

# Expert Evaluation of the Proposed ERP Model for Legal Compliance and Adaptation

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**Abstract**—This study presents an expert-based evaluation of a proposed context-aware ERP model designed to support adaptive legal compliance in multilingual regulatory environments, with a focus on North Macedonia. The model integrates modular ERP architecture, AI-driven legal reasoning, multilingual natural language processing, adaptive learning, and human oversight and is intended to support continuous alignment with changing legislation. A structured questionnaire was administered to 51 experts from fields, including ERP systems, software engineering, artificial intelligence, legal compliance, and public administration, to assess the model's conceptual clarity, technical feasibility, multilingual support, scalability, and compliance functionality. The findings provide expert-based conceptual support for the proposed framework, particularly regarding its relevance, architectural coherence, and potential applicability, but they should not be interpreted as evidence of operational effectiveness in a deployed ERP environment. Participants particularly emphasized the importance of multilingual support and human validation mechanisms for maintaining accountability and trust in AI-assisted compliance processes. The evaluation also identified implementation challenges related to integration complexity, AI interpretability, and organizational readiness, highlighting areas for future prototype development and empirical validation.

**Keywords**—ERP systems; legal compliance; artificial intelligence; multilingual NLP; adaptive learning; expert evaluation; compliance automation

## I. INTRODUCTION

Enterprise Resource Planning (ERP) systems face increasing pressure to adapt to rapidly evolving legal environments, particularly in jurisdictions characterized by complex and multilingual regulatory frameworks. In North Macedonia, where legislative updates are frequent and multilingualism is institutionally embedded, traditional ERP systems struggle to maintain legal compliance efficiently. Static compliance mechanisms configured during system design are often insufficient for responding to dynamic legal conditions, resulting in operational inefficiencies and increased compliance risks.

Although recent ERP research has explored artificial intelligence (AI) and process automation, limited attention has been given to integrated models that combine AI-driven legal reasoning, multilingual natural language processing (NLP), and adaptive learning within a unified compliance framework. This limitation is especially evident in regions such as the Western Balkans, where linguistic diversity and fragmented digital infrastructure further complicate interoperability and legal adaptability.

To address these challenges, this study proposes a modular and context-aware ERP model that integrates AI-based legal compliance mechanisms, bilingual support in Macedonian and Albanian, and adaptive learning for continuous regulatory alignment. The model is structured around a four-layer compliance framework consisting of a Legal Data Interface, an AI Reasoning and Adaptation Engine, a Human Oversight Layer, and an ERP Integration Module. Together, these components are intended to support explainable and traceable compliance adaptation while minimizing disruption to business operations.

The contribution of this study lies in the conceptual integration of ERP compliance adaptation, AI-assisted legal reasoning, multilingual Macedonian-Albanian NLP support, adaptive learning, and human oversight within a unified four-layer framework. Unlike traditional ERP systems that depend on static compliance rules and manual updates, the proposed model treats legal compliance as a continuous and reviewable adaptation process. Unlike general AI-assisted ERP systems, the focus is specifically on legally accountable compliance adaptation rather than broad process automation. Unlike generic legal NLP systems, the proposed framework connects legal interpretation to ERP configuration and workflow adaptation. Unlike conventional rule-based compliance modules, it emphasizes traceability, expert validation, and adaptability in legally dynamic and multilingual environments such as North Macedonia.

The primary objective of this study is to evaluate the model's conceptual soundness, technical feasibility, scalability, and contextual relevance through expert-based theoretical validation. A structured questionnaire was administered to professionals in ERP systems, artificial intelligence, legal compliance, public administration, and software engineering to assess the proposed framework's applicability in legally dynamic environments.

The remainder of the study is organized as follows: Section II reviews related research on ERP adaptation, AI-driven compliance, and multilingual systems. Section III presents the proposed ERP architecture. Section IV describes the research methodology, while Section V presents the evaluation results. Section VI discusses the findings, followed by limitations in Section VII and conclusions with future work directions in Section VIII.

## II. BACKGROUND AND RELATED WORK

Enterprise Resource Planning (ERP) systems are increasingly required to operate in dynamic regulatory and

multilingual environments, where traditional static architectures are insufficient for maintaining long-term legal compliance and operational flexibility. Contemporary research has therefore shifted toward adaptive ERP models capable of integrating artificial intelligence (AI), natural language processing (NLP), and context-aware automation to support evolving organizational and regulatory demands.

#### A. ERP Adoption and Legal Compliance

ERP systems are increasingly shifting from rigid customization models toward adaptive architectures capable of supporting legal compliance in dynamic regulatory environments. Traditional ERP customization often relies on hardcoded extensions that reduce maintainability and scalability when regulations change frequently. In contrast, adaptive frameworks promote modular and constraint-aware flexibility, enabling business processes to evolve while preserving structural integrity and execution safety.

The ADEPT2 framework exemplifies this transition by supporting runtime process adaptation through controlled operations such as fragment insertion and deletion while validating modifications against compliance constraints [8]. Complementary multi-time binding mechanisms further enable process variants and data structures to be configured at either design time or runtime, reducing the limitations associated with static one-size-fits-all ERP customization approaches [8].

Adaptation is particularly important in multi-jurisdictional contexts where ERP systems must accommodate varying tax regulations, data protection requirements, and compliance mandates. AI-based approaches have also been examined in tax planning and regulatory compliance contexts, indicating their potential relevance for structuring compliance-related information and supporting automated verification and governance processes [4]. Similarly, large language model approaches have demonstrated potential for converting legal documents into machine-readable governance policies applicable to regulated sectors affected by overlapping legal frameworks such as GDPR and Basel III [14].

Static compliance mechanisms configured during system design remain limited in their ability to respond to evolving legal interpretations and runtime operational changes. Research on adaptive compliance, therefore, increasingly emphasizes predictive and continuous monitoring approaches capable of identifying potential violations before they occur [1]. These approaches also highlight the importance of explainability, periodic model retraining, and human oversight to ensure trustworthy and legally accountable AI-assisted compliance processes [4].

As ERP systems continue to evolve, adaptive compliance capabilities such as automated regulatory tracking, explainable AI reasoning, and context-aware rule management are becoming essential for maintaining operational flexibility and legal alignment across diverse regulatory environments.

#### B. AI in ERP Systems

Artificial intelligence is increasingly integrated into ERP systems to enhance decision support, adaptability, and compliance management in complex organizational environments. Rather than replacing core ERP functions, AI

augments operational processes through predictive analytics, anomaly detection, contextual automation, and intelligent resource optimization. AI-supported ERP systems can improve decision-making across finance, logistics, human resources, and customer management while operating within predefined organizational and regulatory constraints [6].

AI also reduces cognitive overload by filtering large ERP datasets to identify patterns, risks, and anomalies that may not be easily detectable through manual analysis. Applications include fraud detection, predictive maintenance, demand forecasting, and workforce analytics, all of which contribute to improved responsiveness and operational efficiency [5].

However, the integration of AI into ERP environments introduces important governance and compliance challenges. Since ERP operations frequently intersect with regulated domains such as taxation, labor management, and financial reporting, AI-generated outputs must remain explainable, traceable, and legally accountable [16]. To address these concerns, human-in-the-loop mechanisms are increasingly incorporated into ERP-AI architectures, allowing ambiguous or high-impact decisions to be reviewed and validated by human operators [6]. Explanation interfaces, audit trails, and override capabilities, therefore, become essential components for maintaining institutional trust and regulatory compliance.

Contemporary ERP research also highlights a transition from traditional automation toward bounded process autonomization, where AI systems assume situational control over workflows while remaining constrained by explicit operational, ethical, and governance rules [15]. Within this context, responsible AI integration enables ERP systems to evolve from static transactional platforms into adaptive decision-support ecosystems capable of balancing operational efficiency with regulatory accountability.

These studies show that AI can extend ERP systems beyond static transactional processing toward intelligent decision support. However, much of the existing AI-in-ERP literature focuses on operational optimization, forecasting, anomaly detection, and process automation rather than legal compliance adaptation. The proposed model builds on this direction by focusing specifically on AI-assisted interpretation of legal changes, compliance recommendation generation, and human validation within ERP workflows.

#### C. Multilingual ERP Systems

The deployment of ERP systems in multilingual environments introduces significant challenges related to linguistic diversity, semantic ambiguity, and interoperability. Within such settings, NLP functions as a critical bridge between structured enterprise data and human communication, enabling applications such as document processing, compliance monitoring, automated translation, and conversational interfaces. However, the effectiveness of multilingual ERP systems depends heavily on the availability of reliable linguistic resources and domain-specific language models.

These challenges are particularly evident in the Western Balkans, where underdeveloped NLP infrastructures and limited access to AI technologies hinder enterprise system adaptability and interoperability [7]. Research has shown that NLP tools for

Macedonian and Albanian remain comparatively under-resourced, limiting accurate processing of legal and organizational texts in multilingual ERP environments [9], [13]. Similar limitations have also been identified across South Slavic languages due to insufficient corpora and weak language-processing ecosystems [10].

Within ERP contexts, NLP technologies have demonstrated strong potential for improving automation, user interaction, and knowledge extraction through functions such as invoice parsing, email classification, and semantic process interpretation [17]. AI-augmented business process management research further emphasizes that multilingual natural language understanding is essential for adaptive and explainable ERP environments operating across diverse user groups and regulatory contexts [3], [6].

In the context of North Macedonia, multilingual support represents both a technical and institutional requirement. The integration of Macedonian and Albanian language processing is essential for ensuring inclusive system interaction, accurate compliance interpretation, and operational consistency across public and private sector environments. Consequently, regional digital transformation efforts increasingly emphasize investment in multilingual AI infrastructures, localized NLP services, and language-aware enterprise technologies capable of supporting legally and linguistically diverse organizational ecosystems [2].

Overall, the reviewed literature shows increasing interest in adaptive ERP architectures, AI-supported process automation, and multilingual NLP. However, these research streams are often treated separately. Existing ERP adaptation studies emphasize process flexibility, AI-in-ERP studies often focus on operational optimization, and multilingual NLP studies address language-processing limitations without necessarily embedding them into ERP compliance workflows. This study responds to that gap by proposing a conceptual ERP compliance framework that combines legal-data interpretation, AI-assisted reasoning, multilingual Macedonian-Albanian support, adaptive learning, and human validation within a unified four-layer architecture.

### III. OVERVIEW OF THE PROPOSED ERP MODEL

The proposed model builds on a modular client-server ERP system developed for the North Macedonian enterprise context using PHP, Laravel, and the Model-View-Controller (MVC) architectural pattern. The core ERP system separates presentation, business logic, and data management layers and supports functional domains such as Finance, Human Resources, and Inventory Management. In this study, the ERP system is extended conceptually through an external AI-driven compliance framework designed to support adaptive legal compliance in multilingual regulatory environments.

A central feature of the proposed model is a dedicated four-layer compliance framework consisting of a Legal Data Interface, an external AI Reasoning and Adaptation Engine, a Human Oversight Layer, and an ERP Integration Module. This framework is designed to operate independently from transactional ERP services, enabling legal adaptation recommendations to be generated, reviewed, and transferred to the ERP system without disrupting core business operations.

The architecture integrates AI-based legal reasoning, multilingual natural language processing, adaptive learning mechanisms, and human validation procedures to support explainable and traceable compliance management. Through this combination of modular ERP functionality and intelligent compliance services, the model aims to provide a scalable and context-aware solution for enterprise environments characterized by evolving legal requirements and multilingual interaction.

#### A. Architectural Overview

The ERP system is designed as a modular and context-aware architecture that supports both enterprise operations and adaptive legal compliance. The core ERP system was developed using PHP, Laravel, and the Model-View-Controller (MVC) pattern, separating data access, business logic, and presentation layers to improve maintainability, scalability, and flexibility [11]. Functional domains such as Human Resources, Finance, and Inventory Management operate as independent ERP modules that can be deployed and customized according to organizational requirements.

The proposed compliance architecture is positioned outside the transactional ERP core and communicates with it through the ERP Integration Module. This separation allows the AI-based compliance components to operate as external decision-support and recommendation services rather than as embedded transactional ERP functions [12].

The architecture is intended to use a relational MySQL database with normalized schemas and indexed queries to ensure data consistency, efficient access, and scalable transaction management [11]. A defining characteristic of the system is the separation between operational ERP services and compliance management through a four-layer adaptive framework consisting of the Legal Data Interface, AI Reasoning and Adaptation Engine, Human Oversight Layer, and ERP Integration Module [12].

The Legal Data Interface is intended to collect and structure legislative information from official sources using NLP techniques that transform unstructured legal texts into machine-interpretable representations. The AI Reasoning and Adaptation Engine is designed to apply ontology-based reasoning, rule inference, and reinforcement learning to determine how legislative modifications could affect ERP workflows. The proposed system would identify potentially impacted business domains and generate recommendations for process adaptation, such as revised payroll calculations or compliance-reporting procedures. Reviewer feedback and organizational data could be used in future implementation to refine interpretive accuracy over time [12].

To ensure accountability and institutional control, AI-generated recommendations would be reviewed within the Human Oversight Layer, where authorized experts could validate, reject, or modify proposed changes. Each action would be documented through metadata containing timestamps, legal references, and reviewer information to support transparency and traceability. Approved adaptations would then be transferred to the ERP Integration Module, which is intended to

apply configuration updates through secure APIs without requiring full system redeployment [12].

This separation between compliance services and transactional business logic enables continuous regulatory adaptation while maintaining operational stability. By integrating semantic reasoning, adaptive learning, multilingual processing, and human validation, the architecture supports legally accountable and scalable ERP environments suited to dynamically evolving regulatory contexts.

### B. AI-Driven Legal Compliance Layer

The AI-driven legal compliance layer is designed to enable the ERP system to ingest legislative updates, interpret regulatory implications, and generate compliance adaptation recommendations through explainable and auditable mechanisms. Operating independently from transactional ERP services, this layer supports continuous regulatory alignment while preserving institutional accountability [12].

Legislative data ingestion is managed through the Legal Data Interface, which connects to verified legal sources and applies NLP techniques to structure unstructured legal texts into machine-readable representations. Legal obligations and regulatory triggers are mapped into formal ontologies that encode relationships between legal entities, conditions, and operational processes [12]. In the proposed North Macedonian context, newly collected legal content would be compared with prior legislative versions to identify relevant changes [11].

The AI Reasoning and Adaptation Engine is designed to apply ontology-based reasoning, rule inference, and reinforcement learning to evaluate the impact of legal changes on ERP business processes and generate compliance adaptation recommendations. The proposed system would identify potentially impacted business domains and generate recommendations for process adaptation, such as revised payroll calculations or compliance-reporting procedures. Reviewer feedback and organizational data could be used in future implementation to refine interpretive accuracy over time [12].

To ensure legal reliability and ethical governance, all AI-generated recommendations are reviewed through the Human Oversight Layer before implementation. Legal experts or administrators can validate, reject, or modify proposed adaptations using interfaces that provide reasoning traces, legal references, and suggested system modifications. In the proposed workflow, approved changes would be logged through timestamped audit records containing legal and reviewer metadata, enabling traceability, compliance verification, and post-decision analysis [11-12].

Together, these mechanisms are intended to transform compliance management from a static configuration process into a continuous and context-aware capability connected to ERP operations.

### C. Multilingual and Adaptive Components

The ERP framework incorporates multilingual and adaptive capabilities to support inclusive interaction and continuous legal alignment within North Macedonia's multilingual regulatory environment. The proposed framework includes real-time language switching as an intended multilingual capability,

allowing users to interact with ERP services in their preferred language through AI-supported translation and interface localization mechanisms [11].

Multilingual NLP functionality enables the extraction and interpretation of legal obligations from legislative texts published in different official languages. These obligations are transformed into structured legal ontologies that support automated compliance reasoning and regulatory adaptation within ERP workflows [12].

Adaptive learning is conceptualized through the AI Reasoning and Adaptation Engine, which uses reinforcement learning and reviewer feedback to improve the accuracy of future compliance recommendations. In addition to legal adaptation, machine learning models could analyze organizational data related to employee roles, performance, and workload distribution to support predictive workforce management and operational optimization [11].

When legislative updates are detected, the proposed framework would compare new and previous legal versions, evaluate operational impacts, and generate adaptation recommendations such as revised payroll or leave-management policies. These recommendations are presented in the user's preferred language and validated by human reviewers prior to implementation [11-12].

By connecting multilingual processing and adaptive intelligence to the ERP architecture through an external compliance layer, the proposed framework is intended to support legally compliant, operationally responsive, and linguistically inclusive enterprise management.

The architecture described in this section represents the proposed design logic of the ERP compliance model. The current study evaluates this architecture through expert-based conceptual assessment rather than through deployment or operational prototype testing. Therefore, the described components should be interpreted as intended system capabilities requiring future implementation and empirical validation.

## IV. RESEARCH METHODOLOGY

This section presents the methodology used to evaluate the proposed ERP model for adaptive legal compliance within the North Macedonian context. The study combines Design Science Research (DSR) principles with expert-based theoretical validation supported through a structured questionnaire. Because the research focuses on a conceptual ERP architecture integrating AI-driven legal reasoning, multilingual NLP, and adaptive learning, the evaluation emphasizes conceptual soundness, technical feasibility, and practical applicability rather than prototype implementation. The following sections describe the evaluation approach, expert selection process, questionnaire design, and data analysis procedures.

### A. Evaluation Approach

The evaluation of the proposed ERP framework was grounded in Design Science Research (DSR), a methodology widely used in information systems research for the development and validation of innovative artifacts. The study focused on assessing a context-aware ERP architecture

integrating ontology-based legal reasoning, multilingual NLP, and adaptive learning mechanisms within enterprise compliance processes.

Because the research concerns a conceptual model rather than a deployed software implementation, expert-based validation was adopted as the primary evaluation strategy. Structured feedback was collected from professionals in ERP systems, artificial intelligence, legal compliance, software engineering, and public administration to assess the framework's conceptual integrity, feasibility, and practical relevance.

Data collection was conducted through a structured questionnaire containing both quantitative and qualitative components. This approach enabled systematic evaluation of the model's architectural coherence, implementation potential, and applicability within legally dynamic enterprise environments.

This evaluation approach is appropriate for assessing early-stage conceptual soundness and feasibility, but it does not replace prototype implementation, operational testing, or empirical validation in live ERP environments.

### B. Expert Selection

Experts were selected using purposive sampling to ensure relevant expertise across ERP systems, software engineering, artificial intelligence, legal compliance, and public administration. Participants included ERP consultants, software engineers, IT architects, compliance specialists, legal experts, and academic professionals with experience in enterprise systems and regulatory processes.

All participants confirmed prior experience with ERP platforms, AI systems, legal compliance, or enterprise software environments. Respondents also reported their ERP-related experience levels, categorized as less than five years, five to ten years, or more than ten years, enabling consideration of professional experience during analysis.

Participation was conducted anonymously to encourage unbiased feedback and reduce social desirability bias. Respondents were informed that all collected data would be used exclusively for academic research purposes.

### C. Questionnaire Design

The questionnaire was designed to evaluate the proposed ERP model across six dimensions: conceptual soundness, technical feasibility, AI-driven legal compliance, multilingual support, adaptability and scalability, and human oversight. The instrument combined closed-ended and open-ended questions to support both quantitative and qualitative evaluation.

The six questionnaire dimensions were derived from the main architectural and evaluation concerns of the proposed ERP compliance framework. Conceptual soundness assessed whether the model was understandable and internally coherent. Technical feasibility examined whether the architecture could plausibly be integrated into ERP environments. AI-driven legal compliance evaluated the perceived suitability of AI-assisted legal reasoning for compliance adaptation. Multilingual support reflected the framework's Macedonian–Albanian operating context. Adaptability and scalability assessed the model's ability

to respond to changing legal and organizational conditions. Human oversight evaluated the accountability and validation mechanisms required for AI-assisted compliance decisions.

Closed-ended items used a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree". These questions assessed the clarity of the model's architecture, the feasibility of integrating adaptive compliance mechanisms into ERP environments, the effectiveness of multilingual NLP support, and the role of human oversight in ensuring accountability and transparency within AI-assisted compliance processes.

The questionnaire also evaluated whether the proposed architecture could adapt to evolving legal and organizational conditions and whether its modular design supported scalable deployment across different institutional contexts. Two open-ended questions allowed participants to identify perceived strengths, limitations, and implementation challenges associated with the proposed framework.

This structure enabled a balanced evaluation of both the technical and contextual aspects of the ERP model while providing qualitative insights beyond numerical ratings.

The final dataset consisted of 51 questionnaire responses. The questionnaire included demographic and professional background items, 14 substantive closed-ended Likert-scale evaluation items, and two open-ended questions. All closed-ended items were complete for all 51 respondents. The first open-ended question received 34 valid responses, while the second received 31 valid responses. These response counts were considered during qualitative interpretation. Appendix A presents the questionnaire items used.

### D. Instrument Validity and Reliability

Content validity was addressed by aligning the questionnaire dimensions with the main components and evaluation concerns of the proposed ERP compliance framework, including conceptual clarity, technical feasibility, AI-assisted legal compliance, multilingual support, adaptability and scalability, and human oversight. Internal consistency was assessed using Cronbach's Alpha across the 14 substantive Likert-scale items, producing a value of approximately 0.871, which indicates strong internal consistency for the current sample. However, construct validity was not independently verified through factor analysis, and the study did not include prototype testing or follow-up interviews. Therefore, the instrument should be interpreted as supporting expert-based conceptual evaluation rather than full psychometric or operational validation.

### E. Data Collection and Analysis

Data was collected through a secure online questionnaire distributed via academic and professional networks. Participants received information regarding the study objectives, anonymity procedures, and research ethics prior to participation. The questionnaire remained open for two weeks, and no identifying information was stored. All closed-ended Likert-scale items were complete for all 51 responses and were included in the descriptive and reliability analysis. The dataset also contained a "Score" variable; however, because all entries contained a value of zero, this variable was excluded from analytical interpretation.

Quantitative responses were analyzed using descriptive statistics, including frequency distributions, mean scores, standard deviations, and 95% confidence intervals for each evaluation dimension. Dimension-level scores were calculated by aggregating thematically related Likert-scale items corresponding to the six evaluation dimensions. These measures enabled the identification of agreement levels, response patterns, and variability across expert assessments. Internal consistency of the questionnaire was evaluated using Cronbach's Alpha across the 14 substantive Likert-scale items. The resulting Cronbach's Alpha value was approximately 0.871, indicating strong internal consistency of the evaluation instrument.

Qualitative responses from the open-ended questions were analyzed using thematic coding to identify recurring strengths, limitations, and implementation concerns associated with the proposed ERP model. Common themes included the benefits of modular architecture and multilingual integration, as well as concerns related to AI interpretability, legal ontology maintenance, and integration complexity.

The combination of statistical and thematic analysis provided a multidimensional evaluation of the model's conceptual validity, technical feasibility, and contextual applicability.

## V. RESULTS

The evaluation assessed the proposed ERP model's conceptual validity, technical feasibility, and contextual suitability within the legal and organizational environment of North Macedonia. Expert feedback was analyzed through both quantitative ratings and qualitative reflections, providing insight into the model's architectural coherence, compliance functionality, multilingual capabilities, and implementation considerations. The findings highlight strong overall support for the proposed framework while also identifying challenges relevant to future implementation and validation efforts.

### A. Participant Profile

The expert evaluation included participants from diverse professional backgrounds related to ERP systems, software engineering, artificial intelligence, legal compliance, and public administration. Software engineers represented the largest participant group, alongside ERP architects, lecturers, compliance specialists, and public-sector professionals. Additional expertise in AI engineering, cloud infrastructure, and network systems further broadened the evaluation perspective.

Among the 51 respondents, 26 reported less than five years of ERP experience, 17 reported between five and ten years of ERP-related experience, and 8 reported more than ten years of ERP experience. The participant structure, therefore, reflects perspectives from respondents with varying levels of ERP familiarity and implementation exposure.

Although 26 respondents reported fewer than five years of ERP-related experience, this distribution should be interpreted in light of the multidisciplinary nature of the evaluation. The proposed framework combines ERP architecture, software engineering, AI-assisted reasoning, legal compliance, multilingual support, and public-sector regulatory context. Therefore, participants with relevant experience in these related

domains were considered suitable for assessing specific aspects of the model. Nevertheless, the relatively high proportion of respondents with limited ERP-specific experience is acknowledged as a limitation when interpreting conclusions about practical ERP deployment feasibility.

### B. Quantitative Results

The quantitative evaluation demonstrated consistently positive assessments across all six dimensions of the proposed ERP model using a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree". Mean scores exceeded 4.2 across all categories, indicating strong expert support for the model's conceptual structure, technical feasibility, and compliance-oriented functionality within the North Macedonian context.

The highest-rated dimension was Multilingual ERP Support with a mean score of 4.51, reflecting the perceived importance of Macedonian and Albanian language integration within enterprise systems. Participants identified multilingual NLP capabilities as essential for improving communication accuracy, operational inclusivity, and regulatory interpretation in bilingual environments.

Human oversight received the second-highest score at 4.49. Respondents emphasized the importance of maintaining expert validation for AI-generated compliance decisions through auditability, traceability, and accountability mechanisms. Conceptual Clarity followed with a mean score of 4.42, indicating strong agreement regarding the coherence and internal structure of the proposed architecture.

Technical feasibility achieved a mean score of 4.33, suggesting that the modular and service-oriented architecture could be integrated into existing ERP environments with appropriate organizational readiness and infrastructure support. Adaptability and Scalability received a mean score of 4.32, reflecting confidence in the framework's ability to respond to evolving legal and organizational requirements through adaptive learning mechanisms.

Finally, AI compliance validity received a mean score of 4.29, indicating positive assessments regarding the feasibility of AI-assisted legal interpretation and compliance automation. Participants nevertheless emphasized the continued necessity of combining AI reasoning with human oversight to preserve legal reliability and institutional trust.

The dimension-level results presented in Table I were constructed from thematically related questionnaire items. These dimensions include conceptual clarity, multilingual ERP support, technical feasibility, AI-assisted compliance adaptability, scalability, and human oversight mechanisms. The aggregation of questionnaire items into thematic dimensions was used to summarize expert evaluation trends across the proposed ERP framework components. The results are summarized in Table I.

In addition to the aggregated dimension scores, item-level descriptive statistics demonstrated consistently positive evaluations across the questionnaire items. The highest agreement was observed for the necessity of full Macedonian and Albanian language support, with a mean score of 4.57.

Strong agreement was also observed for multilingual NLP functionality (mean = 4.55) and the importance of human oversight in AI-assisted compliance adaptation (mean = 4.49). Comparatively lower, although still positive, agreement was observed for the feasibility of automated legislative interpretation (mean = 4.10), suggesting comparatively greater caution regarding autonomous legal interpretation mechanisms.

TABLE I. MEAN EXPERT EVALUATION SCORES ACROSS SIX ASSESSMENT DIMENSIONS OF THE PROPOSED ERP MODEL.

| Evaluation Dimension         | Mean score | SD   | 95% CI    |
|------------------------------|------------|------|-----------|
| Multilingual ERP support     | 4.51       | 0.59 | 4.34-4.67 |
| Human oversight              | 4.49       | 0.76 | 4.28-4.70 |
| Conceptual clarity           | 4.42       | 0.60 | 4.25-4.59 |
| Technical feasibility        | 4.33       | 0.77 | 4.12-4.55 |
| Adaptability and scalability | 4.32       | 0.52 | 4.17-4.47 |
| AI compliance validity       | 4.29       | 0.54 | 4.14-4.44 |

Note. N = 51; CI = confidence interval.

Table II presents selected item-level descriptive statistics for representative questionnaire items associated with multilingual support, human oversight, and AI-assisted compliance functionality. These item-level results complement the aggregated dimension-level findings by illustrating expert agreement patterns across specific aspects of the proposed ERP framework.

TABLE II. SELECTED ITEM-LEVEL DESCRIPTIVE STATISTICS

| Questionnaire item                                    | Mean score | SD   | 95% CI    |
|---|------------|------|-----------|
| Necessity of Macedonian and Albanian language support | 4.57       | 0.83 | 4.33-4.80 |
| Multilingual NLP functionality                        | 4.55       | 0.61 | 4.38-4.72 |
| Human oversight necessity                             | 4.49       | 0.76 | 4.28-4.70 |
| Automated legislative interpretation feasibility      | 4.10       | 0.76 | 3.89-4.31 |

Note. N = 51; CI = confidence interval.

### C. Qualitative Feedback

The qualitative findings were derived from optional open-ended questionnaire responses. The first open-ended question received 34 valid responses, while the second received 31 valid responses. Consequently, the qualitative findings should be interpreted as supplementary thematic insights rather than complete-sample evidence.

The open-ended responses provided additional insight into the perceived strengths and limitations of the proposed ERP model. A dominant theme concerned the system's strong alignment with legal compliance requirements in environments characterized by frequent regulatory changes. Participants viewed the architecture as particularly relevant for organizations requiring adaptive compliance capabilities beyond those offered by traditional ERP systems.

Human oversight emerged as another central theme. Respondents consistently emphasized that AI-generated compliance recommendations should remain subject to expert validation in order to ensure accountability, legal reliability, and institutional trust. The inclusion of auditability and traceability

mechanisms was therefore regarded as a major architectural strength.

Participants also highlighted the innovative integration of AI-driven legal reasoning, adaptive learning, and modular ERP services. The modular architecture was considered beneficial for scalability and integration with existing infrastructures, particularly within organizations operating with heterogeneous or legacy systems. Multilingual support for Macedonian and Albanian was similarly viewed as essential for operational inclusivity and accurate legal interpretation.

Despite the positive assessments, experts identified several implementation challenges. These included integration complexity, infrastructure requirements, AI interpretability limitations, and the risk of excessive reliance on automated legal reasoning. Respondents also noted that successful adoption would depend on organizational readiness, effective user training, and clear governance procedures. Data traceability and audit-ready compliance records were considered critical for maintaining long-term trust and regulatory accountability.

Overall, the qualitative feedback reinforced the quantitative findings while offering deeper insight into the practical conditions necessary for successful implementation of the proposed framework.

## VI. DISCUSSION

The expert evaluation provides strong support for the proposed ERP model's conceptual structure, technical feasibility, and relevance within legally dynamic enterprise environments. The findings demonstrate broad agreement regarding the value of integrating AI-assisted compliance mechanisms, multilingual support, adaptive learning, and human oversight within ERP architectures. This section interprets these findings in relation to ERP system design, regulatory adaptability, and existing compliance approaches.

### A. Interpretation of Expert Evaluation

The evaluation results provide consistent expert-based support for the proposed ERP framework across all assessed dimensions. Expert responses suggest that the model has the potential to address key challenges associated with regulatory adaptation, multilingual operation, and AI-assisted compliance management within enterprise systems. However, this support should be interpreted as conceptual validation rather than evidence of operational effectiveness in a deployed ERP environment.

Particular support was observed for the modular separation between operational ERP services and compliance-management functions. Participants viewed this architectural distinction as essential for enabling scalable and maintainable regulatory adaptation without disrupting transactional business processes. The integration of auditability, traceability, and human validation mechanisms further strengthened perceptions of legal reliability and institutional accountability.

The findings also suggest that the proposed framework aligns well with emerging expectations for intelligent ERP environments capable of supporting continuous compliance adaptation in complex regulatory settings. These findings

reinforce the model's relevance as a foundation for future implementation and empirical testing.

### B. Implications for ERP Design

The evaluation highlights several broader implications for contemporary ERP system design. First, the findings suggest the potential feasibility of AI-assisted compliance management as an alternative to static and manually maintained regulatory mechanisms. The integration of ontology-based reasoning, adaptive learning, and multilingual NLP demonstrates how ERP systems can evolve toward continuous and context-aware legal alignment.

At the same time, the results strongly reinforce the necessity of human-in-the-loop governance within AI-driven enterprise environments. Experts consistently emphasized that automated legal interpretation must remain subject to human validation in order to preserve accountability, transparency, and institutional trust. Consequently, explainability, auditability, and reviewer oversight should be treated as foundational architectural requirements rather than optional enhancements.

The findings also underscore the importance of multilingual functionality in ERP systems operating within linguistically diverse regulatory contexts. In the North Macedonian setting, support for both Macedonian and Albanian was viewed as essential for inclusive interaction, accurate compliance interpretation, and organizational accessibility. More broadly, this suggests that multilingual NLP capabilities will become increasingly important in internationally distributed or multi-jurisdictional ERP deployments.

Overall, the study supports a transition from rigid ERP infrastructures toward adaptive enterprise ecosystems capable of combining operational efficiency with continuous regulatory responsiveness.

### C. Comparison with Existing Approaches

Compared with traditional ERP systems that rely on static compliance rules and manually configured updates, the proposed framework introduces a more adaptive and context-aware approach to regulatory management. Conventional ERP architectures often struggle to accommodate evolving legal requirements without extensive redevelopment or operational disruption.

In contrast, the proposed model integrates AI-assisted legal reasoning, adaptive learning, multilingual NLP, and modular compliance services capable of responding dynamically to legislative changes. The separation between transactional ERP operations and compliance-management layers further improves scalability, maintainability, and deployment flexibility.

The architecture also addresses common limitations associated with opaque automation by incorporating auditability, traceability, and human oversight directly into the compliance workflow. These mechanisms are intended to enhance institutional accountability and distinguish the framework from conventional rule-based compliance systems that frequently lack transparent adaptation processes.

Collectively, these features position the proposed model as a promising conceptual contribution toward intelligent ERP

systems capable of maintaining continuous legal alignment in multilingual and rapidly evolving regulatory environments.

## VII. THREATS TO VALIDITY

The expert-based evaluation of the proposed ERP model is subject to several validity considerations that should be acknowledged when interpreting the findings.

Regarding internal validity, the evaluation relied on expert judgment, meaning that responses were influenced by participants' professional experiences and familiarity with ERP systems, artificial intelligence, and compliance processes. Because the study assessed a conceptual framework rather than a deployed implementation, some variation in interpretation across respondents was expected.

A further limitation concerns the distribution of ERP-specific experience among participants. Although expertise was treated as multidimensional and included ERP systems, software engineering, artificial intelligence, legal compliance, public administration, and enterprise software experience, 26 of the 51 respondents reported fewer than five years of ERP-related experience. This provides useful multidisciplinary perspectives but may limit the strength of conclusions regarding senior ERP implementation feasibility.

Construct validity is also relevant due to the use of a 5-point Likert scale, where respondents may have interpreted agreement levels differently, particularly for abstract concepts such as adaptive learning or AI-driven legal compliance. Although the questionnaire was carefully structured around clearly defined evaluation dimensions, the absence of follow-up interviews may have limited clarification of individual interpretations.

External validity is constrained by the study's focus on the North Macedonian regulatory and linguistic environment, including bilingual support for Macedonian and Albanian. While core architectural principles such as modularity, AI-assisted compliance, and human oversight may be transferable to other contexts, the evaluation results remain closely connected to the regional conditions in which the framework was designed.

Several measures were applied to mitigate these limitations. Experts were selected based on relevant professional experience in ERP systems, information systems, or legal compliance, and participation was conducted anonymously to encourage unbiased responses. In addition, the combination of quantitative and qualitative feedback provided a broader and more consistent understanding of participant perspectives across different evaluation dimensions.

Although the analysis included mean scores, standard deviations, confidence intervals, and reliability assessment using Cronbach's Alpha, the study did not conduct factor analysis or subgroup comparisons by experience level. Therefore, the statistical findings should be interpreted as descriptive evidence of expert perceptions rather than as confirmatory psychometric validation or evidence of statistically significant differences between participant groups.

The study relies on descriptive and expert-based evaluation rather than inferential or experimental analysis. Consequently,

the dataset does not provide sufficient evidence for causal inference, predictive performance evaluation, or statistically verified implementation outcomes.

### VIII. CONCLUSION AND FUTURE WORK

This study presented an expert-based evaluation of a context-aware ERP model designed to support adaptive legal compliance within multilingual regulatory environments. The findings indicate strong expert-based support for the model's conceptual structure, technical feasibility, and contextual relevance within the North Macedonian enterprise landscape.

The proposed framework combines modular ERP architecture with AI-assisted legal reasoning, multilingual NLP, adaptive learning, and human oversight mechanisms and is intended to support continuous regulatory alignment. Experts particularly emphasized the importance of multilingual support and human validation in maintaining operational inclusivity, accountability, and trust within AI-assisted compliance processes.

The evaluation further suggests that adaptive and explainable compliance mechanisms represent an important direction for future ERP development, particularly in environments characterized by evolving legal requirements and multilingual governance structures. At the same time, the study identified implementation challenges related to integration complexity, organizational readiness, and AI interpretability, highlighting the need for careful governance and deployment planning.

Several limitations should be acknowledged. The evaluation focused on theoretical validation through expert assessment rather than empirical testing of a deployed system. Consequently, the findings reflect professional perceptions of feasibility and relevance rather than operational performance under real-world conditions.

Future work will focus on prototype implementation and empirical validation of the proposed framework in live enterprise environments. Additional research will examine the effectiveness of AI-driven compliance adaptation, multilingual NLP processing, and reinforcement-learning mechanisms over time. Cross-jurisdictional studies will also be necessary to evaluate the transferability of the architecture beyond North Macedonia and to identify adjustments required for broader regulatory and linguistic contexts.

Overall, the proposed model contributes toward the development of intelligent ERP systems capable of supporting continuous legal alignment, accountable automation, and multilingual enterprise management in dynamically evolving regulatory environments.

### APPENDIX A: QUESTIONNAIRE ITEMS

The questionnaire used in the expert evaluation consisted of demographic/background questions, 14 closed-ended Likert-scale evaluation items, and two open-ended questions. The Likert-scale items were rated on a 5-point scale ranging from 'Strongly Disagree' to 'Strongly Agree'.

#### A. Background Information

Your professional role?

Years of experience with ERP systems?

I confirm that I have experience related to ERP systems, legal compliance, AI, or enterprise systems.

#### B. Likert-Scale Evaluation Items

The proposed ERP model is conceptually clear and logically structured.

The interaction between ERP modules and AI components is well-defined and understandable.

Automated interpretation of legislative changes is feasible within the proposed ERP model.

The AI-driven compliance component can improve legal alignment of ERP systems in North Macedonia.

Full support for both Macedonian and Albanian languages is necessary in ERP systems operating in North Macedonia.

NLP-based multilingual modules can improve clarity and reduce operational errors in ERP systems.

Adaptive learning mechanisms enable ERP systems to respond effectively to regulatory or organizational changes.

The proposed ERP model is scalable and suitable for enterprises in North Macedonia.

The proposed ERP model provides a coherent and realistic approach for integrating legal compliance, multilingual support, and adaptive learning within a single ERP system.

The proposed ERP model ensures that compliance-related decisions and process adaptations are traceable, auditable, and linked to specific legal requirements.

Human validation and oversight of AI-driven compliance adaptations are necessary and appropriate for ensuring accountability and trust in ERP systems.

The proposed ERP model appears technically feasible to integrate with existing ERP systems using modular services and standard interfaces.

Multilingual NLP support can improve data consistency and accuracy across Macedonian and Albanian records and reports.

The proposed ERP model sufficiently mitigates risks related to AI-based legal misinterpretation through human validation and auditability.

#### C. Open-Ended Questions

What do you consider the main strength or limitation of the proposed ERP model?

Which aspect would require the most attention in a real-world implementation of this model?

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