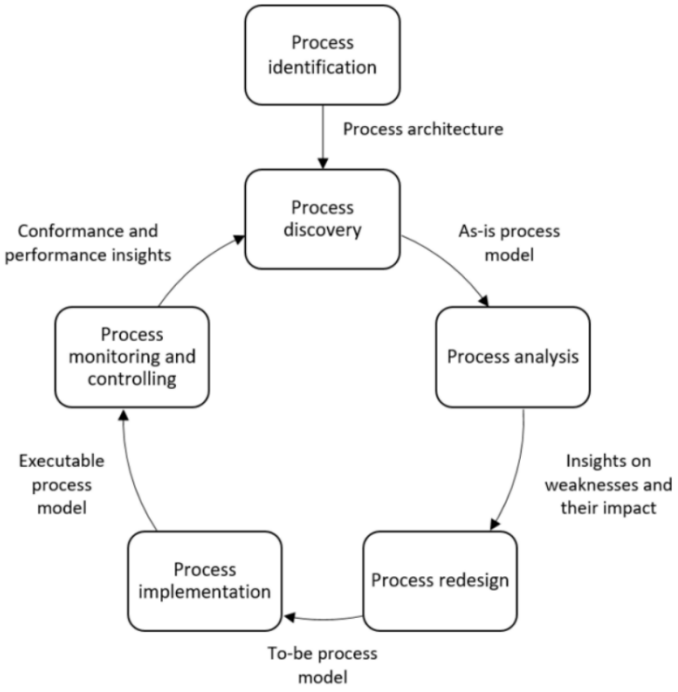

Figure 6 - BPM Lifecicle

Within the context of modelling an ODR process, this phase is crucial for identifying the specific dispute mechanisms and workflows relevant to the organization. The BPM team can prioritize processes and assess potential interventions by establishing key performance measures focusing on cost, time, quality, and flexibility, ensuring that the ODR framework is efficient and responsive to stakeholder needs.

The subsequent phase, 'Process Discovery', focuses on identifying and documenting existing processes within the organization, aiming to capture the actual sequence of tasks while recognizing the roles and interactions among stakeholders involved in the ODR process. This step is particularly valuable for understanding the current state of dispute resolution practices and stakeholder interactions, thereby informing the design of the ODR model.

Following this, the Process Analysis phase evaluates the current ('as-is') model to identify issues, root causes, and their impacts (Dumas et al., 2018). This evaluation employs both qualitative methods (e.g., value-added analysis, waste analysis) and quantitative methods (e.g., simulation, flow time analysis), facilitating a deeper understanding of the existing ODR processes' effectiveness and efficiency.

The next phase, 'Process Redesign', assesses opportunities for improvement by developing a future ('to-be') business process model that visualizes how the ODR process should be executed moving forward. This phase allows for the integration of best practices and innovative solutions, such as the use of AI to enhance dispute resolution mechanisms.

In the 'Process Implementation' phase, the 'to-be' model is operationalized, requiring change management and the development of IT applications to execute the process effectively.

Finally, the 'Process Monitoring and Controlling' phase focuses on understanding process execution and implementing corrective measures as necessary (Dumas et al., 2018). Performance dashboards visualize execution data, providing insights into key metrics related to the ODR process. This monitoring yields valuable insights for process discovery and analysis, allowing the ODR lifecycle to restart as required.

As discussed in Section 2 of this dissertation, BPMN offers crucial clarity for understanding dispute resolution mechanisms, breaking down each phase and specifying the roles of involved parties, such as Complainants and Respondents.

This clarity ensures that all stakeholders understand their roles and the overall workflow, thereby simplifying navigation through procedural steps. The graphical nature of BPMN also aids in identifying potential bottlenecks, fostering continuous improvement.

By clearly delineating interactions, such as communication, decision-making, and information flow, it creates a framework that can be analysed and optimized, ensuring that the ODR process is adaptable to change.

Furthermore, BPMN's flexibility allows the same ODR model to be implemented across various legal systems with minimal adjustments. Whether adapting to different jurisdictions or evolving legal requirements, BPMN's structured nature eases rapid modifications of specific components without demanding a complete overhaul.

To support this proposal, the Camunda platform has been chosen. Known for its flexibility and scalability, Camunda is ideal for ODR applications. Leveraging BPMN, it allows users to design complex workflows clearly and methodically, ensuring precision at every stage. A key strength of Camunda is its ability

to model and execute processes in real-time, enhancing efficiency and enabling dynamic operations with minimal manual intervention.

A vital component of Camunda is Zeebe, a workflow engine for microservices orchestration and AI integration. Zeebe enhances Camunda by enabling the orchestration of AI-driven tasks and real-time data processing, allowing for dynamic optimization.

Camunda's flexibility enables extensive customization of process flows to meet specific legal, organizational, or procedural needs. Its adaptability ensures that the ODR process can be tailored to various contexts, whether for small or large-scale applications.

As an open-source platform, Camunda provides full access to its source code, allowing for deeper modifications and integrations, thereby ensuring the process remains agile and responsive over time.

Furthermore, Camunda's suite of tools, including Zeebe, supports process optimization, monitoring, and automation, making it a comprehensive solution for designing and executing dynamic workflows. Therefore, the choice of Camunda for the ODR process reflects its capacity to deliver both flexibility and reliability in managing complex, scalable, and customizable workflows.

5.1. High-Level Process

The structured process operates on two main levels: a high-level process composed of various call activities, which serve as doorways to more detailed subprocesses. This modular organization offers significant advantages in terms of flexibility and maintainability.

As mentioned above, given the dynamic nature of the legal environment, where laws and regulations frequently change, ADR processes must also adapt accordingly. Necessary changes can be made more efficiently and effectively by breaking down the process into smaller, independent phases. When new legislation affects only a specific phase, adjustments can be localized without overhauling the entire process. This approach not only simplifies maintenance but also reduces the risk of errors by minimizing unnecessary interventions in other stages.

Moreover, this modular model enhances the ability to respond quickly to contextual or regulatory shifts, streamlining the adaptation to new legal requirements. It also facilitates continuous process improvements; as opportunities arise to increase efficiency in certain phases, incremental upgrades can be implemented without disrupting the overall process.

This phased implementation ensures a smoother transition, lowering costs and minimizing operational disruptions. The adaptability provided by this modular structure fosters resilience and innovation in ADR processes, allowing for better control over resources and timelines.

Figure 7 illustrates the high-level process that begins when the complainant identifies an issue and seeks to enforce their rights. The process starts with a none start event, which is linked to a call activity titled 'Choose ODR' through a sequence flow.

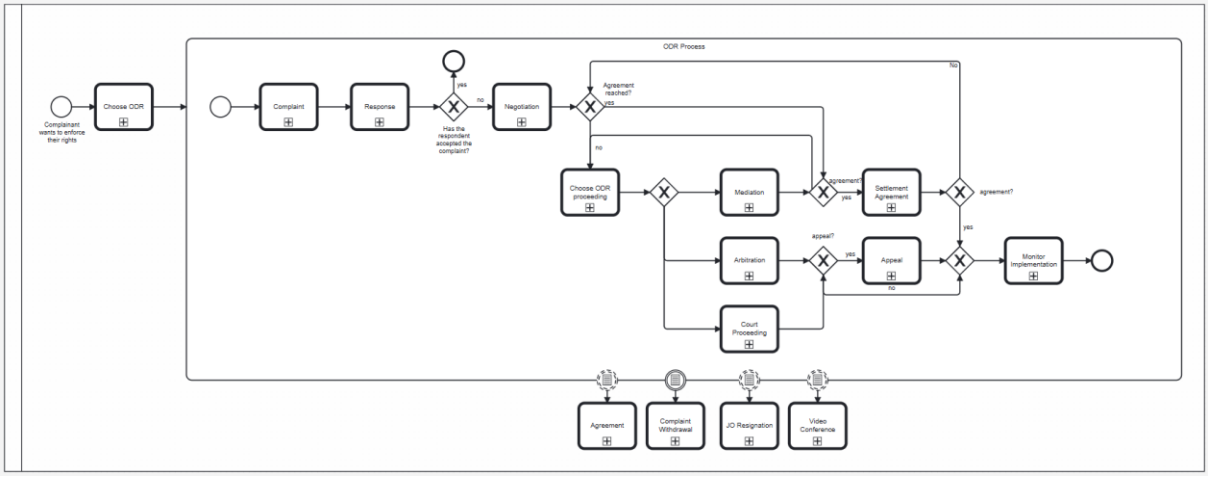

Figure 7 – High-Level Process

At this stage, the complainant can select the platform that best suits their needs, considering factors such as the issue at hand, the parties involved, location, language, and other relevant considerations. Once the platform is chosen, the process expands to reveal a detailed subprocess that includes everything from the complaint to the implementation of the agreement or decision.

During the 'Complaint' call activity, the complainant has the opportunity to explain their case, including the start date, value, respondent details, resolution proposals, whether they intend to escalate to ODR, or if they are subject to a specific dispute resolution body.

They will also specify how many Justice Officers (JOs) will decide the case. Following this, the process moves to the Response phase, where the respondent can analyse the complainant's arguments and propose new resolutions.

If the respondent accepts the complaint, the dispute is resolved, and the process concludes. If not, a negotiation stage begins. Should the parties fail to reach an agreement, they may escalate the matter to other dispute resolution methods, such as mediation, arbitration, or court.

In mediation, an impartial third party, the mediator, assists the parties in reaching a mutually acceptable agreement without the authority to impose a decision. In contrast, arbitration and court decisions are binding and generally final, with limited options for appeal. Similar to negotiation, mediation requires the parties to draft a written agreement, which both must sign. If they cannot agree on the wording, they may opt for arbitration or a court judgment.

Once the settlement agreement is defined or the arbitrator's/judge's decision is final (or the appeal process concludes), a call activity will be initiated to implement the agreement or decision within the ODR process.

Additionally, various events can be activated at any time if specific conditions are met. These include conditional boundary events, which act as observers triggered when a specific condition evaluates to True. These events can be classified as interrupting or non-interrupting. The main distinction lies in their impact on process flow: interrupting events pause the current activity and redirect the flow to manage the event, while

non-interrupting events run simultaneously with the primary process, allowing it to proceed while the event is handled.

For example, events related to 'Complaint Withdrawal' and 'Agreement' are interrupting events, requiring participation from both parties. In contrast, events such as 'JO Resignation' and 'Video Conference' are non-interrupting events, as a JO's resignation during negotiations does not directly affect the proceedings.

5.2. Sub-Processes

As highlighted, the called processes are vital in complex proceedings, enabling the invocation of independent processes. In BPMN, call activities allow predefined processes or subprocesses to be invoked and reused within a larger process model. This approach fosters modularity and efficiency by encapsulating complex logic in separate, reusable processes, thereby reducing redundancy and simplifying process management.

To effectively implement a call activity, you first need to define the sub-process or global process intended for use. This sub-process must be fully modelled, with all tasks, decision points, and flows clearly defined. In your main BPMN diagram, insert a call activity symbol at the point where the predefined subprocess will be invoked. The call activity acts as a placeholder, indicating that a separate, detailed process will execute at this stage.

To configure the call activity, link it to the defined sub-process by specifying its name or ID in the properties. This directs the BPMN model to execute the specific subprocess when the call activity is reached.

During execution, when the flow reaches the call activity, the parent process pauses, and control transfers to the referenced subprocess. Once the subprocess completes, control returns to the parent process, continuing immediately after the call activity.

The flexibility of call activities allows customization of subprocess behaviour based on input parameters, enabling a single global process to adapt its behaviour to specific contexts, such as different payment methods or varying customer requirements.

With this understanding, we will now describe the call activities integral to our process, illustrating its development. The high-level process begins with a start event, marking the moment the Complainant intends to assert their rights.

This moment is crucial as it signals the start of the dispute resolution journey, directing the user immediately to the subprocess called 'Choose ODR Platform'.

5.2.1. Choose ODR Platform

The high-level process, as shown in figure 7 begins with a start event, marking the moment the Complainant indicates their intention to assert their rights. This event is crucial as it initiates the dispute

resolution journey, directing the user to the Sub-Process linked to the call activity named Choose ODR Platform (process ID: choose_ODR), represented in figure 8.

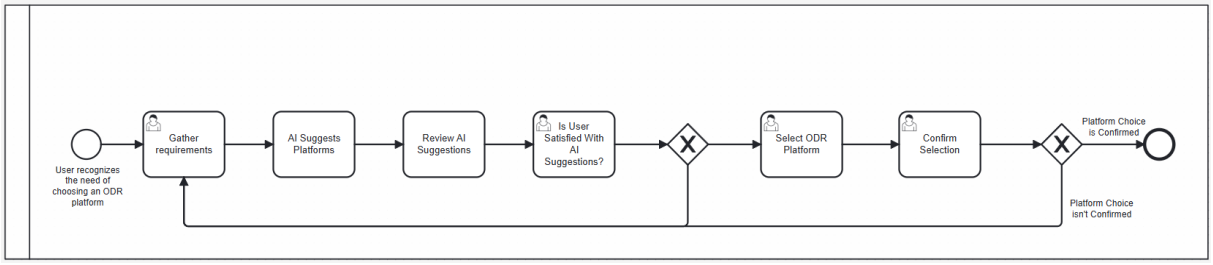

Figure 8 - Choose ODR Process

At this stage, users must define their requirements and preferences for resolving their dispute by filling in a form (figure 20), including preferred language, cost limits, process speed, and any other relevant conditions. Based on these inputs, an AI system is activated to recommend dispute resolution platforms that best match their needs.

Integrating AI into the selection process enhances both efficiency and decision-making. AI provides personalized recommendations tailored to user preferences, ensuring a customized experience. It streamlines the selection process by quickly narrowing down relevant options, allowing users to focus on platforms that meet their criteria without unnecessary delays. This efficiency reduces the burden on users, making the process more user-friendly.

AI also improves decision-making by analysing extensive data, such as platform performance metrics, user reviews, and success rates. This data-driven approach ensures users make informed choices, optimizing cost by recommending platforms within the complainant's financial capacity. Additionally, AI offers consistent and accurate recommendations, eliminating biases common in manual processes.

The implementation of AI significantly enhances the user experience by simplifying a potentially overwhelming task. It encourages greater participation in ODR, leading to higher satisfaction as users confidently rely on technology for guidance.

For effective AI-driven recommendations, advanced techniques like Machine Learning, NLP, and Recommendation Systems are employed. Recommendation Systems analyse user data and platform attributes, utilizing collaborative filtering (which leverages similar past users' preferences) and content-based filtering (which matches user preferences with platform features). A hybrid model combining both techniques is often the most effective.

ML algorithms optimize the selection process by analysing data on user preferences, past disputes, and platform performance to predict suitable options. Supervised learning models can be trained on historical data to forecast outcomes, improving recommendations over time as the system gathers more data.

NLP is essential for interpreting user inputs, allowing the AI to extract critical information from free-text descriptions. Techniques like text classification and sentiment analysis help refine recommendations to align more closely with user situations.

Reinforcement Learning can also be integrated, enabling the AI to learn from user interactions and feedback. If users consistently report positive outcomes with certain platforms, the AI can adjust its algorithms to favour those options, continuously enhancing its accuracy and responsiveness.

The synergy of these AI technologies creates a flexible, adaptive system capable of responding to the evolving landscape of online dispute resolution. As a result, the AI analyses user input and preferences to recommend platforms that align closely with established criteria, offering a personalized experience that significantly reduces the time and effort required to find suitable resolution options. Upon receiving the suggested platforms, users can evaluate their satisfaction. If satisfied, they select a recommended platform, confirming their choice through a simple process before being redirected to the platform's interface for formal dispute processing.

If users are dissatisfied with the AI-generated suggestions, they can return to the 'Gather Requirements' phase to modify criteria or add preferences. The AI will then conduct a refined analysis based on these updates, presenting an adjusted list of recommendations. This iterative process continues until users find a platform that meets their expectations.

Once a selection is made, the dispute resolution process is initiated by activating an expanded subprocess, which outlines the essential steps required for effective resolution. This includes evidence submission, argument exchanges between parties, and mediation or arbitration facilitation based on the selected platform's attributes and the nature of the dispute.

This modular and flexible design streamlines the commencement of dispute resolution, ensuring subsequent stages are carried out in a structured, tailored manner. The system architecture supports high personalization and operational efficiency, providing users with faster, cost-effective resolutions adapted to their unique needs and circumstances.

5.2.2. Complaint

When a dispute arises, it triggers an expanded subprocess activated through a start event linked to the 'Complaint' via sequence flow. The complaint is represented as a call activity directing to the subprocess identified by 'Process_complaint', illustrated in fig. 9.

In the 'Complaint' subprocess, the Complainant fills out a dedicated form (fig. 21 to 30) to describe their reasons for initiating the dispute and their expectations for resolution. Initially, the Complainant must indicate whether they are filing the complaint on their own behalf or as a legal representative. If self-represented, they are informed about the option to hire a legal professional, as many self-represented individuals lack familiarity with legal jargon and dispute navigation.

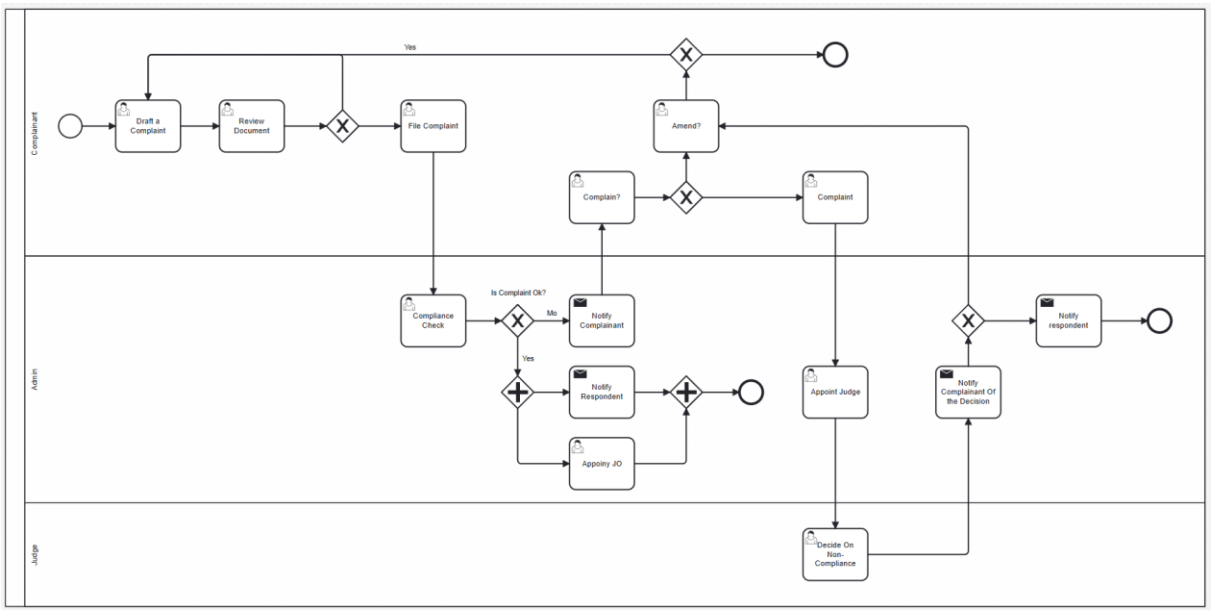

Figure 9 - Complaint Process

If the dispute escalates, the Judge, JO, Mediator, or Arbitrator can adjust their language and approach based on the parties' experience levels, ensuring a fairer process. Tools like proposal generators and chatbots support both parties and legal professionals, particularly benefiting self-represented litigants who often encounter fragmented information online.

The complaint form requires the Complainant to provide detailed personal information, including their name, organization (if applicable), contact details, country of residence, and preferred language for communication. This ensures clear and effective communication throughout the dispute resolution process.

After entering personal details, the Complainant describes the nature of their complaint, specifying the type of case and the issues involved. A well-detailed account helps the Respondent understand the conflict, facilitating a more informed resolution process.

The 'Draft Complaint' form includes a section for 'Resolution Proposals', where the Complainant can outline preferred outcomes, such as contract termination, reimbursement, or product repair. They can also propose tailored resolutions, explaining their reasoning to clarify the basis for their suggestions. The platform informs the Complainant about their rights and obligations related to the proposed resolution, outlining any legal or procedural requirements for both parties. If necessary, the Complainant can modify their resolution suggestion.

For consumer disputes, the form requires specific 'Transaction Details', such as order ID, payment amount, currency, and transaction date, to link the complaint directly to the transaction.

The Complainant must also provide detailed information about the Respondent, including their name, organization (if applicable), contact information, and preferred communication language. This comprehensive data ensures accurate contact for all parties involved.

The form concludes by asking whether the Complainant has previously attempted to resolve the issue directly with the Respondent. If such attempts have been unsuccessful, the dispute can escalate to the ODR process, engaging an impartial third party for resolution.

If a specific dispute resolution body is required, the Complainant must disclose this information to ensure compliance with contractual obligations. They can also select the number and type of decision-makers (Judges, JOs, etc.) to handle the case, tailoring the process to their needs.

Before proceeding, the Complainant must agree to the terms and conditions of the ODR platform. After submission, they can review the entire document to ensure accuracy and reflect their preferences, making corrections if necessary.

Once submitted, the platform assesses the complaint for compliance. If it meets requirements, a Judge, JO, or another decision-maker is assigned, and the Respondent is notified to begin the Response phase. If not compliant, the Complainant is informed of the issues and can appeal the decision by filling out a specific task labelled 'Complaint' to detail their disagreement.

Upon appeal submission, a Judge reviews the case and informs the Complainant of the decision. If the Judge rules in favour of the Complainant, the process continues, and the Respondent is notified. If the Judge upholds the platform's decision, the Complainant may amend and resubmit their complaint or terminate the dispute resolution process.

5.2.3. Response

Continuing with the process, we advance to the next call activity in the high-level process: the 'Response' (fig. 10). During this phase, the respondent is given the opportunity to address the issues raised by the complainant in their initial complaint form.

This stage is similar to the 'Complaint' phase in that, after the respondent completes their response form (figs. 31 and 32), they have the chance to thoroughly review the content, make any necessary revisions, and then submit the form for a compliance check by the ODR platform.

The 'Response' is crucial as it allows the respondent to provide their side of the story, present counterarguments, and offer any evidence or documentation that supports their position. The review and edit process ensures that the response accurately reflects the respondent's stance and addresses the complainant's claims effectively.

Once the response is submitted, it undergoes a compliance check by the platform to verify that it meets all required standards and guidelines. This ensures that the response is properly formatted, and that all necessary information is included before it moves forward in the dispute resolution process.

Similar to the complaint phase, if the response does not meet the required standards, the platform will notify the Respondent of the non-compliance. The Respondent then has the option to either appeal the platform's decision or make the necessary corrections to their response.

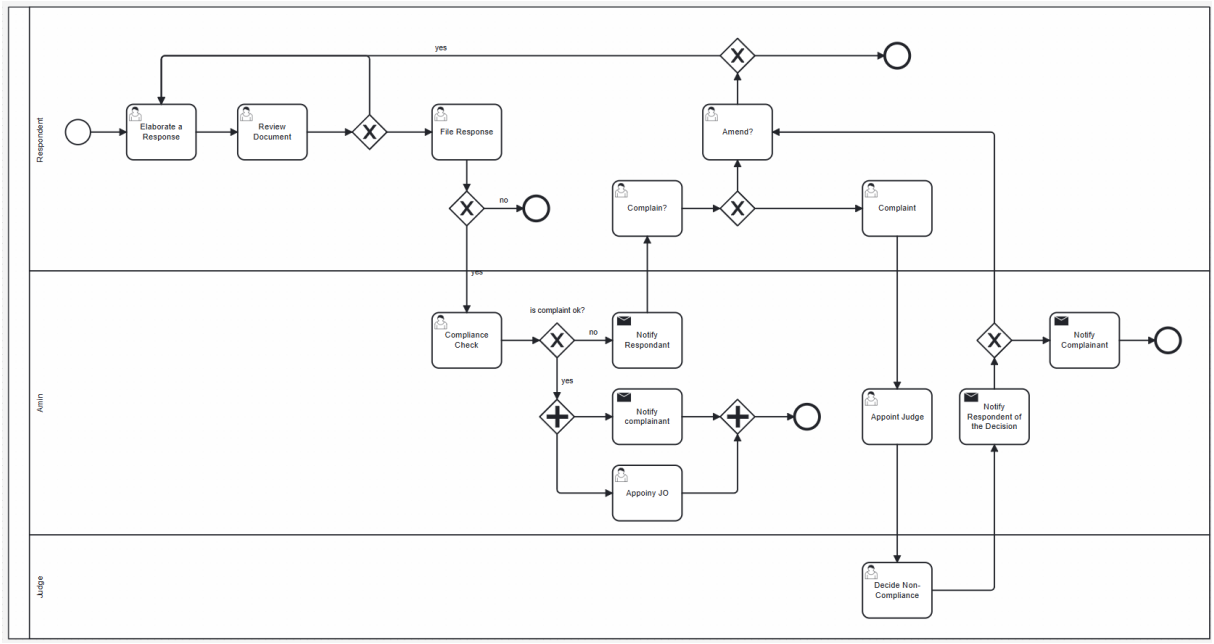

Figure 10 – Response Process

If the Respondent opts to appeal, the matter will be escalated to a judge. The judge will then review the platform's decision to determine whether it was appropriate to accept or reject the response. If the judge concludes that the response should be accepted, they will authorize the platform to notify the complainant of the response. This allows the complainant to review and address the respondent's reply, ensuring that both parties have the opportunity to present their perspectives before proceeding further in the dispute resolution process.

Although the processes for handling complaints and responses share several similarities, it is essential to pay attention to the specific requirements of the Respondent's response form. In this form, the respondent is required to specify whether they are representing themselves or if they are being represented by a legal professional. This distinction helps ensure that the platform understands the level of legal expertise involved in the case.

Additionally, the Respondent must provide their own personal details, including any necessary corrections to information that may have been inaccurately submitted by the Complainant. This step is crucial for maintaining accurate and up-to-date records within the dispute resolution system.

In the 'Your Response to the Complaint' section, the Respondent is given the chance to examine the specifics of the item or service involved in the dispute, including the details of the purchase, the nature of the dispute, and the particular issues raised by the Complainant.

Following this review, the respondent can address the complainant's allegations by providing their own perspective on the matter. They are encouraged to offer detailed comments that clarify their stance, describe the events as they experienced them, and provide supporting reasons and evidence to counter any inaccuracies or misunderstandings presented by the complainant. This opportunity ensures that the

Respondent's viewpoint is clearly articulated and that all relevant facts and evidence are considered in the dispute resolution process.

Subsequently, in the 'Resolution Proposal' section, the respondent can review the resolution proposals put forth by the complainant. This section provides the respondent with an opportunity to comment on the Complainant's suggestions, addressing any concerns or objections they may have. Additionally, the respondent can submit their own counter-proposals if they believe alternative solutions might better address the issues at hand.

If the Complainant has not provided any proposals for resolution, this section allows the respondent to proactively offer their own suggestions for resolving the dispute. The respondent can facilitate a quicker resolution process and help move the dispute toward a satisfactory conclusion for both parties by proposing their own resolution.

After completing the proposals section, the Respondent is required to make a final decision on whether they accept or reject the complaint. If the Respondent decides to accept the complaint, it signifies that they agree with all the demands and terms proposed by the Complainant. This acceptance indicates a mutual agreement between both parties on how to resolve the dispute.

When the Respondent accepts the complaint, the dispute resolution process concludes at this point, as the resolution is satisfactory to both parties. This acceptance renders the completion of any remaining sections of the form unnecessary, as the acceptance itself finalizes the resolution and formally ends the dispute.

If the Respondent chooses to reject the complaint, it signifies that they contest all the allegations put forth by the Complainant. This rejection indicates that the respondent disagrees with the claims and does not accept the proposed resolution.

In this situation, the respondent has the option to escalate the matter to a formal ODR procedure. They may opt for this escalation if they believe that further negotiation with the Complainant will not lead to an agreement and that an objective, third-party perspective is needed to resolve the dispute. This step ensures that the dispute can be reviewed fairly, providing a structured path to a potential resolution when direct negotiations fail.

Upon completing the form, Respondents have the opportunity to attach any relevant documents that substantiate their claims. Additionally, they can select from a list of judges or JOs whom they prefer to be appointed for the resolution of the conflict. This ensures that their case is supported by appropriate evidence and considered by their chosen decision-makers.

As detailed in the high-level process (fig. 7), if the Respondent acknowledges and accepts the Complainant's claims, the process will be considered complete. Acceptance indicates that the Respondent agrees with all aspects of the Complainant's assertions, so no further action is required.

However, if the Respondent disputes any part of the claims, the process will move to the 'Negotiation' stage to attempt to resolve the issues. If negotiations have already been conducted without reaching a resolution, or if the respondent outright rejects all of the claims, the process will then advance to the 'Choose ODR Proceeding' phase, where further steps for dispute resolution will be determined.

5.2.4. Negotiation

When the process moves to the call activity 'Negotiation' (fig. 11), the Complainant will have the opportunity to carefully review the document containing the Respondent's response. At this stage, the Complainant must evaluate the proposal presented by the Respondent and decide whether to accept or reject it. This assessment is crucial, as it will determine the next steps in the conflict resolution process.

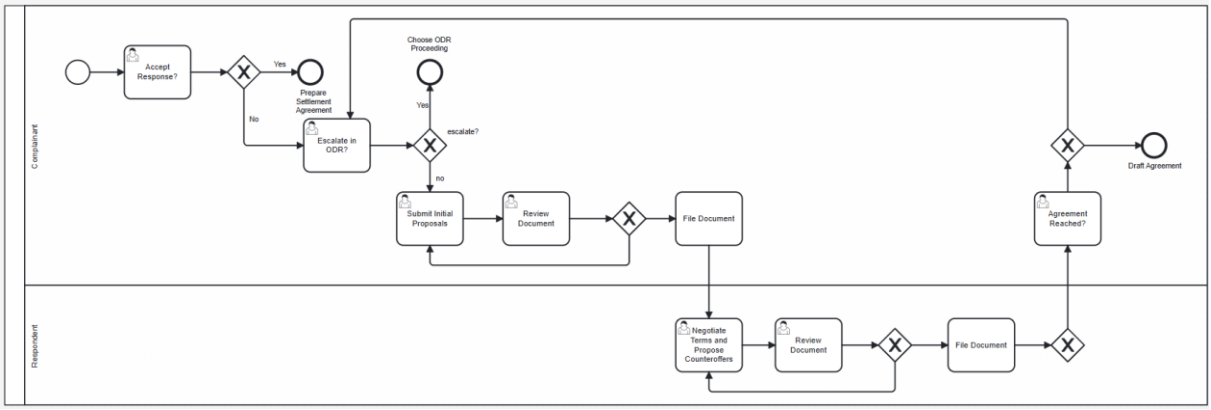

Figure 11 - Negotiation Process

If the Complainant agrees to the Respondent's response, the negotiation phase will be considered complete. The process will then advance to the call activity 'Prepare Settlement Agreement', where the terms of the resolution will be formalized and prepared for final agreement.

On the other hand, if the Complainant decides not to accept the Respondent's proposal and concludes that there is no viable way to negotiate effectively, whether due to the nature of the facts presented or the way the Respondent has argued their case, the Complainant has the option to escalate the dispute to other ODR proceeding.

This involves engaging an impartial third party who can assist in resolving the conflict. In such a scenario, the process will advance to the call activity 'Choose ODR Proceeding', where the Complainant will select the ODR procedure to facilitate a resolution with the help of an external mediator or arbitrator.

Additionally, if the Complainant chooses to proceed with the negotiation, they will be required to fill out a form where they must outline their initial proposals for resolving the conflict (figs. 33 to 35). This form is designed to capture the specifics of the Complainant's suggested resolutions. It allows the Complainant to present a primary proposal and, if they wish, include an additional supplementary proposal.

AI can significantly aid in making proposals during negotiation by analysing data from similar past cases to suggest effective proposal strategies. It provides personalized recommendations by evaluating the needs and positions of each party and uses scenario modelling to predict the outcomes of different proposals. AI tools can also assist in drafting proposals with structured templates and language suggestions.

Additionally, AI can adjust proposals in real-time based on negotiation dynamics and feedback, helping to address issues as they arise. It identifies potential conflicts within proposals and suggests modifications to resolve them. AI also benchmarks proposals against industry standards to ensure fairness and competitiveness and integrates feedback from previous proposals to improve future ones.

To achieve this goal, a variety of AI techniques can be employed. Among these techniques, machine learning algorithms stand out for their ability to analyse historical data and suggest more effective proposal strategies. Additionally, NLP plays a crucial role by assisting in drafting and interpreting the language used in negotiations, thereby facilitating communication and understanding between the parties involved.

Furthermore, predictive analytics can provide forecasts on the likely success of proposals by analysing trends and patterns from past data. Scenario analysis, on the other hand, allows for the simulation of various potential outcomes to understand their possible effects on the negotiation process.

For instance, in the context of selecting an ODR platform, recommendation systems use algorithms to offer personalized proposal suggestions tailored to the preferences and needs of the parties involved. Meanwhile, optimization algorithms fine-tune these proposals by considering various constraints and goals, ensuring that the final recommendations are as effective and practical as possible.

Additionally, automated drafting tools employ sophisticated templates to create clear and well-structured proposals, while real-time adjustment mechanisms allow for dynamic modifications based on continuous feedback.

Finally, sentiment analysis is utilized to detect emotional undertones in negotiations, which aids in resolving conflicts and reinforcing agreements.

Returning to the process, following the proposals, the form provides sections for the Complainant to attach any relevant documents that might support their proposals or clarify their position.

Additionally, there is a field labelled 'number' where the Complainant can specify the 'amount' they believe is fair for settling the conflict. This allows them to indicate the proposed settlement figure they are seeking.

Lastly, the form includes a 'date time' field, where the Complainant can set an expiration date for their proposal if they wish to establish a deadline for acceptance or response. This helps ensure that the negotiation process has a clear timeframe for resolution.

Once the form is completed, the Complainant will have the opportunity to thoroughly review the document. This review process allows the Complainant to make any necessary edits if they identify any errors, omissions, or inconsistencies in their initial submission.

After making any corrections and ensuring that all information is accurate and complete, the Complainant can finalize the document and submit it for the Respondent's review. This submission will allow the Respondent to assess the proposals and supporting documents provided by the Complainant, setting the stage for further negotiation or resolution.

Once the Complainant has submitted their proposals, the Respondent will carefully review each one. The Respondent can choose to accept all of the terms and conditions proposed by the Complainant, thereby agreeing to the resolution as suggested.

Alternatively, the Respondent may find it necessary to negotiate the terms further. In this case, the Respondent will provide counterproposals that address their concerns or suggest alternative solutions.

The process will then move forward with a thorough review of these negotiations and counterproposals. Both parties will engage in this iterative process until they reach a consensus or finalize the terms. The revised document, reflecting any agreed-upon changes, will then be submitted for final consideration.

Once the Respondent has completed their review of the submitted document, the Complainant will be asked to confirm whether the parties have reached an agreement. This involves assessing whether the terms proposed by the Respondent, including any counterproposals, are acceptable to the Complainant and whether all aspects of the dispute have been resolved to mutual satisfaction. The Complainant's response will determine the next steps in the process, whether that involves finalizing the agreement or continuing with further negotiations or alternative resolution methods.

If the Complainant determines that an agreement has been successfully reached, the 'Negotiation' phase will be concluded, and the process will move forward to the 'Call Activity' labelled 'Settlement Agreement.' This next phase is where the final terms of the agreement will be formalized and documented.

However, if the Complainant feels that an agreement has not been achieved, the process will revert to a previous stage. The Complainant will then be asked to decide whether they would like to escalate the dispute to an ODR procedure, which involves bringing in an impartial third party to facilitate a resolution.

Alternatively, the Complainant can choose to continue negotiating directly with the Respondent in hopes of reaching an agreement. This decision will dictate the subsequent steps in the resolution process.

5.2.5. Choose ODR Proceeding

If the complainant chooses to escalate to an ODR procedure (Fig. 12), they will be directed to the call activity titled 'Choose ODR Proceeding.' This same call activity will also be utilized to guide the parties if they decide, at either the complaint or response stage, to bypass the negotiation phase and directly select mediation, arbitration, or to submit the case for formal review by a judge in an online court.

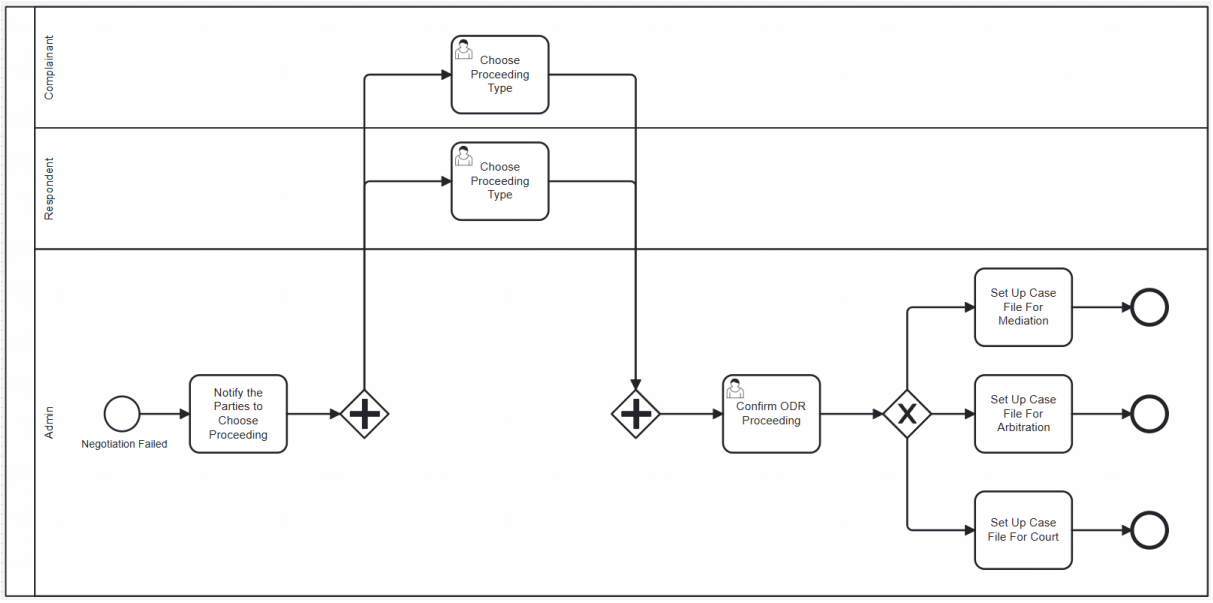

Figure 12 - Choose ODR Proceeding Process

In this framework, the process identified as 'Process_Choose_ODR_Proceeding' commences with the platform's administration formally notifying the involved parties. This notification prompts them to choose the procedural approach that most appropriately addresses their goals and the particulars of the case at hand.

Both parties involved—the complainant and the respondent—will simultaneously indicate their preference for either mediation, arbitration, or court adjudication. Upon submission of their respective choices through the designated form, the platform administration will then review and assess these selections. Based on this evaluation, the administration will make a final decision and subsequently guide the parties towards the appropriate dispute resolution method—whether it be mediation, arbitration, or a formal court process—reflecting their chosen preferences.

5.2.6. Mediation

If the selected resolution method is 'Mediation', as shown in figures 13 and 14, the process will begin with the mediator individually inviting each party to an initial consultation session. In this preliminary phase, the mediator will engage with each party separately to discuss their individual expectations and goals for resolving the dispute. This session provides the mediator with valuable insights into each party's perspectives and interpersonal dynamics.

The mediator can tailor their approach and strategies to better align with the needs and characteristics of both parties by understanding these elements. Their goal is to facilitate a process that supports constructive dialogue and ultimately guides the parties toward a resolution that is satisfactory and beneficial for all involved.

In this context, the mediator will inform each party individually of the available time slots for scheduling the meeting. Each party will then have the opportunity to choose the time that best suits their availability. Once both parties have submitted their preferred time slots, the mediator will finalize and schedule the meeting, setting a specific date and time for the session.

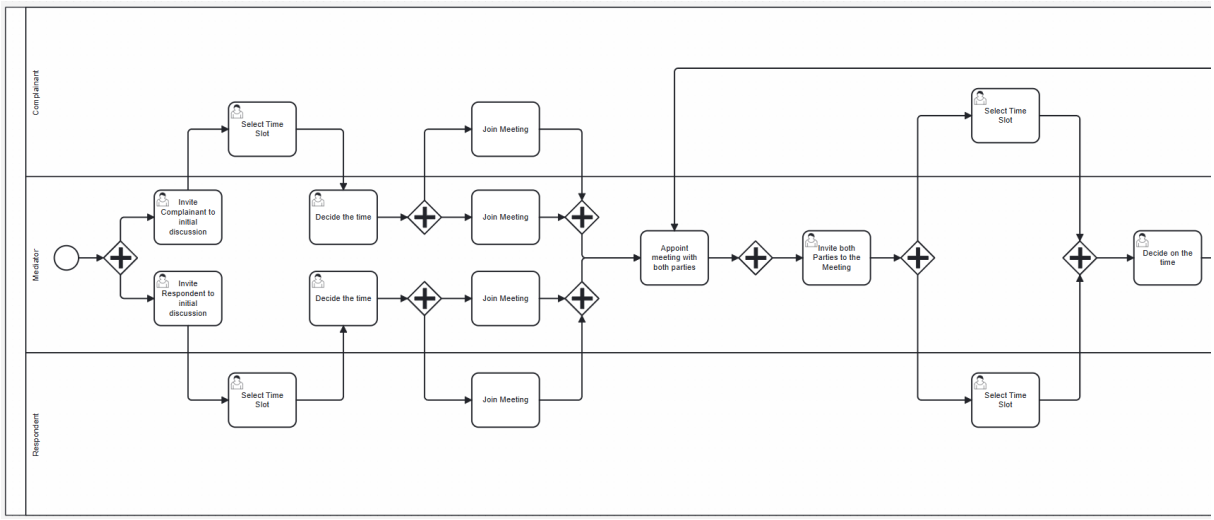

Figure 13 - Mediation Process (1)

On the scheduled date and time, the mediator will join each party in a virtual meeting to establish the terms of the mediation. During this session, the mediator will also outline and clarify the objectives and positions of each party.

Following the completion of the individual meetings, the mediator will schedule a joint meeting with both parties to facilitate the necessary dialogue for resolving the conflict (figs. 36 to 38). The mediator will propose three potential dates and times for this meeting, along with the available time slots.

Similar to the initial session, the parties will review the proposed time slots and select the one that best fits their schedules and availability. Once both parties have submitted their preferred times, the mediator will review their responses and choose the most suitable option from the provided slots to finalize and schedule the joint meeting.

After the meeting, during which the parties discuss and agree on all the essential terms to be included in the agreement, the mediator will draft a resolution proposal based on the discussions. This proposal will be communicated to both parties, who will then need to indicate whether they accept the terms outlined and provide their reasons if they do not.

Once both parties have responded, it is the mediator's responsibility to inform the platform whether an agreement has been reached. If the response is negative and the mediator determines that an agreement cannot be achieved despite their efforts, the parties will be redirected to the 'Call Activity' titled 'Choose ODR Proceeding.' Here, they will have the option to pursue conflict resolution through mediation with a new mediator, arbitration, or a court proceeding.

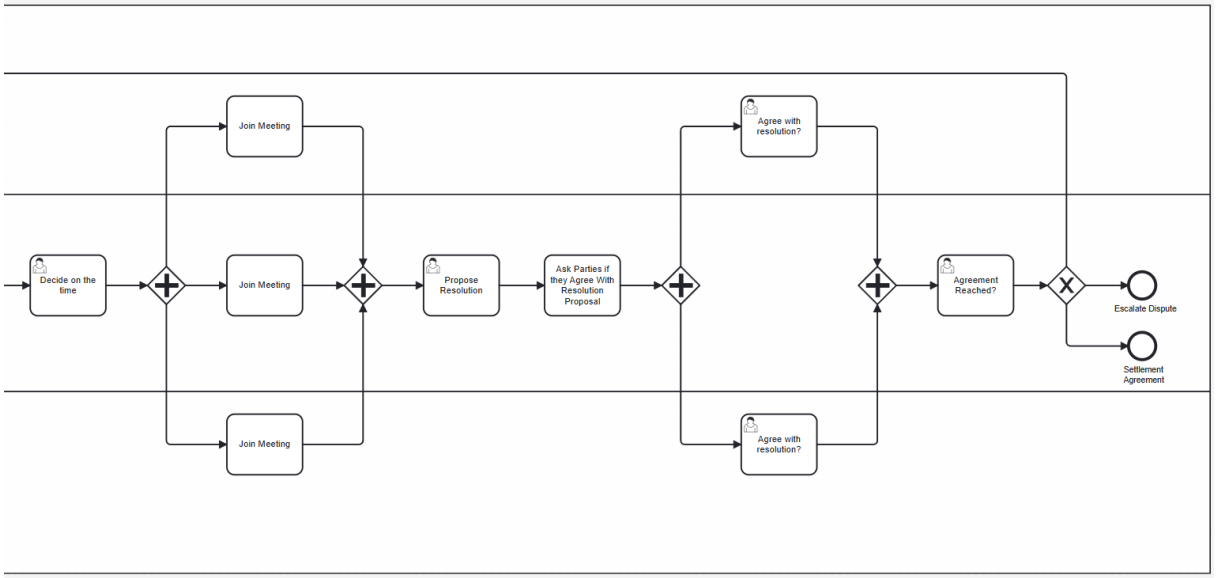

Figure 14 - Mediation Process (2)

If the parties have not reached an agreement, but the mediator, based on the explanations provided and the behaviour observed during the meetings, believes that an agreement could still be possible with an additional meeting, the process will revert to the mediator task titled 'Appointing Meeting with Both Parties.'

In this scenario, the mediator will arrange another session to revisit and clarify any unresolved terms or address disagreements. The process will continue in this manner until the mediator is able to report to the platform whether an agreement has been reached or not.

Finally, if the parties accept all the terms proposed by the mediator, often having already agreed to them during the meeting, the mediator will direct the parties to the call activity titled 'Settlement Agreement'.

5.2.7. Settlement Agreement

The 'Settlement Agreement' call activity follows the 'Negotiation' and 'Mediation' phases. The purpose of this process, shown in figure 15, is to facilitate the creation of the final resolution document, incorporating all the proposed terms that must be included in the agreement.

Initially, it is the responsibility of the complainant to draft the terms of the agreement. After the document is prepared, it is submitted to the respondent for review. The respondent will then decide whether to sign the document as is or propose modifications. If the respondent signs the document, it is returned to the complainant for final signature. Once signed by both parties, the document is forwarded to a judge for review and confirmation.

This confirmation is crucial, as parties may sometimes reach an agreement that is detrimental to one or both sides, either due to a lack of legal knowledge or due to feeling pressured by the opposing party to accept the proposed terms. If the judge determines that the agreement does not comply with applicable

legislation or is unfair to either party, they must redirect the parties to a new ODR procedure, specifically to the call activity titled 'Choose ODR Proceeding'.

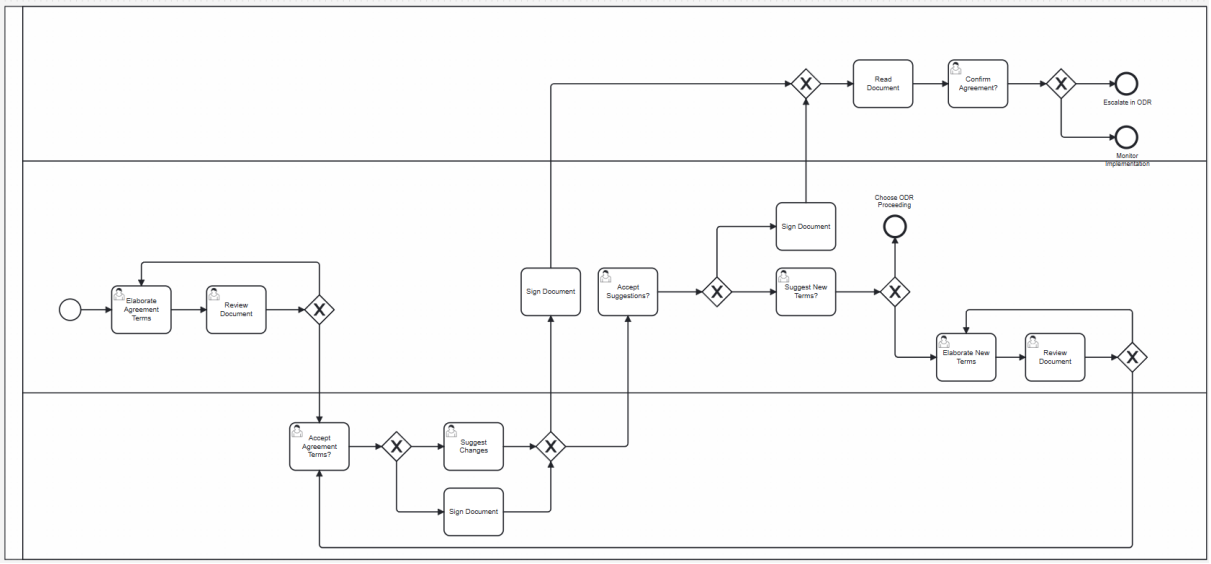

Figure 15 - Settlement Agreement Process

If the parties agree to the terms of the settlement, the 'Settlement Agreement' process concludes there, with the parties having reached a mutually acceptable resolution to the conflict.

But, if during the initial review of the terms proposed by the complainant the respondent disagrees, they may propose changes to the agreement. These proposed modifications will be forwarded to the complainant. If the complainant agrees to the changes, they will be incorporated into the final document, which both parties will then sign before it is sent to the judge. The judge will follow the previously described procedure. Alternatively, the complainant may suggest new terms, which will be presented to the respondent for review and agreement.

5.2.8. Arbitration and Court Proceedings

If the parties select 'Arbitration' as the procedure in the 'Choose ODR Proceeding' stage, or if it is selected by the platform administration, the process (fig. 16) begins with the Arbitrator gaining access to the comprehensive records of the 'Complaint', 'Response', and 'Negotiation' phases. This allows the Arbitrator to thoroughly review and evaluate the interactions and information provided by each side before making an informed decision.

Similarly, if the parties choose 'Court' as the procedure (fig. 17), or if it is designated by the platform administration, the process follows a comparable sequence. The Judge will also review the records of the 'Complaint', 'Response', and 'Negotiation' phases to assess the case.

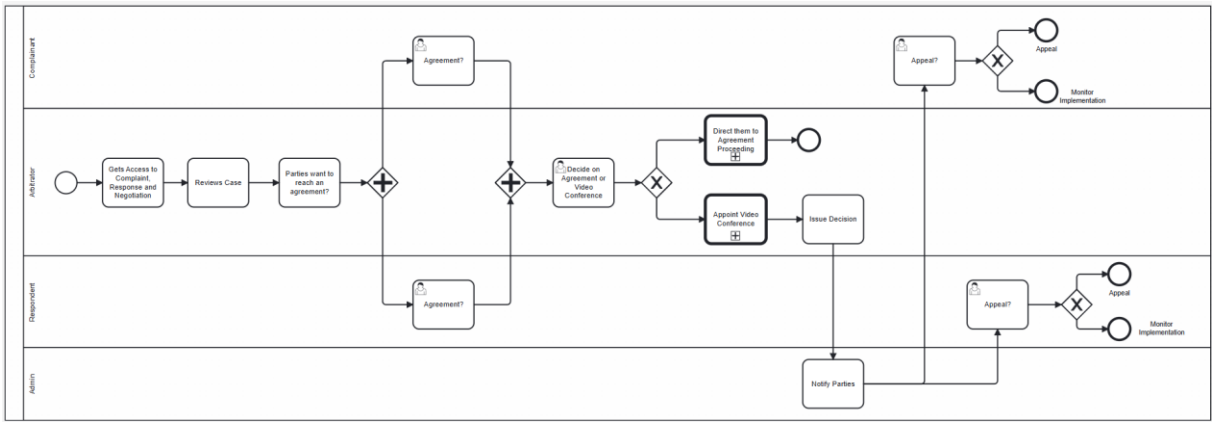

Figure 16 - Arbitration Process

Before proceeding to a binding decision, both the Arbitrator and the Judge must first inquire whether the parties wish to attempt reaching a settlement. The parties will then decide if they are interested in negotiating a settlement. After receiving their responses through the appropriate form, the Arbitrator or Judge will determine whether to move forward with a settlement process or schedule a video conference.

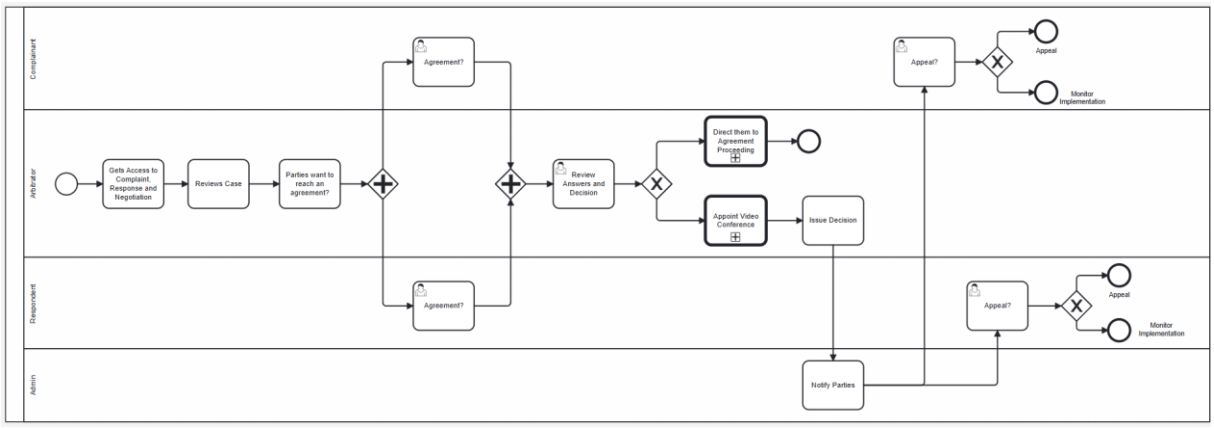

Figure 17 - Court Proceeding Process

Depending on this decision, the process will advance to either the call activity titled 'Direct Them to Agreement Proceeding,' associated with the process ID 'Process_Agreement', or the call activity named 'Appoint Video Conference', linked to the process ID 'Process_VC'. Details of these processes will be described.

Following the video conference, the Arbitrator or Judge will issue a decision, which will be communicated to the parties by the platform administration. The parties will have the option to appeal the decision if they choose. If an appeal is filed, they will be directed to the call activity titled 'Appeal'. If no appeal is made, the process will proceed to the call activity named 'Monitor Implementation', after which the process will be concluded.

5.2.9. Appeal

If the parties express a desire to appeal the decision rendered by either the Arbitrator or the Judge, they will be directed to the call activity named 'Appeal'. This activity is linked to the process ID 'Process_Appeal',

represented in figure 18, and is designed to facilitate the appeal process. Through this phase, the parties will follow the necessary procedures to challenge the decision, and further steps will be taken to address their appeal in accordance with the established process.

In this phase, no separate lanes are allocated for the Complainant and Respondent, as either party is entitled to appeal the decision issued by the Arbitrator or Judge. The appeal process commences with the parties submitting the 'Appeal' form (fig. 39), where they must clearly articulate their reasons for contesting the decision. It is essential for the parties to provide substantive and valid grounds for their appeal, as frivolous or dilatory tactics aimed merely at delaying the resolution could lead to sanctions for bad faith litigation. This ensures that the appeal process remains efficient and focused on genuine disputes.

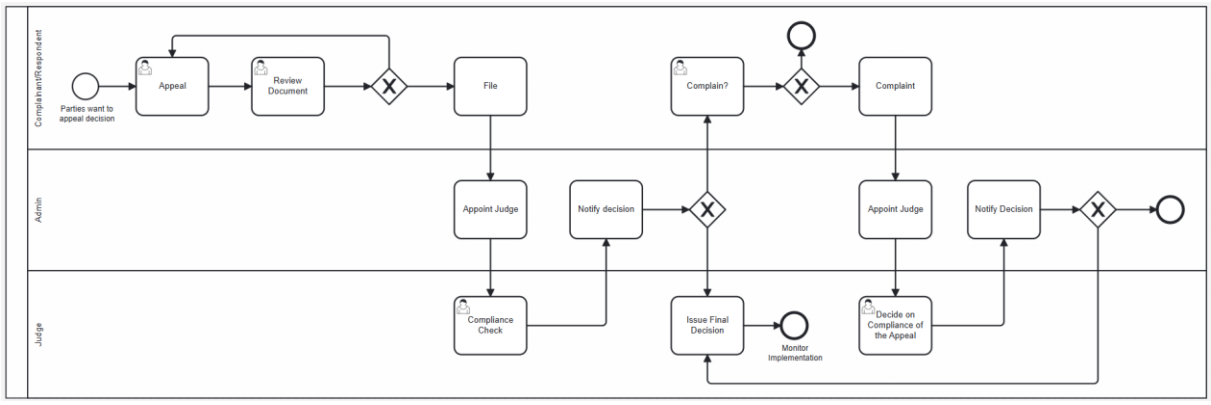

Figure 18 – Appeal Proceeding Process

Therefore, in the appeal form, the appealing party must specify the grounds for their appeal. These grounds may include, for example: 'Procedural Error' (indicating a significant procedural issue that impacted the fairness of the process), 'New Evidence' (highlighting relevant new evidence that was not available during the initial proceedings), or 'Interpretation of the Agreement/Contract' (pertaining to disputes over the interpretation of the agreement or contract).

Additionally, the appealing party is required to provide a comprehensive explanation for their appeal. This should include a clear articulation of the reasons for the appeal, supported by any relevant evidence or legal arguments they wish to present. The party must also specify the particular outcome or remedy they are seeking as a result of the appeal. Furthermore, the appealing party has the opportunity to submit any supporting documents that substantiate their claims, ensuring that their appeal is well-supported and thoroughly considered.

Once the form has been completed, the party will have the chance to review the document thoroughly. They can make any necessary revisions or corrections if they feel it is required. If, after this review, no further changes are deemed necessary, the party can proceed to submit the 'Appeal' in its current form.

Following this, the platform administration will assign a judge to review the appeal. The judge's role is to ensure that the appeal meets all necessary criteria and procedural requirements for acceptance. The judge will carefully assess the appeal to determine if it warrants further consideration. Once the review is complete,

the judge will issue a decision regarding the acceptance of the appeal. This decision will be communicated to both parties involved. If the appeal is accepted, the judge will then issue a formal ruling on the merits of the appeal, addressing the specific issues raised by the appealing party and determining the appropriate course of action.

If the 'Appeal' does not meet the necessary compliance standards, the appealing party will be given the opportunity to contest the decision related to the 'Compliance Check' of their appeal. This challenge will be forwarded to a different judge, selected by the platform administration, who will review the compliance issues afresh. The new judge will then issue a decision on whether the appeal should be accepted, or further action is required.

On the other hand, if the appealing party decides not to challenge the decision regarding the 'Compliance Check' of their appeal, or if they do choose to contest it and the judge affirms that the initial compliance decision was accurate and appropriate, the process will be ended. In either case, no further action will be taken, and the matter will be considered resolved at that stage.

Lastly, if the judge determines that the appealing party's complaint to the 'Compliance Check' decision is valid, the process will proceed to the 'Issue Final Decision' phase. Following this, the process will be directed to the call activity titled 'Monitor Implementation', as was mentioned in the 'Settlement Agreement,' 'Arbitration,' and 'Court' procedures.

5.2.10. Monitor Implementation

To bring the ODR process to its final stage, we transition into the call activity known as 'Monitor Implementation', as previously described. This process (Fig. 19) occurs after the completion of the 'Settlement Agreement,' or once a formal decision has been rendered by the Arbitrator or Judge in their respective proceedings, including any outcomes from the 'Appeal' process.

At this stage of the process, the platform administration reaches out to both parties to assess whether the terms of the agreement or decision are being fully and properly implemented. This ensures that all obligations are being met in accordance with the resolution, and that both parties are adhering to the commitments laid out in the final ruling.

At this point, parties are asked to submit their responses (fig. 40), indicating whether the terms of the agreement are being fully honoured. They are also given the opportunity to include additional comments, offering further clarification or details to support their answers and provide context for any issues or concerns they may have regarding the implementation.

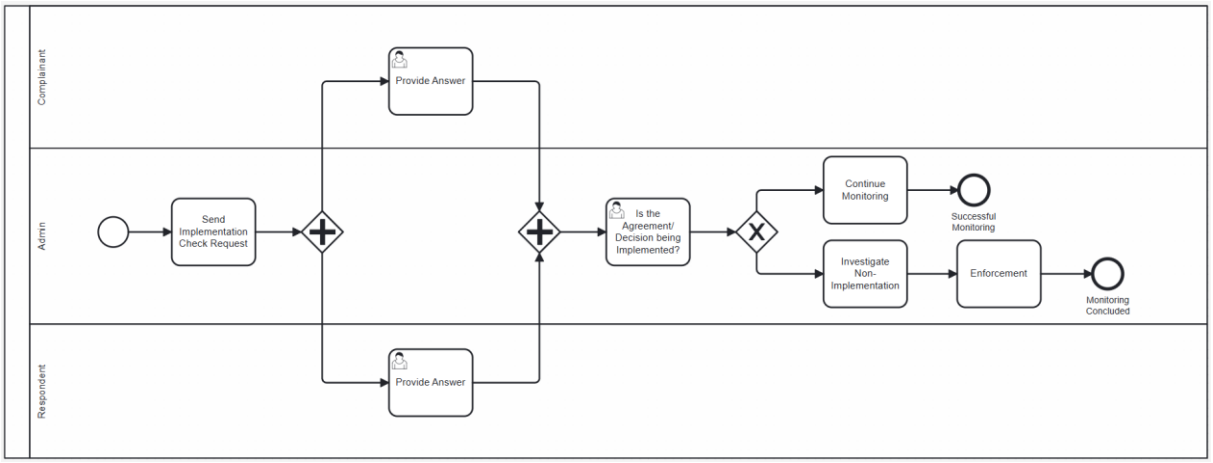

Figure 19 - Monitor Implementation Process

In this phase, if it is determined that the agreement is being fully honoured, the platform will maintain oversight of its implementation. This monitoring will continue until it is no longer necessary, such as when all obligations have been completely fulfilled. Once the agreement has been entirely executed, and no further supervision is required, the platform will conclude its monitoring efforts.

To conclude, if the agreement or decision is not being properly implemented, the platform administration will initiate a thorough investigation to identify the underlying reasons for the non-compliance. This investigation aims to understand why the terms are not being met and to rectify the situation. After the investigation is concluded and the root cause of the issue is determined, the process will advance to the enforcement stage. At this point, measures will be taken to ensure the compulsory implementation of the agreed-upon terms, ensuring that compliance is achieved.

6. Results

6.1. Main Contributions

Although this dissertation presents only a selection of the work developed, one of its most significant achievements is the creation of 16 distinct BPMN processes, which together offer a comprehensive and detailed representation of an ODR system. These BPMN models provide a structured framework that defines each phase of the ODR process, capturing the intricate flow of activities required to resolve disputes in an online environment.

To further support these processes, 79 forms were created to ensure that essential information is systematically captured from all stakeholders involved in ODR proceedings. These forms play a critical role in gathering, organizing, and processing the necessary data at each stage, ensuring that all information is recorded and managed in an orderly manner, thus contributing to the overall efficiency of the process.

Beyond these technical contributions, this research makes a substantial interdisciplinary impact by encouraging a stronger connection between the fields of computer science and law. The development of these BPMN processes and forms not only translates legal workflows into digital models but also bridges the communication gap between experts in both domains. This enables more effective collaboration between legal professionals and software developers, improving their shared understanding of the system's requirements and functionalities.

This work also serves as a common language that allows complex legal processes to be easily understood and implemented by technology specialists. Moreover, this dissertation clarifies the specific data requirements for each phase of the ODR process, offering a clear roadmap for developers to create robust and efficient solutions, including AI-driven applications, that support and automate these processes.

Ultimately, this research lays the groundwork for future innovations in legal technology, particularly in the development of intelligent systems that can enhance decision-making, streamline dispute resolution, and improve the overall efficiency of ODR systems. These contributions benefit both the legal and technical communities, with the potential to make ODR more accessible and effective for a broader audience.

6.2. Scientific Outcomes

Additionally, the work developed in this dissertation culminated in a significant scientific contribution, which was both published and presented at the EPIA 2024 conference, an international forum for the dissemination of advancements in AI. This achievement underscores the relevance and impact of the research conducted, as it gained attention from the academic community and experts in the field.

Ribeiro, M., Carneiro, D., & Mesquita, L. (2025). Digital justice in the EU: Integration of BPMN and AI into ODR processes. In M. F. Santos, J. Machado, P. Novais, P. Cortez, & P. M. Moreira (Eds.), *Progress in Artificial Intelligence. EPIA 2024. Lecture Notes in Computer Science* (Vol. 14967). Springer, Cham. https://doi.org/10.1007/978-3-031-73497-7_21

Abstract: With the proliferation of ODR service providers, there is a critical necessity to establish mechanisms supporting their functioning, particularly while designing ODR processes. This article aims to examine the impact of process modelling using BPMN, and of its relevance in the integration of AI into ODR processes within the EU. BPMN allows a meticulous depiction of all the ODR process steps, stakeholders, and underlying data in structured formats that are readable and interpretable by both humans and AI, which enables its integration. The advantages include predictive analysis, identification of opportunities for continuous improvement, operational efficiency, cost and time reduction, and enhanced accessibility for self-represented litigants. Additionally, the transparency afforded by explicitly incorporating AI in BPMN notation fosters a clearer comprehension of processes, facilitating management and informed decision-making. Nevertheless, it remains imperative to address ethical concerns such as algorithmic bias, fairness, and privacy.

7. Conclusions

To date, the EU's initiatives in ODR have primarily focused on the consumer sector, establishing an ODR platform to facilitate conflict resolution between traders and consumers across European borders. This platform serves as both a bridge for resolving disputes and a conduit connecting various institutions responsible for adjudication.

However, the initial focus on consumer issues has underscored the need for ODR services that extend beyond this sector. As demand for efficient, accessible dispute resolution mechanisms grows globally, there is a pressing need to broaden ODR services to encompass a wider range of disputes and stakeholders.

This expansion is vital not only to meet escalating demand but also to adapt to evolving legal and regulatory standards governing dispute resolution across jurisdictions. Thus, there is significant momentum towards enhancing ODR systems to ensure they are robust and comprehensive, capable of addressing diverse dispute scenarios effectively.

This dissertation advocates the use of BPMN to model ODR processes. BPMN provides an effective methodology for designing and testing ODR workflows through clear, graphical representations using various symbols and elements. This visual approach enables stakeholders to easily understand the sequence of activities, events, and decision points involved.

BPMN integrates XML files to encapsulate all relevant process data, ensuring comprehensive documentation that is both accessible and detailed. The XML format allows for the accurate tracking and management of each procedural element. Additionally, forms associated with BPMN tasks are structured using JSON, which organizes data into key-value pairs, enabling real-time data entry and enhancing workflow dynamics.

This combination of BPMN's visual clarity with XML and JSON structured data management ensures that all ODR process participants have a thorough understanding of workflows, promoting transparency and facilitating effective communication.

The use of structured languages like BPMN significantly enhances process clarity and transparency. Its graphical representation, combined with an XML-based data structure, provides an organized depiction of workflows, making it accessible and manageable.

Integrating AI into BPMN-designed processes further amplifies these benefits, allowing for sophisticated tracking and analysis of user interactions and process data. Each user input is tagged with specific keys within the BPMN framework, enhancing accountability and simplifying the review of process performance. This structured approach supports ongoing process optimization, enabling AI to identify inefficiencies and drive improvements, which leads to cost reductions and increased operational efficiency.

Finally, AI integration enhances ODR accessibility and functionality. AI-driven tools such as automated workflows, messaging systems, confidential case registries, and structured forms streamline

routine tasks and facilitate smoother interactions between parties. While NLP technologies provide real-time translation and document summarization, particularly valuable in European cross-border disputes where language barriers can hinder resolution, intelligent chatbots offer dynamic solutions for proposal generation and optimization, gathering information, generating tailored proposals, and suggesting improvements, thereby enhancing the overall user experience and efficiency of the ODR process.

References

Almeida, M. B. (2002). Uma introdução ao XML, sua utilização na Internet e alguns conceitos complementares. Ciência da informação, 31, 5-13.

Andaloussi, A. A. (2021). A framework for enhancing the modeling and comprehension of declarative process models (Doctoral dissertation). Technical University of Denmark. https://www.alexandria.unisg.ch/handle/20.500.14171/110801

Anderson, D. (2019). The convergence of ADR and ODR within the courts: the impact on access to justice. *Civil Justice Quarterly*, *38*(1), 126. https://ink.library.smu.edu.sg/sol_research/2842

Bakhramova, M. (2022). The Origins of the ODR System and Its Advantages over other ADR Methods. *BARQARORLIK VA YETAKCHI TADQIQOTLAR ONLAYN ILMIY JURNALI*, *2*(1), 527-530. https://sciencebox.uz/index.php/jars/article/view/1045

Bear, L. S. (1992). Alternative dispute resolution. Sweet and maxwell publishers. https://impekacdn.s3.us-east-2.amazonaws.com/onefamilylaw.ca/content/user_files/2023/08/29143319/nativewomen_adr.pdf

Bennett, S. C. (2002). *Arbitration: essential concepts*. Alm Publishing. https://doi.org/10.1093/arbitration/19.1.115

Bikaki, A. & Peters, M. & Krozel, J., & Kakadiaris, I. A. (2024). Building an open-source collaborative platform for migration research: A metadata modeling approach using XML. *Knowledge-Based Systems*, *299*, 111823. https://doi.org/10.1016/j.knosys.2024.111823

Bourret, R. (1999). XML and databases. XML and Databases, 1-15.

Carneiro, D. & Novais, P. & Neves, J. (2013). Using genetic algorithms to create solutions for conflict resolution. *Neurocomputing*, *109*, 16-26. https://doi.org/10.1016/j.neucom.2012.03.024

Carneiro, D. & Novais, P. & Andrade, F. & Zeleznikow, J., & Neves, J. (2014). Online dispute resolution: an artificial intelligence perspective. *Artificial Intelligence Review*, *41*, 211-240. https://doi.org/10.1007/s10462-011-9305-z

Carnevale, P. J., & Pruitt, D. G. (1992). Negotiation and mediation. *Annual review of psychology*, *43* (1), 531-582. https://psycnet.apa.org/doi/10.1146/annurev.ps.43.020192.002531

Chinosi, M., & Trombetta, A. (2012). BPMN: An introduction to the standard. *Computer Standards & Interfaces*, *34* (1), 124-134. https://doi.org/10.1016/j.csi.2011.06.002

Collins, C. & Dennehy, D. & Conboy, K. & Mikalef, P. (2021). Artificial intelligence in information systems research: A systematic literature review and research agenda. *International Journal of Information Management*, *60*, 102383. https://doi.org/10.1016/j.ijinfomgt.2021.102383

Compagnucci, I., Corradini, F., Fornari, F., & Re, B. (2024). A Study on the Usage of the BPMN Notation for Designing Process Collaboration, Choreography, and Conversation Models. *Business & Information Systems Engineering, 66*(1), 43-66. https://doi.org/10.1007/s12599-023-00818-7

Copeland, B. (2024, September 27). Artificial intelligence. Encyclopedia Britannica. https://www.britannica.com/technology/artificial-intelligence

Cruz, R. M. (2021). *A Mediação Familiar como Meio Complementar de Justiça - Algumas Questões*. Grupo Almedina. https://ebooks.almedina.net/books/9789724093413

deeplearning.ai (2023). Natural Language Processing. https://www.deeplearning.ai/resources/natural-language-processing/

Dumas, M., Rosa, L. M., Mendling, J., & Reijers, A. H. (2018). *Fundamentals of business process management*. Springer-Verlag. https://doi.org/10.1007/978-3-662-56509-4

European Parliament and Council of the European Union. (2013). *Directive 2013/11/EU of 21 May 2013 on alternative dispute resolution for consumer disputes, amending Regulation (EC) No 2006/2004 and Directive 2009/22/EC (ADR Directive)*. Official Journal of the European Union. http://data.europa.eu/eli/dir/2013/11/oj

European Parliament and Council of the European Union. (2013). *Regulation (EU) No 524/2013 of 21 May 2013 on online dispute resolution for consumer disputes, amending Regulation (EC) No 2006/2004 and Directive 2009/22/EC (ODR Regulation)*. Official Journal of the European Union. http://data.europa.eu/eli/reg/2013/524/oj

European Parliament and Council of the European Union. (2024). *Regulation (EU) 2024/1689 of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act)*. Official Journal of the European Union. http://data.europa.eu/eli/reg/2024/1689/oj

Frade, C. (2003). A resolução alternativa de litígios e o acesso à justiça: A mediação do sobreendividamento. *Revista Crítica de Ciências Sociais*, (65), 107-128. https://doi.org/10.4000/rccs.1184

Gill, C. &Williams, J. & Brennan, C. & Hirst, C. (2014). Models of alternative dispute resolution (ADR). *A report for the legal Ombudsman. Queen Margaret University Retrieved from*. https://eresearch.qmu.ac.uk/handle/20.500.12289/3584

Goltsman, M., Hörner, J., Pavlov, G., & Squintani, F. (2009). Mediation, arbitration and negotiation. *Journal of Economic Theory, 144*(4), 1397-1420. https://doi.org/10.1016/j.jet.2008.08.010

Gonçalves, M. C. (2022). Resolução de litígios em linha nos litígios transfronteiriços: problemas e desafios. In Andrade, F. & Gonçalves, M. C. & Cruz, R. M. (Coord.), Atas do Congresso Internacional – Meios de resolução alternativa de litígios online, 469-489. ISBN: 978-989-53342-2-3.

Hernández-Orallo, J. (2017). Evaluation in artificial intelligence: from task-oriented to ability-oriented measurement. *Artificial Intelligence Review, 48*, 397-447. https://doi.org/10.1007/s10462-016-9505-7

Ibrahim, A. S., Abubakari, M., Akanbang, B. A., & Kepe, T. (2022). Resolving land conflicts through alternative dispute resolution: Exploring the motivations and challenges in Ghana. *Land Use Policy, 120*. https://doi.org/10.1016/j.landusepol.2022.106272

Justo, A. S. (2009). Introdução ao Estudo do Direito (4.a). Coimbra Editora. ISBN: 978-972-32-1746-9.

Katsh, E. E. & Katsh, M. E. & Rifkin, J. (2001). *Online dispute resolution: Resolving conflicts in cyberspace*. John Wiley & Sons, Inc. https://dl.acm.org/doi/abs/10.5555/558866

Lennon, J. (2009). Introduction to JSON. In *Beginning couchdb* (pp. 87-105). Berkeley, CA: Apress. https://doi.org/10.1007/978-1-4302-7236-6_6

Lodder, A. R., & Zeleznikow, J. (2010). Internet and Dispute Resolution-Chapter 1 (Intro) and 2 (Norms). *ENHANCED DISPUTE RESOLUTION THROUGH THE USE OF INFORMATION TECHNOLOGY, AR Lodder, J. Zeleznikow, eds., Cambridge University Press, ISBN13 9780521515429.*, SSRN: https://ssrn.com/abstract=2059976

Loebl, Z. (2019). Designing online courts. *Alphen aan den Rijn: Wolters Kluwer*. ISBN: 9789403517209. http://digital.casalini.it/9789403517209

Loebl, Z., Carneiro, D., Ciubotariu, C., & Rezabkova, T. (2023). Personalized e-Justice ODR Forms. *International Journal of Online Dispute Resolution, 10* (1). https://doi.org/10.5553/IJODR/235250022023010001009

Lorenzi, F., & Ricci, F. (2003, August). Case-based recommender systems: A unifying view. In *IJCAI Workshop on Intelligent Techniques for Web Personalization* (pp. 89-113). Berlin, Heidelberg: Springer Berlin Heidelberg. https://doi.org/10.1007/11577935_5

Mamrot, S. (2023). Application of business process modelling and reengineering to law making process in Poland. *JeDEM-eJournal of eDemocracy and Open Government, 15*(1), 144-168. https://doi.org/10.29379/jedem.v15i1.736

Mania, K. (2015). Online dispute resolution: The future of justice. *International Comparative Jurisprudence, 1*(1), 76-86. https://doi.org/10.1016/j.icj.2015.10.006

McCarthy, J. (2022). Artificial intelligence, logic, and formalising common sense. Machine Learning and the City: Applications in Architecture and Urban Design, 69-90. https://doi.org/10.1002/9781119815075.ch6

McManus, M., & Silverstein, B. (2011). Brief history of alternative dispute resolution in the United States. *Cadmus, 1*(3), 100-105. https://www.proquest.com/scholarly-journals/brief-history-alternative-dispute-resolution/docview/1086326549/se-2

Mesquita, L. M. (2022). Online courts: um modelo a considerar no sistema português?. In Andrade, F. & Gonçalves, M. C. & Cruz, R. M. (Coord.), Atas do Congresso Internacional – Meios de resolução alternativa de litígios online, 469-489. ISBN: 978-989-53342-2-3.

Minsky, M. (1958). The society of mind. Simon and Schuster.

Mirante, A. P. P. & Monteiro, A. F. & Silva, D. (2019). *Manual de Arbitragem*. Grupo Almedina. https://ebooks.almedina.net/books/9789724080383

Mnookin, R. H. & Peppet, S. R. & Tulumello, A. S. (2000). *Beyond winning: Negotiating to create value in deals and disputes*. Harvard University Press. https://www.production.hup.harvard.edu/file/feeds/PDF/9780674012318_sample.pdf

Newell, A., & Simon, H. A. (2007). Computer science as empirical inquiry: Symbols and search. In *ACM Turing award lectures* (p. 1975). https://doi.org/10.1145/1283920.1283930

Oliveira, M. N. D. & Carvalho, K. M. D. & Silva, R. S. & Olave, M. E. L. & Oliveira, K. F. D. (2022). Modeling in Public Administration: an integrative systematic review with an international view. Research, Society and Development, 11, (7). https://doi.org/10.33448/rsd-v11i7.29786

Palmirani, M., & Governatori, G. (2018). Modelling legal knowledge for GDPR compliance checking. In *Legal knowledge and information systems* (pp. 101-110). IOS Press. https://doi.org/10.3233/978-1-61499-935-5-101

Peruginelli, G., & Chiti, G. (2002). Artificial intelligence in alternative dispute resolution. In *Proceedings of the Workshop on the law of electronic agents–LEA*.

Pezoa, F., Reutter, J. L., Suarez, F., Ugarte, M., & Vrgo**č**, D. (2016, April). Foundations of JSON schema. In *Proceedings of the 25th international conference on World Wide Web* (pp. 263-273). https://doi.org/10.1145/2872427.2883029

Poblet, M., & Ross, G. (2021). ODR in Europe. *Rainey, D., Katsh, E. and Abdel Wahab, A.(2021). Online Dispute Resolution: Theory and Practice (2nd ed.). Eleven Intl. Publishing.* https://ssrn.com/abstract=3912330

Portuguese Republic. (2013). *Law No. 29/2013 of 19 April*. Diário da República. https://data.dre.pt/eli/lei/29/2013/04/19/p/dre/pt/html

Rainey, D., Abdel Wahab, M. S. A., & Katsh, E. (2021). Online Dispute Resolution-Theory and Practice: A Treatise on Technology and Dispute Resolution. ISBN: 9789089743602

Rabinovich-Einy, O., & Katsh, E. (2012). Technology and the future of dispute systems design. *Harv. Negot. L. Rev., 17*, 151. https://ssrn.com/abstract=3504126

Rule, C. (2020). Online dispute resolution and the future of justice. *Annual Review of Law and Social Science*, *16*(1), 277-292. https://doi.org/10.1146/annurev-lawsocsci-101518-043049

Schmitz, A. J., & Zeleznikow, J. (2021). Intelligent legal tech to empower self-represented litigants. *Colum. Sci. & Tech. L. Rev., 23*, 142. https://doi.org/10.52214/stlr.v23i1.9391

Schultz, T. (2003). An Essay on the Role of Government for ODR: Theoretical Considerations about the Future of ODR. *Online Dispute Resolution (ODR): Technology as the'Fourth Party*. SSRN: https://ssrn.com/abstract=896678

Silver, B., & Richard, B. (2009). *BPMN method and style* (Vol. 2). Aptos: Cody-Cassidy Press. ISBN 978-0-9823681-1-4 https://ebpm.ir/wp-content/uploads/2021/01/bpmn-method-and-style-with-bpmn-implementers-guide-second-edition-Bruce-Silver.pdf

Smith, R. (2014). Digital delivery of legal services to people on low incomes. *The Legal Education Foundation*. https://www.thelegaleducationfoundation.org/wp-content/uploads/2014/12/Digital-Delivery-Paper-4.pdf

Stone, K. V. W. (2004). Alternative dispute resolution. SSRN. https://ssrn.com/abstract=631346

Susskind, R. (2019). *Online courts and the future of justice*. Oxford University Press. https://doi.org/10.1093/oso/9780198838364.001.0001

Walton, R. E., & McKersie, R. B. (1991). *A behavioral theory of labor negotiations: An analysis of a social interaction system*. Cornell University Press. https://doi.org/10.1111/nejo.12350

Wang, F. F. (2009). Online Dispute Resolution. *Technology, Management and Legal Practice from an International Perspective, Chandos Pub-lishing*, 63-64. ISBN: 978-1843345190

Westermann, H., Savelka, J., & Benyekhlef, K. (2023). LImediator: Gpt-4 assisted online dispute resolution. *arXiv preprint arXiv:2307.16732*. https://doi.org/10.48550/arXiv.2307.16732

Wing, L., Martinez, J., Katsh, E., & Rule, C. (2021). Designing ethical online dispute resolution systems: the rise of the fourth party. *Negotiation Journal*, *37*(1), 49-64.

Xu, Y., Liu, X., Cao, X., Huang, C., Liu, E., Qian, S., ... & Zhang, J. (2021). Artificial intelligence: A powerful paradigm for scientific research. *The Innovation*, *2*(4). https://doi.org/10.1016/j.xinn.2021.100179

Appendices

Appendix 1

Choose ODR Process

Gather Requirements Form

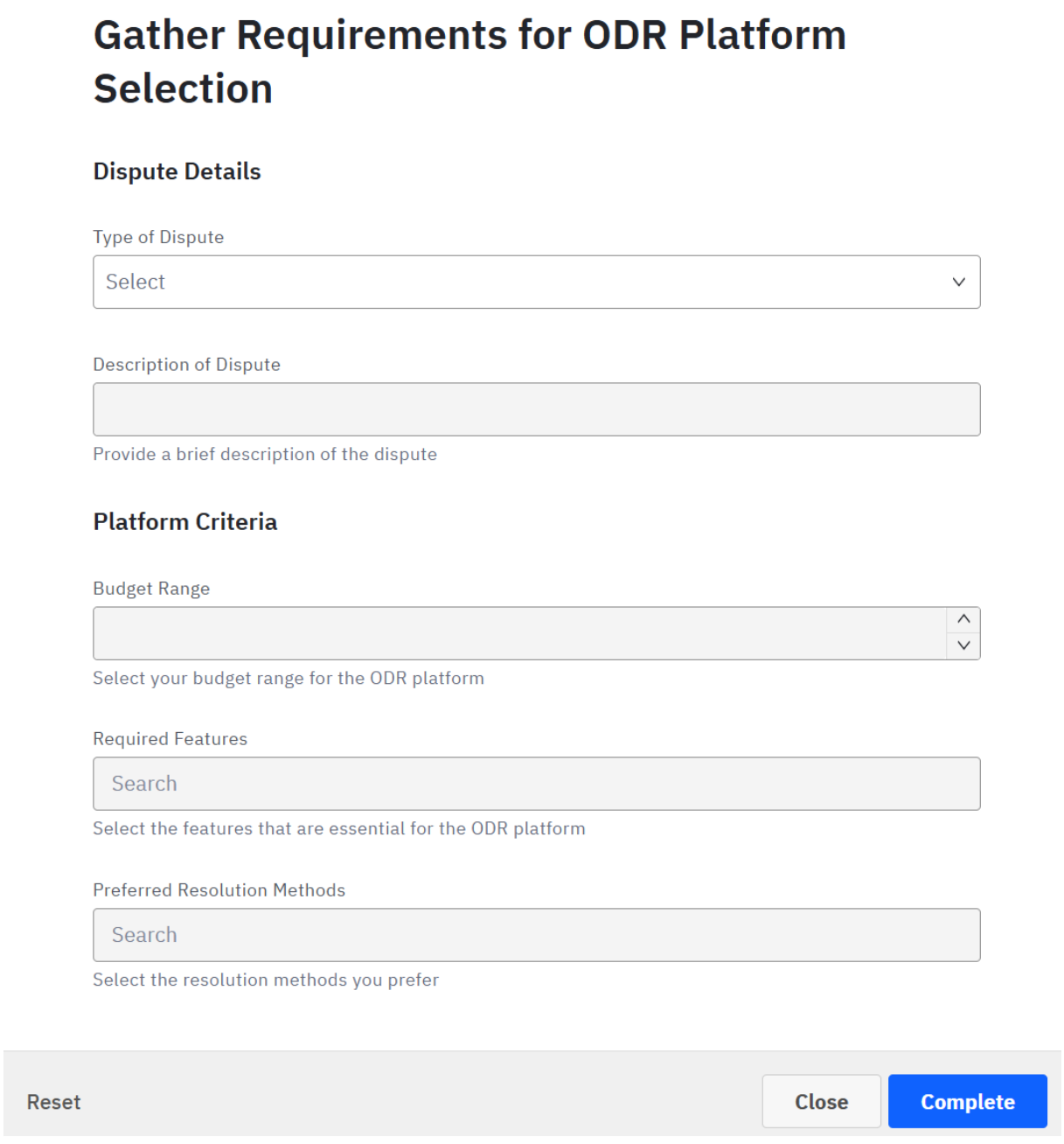

Figure 20 - Gather Requirements for ODR Platform' Form

Appendix 2

Complaint Process

Complaint Form

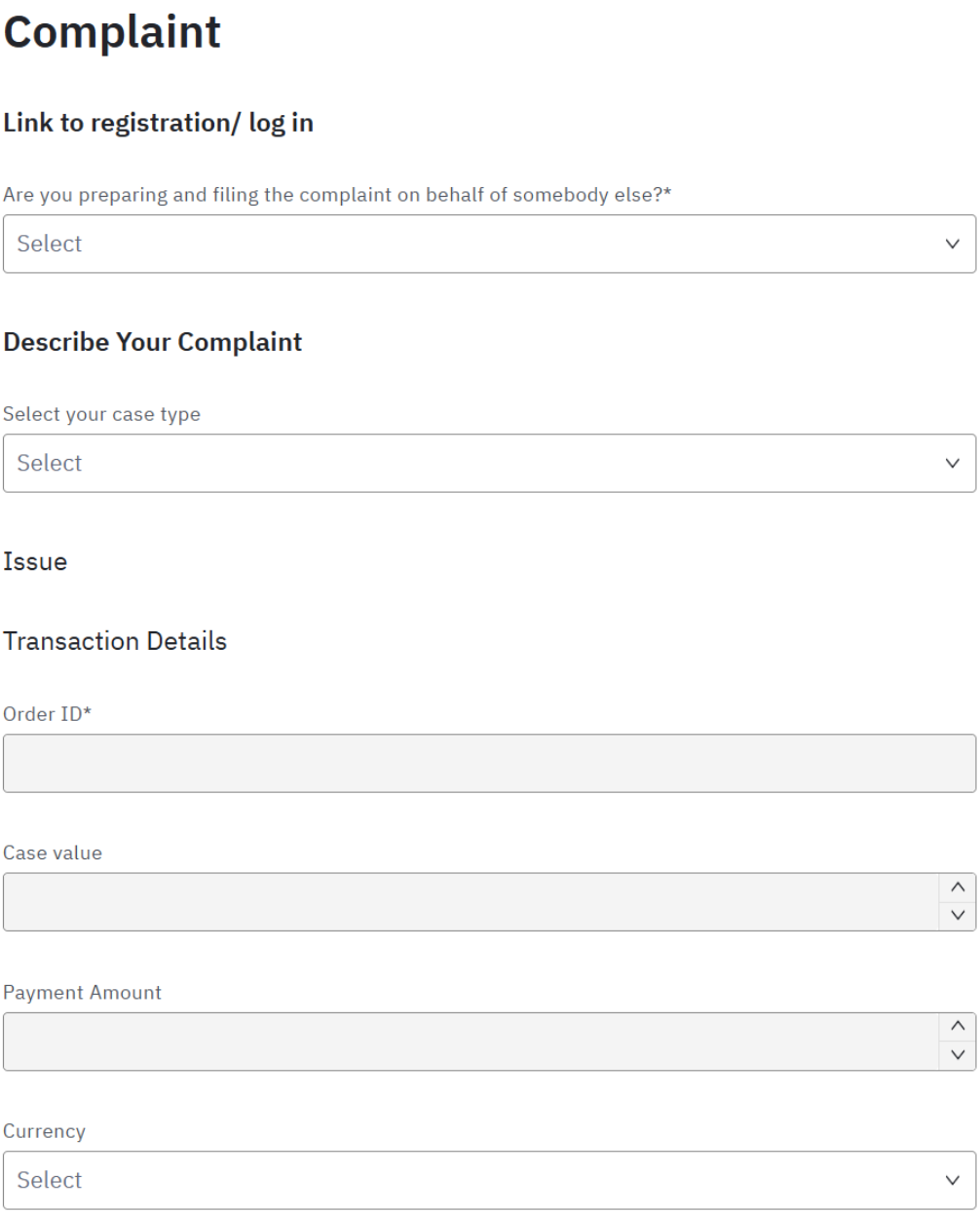

Figure 21 - Complaint Form (1)

Date

dd/mm/yyyy

Preferred form of communication

Select

Respondent's Details

Please enter as much information as possible on the counterparty

First Name*

Last Name*

Organization Name*

Phone Number

Email Address*

Website*

Figure 22 - Complaint Form (2)

Street*

Postcode*

City*

Country*

Select

The language(s) they want to be contacted

Search

Do you want to attach documents to your complaint?

☐ Attach documents

If you want to upload a document, you can use the following file types: pdf, jpeg, doc, docx, xls, xlsx, ppt, pptx. The maximum file size is 10MB

Elevate to ODR

Have you already contacted the respondent?

Select

Have you already tried to reach an out-of-court settlement or taken the other party to court over your con

Select

Figure 23 - Complaint Form (3)

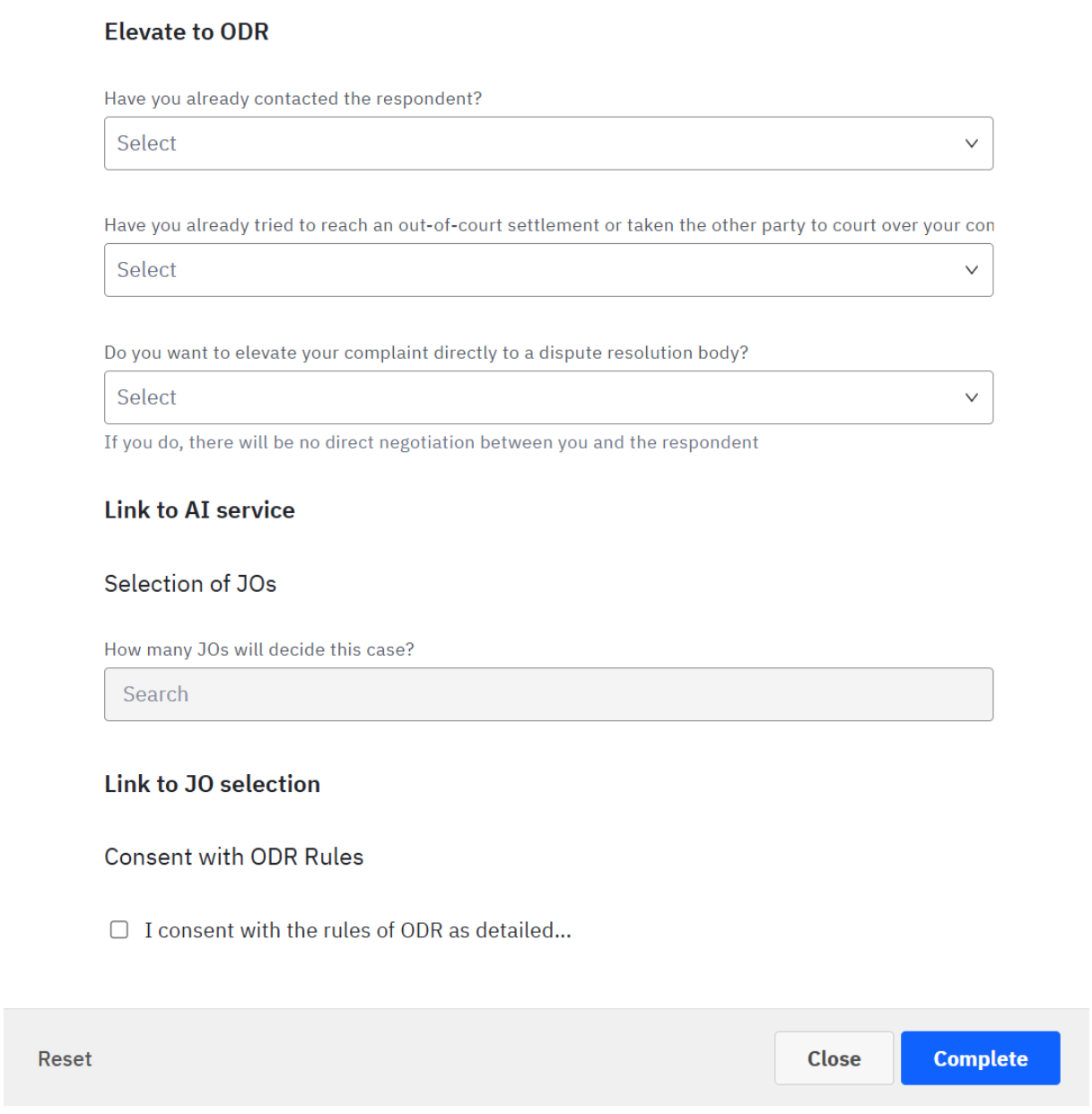

Figure 24 - Complaint Form (4)

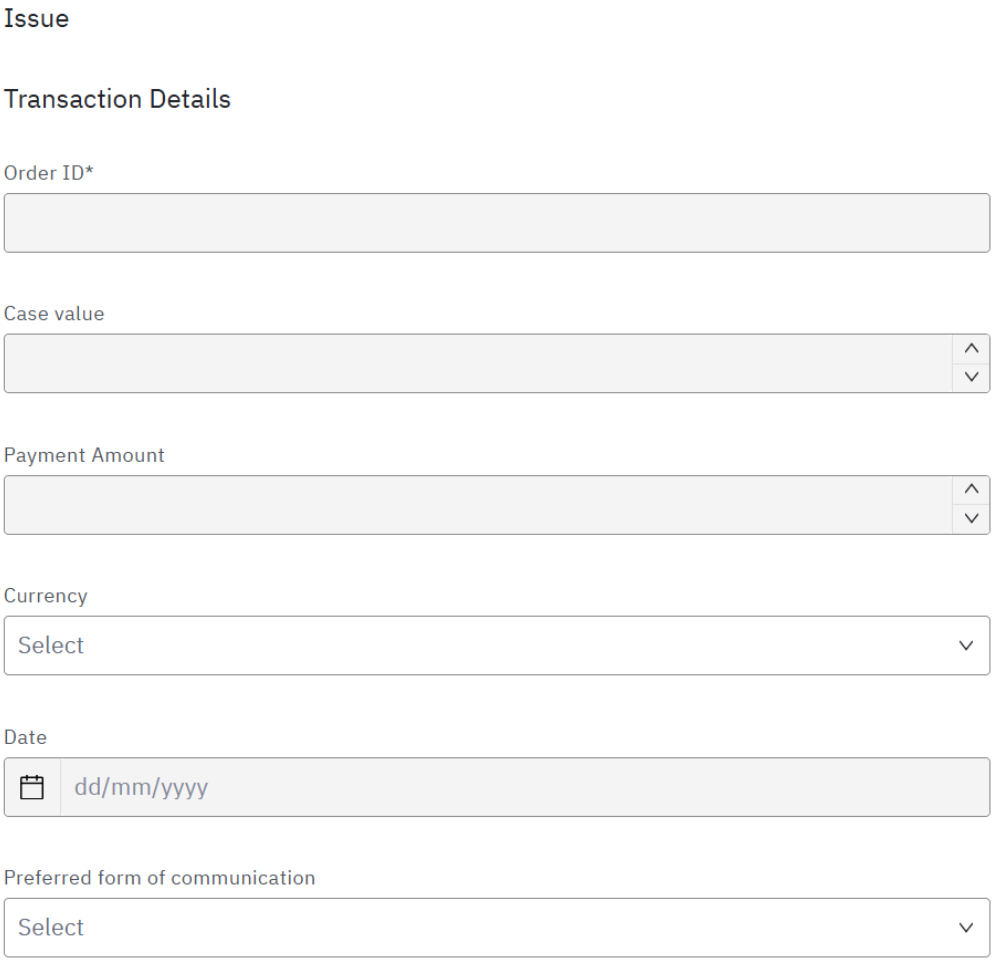

Figure 25 - Complaint Form (5)

Respondent's Details

Please enter as much information as possible on the counterparty

First Name*

Last Name*

Organization Name*

Phone Number

Email Address*

Website*

Street*

Figure 26 - Complaint Form (6)

City*

Country*

Select

The language(s) they want to be contacted

Search

Figure 27 - Complaint Form (7)

Postcode*

City*

Country*

Select

The language(s) they want to be contacted

Search

Figure 28 - Complaint Form (8)

Do you want to attach documents to your complaint?

☐ Attach documents

If you want to upload a document, you can use the following file types: pdf, jpeg, doc, docx, xls, xlsx, ppt, pptx. The maximum file size is 10MB

Elevate to ODR

Have you already contacted the respondent?

Select

Have you already tried to reach an out-of-court settlement or taken the other party to court over your con

Select

Do you want to elevate your complaint directly to a dispute resolution body?

Select

If you do, there will be no direct negotiation between you and the respondent

Figure 29 - Complaint Form (9)

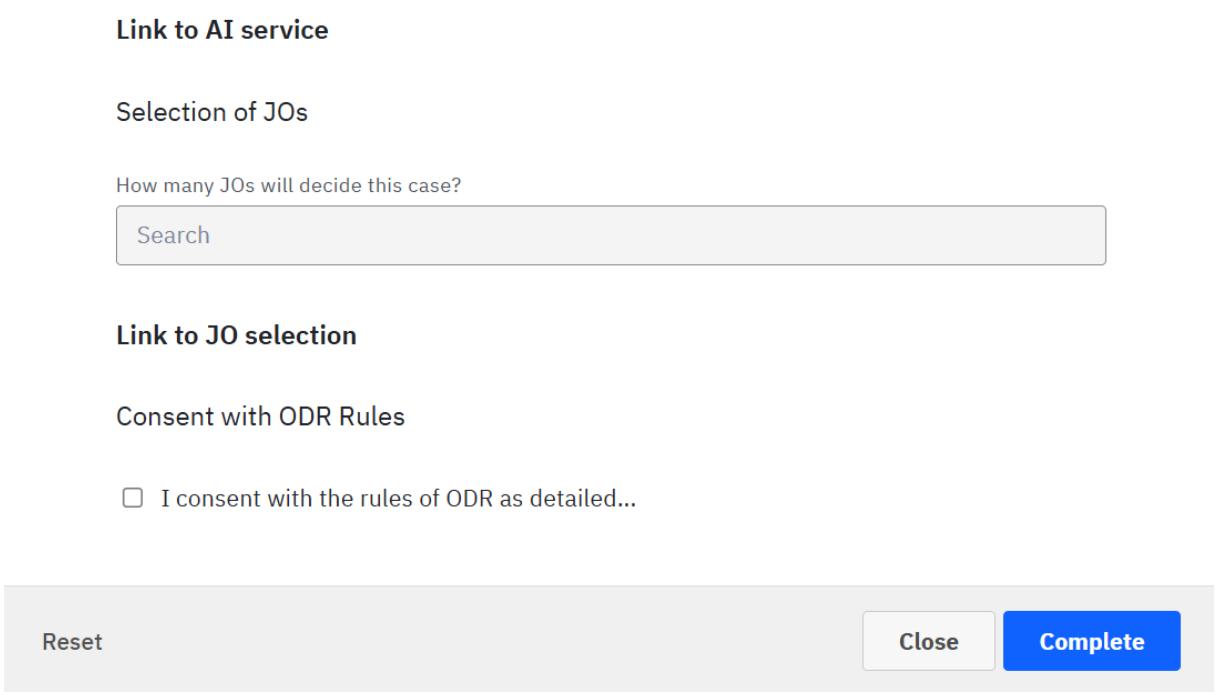

Figure 30 - Complaint Form (10)

Appendix 3

Response Process

Response Form

Response

Are you making the response on behalf of somebody else?*

Select

Link to registration/ log in

Your Response to the Complaint

The Good or Service the Complainant Purchased

Issue Description

Your Comments to the Complainant's Issue(s)

Figure 31 – Response Form (1)

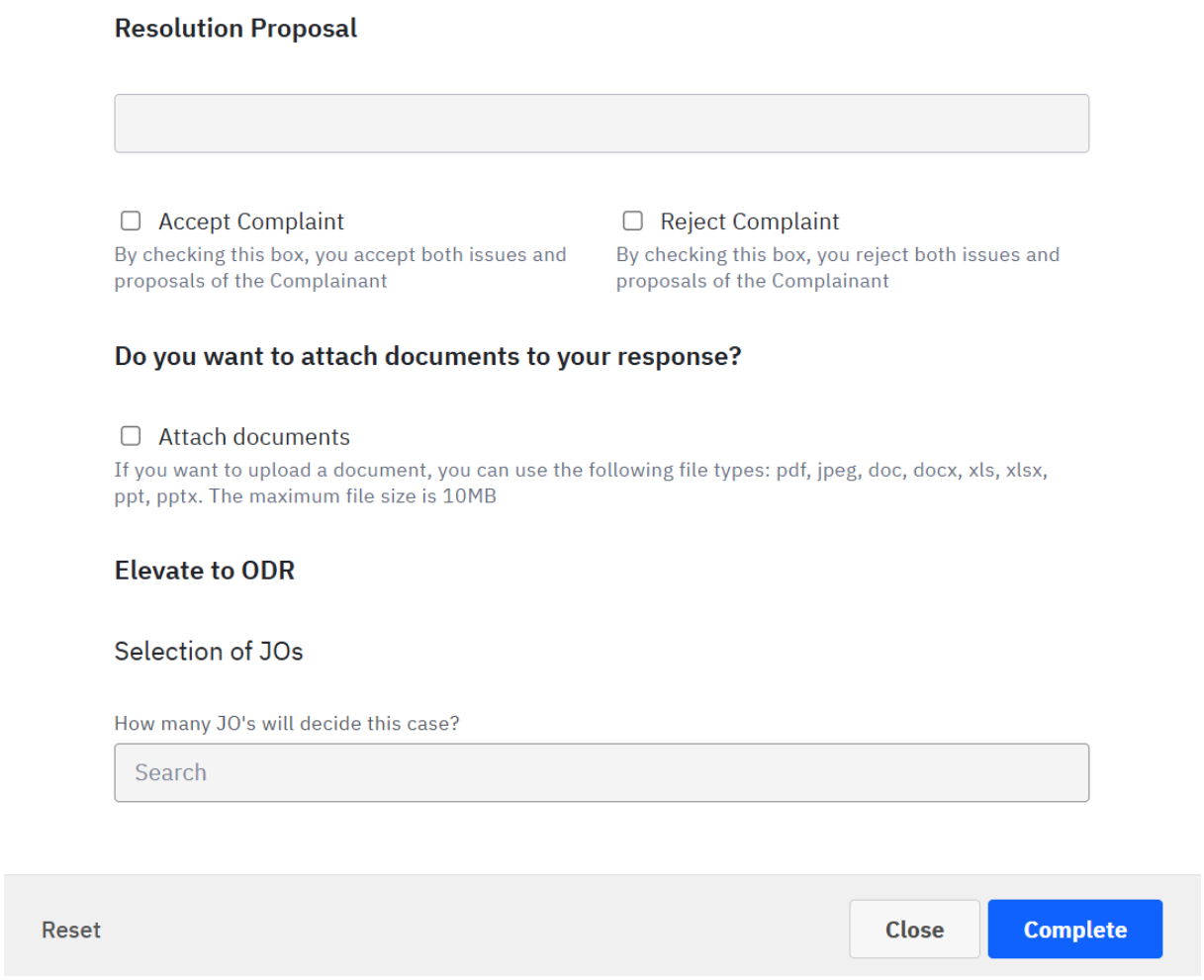

Figure 32 - Response Form (2)

Appendix 4

Negotiation Process

Submit Initial Proposals Form

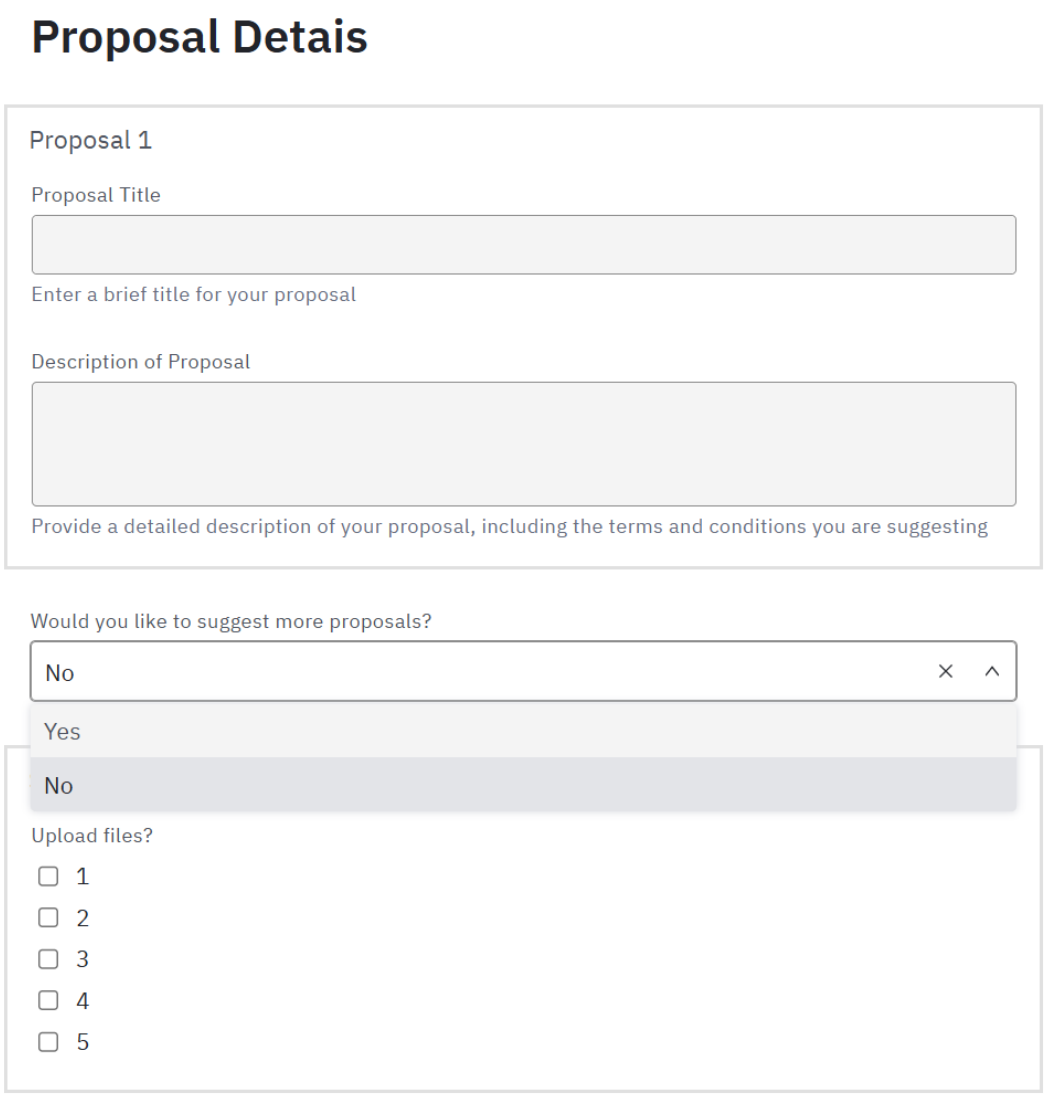

Figure 33 - Submit Initial Proposal Form (1)

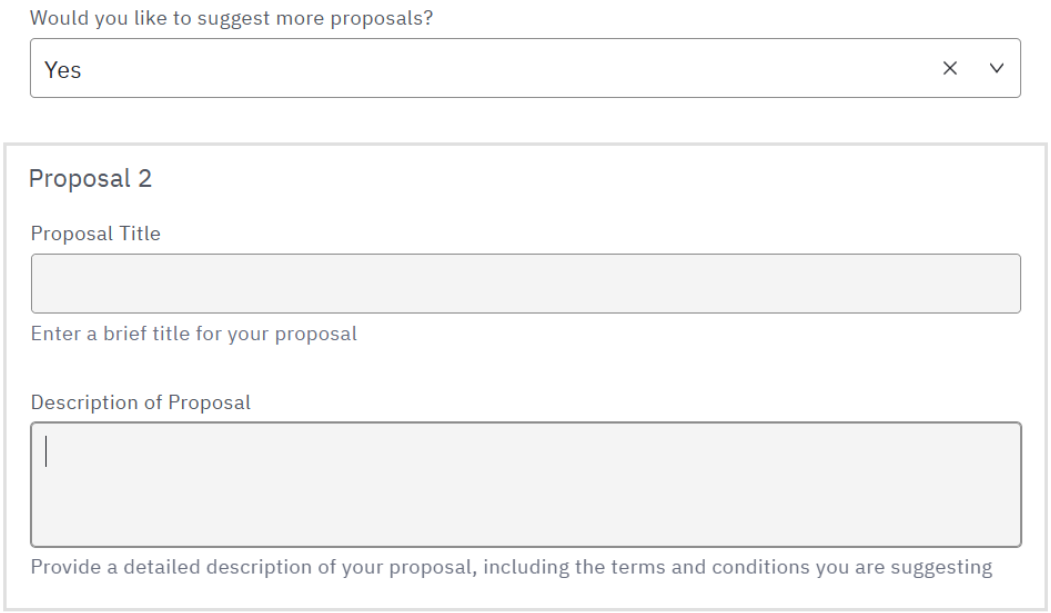

Figure 34 - Submit Initial Proposal Form (2)

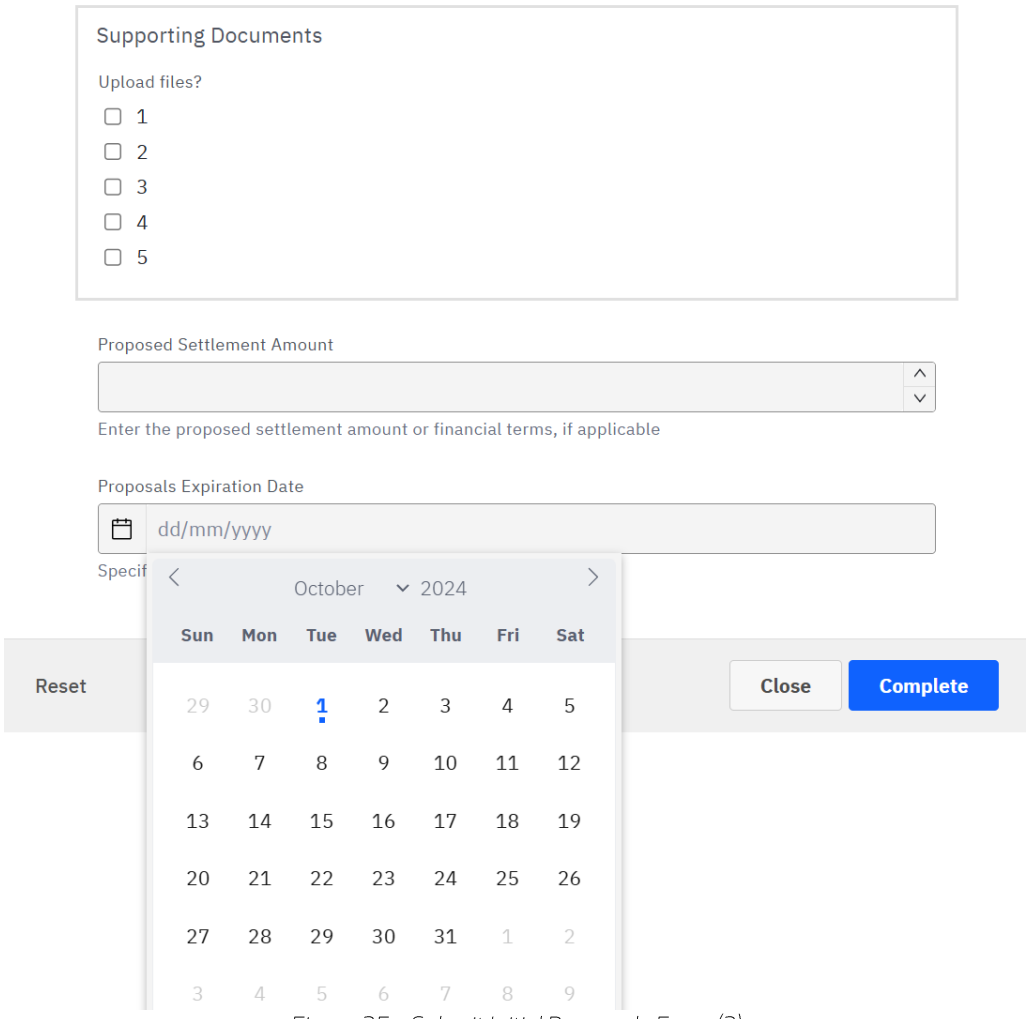

Figure 35 - Submit Initial Proposals Form (3)

Appendix 5

Mediation Process

Invite Both Parties to the Meeting Form

Invitation to Mediation Meeting

Dear(Complainant's Name) and (Respondent's Name),
I hope this message finds you well. After our individual meetings, I have gained a better understanding of the issues both of you have brought forward. I appreciate the time and openness you have each dedicated to this process so far.
As part of the next step in our mediation process, I would like to invite both of you to a joint mediation session. This meeting will provide an opportunity for both of you to engage in a constructive dialogue to negotiate a mutually agreeable resolution to the concerns raised.

Details of the Mediation Session:

Preferred Dates:

Date

15/10/2024

Date

16/10/2024

Date

17/10/2024

Figure 36 - Invite Both Parties to the Meeting Form (1)

Duration:

Select

30 minutes

1 hour

1 hour 30 minutes

2 hours

Preparation:

Please come prepared to discuss your perspectives and any potential solutions you may have in mind. During the session, we will adhere to the following guidelines:
Both parties will have the opportunity to speak uninterrupted.
The process will remain confidential, and no part of the discussion will be shared outside this mediation unless agreed upon by both parties.

Figure 37 - Invite Both Parties to the Meeting Form (2)

Proposed Resolutions for Mediation

Following our recent mediation session, I have outlined several potential resolutions based on the discussions and concerns raised by both parties. The aim is to assist you in reaching a mutually acceptable agreement.
Below are the proposed resolutions. Please review them carefully and provide your feedback or any additional suggestions.

Proposal 1

shdfguw

Proposal 2

Proposal 3

Next Steps:

Review and Feedback: Please review the proposed resolutions.
Follow-Up Meeting: Once feedback is received, we can schedule a follow-up meeting to discuss and finalize the resolutions.

Figure 38 - Invite Both Parties to the Meeting Form (3)

Appendix 6

Appeal Proceeding Process

Appeal Form

Appeal of Decision

I hereby submit a formal appeal of the decision rendered in the arbitration case outlined below.

I wish to appeal the decision for the following reason(s) (select all that apply):

Search

Appeal Explanation

Please provide a detailed explanation of the reasons for your appeal, including any supporting evidence or legal arguments that you wish to present.

Relief Requested

Please specify what outcome or remedy you are seeking from this appeal.

Supporting Documentation

- [ ] Document 1
- [ ] Document 2
- [ ] Document 3

Please list and attach any supporting documents, evidence, or additional materials that you are submitting with this appeal.

Figure 39 - Appeal Form

Appendix 7

Monitor Implementation Process

Implementation Check Answer Form

Implementation Status Response Form

We hope this message finds you well. As part of the ongoing monitoring process, we would like to inquire about the status of the agreement/decision that was reached during ODR. Please take a moment to provide your response by indicating whether the agreement/decision is being implemented.

Agreement/Decision Reference Number:

Date of Agreement/Decision:

dd/mm/yyyy

Is the agreement/decision currently being implemented?

Select

Additional comments:

Please provide any additional comments or concerns you may have regarding the implementation.

Figure 40 - Implementation Check Answer Form

SCHOOL OF MANAGEMENT AND TECHNOLOGY
POLYTECHNIC OF PORTO

M **MASTER**
DIGITAL LEGAL PRACTICES

Modelling Online Dispute Resolution Processes in the European Union

Marta Sofia da Silva Ribeiro

11/**2024**