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Application of Artificial Intelligence in the Personalization of Requests to Companies in Application Maintenance Services (AMS) projects: A Decision Support Tool for IT Project Management

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Master's Degree in, Digital Technologies for Business

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TECNOLOGIAS
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Department of Information Science and Technology

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Resumo

A elicitação de requisitos durante a fase de integração de projetos de Application Maintenance Services é frequentemente dificultada por ambiguidade, informação incompleta e perspetivas heterogéneas dos stakeholders. As práticas atuais baseiam se muitas vezes em questionários estáticos ou em discussões informais, que oferecem suporte limitado a uma tomada de decisão estruturada, transparente e defensável. Neste contexto, existe a necessidade de modelos de interação que consigam adaptar se a uma compreensão progressiva de forma a apoiar a tomada de decisão.

Esta investigação analisa de que forma técnicas adaptativas e explicáveis de UX e UI, recorrendo a Inteligência Artificial, podem ser concebidas para melhorar a elicitação de requisitos em projetos AMS. Adotando uma abordagem de Design Science Research, o estudo resultou no desenho e instância de um artefacto de avaliação adaptativo, a AMS Assessment Tool. O artefacto estrutura a elicitação como uma interação de diagnóstico através de múltiplos contextos de avaliação e utiliza elicitação adaptativa para priorizar questões de seguimento com base em informação não resolvida ou crítica para a decisão. A explicabilidade é incorporada ao nível da interação através de pistas explicativas ao nível das perguntas e das opções, reforçando a transparência e a interpretabilidade sem expor a complexidade algorítmica subjacente.

O artefacto foi avaliado através de uma abordagem mista que combinou um inquérito a profissionais de AMS e duas iterações de entrevistas com especialistas. A avaliação centrou se na lógica de interação, na usabilidade e na relevância profissional percecionada. Os resultados indicam que a abordagem proposta está alinhada com as práticas atuais de consultoria e responde a limitações fundamentais dos métodos de elicitação estáticos, ao apoiar interações focadas, transparentes e orientadas para a decisão.

A investigação demonstra que o design de interações adaptativas e explicáveis pode melhorar a elicitação de requisitos na integração de AMS, ao apoiar a construção estruturada de sentido em contextos de incerteza. O conhecimento de design gerado por este trabalho é transferível para outros ambientes de consultoria e projetos, caracterizados por requisitos ambíguos e críticos para a tomada de decisão.

Palavras chave: Elicitação de Requisitos; Levantamento de Requisitos; Application Maintenace Service; Manutenção aplicacional; Manutenção de Software; Inteligência Artificial; Experiência do Utilizador, Interface do Utilizador

Abstract

Requirements elicitation during the onboarding phase of Application Maintenance Services projects is frequently challenged by ambiguity, incomplete information, and heterogeneous stakeholder perspectives. Current practices often rely on static questionnaires or informal discussions, which provide limited support for structured, transparent, and defensible decision making. In this context, there is a need for interaction models that can adapt to evolving understanding while supporting professional judgement.

This research investigates how adaptive and explainable UX and UI techniques, leveraging AI, can be designed to improve requirements elicitation in AMS projects. Adopting a Design Science Research approach, the research resulted in the design and instantiation of an adaptive assessment artefact, the AMS Assessment Tool. The artefact structures elicitation as a diagnostic interaction across multiple assessment contexts and employs adaptive elicitation to prioritise follow up questions based on unresolved or decision critical information. Explainability is embedded at the interaction level through question and option level explanatory cues, enhancing transparency and interpretability without exposing underlying algorithmic complexity.

The artefact was evaluated through a mixed approach combining a survey of AMS professionals and two iterations of expert interviews. The evaluation focused on interaction logic, usability, and perceived professional relevance. Findings indicate that the proposed approach aligns with current consulting practices and addresses key limitations of static elicitation methods by supporting focused, transparent, and decision-oriented interactions.

The research demonstrates that adaptive and explainable interaction design can enhance requirements elicitation in AMS onboarding by supporting structured sense making under uncertainty. The design knowledge contributed by this work is transferable to other consulting and project-based environments characterised by ambiguous and decision critical requirements.

Keywords: Requirements Elicitation; Requirements Gathering; Application Maintenance Services; Application Maintenance; Software Maintenance; Artificial Intelligence; User Experience; User Interface

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Acronyms

AE: Adaptive Elicitation

AMS: Application Maintenance Services

AI: Artificial Intelligence

DSR: Design Science Research

DSS: Decision Support Systems

LLM: Large Language Model

ML: Machine Learning

NBQ: Next Best Question

NLP: Natural Language Processing

REl: Requirements Elicitation

RE: Requirements Engineering

RFP: Request For Proposal

SLR: Systematic Literature Review

UI: User Interface

UX: User Experience

CHAPTER 1

Introduction

Application Maintenance Services (AMS) projects play a central role in sustaining and evolving deployed software systems within contemporary organisations. Unlike greenfield development, AMS engagements are initiated around existing application landscapes that are often heterogeneous, partially undocumented, and shaped by long term operational and organisational constraints [1]. During the onboarding phase of an AMS engagement, providers are required to evaluate incoming requests, frequently in the context of a Request for Proposal (RFP), and to make early decisions regarding feasibility, scope, risk exposure, and bid viability. These decisions must be taken under conditions of limited time, fragmented information, and restricted access to stakeholders, while carrying significant commercial and operational consequences.

In this context, Requirements Elicitation (REl) assumes a diagnostic rather than a generative role. The objective is not to specify future system behaviour in detail, but to construct a sufficiently reliable understanding of the current application environment, service expectations, and areas of uncertainty to support defensible decision making. Traditional Requirements Engineering (RE) approaches, which are largely based on static questionnaires, document templates, or informal expert driven interviews, provide limited support for this form of early-stage assessment. Static instruments tend to overwhelm stakeholders with uniform question sets, while informal elicitation relies heavily on individual consultant experience, resulting in inconsistent coverage, implicit assumptions, and limited traceability [2].

The inability of these approaches to surface, prioritise, and make explicit unresolved information gaps increases the likelihood of misjudgement during AMS onboarding and contributes to downstream delivery risk.

Recent advances in Artificial Intelligence (AI) have stimulated growing interest in the use of adaptive systems to support requirements related activities. Research in AI supported RE has demonstrated the potential of Machine Learning (ML), Natural Language Processing (NLP), and Decision Support Systems (DSS) to assist with tasks such as classification, prioritisation, and ambiguity detection [3, 4].

However, most existing approaches operate on pre-existing artefacts or assume extended engagement horizons, making them poorly aligned with the constraints of AMS onboarding. Moreover, adaptive behaviour alone is insufficient in professional and risk sensitive contexts.

When assessment outcomes inform contractual commitments and bid decisions, stakeholders must be able to understand and justify how elicitation paths were used and how conclusions were reached. Explainability therefore becomes a prerequisite for the effective use of adaptive systems in AMS contexts [5, 6].

While adaptive and explainable User Experience (UX) and User Interface (UI) techniques have been widely studied in domains such as recommender systems, analytics, and decision support interfaces, their application to interactive REl remains fragmented. Adaptivity is often implemented without transparency, and explainability is frequently treated as a post hoc analytical feature rather than as an integral part of the interaction. This disconnect is particularly problematic in AMS onboarding, where elicitation must support structured sense making under uncertainty and produce outcomes that are interpretable, auditable, and defensible. The absence of interaction level approaches that combine adaptive questioning with embedded explainability constitutes a significant gap in both research and practice, particularly for early-stage AMS project evaluation.

This research addresses this research question: “How adaptive and explainable UX and UI techniques, leveraging AI, can be designed to improve REl in AMS projects”. The focus of the research is explicitly on interaction design and UX, rather than on backend algorithms or optimisation mechanisms. AI is considered an enabling component that supports adaptive interaction behaviour, while human judgement remains central to decision making.

The objective of this research is to conceptualise and design AMS Assessment Tool, which contains an interaction model that supports systematic and auditable REl during AMS onboarding, prioritises unresolved and decision critical information through adaptive questioning, and embeds explainability at the level of questions and response options to enhance transparency and interpretability.

The artefact aims to support AMS consultants in constructing a defensible understanding of project requests under conditions of uncertainty, without replacing professional judgement or exposing underlying algorithmic complexity.

By focusing on UX and UI level mechanisms, this research contributes design knowledge applicable to AMS onboarding and to other consulting and project-based environments characterised by ambiguous requirements and high stakes early decision making.

CHAPTER 2

State of the Art

2.1. Theoretical Background

This section presents the theoretical foundations required to contextualise the design of an adaptive and explainable assessment artefact for AMS onboarding. Rather than offering a comprehensive review of RE, AI as independent disciplines, the section draws selectively on these bodies of knowledge to frame REl as an interaction centred activity. Concepts from UX, and UI research are used to position elicitation as a process of structured sense making, in which adaptive questioning and embedded explainability at the design level support users in navigating uncertainty and early-stage decision making. The purpose of this section is to establish the conceptual lens through which the research problem is examined and to support the interpretation of the literature synthesis and artefact design presented in subsequent sections.

2.1.1. Requirements Elicitation in AMS and Onboarding Contexts

RE is traditionally concerned with identifying, analysing, and documenting stakeholder needs to specify future system behaviour. In development-oriented contexts, REl typically proceeds through iterative engagement with stakeholders, supported by explicit documentation and progressive refinement of specifications. These practices assume stable access to domain knowledge and sufficient time to converge towards detailed and consistent requirements.

REl in AMS contexts diverges significantly from these assumptions. AMS engagements are initiated around existing application environments that are frequently heterogeneous, partially documented, and shaped by long standing technical and organisational constraints. During the onboarding phase, often initiated through a RFP, REl is primarily directed towards constructing an understanding of the current operational reality rather than defining future functionality. This understanding is required to support early-stage decision making, including bid or no bid decisions, effort estimation, risk assessment, and the planning of service transition activities. Research on legacy system modernisation highlights the prevalence of long-lived systems and accumulated constraints that complicate early assessment activities in such contexts [1].

In this setting, REl assumes a diagnostic and exploratory role. Rather than aiming to produce complete and stable requirement specifications, elicitation activities focus on identifying critical information gaps, surfacing implicit assumptions, and assessing areas of uncertainty that may affect service delivery and contractual commitments. Studies on documentation sufficiency and early estimation demonstrate that inadequate or unstable information at this stage contributes directly to inaccurate estimates, repeated rework, and increased delivery risk [2]. Making uncertainty visible and manageable therefore becomes a central concern of AMS onboarding REl.

2.1.2. AI Supported Requirements Elicitation

AI has been increasingly considered as a means of enhancing the level of support available to RE activities. The existing body of research examines the application of AI across multiple RE subtasks, including requirements classification, clustering of similar requirements, prioritisation, traceability analysis, and the identification of ambiguity within requirement statements. NLP and ML techniques are commonly applied to analyse large volumes of textual requirements and stakeholder comments, with the aim of reducing the manual effort required for review and improving analytical consistency [4], [7].

A growing body of research has also explored more interactive forms of AI based support for REl, including DSS and software modelling assistants that guide users through assessment or elicitation activities. These approaches extend the role of AI from the analysis of user provided input to the management of interaction between the user and the system. However, much of the prior research in this area has focused primarily on developing accurate inference models to support decision making, while treating the UI as a passive mechanism for data input. As a result, limited attention has been given to how interaction design influences user understanding, confidence in outcomes, and the ability to justify elicitation decisions.

These limitations are particularly problematic in professional service contexts, such as the onboarding of AMS. In such environments, requirements engineers are responsible for eliciting information that directly informs commercial, operational, and contractual decisions. Consequently, elicitation outcomes must be defensible, auditable, and interpretable by multiple stakeholders. This highlights the need for AI supported elicitation approaches that balance analytical guidance with interaction designs that emphasise transparency, user control, and clarity of reasoning, rather than relying solely on backend inference capabilities.

2.1.3. Adaptive and Explainable UX/UI

UIs that adjust their content, structure, or sequencing based on user input, contextual factors, or inferred system state are commonly referred to as adaptive UIs. Research on information intensive tasks has shown that such UIs can reduce cognitive effort, improve task efficiency, and support sustained user focus by presenting only information that is relevant at a given moment [6]. Common adaptive techniques include progressive disclosure, context sensitive questioning that builds on previous responses, and dynamic workflow sequencing, such as adjusting the order in which questions are presented based on user input or inferred levels of certainty.

In the context of REl, adaptivity enables a shift from static and linear questionnaire approaches towards interaction flow-based processes that respond to user knowledge and emerging uncertainty. Rather than presenting all possible questions within a single interaction, adaptive systems aim to identify and present only those questions that are most informative at a particular stage of the elicitation process. This approach supports more focused interactions and reduces unnecessary cognitive load during complex assessment activities.

Explainable Artificial Intelligence complements adaptive interaction by supporting transparency in how system behaviour is perceived and interpreted by users. Explainability is commonly defined as the ability of a system to communicate understandable reasons for its actions or recommendations [5]. In DSS contexts, explainability is closely associated with user trust, accountability, and the ability to justify outcomes. Research indicates that poorly timed explanations, excessive use of technical terminology, or explanations that are disconnected from the current interaction context can hinder understanding and reduce user confidence in system behaviour.

Recent research increasingly emphasises the importance of embedding explanations directly within the UI and not just providing them as separate analytical artefacts. In interactive REl tasks, users benefit from understanding why a particular question is presented and how their responses influence subsequent interaction paths and assessment outcomes. Integrating adaptive interaction mechanisms with UX and UI level explanations therefore supports informed decision making by enabling users to engage with the elicitation process in a transparent, interpretable, and contextually grounded manner, which is particularly important in professional and high stakes environments.

2.2. Literature Review

2.2.1. Databases used

The literature review was conducted following a Systematic Literature Review (SLR) approach and aligned with the PRISMA guidelines [8], with the objective of identifying relevant studies related to REl, AI, and adaptive and explainable UX and UI approaches within AMS and software maintenance contexts.

Four academic databases were selected as primary sources for the literature search. These were chosen due to their broad coverage of research in RE, information systems, software engineering, and software maintenance, as well as their relevance for studies addressing emerging technologies such as AI. Together, they provide a multidisciplinary and comprehensive foundation for capturing both technical and interaction focused research relevant to this research. Below, are the respective database repositories:

- Scopus: (https://www.scopus.com/)
- Web of Science (https://www.webofscience.com/)
- Springer (https://www.springer.com/gp)
- ACM DL (https://dl.acm.org/)

2.2.2. Search strategy and inclusion/exclusion criteria

The search and screening process was designed to ensure transparency and traceability in the identification and selection of relevant studies, in accordance with the PRISMA framework [8]. The objective of this process was to retrieve literature situated at the intersection of REl, AMS and software maintenance contexts, UX and UI considerations, and AI.

The search was conducted across the four academic databases described in Section 2.2.1 using a predefined search string. This search string combined terms related to requirements practices, maintenance contexts, UX and UI, and AI, and was defined as follows:

Keywords: ("requirements gathering" OR "requirements analysis") AND ("application maintenance" OR "software maintenance") AND (ux OR ui OR "User experience" OR "User interface") AND ("Artificial Intelligence" OR "AI")

Minor syntactic adaptations were applied where necessary to comply with database specific query formats, while preserving the semantic intent of the search.

Following the initial retrieval of records, a preliminary screening process based on non-thematic inclusion criteria was applied to reduce the volume of studies to a manageable and methodologically consistent set. Three filters were applied at this stage. First, the publication date was restricted to studies published between 2020 and 2025, reflecting the recent evolution of AI based approaches and UX and UI research. Second, document types were limited to journal articles, conference papers, review papers, and proceedings. Third, a language filter was applied to include only studies published in English.

No further thematic inclusion or exclusion criteria were applied during this initial screening stage. This decision was taken deliberately to avoid prematurely excluding studies that could contribute to the conceptual and methodological synthesis.

The overall study selection process is illustrated in the PRISMA flow diagram shown in Figure 1. A total of 365 records were initially identified across the four database searches. Following the application of the inclusion criteria mentioned previously, 223 records were excluded. A further 101 records, primarily originating from ACM Digital Library conference proceedings, were excluded due to lack of access. The final dataset consisted of 43 studies that addressed one or more of the research streams relevant to this study, namely REl in AMS and onboarding contexts, AI supported REl, and adaptive and explainable UX and UI design.

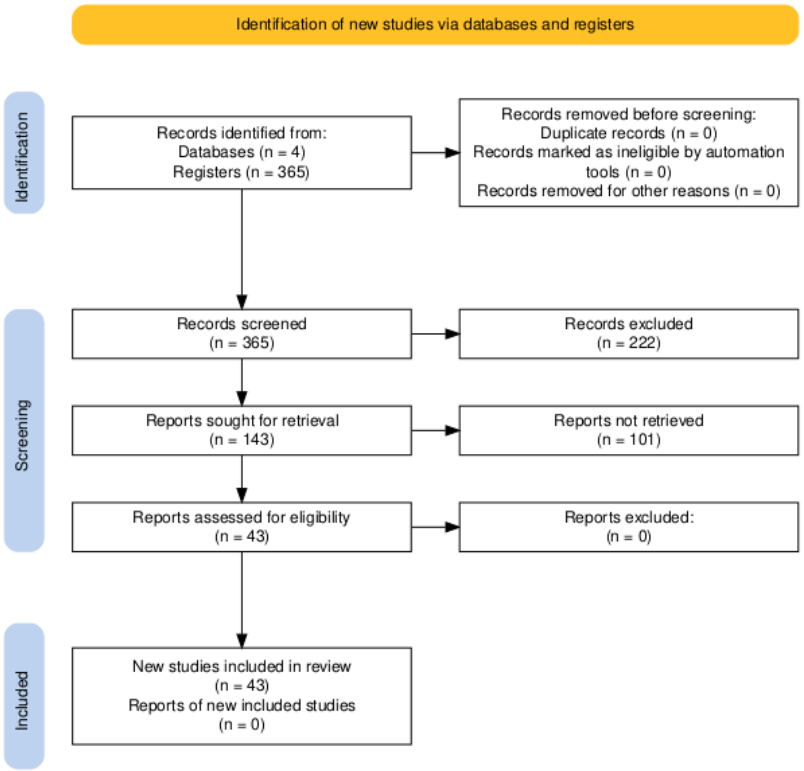


Figure 1: PRISMA Filtration Process

2.2.3. Related Work Synthesis

Following the filtering process described in the preceding sections, a final set of 43 studies was retained for analysis. These studies were examined in relation to the core dimensions underpinning the research questions of this thesis, with the objective of understanding how the existing body of literature collectively addresses the problem space rather than assessing whether individual studies directly answer the research questions.

The synthesis was guided by the theoretical framework established in Section 2.1, which frames REl as an interaction centred activity situated within AMS and software maintenance contexts, AI enabled capabilities and adaptive and explainable UX and UI mechanisms.

While the final dataset comprised 43 studies, the synthesis presented in this section focuses on a subset of 24 studies that explicitly engage with interaction, adaptivity, or explainability in requirements related activities. The remaining studies informed the broader understanding of the domain and contextual characteristics but were not analysed in depth, as they did not address directly the research streams adopted in this research.

To provide an overview of how the analysed studies relate to the three research streams derived from the theoretical framework, Table 1 summarises the distribution of references across the research areas. The table illustrates how the literature addressing REl in AMS and onboarding contexts, AI supported REl, and adaptive and explainable UX and UI for elicitation is represented within the final dataset and serves as a structural complement to the narrative synthesis presented in this section.

Table 1: References mapping

Subject	Reference
Requirements Elicitation in AMS and Onboarding Contexts	[1], [2], [9, 10, 11, 12, 13]
AI Supported Requirements Elicitation	[3], [4], [7], [14, 15, 16, 17, 18, 19, 20, 21]
Adaptive and Explainable UX and UI for Elicitation	[5], [6], [12], [17, 18], [22, 23, 24, 25, 26, 27]

Across the literature addressing REl in application maintenance and onboarding contexts, a recurring theme concerns the inherent difficulty of obtaining complete and reliable information in environments characterised by legacy systems, evolving architectures, and fragmented documentation.

Studies consistently report that, in contrast to green field development settings, requirements in maintenance and modernisation contexts are frequently incomplete, distributed across heterogeneous artefacts, and subject to ongoing change [1, 2], [9, 10]. These challenges are particularly pronounced in legacy system environments, where early elicitation activities must account for accumulated technical constraints, historical design decisions, and organisational dependencies that limit the feasibility of radical change [1].

Research on lightweight language processing and domain specific tooling further emphasises that requirements in such contexts are tightly coupled to existing artefacts and require careful interpretation prior to any form of automation or transformation [12]. Therefore, REl is commonly embedded within ongoing development or maintenance activities and not specifically treated as a distinct and structured process during the early phases of a project.

This implicit and iterative treatment of early requirements activities is further reflected in studies that model iteration and negotiation as inherent characteristics of software engineering processes, highlighting how unclear or evolving requirements contribute to rework and prolonged decision making rather than being addressed through explicit early elicitation mechanisms [13].

Despite the acknowledged importance of early understanding, the literature rarely addresses REl explicitly in the context of AMS onboarding and service transition. Instead, elicitation is typically discussed as part of broader agile, maintenance, or modernisation workflows, where requirements evolve incrementally through documentation updates, developer communication, or backlog refinement practices [1, [2], [10]. Even in highly regulated domains such as healthcare, where early clarity is critical, REl is primarily described as an iterative activity integrated within development processes [11]. Empirical studies further indicate that deficiencies in early requirements information have a direct impact on downstream decision making, with inadequate or unstable documentation contributing to repeated re-estimation of effort and increased uncertainty during planning and contractual negotiations [2]. Collectively, these findings suggest that while the complexity of REl in maintenance environments is well recognised, the activity is generally treated as informal and continuous rather than as a structured process supporting early project assessment.

Research on AI supported RE has expanded significantly in recent years, with SLRs documenting extensive application of ML, NLP, and automated analysis techniques across a wide range of requirements related tasks [3], [14, 15]. These approaches are predominantly applied to artefact centric activities such as requirements extraction, classification, prioritisation, traceability analysis, and ambiguity detection, often leveraging textual specifications, user generated content, or graph-based representations [3, 4], [16]. More recent studies report the emergence of AI driven assistant solutions, including chatbots, recommender systems, and virtual assistants, designed to support analysts during elicitation and analysis tasks [4], [17]. Advances in deep learning-based software engineering further reinforce the breadth and maturity of AI applications across the software lifecycle [7], [18], while emerging work on Large Language Model (LLM) based multi agent systems proposes autonomous or semi-autonomous agents capable of collaborating on requirements related activities such as elicitation, analysis, and validation [19].

However, across these papers, AI is most positioned as a decision support mechanism operating on pre-existing artefacts or simulated interactions, rather than as a component embedded within real time elicitation interactions with stakeholders [4], [15], [17], [20]. In multi agent approaches, agents are frequently designed to simulate stakeholder roles, generate candidate requirements, or identify inconsistencies through iterative reasoning, but they typically assume limited direct involvement of human stakeholders during early project phases [19]. As a result, while analytical capability has advanced considerably, comparatively little attention has been paid to how AI mediated insights are presented, explained, or integrated into user facing elicitation workflows.

Concerns related to transparency, explainability, and trust recur across the AI supported RE literature, yet these concerns are predominantly addressed at the level of model behaviour or system level observability rather than through the design of user facing interaction mechanisms [5], [17, 18]. Even in advanced AI and LLM based approaches, explainability is typically framed in terms of internal reasoning, traceability, or interpretability of automated decisions, offering limited guidance on how explanations should be delivered to users during the elicitation process itself. This emphasis on traceability at the pre-requirements specification stage further demonstrates that understanding the provenance, rationale, and stakeholder context of requirements is critical for transparency and auditability, yet existing approaches focus on process documentation rather than on how such information is made accessible and meaningful to users during elicitation interactions [21].

Parallel research in human centred software engineering and requirements related UX and UI design highlights the cognitive demands imposed on users when engaging with complex requirements activities, particularly in contexts involving multiple stakeholders, evolving systems, and incomplete information [6], [22], [24]. The role of requirements artefacts has increasingly been reconceptualised from static representations of system needs towards mediating instruments that support shared understanding, sense making, and coordination among stakeholders [25]. Studies on adaptive interaction and recommender systems demonstrate that tailoring information presentation, rationale, and interaction flow to user roles, expertise, and situational context can significantly enhance engagement and decision quality in requirements related tasks [6], [22], [24]. Evidence from long lived and configurable platform research further suggests that flexible user specific views and interaction mechanisms are critical for supporting heterogeneous user groups and changing requirements over time [23], [27].

Nevertheless, while adaptivity and explainability are widely acknowledged as important principles, they are seldom applied explicitly within tools designed to support REl during the initial stages of a project. Explainability is most often achieved through documentation, traceability mechanisms, or post hoc analytical reports, rather than through embedded UX and UI elements that accompany the elicitation interaction itself [5], [17]. This limitation is repeatedly identified in broader surveys of AI based software engineering as a persistent challenge, particularly in contexts where trust, accountability, and professional judgement are central concerns [18].

Taken together, the reviewed literature highlights recurring challenges and limitations across maintenance oriented REl, AI supported RE, and UX and UI design for complex decision-making tasks. While each research stream provides valuable insights, their treatment remains largely isolated, with limited convergence at the level of early-stage elicitation interactions. These observations provide the empirical and conceptual basis for the integrative synthesis and identification of research gaps presented in the following section.

2.3. Synthesis and Research Gap

The synthesis of the literature reviewed in the preceding sections reveals that, although each research stream provides valuable insights into specific aspects of REl, the overall body of knowledge does not address REl as an integrated process that supports early-stage, structured, decision-oriented, and interactive assessment. In particular, the literature lacks approaches that

explicitly combine the characteristics of AMS contexts, the analytical capabilities of AI, and the principles of adaptive and explainable UX and UI design within a single, coherent elicitation framework.

Research focusing on REl in AMS and related onboarding contexts consistently highlights the challenges associated with non-greenfield environments. Requirements are frequently incomplete, fragmented across multiple artefacts, and constrained by existing technical and organisational conditions [1, 2], [9, 10]. While the importance of early requirements-related information for planning, estimation, and risk assessment is widely acknowledged, elicitation is typically treated as an informal and continuous activity embedded within broader agile, maintenance, or modernisation workflows rather than as a distinct process supporting early-stage decision-making, service transition, or RFP evaluation [2], [11]. As a result, the literature provides limited guidance on how requirements attachment can be conducted in a systematic manner to support early bid or no-bid decisions in AMS contexts.

At the same time, research on AI-supported RE (RE) demonstrates substantial progress in backend automation and analytical decision support. Systematic literature reviews and surveys show that AI techniques are extensively applied to tasks such as requirements extraction, classification, prioritisation, and ambiguity detection, primarily operating on existing textual artefacts or user-generated data [3,4], [14, 15, 16]. Recent advances in LLM based approaches further enhance these analytical capabilities by enabling automated reasoning and iterative refinement of requirements information [18, 19]. However, these approaches generally assume the prior availability of requirements-related data and treat elicitation as a post hoc analytical activity, rather than as an interactive process through which information is progressively gathered, clarified, and validated with stakeholders.

In parallel, literature on adaptive and explainable UX and UI design emphasises the importance of human-centred interaction, usability, and transparency when supporting complex software engineering tasks. Empirical studies indicate that RE activities impose significant cognitive demands on stakeholders and that interaction artefacts play a critical role in facilitating sense-making and shared understanding [6], [22], [24, 25].

Research on adaptive interfaces, personalisable platforms, and collaborative tools further demonstrates their potential to enhance user engagement and decision quality by tailoring interaction to user roles, expertise, and situational context [6], [20], [24, 25].

Nevertheless, explainability in RE-supporting systems is most achieved through documentation or traceability mechanisms and not through embedded interaction-level explanations.

A notable gap emerging from the synthesis concerns the limited use of adaptive diagnostic questioning as an explicit interaction strategy for REl. While structured questioning and uncertainty reduction are well-established in several adjacent domains, they are rarely applied in RE as a deliberate, user-facing mechanism for progressively refining incomplete information. Emerging research on LLM-based multi-agent systems demonstrates that adaptive question generation is technically feasible and effective for refining partially specified requirements [18, 19]. However, in these approaches, questioning is typically internal to backend reasoning processes and not exposed as a transparent, user-centred interaction pattern. Consequently, questioning in REl remains largely analyst-driven, ad hoc, and opaque to stakeholders.

Addressing these gaps requires an integrative perspective that combines RE principles with adaptive and explainable interaction design to support informed decision-making in IT project management settings.

CHAPTER 3

Research Methodology

This research addresses a real-world problem encountered during the onboarding phase of AMS, where project assessments must be conducted under time constraints and conditions of incomplete and fragmented information. In such contexts, AMS providers are required to make early judgements regarding project scope, risk, and feasibility based on limited requirements artefacts, incomplete documentation, and constrained stakeholder availability. These conditions increase the likelihood of ambiguity and misjudgement, particularly when assessment activities rely on informal or ad hoc elicitation practices.

To address this problem, the research adopts a DSR methodology, as it supports the systematic design, development, and evaluation of artefacts intended to solve identified organisational problems [28, 29]. The artefact developed in this research is conceived as a decision support solution that assists consultants during the AMS onboarding process by structuring and guiding REl under conditions of uncertainty. Central to the design of the artefact is the quality of the user interaction, including how information is presented, adapted, and explained, and how these interaction mechanisms support informed decision-making.

Accordingly, UX and UI design principles constitute the primary focus of the artefact's design and evaluation. This chapter follows the six DSR activities illustrated in Figure 2 based on Peffers model, but in a hybrid and iterative approach [30]. In particular, the research was conducted through two design–evaluation cycles, where the first iteration served an exploratory and formative purpose to refine the conceptual model and interaction design, Adaptive Elicitation (AE) and Explainability. The second iteration focused on evaluating the refined artefact. The chapter therefore covers problem identification and motivation, definition of research objectives, design and development of the artefact, its demonstration within a realistic AMS scenario, and the preparation of the empirical evaluation, which is presented in the subsequent chapter.

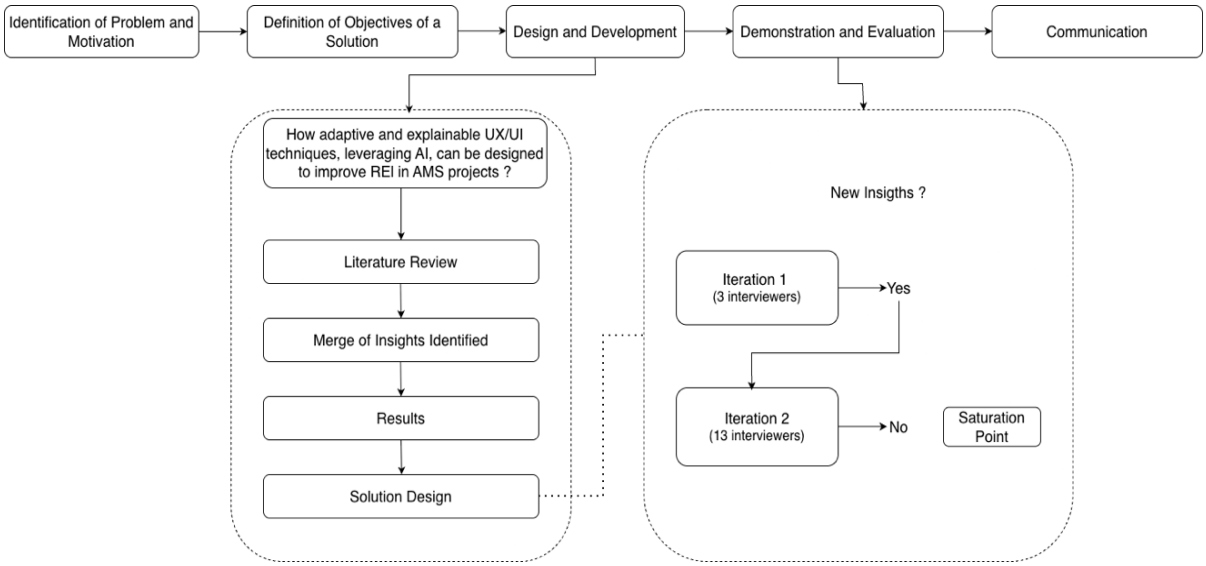


Figure 2: DSR Steps Diagram

3.1. Problem Identification & Motivation

The central difficulty encountered during AMS onboarding is not the absence of information, but rather the inadequacy of existing mechanisms for structuring, prioritising, and interpreting available information during the early stages of project evaluation. Many traditional RE approaches tend to assume that relevant information can be collected in a relatively complete and linear manner and therefore provide limited support for the incremental reduction of uncertainty in contexts where information is fragmented, evolving, or partially tacit [14]. In addition, such approaches often represent elicited information in static forms, offering limited support for dynamically adapting the elicitation process as understanding of the project evolves.

Therefore, AMS providers are frequently unable to systematically identify and address ambiguities during early elicitation activities, and the reasoning underlying initial assessment outcomes often remains implicit and difficult to justify. Early AMS assessments have a significant impact on high-stakes professional decisions, such as bid or no-bid determinations and the definition of initial delivery commitments. When elicitation support fails to adequately surface uncertainty or guide users through incomplete information, consultants are forced to rely heavily on personal experience and intuition to compensate for missing or ambiguous information, which may lead to unrealistic delivery expectations, underestimated operational costs, and increased project risk.

From a DSR perspective, the problem addressed in this research is therefore fundamentally interactional rather than organisational or procedural.

Existing elicitation approaches provide limited support for interaction mechanisms that assist users in reducing uncertainty incrementally, making unresolved information gaps explicit, or rendering the rationale behind elicitation choices transparent and defensible. This motivates the need for a designed artefact that supports REl as an interactive, adaptive, and explainable process, aligned with the cognitive demands and decision-making responsibilities characteristic of AMS onboarding contexts.

3.2. Objectives

The following objectives presented in Table 2 are driven by the main objective, which is conceptualise and design AMS Assessment Tool, which contains an interaction model that supports systematic and auditable REl during AMS onboarding.

Table 2: DSRM Objectives

ID	Objetive
DO1	Provide a structured and systematic approach for eliciting AMS project requirements during onboarding phase, ensuring comprehensive and auditable coverage
DO2	Support REl as a diagnostic interaction process that explicitly captures and responds to ambiguity and incomplete knowledge through adaptive questioning
DO3	Enable the adaptive prioritization of follow up questions based on previously elicited information, to focus the elicitation process on unresolved or decision critical aspects of the AMS assessments
DO4	Embed explainability within the elicitation interaction, enabling stakeholders to understand why questions are asked and how response options should be interpreted to reduce false certainty, support accountable decision making
DO5	Ensure that the outputs of the elicitation process provide decision-oriented insights for AMS consultants by synthesizing assessments results into context level summaries that make residual uncertainty, information related risk and confidence explicit thereby supporting informed bid and onboarding discussions without replacing human judgement.
DO6	Design the assessment model at a conceptual and interaction level in which can be adapted and extended to different AMS contexts, client environments and application landscapes through configuration of topics and questions without requiring changes to the underlying elicitation logic

The design objectives outlined are consolidated, developed, and substantiated for the proposed artefact. They were initially identified via Chapter 2 and subsequently refined through preliminary expert engagement. These objectives address the deficiencies in structured elicitation during AMS onboarding, the inadequate support for uncertainty-driven interactions, and the poor incorporation of explainability within REl interfaces. They together delineate the

parameters and priorities of the design space, directing the ensuing design and development of the AMS Assessment Tool.

3.3. Design and Development

The design and development phase seeks to actualize the design objectives by a systematic series of design decisions, encompassing both conceptual and interactional dimensions. This section delineates how the validated objectives are transformed into design principles and the associated design mechanisms that guide the REl process utilising the AMS Assessment Tool, rather than offering comprehensive specifications for the implementation of the assessed goals. The design is articulated by a conceptual model that delineates the primary entities and their interrelations, along with considerations of interaction levels that dictate the adaptation, explicability and synthesis of the assessments. These two elements are the foundation of an adaptive and elucidative needs elicitation methodology, intentionally omitting technical and implementation specifics.

3.3.1. Design Principles

This research contribution in DSR transcends mere object construction to encompass specific design information elucidating how and why a solution corresponds to its classification. Previous research underscores the necessity for this knowledge to be expressed in an abstract and transferable manner, establishing a link between design aims and artefact attributes that facilitates justification and reuse in analogous situations [28].

Table 3 consolidates the design principles informed by the research objectives outlined in section 3.2. These principles delineate how the requirements elicitation for the AMS onboarding process can be structured, adjusted, and articulated to facilitate informed and justifiable decision making in scenarios of limited comprehension. The principles establish a foundational framework for the necessity of a systematic diagnostic approach encompassing most AMS related elements. A transparent and clear approach to managing uncertainty during interactions, along with flexible prioritisation of emphasis areas in the elicitation process and the incorporation of explanations during REl. Rather than necessitating specific UI or technological components to attain these objectives, the design principles establish the normative foundation for the restrictions governing subsequent design decisions.

Table 3: Design principles guiding the AMS Assessment Tool

Design Principle	Description	Research Objectives
Structured Diagnostic Coverage	Requirements elicitation should be view as a diagnostic process that ensures systematic and auditable coverage of multi-contexts relevant to AMS	DO1, DO6
Uncertainty First Interaction	The elicitation dialogue should explicitly acknowledge ambiguity, incompleteness and conditionality in the provided information and preserve it as opposed to requiring its premature commitment.	DO2
Adaptive Question Prioritisation	The progression on the assessment should be adaptive based on the previous elicited information and prioritizing unresolved or decision critical aspects instead following a static questionnaire	DO3
Interaction Level Explainability for Accountability	Explainability should be integrated within the interaction to clarify why questions are asked and what options should be interpreted, supporting accountable and defensible decision making	DO4, DO5

3.3.2. Conceptual Model

The conceptual model defines the user-facing structural elements that support structured, adaptive, and explainable REl in the context of AMS onboarding. It provides a stable abstraction for organising elicited information and supporting decision-oriented interpretation, while intentionally excluding backend logic and data processing, which are outside the scope of this research. The model focuses on how elicitation is structured and navigated from an interaction design perspective.

As illustrated in Figure 3, the model distinguishes between clients, projects, and assessments. A client represents an organisational entity, while a project corresponds to a specific AMS onboarding engagement. Each project may include multiple assessments, allowing elicitation to be conducted from different bounded perspectives. Each assessment is organised by a context, which structures elicitation activities into clearly scoped domains and supports systematic coverage during onboarding.

Within each context, elicitation is structured through a topic and subtopic hierarchy. Subtopics are clarified through questions associated with predefined response options, with questions remaining independent of any fixed presentation order.

This separation between informational structure and interaction flow enables adaptive questioning while preserving consistency and traceability. Elicited information is synthesised into context-level summaries and consolidated at the project level, supporting reflective interpretation and uncertainty-aware decision support across assessments.

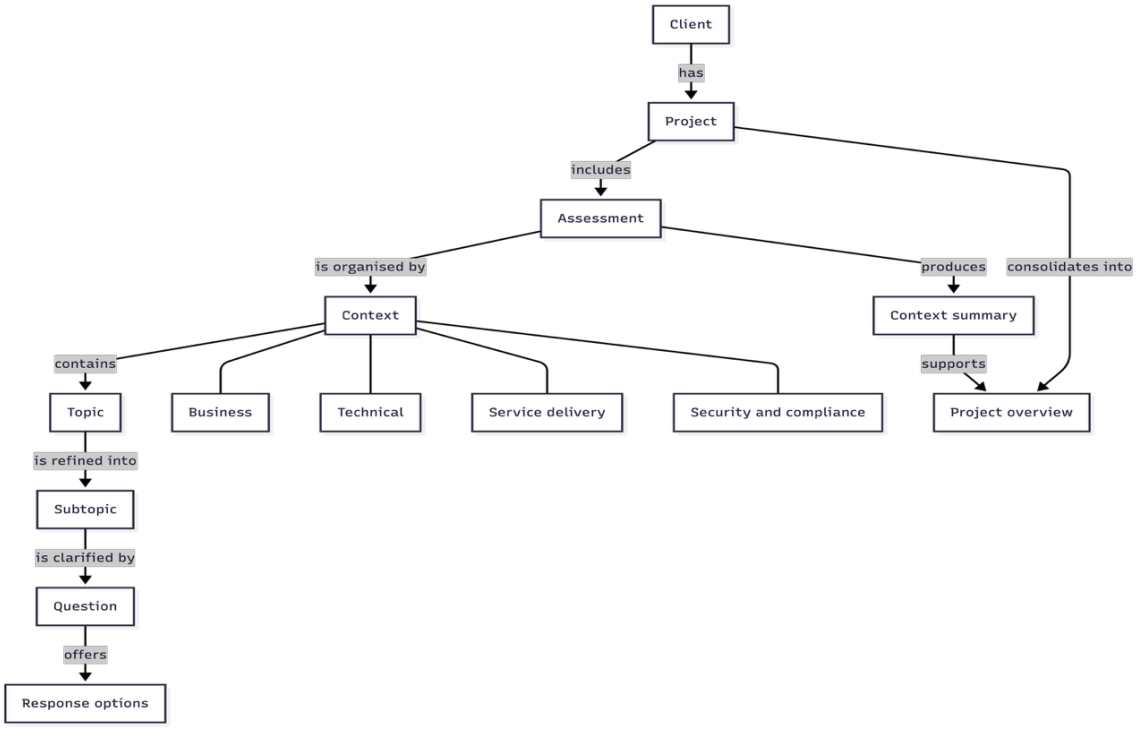


Figure 3: Conceptual diagram

3.3.3. Interaction Design

This section describes how the conceptual model defined in the previous section is experienced by users as an interactive assessment during AMS onboarding. The design emphasises how REl is conducted as a structured and adaptive dialogue that supports decision-making under conditions of incomplete and evolving information.

Assessments are always conducted within a defined client, project, and assessment context, ensuring that elicitation activities are grounded in a concrete AMS engagement. Therefore, the creation of clients, projects and assessment context selection are considered as prerequisites. From the user's perspective, this framing establishes a clear scope for the interaction and a shared understanding of the assessment's purpose. Once an assessment context is selected, the interaction proceeds as an elicitation dialogue that covers the relevant information associated with that context. The interaction is typically facilitated by an AMS consultant in direct engagement with client stakeholders, either in person or through remote collaboration tools, with stakeholders providing responses during the elicitation dialogue.

The elicitation interaction does not follow a fixed sequence of questions. Instead, the dialogue remains focused on areas that require clarification, allowing users to progressively refine their understanding as information is provided.

This interaction design reflects the iterative nature of REl, where stakeholders understanding develops over time and progressively refine their earlier interpretations of requirements through ongoing discussion. As a result, the interaction is experienced as a focused and coherent dialogue.

Throughout the assessment, users interact within a single, persistent interaction space in which the overall screen structure and layout remain constant. While this stable frame is maintained, key content components are dynamically refreshed as the assessment progresses, including the current topic, question titles, available response options, interaction-level explanations, and the progress indicator. This combination of structural stability and dynamic content supports cognitive continuity by allowing users to maintain orientation and contextual awareness over time without the need to manage navigation between elicitation steps [31].

When the elicitation phase concludes, the interaction transitions from information gathering to interpretation in which summarise the information collected across topics and subtopics within the selected context. These summaries are intended to support reflection and discussion rather than to present definitive conclusions.

3.3.4. Adaptive Elicitation

Adaptive Elicitation (AE) describes how the assessment interaction supports a focused and responsive REl diagnostic dialogue during AMS onboarding, from the user's perspective. Instead, then treating elicitation as a linear questionnaire, the interaction is designed to remain responsive to the evolving understanding of stakeholders, reflecting the variability of project contexts, stakeholder knowledge, and informational uncertainty that characterise AMS engagements.

AE is applied consistently across four assessment contexts: Business, Technical, Service Delivery, and Security and Compliance. These contexts represent complementary assessment perspectives that collectively address the primary dimensions of REl in early AMS onboarding decisions.

The business context focuses on understanding the organisational and operational context of the client, including business objectives and situational factors such as industry characteristics that shape service expectations. The technical context addresses the characteristics of the application landscape and supporting infrastructure that constrain maintenance and evolution activities. The service delivery context examines how operational responsibilities, support processes, and transition considerations are expected to be managed, while the security and compliance context addresses regulatory, contractual, and data protection obligations that may introduce additional constraints or risks.

Together, these perspectives support structured exploration of decision-relevant concerns without requiring exhaustive specification at the early stages of onboarding.

Within each context, AE is structured using the topic and subtopic model introduced in Section 3.3.2. Topics define areas of inquiry relevant to decision-making within a given context, while subtopics capture specific aspects of understanding that require clarification. From an interaction standpoint, this structure provides a stable cognitive scaffold that supports consistent coverage while allowing attention to be directed towards areas that warrant further clarification during the assessment.

Table 4 presents an illustrative example of topics and subtopics across the four assessment contexts, demonstrating how a common structural approach is applied while addressing context-specific concerns. The table is intended to support understanding of the interaction structure rather than to provide an exhaustive specification. The complete topic and subtopic list for each context are provided in Appendix A.

Table 4: Example of Topic-Subtopic Structure Across Contexts

Assessment Context	Topic	Subtopic	Diagnostic Purpose
Business	Business Context and Value	Business objectives and expected AMS outcomes	Establishes strategic drivers and success criteria
Technical	Application and System Architecture	Application architecture type	Identifies technical complexity and constraints
Service Delivery	Support Model and Service Scope	Support levels and responsibilities	Assesses service readiness and coverage expectations
Security and Compliance	Regulatory and Compliance Requirements	Applicable regulations and standards	Identifies compliance-driven obligations

From the UX perspective, adaptivity is experienced through the relevance and focus of the questions presented during the elicitation dialogue. Areas that require clarification remain the focus of discussion, while unnecessary questioning is avoided in areas where sufficient understanding has already been achieved. From the user's perspective, adaptivity is manifested through the way the interaction maintains focus on clarification when responses indicate incomplete or uncertain understanding and progresses to subsequent subtopics when sufficient clarity has been achieved. The interaction supports a conversational flow in which follow-up questions are presented to refine understanding where needed, while avoiding unnecessary questioning in areas that are already well understood.

The generation of questions, response options, and interaction-level explanations within the assessment is supported by a Next Best Question (NBQ) approach. The logic used to determine which questions, options, and explanations are presented is outside the scope of this research and is addressed in a separate thesis. In the context of this research, NBQ is treated as a user-facing interaction pattern that supports adaptive and explainable interaction, without being examined at the level of algorithmic design or implementation.

AE supports AMS consultants and client stakeholders by making areas of uncertainty visible and by guiding attention towards aspects of the assessment that may benefit from further discussion.

In its current design, the assessment interaction is based on single and multiple choice questions. This design decision was taken to preserve a clear focus on interaction structure, adaptivity, and explainability, without introducing additional complexity related to the interpretation of unstructured user input. Unresolved or partially understood aspects are treated as legitimate outcomes of the elicitation process, reinforcing transparency and supporting accountable decision-making during AMS onboarding.

3.3.5. Explainability

Explainability is a central design consideration in the AMS Assessment Tool due to its support for the adaptive interaction and its role as a decision support instrument. As users engage with the assessment, they are required not only to interpret what information is being requested, but also to understand why particular questions and response options are presented at specific moments. From a UX perspective, explainability supports sense-making, trust, and accountability by making the interaction intelligible rather than opaque.

This research approaches explainability as a user-facing interaction concern instead of a property for underlying algorithms or models. Accordingly, this section focuses exclusively on how explanatory information is presented within the assessment interface to support user understanding during elicitation, without addressing the computational logic that generates adaptive behaviour or explanatory content, which is covered in a separate thesis.

Explainability within the assessment interaction is implemented through two complementary forms of user facing explanation: question level and option level explanations. Question level explanations clarify the intent of a specific elicitation item by indicating why a question is relevant within the current assessment context. To balance transparency with cognitive load, question level explanations are presented in a collapsed form by default, while allowing users to expand them on demand to access a more detailed rationale explaining why the question has been included at that point in the assessment. This approach supports progressive disclosure, enabling users to obtain additional context when needed without interrupting the overall flow of the interaction.

Option level explanations focus on clarifying the meaning, scope, and implications of individual response options. In AMS onboarding, response options often represent distinct characteristics of the client environment, application landscape, or service expectations, which may be interpreted differently by different stakeholders. By providing concise explanations at the option level, the interface supports accurate interpretation of response choices and helps users align their selections with their own understanding and reasoning about the project context. This is particularly important when consultants are responding on behalf of multiple stakeholders or when terminology may be ambiguous.

Together, question and option level explanations support complementary aspects of user sense-making during AE. Question level explanations assist users in understanding the direction and intent of the assessment dialogue, while option level explanations support the articulation of accurate and confident responses. Separating explanations across these two levels allows explanatory information to be presented selectively, ensuring that users can access clarification when needed without being overloaded with unnecessary detail.

Explainability does not aim to justify or defend automated decisions, but rather to enable users to understand and reflect on the assessment process as it unfolds, reinforcing the role of the tool as a decision-support aid within AMS onboarding.

3.4. Demonstration

The purpose of this demonstration is to instantiate the AMS Assessment Tool by illustrating how the design decisions presented in Section 3.3 are expressed through the UI. The demonstration aims to show the internal coherence of the proposed artefact by exemplifying how AE and explainability are experienced during an assessment interaction in an AMS onboarding context. The wireframes presented are also the result of feedback collected in the two iterations. The details of each input collected will be discussed in detail in Chapter 4.

A realistic but fictional client scenario is used to illustrate the interaction within a single assessment context, allowing the full assessment lifecycle to be demonstrated. Key stages of the interaction are presented, including client and project creation, assessment initiation, adaptive progression of questions, question and option level explainability, and assessment completion. The wireframes were created using Figma is used to represent these stages and should be interpreted as illustrative representations of the proposed interaction design rather than as a fully implemented system.

The demonstration is intended to simulate a diagnostic REl assessment from a UX perspective. The wireframes focus on illustrating how questions are presented, how the interaction progresses in response to user input, and how explainability is embedded within the assessment interface. This focus reflects the scope of the research, which centres on the design of the assessment interaction and its UX and UI implications.

3.4.1. Demonstration Scenario and Scope

The demonstration is based on a fictional yet representative AMS onboarding scenario, designed to illustrate how the AMS Assessment Tool can be applied in practice. The scenario is used to contextualise the interaction design, AE, and explainability concepts introduced in Section 3.3, without relying on data from real client engagements. Its purpose is to provide a concrete but controlled setting in which the proposed interaction model can be exemplified.

In the demonstration, the AMS Assessment Tool is used by an experienced AMS consultant responsible for initiating and facilitating the assessment with client stakeholders.

For the purposes of the scenario, the stakeholders that the AMS consultants interact, are client-side service delivery managers and operational roles responsible for overseeing application support services. The assessment interaction is assumed to take place either in person or through a virtual meeting, where information is elicited collaboratively and clarified through discussion. This setting reflects the intended use of the artefact as a decision support tool that structures diagnostic interaction between consultants and client stakeholders during AMS onboarding.

Table 5 summarises the key characteristics of the fictional client and project scenario used in the demonstration. To maintain focus and avoid unnecessary repetition across assessment contexts, the demonstration concentrates on the Service Delivery context. This context is considered representative of AMS onboarding activities, as it commonly involves ambiguity related to service scope, operational dependencies, and resource responsibilities. The interaction patterns illustrated in the demonstration are not specific to this context and are equally applicable across the remaining assessment contexts defined in the model.

Table 5: Fictional Client Characteristics

Category	Characteristics Used in the Demonstration
Industry and Sector	Healthcare organisation operating in a regulated environment
Organisation Size	Medium sized enterprise, used to represent a typical AMS client with established operational processes
Application Portfolio Size	Limited application portfolio
Portfolio Composition	Combination of legacy monolithic systems and modern cloud-based applications
Technology Landscape Complexity	Moderate technical complexity characterised by heterogeneous technologies and partial system integrations
Current Service Delivery Setup	AMS delivery model involving an external provider, with limited documentation and evolving operational boundaries
Business Criticality	Medium business criticality, where applications support core operations without being continuously mission critical
Primary Motivation for AMS	Improvement of service stability and gradual modernisation of the application landscape
Known Pain Points	Incomplete documentation and change management practices that motivate structured assessment and clarification

3.4.2. Assessment Initiation and Context Selection

The assessment interaction begins once the client, project, and assessment context have been defined within the tool. As described in Section 3.3, these elements are treated as prerequisites to the elicitation process and establish the organizational and engagement context within which assessments are conducted. Appendix B presents additional wireframes illustrating how consultants manage clients and projects, review existing assessments, and initiate new assessments within the AMS Assessment Tool.

From the Assessments section of the navigation menu or clicking "New Assessment" on the project screen (See Appendix B), the consultant initiates a new assessment by selecting the assessment type, the relevant client and project, and the desired assessment context, which in the demonstration is the Service Delivery context. This interaction establishes the scope of the assessment and frames the subsequent elicitation dialogue, while maintaining a consistent interaction pattern across different contexts.

Figure 4 illustrates the assessment initiation and context selection as instantiated in the AMS Assessment Tool. The wireframes show how the consultant reviews client and project information, confirms assessment prerequisites, and selects the Service Delivery context prior to entering the elicitation interaction. The figure is intended to demonstrate how assessment setup is clearly separated from elicitation, reinforcing the consultant's role in framing the assessment before engaging in adaptive questioning.

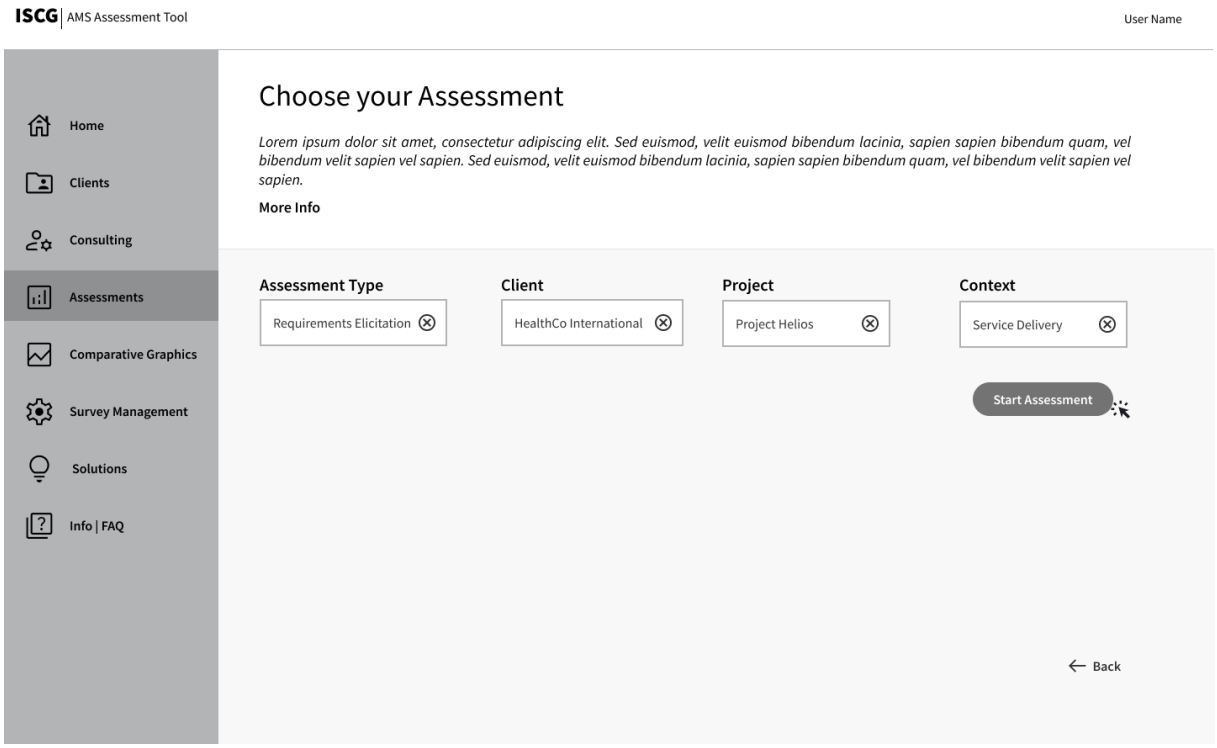


Figure 4: Choose Your Assessment Screen

By explicitly distinguishing assessment initiation from the elicitation interaction, the tool supports deliberate framing of the assessment context and scope. This separation helps ensure that AE is grounded in a clearly defined engagement setting, while preserving the consultant's professional responsibility for initiating and contextualising the assessment.

3.4.3. Adaptive Elicitation in Practice

Following assessment initiation and context selection, the interaction enters the adaptive elicitation phase. At this stage, the AMS consultant conducts a live elicitation session with client stakeholders, using the AMS Assessment Tool as a structured medium for diagnostic dialogue. The assessment is experienced within a single, persistent interaction space, while the content presented are dynamically refreshed as the discussion progresses and understanding is refined. Figure 5 illustrates the start of the elicitation interaction within the Service Delivery context. The initial question focuses on the support model and service scope, establishing a baseline understanding of how incidents are received, classified, and handled within the client organisation. Multiple response options are presented to allow consultants and stakeholders to describe service intake arrangements that may coexist in practice. From a UX perspective, this interaction supports articulation of existing practices without presupposing a single, uniform service model.

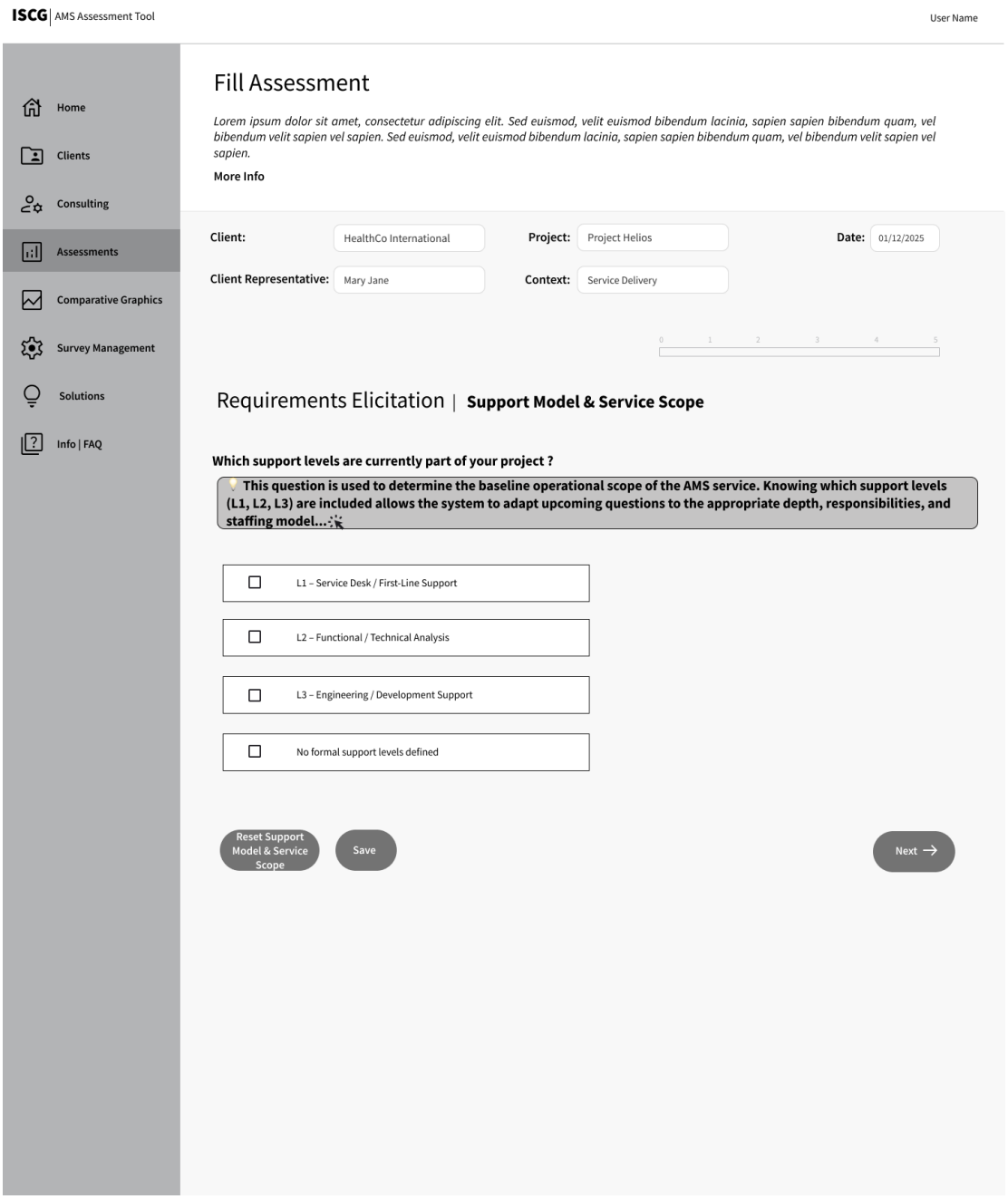


Figure 5: Initial Service Delivery Context Question

As the elicitation continues, the interaction shifts its focus to areas requiring further clarification. Figure 6 illustrates a follow-up question that supports deeper exploration of responsibility boundaries across support levels. The interaction maintains attention on aspects of the service model that remain unclear or require further articulation, reflecting the diagnostic nature of REl in AMS onboarding.

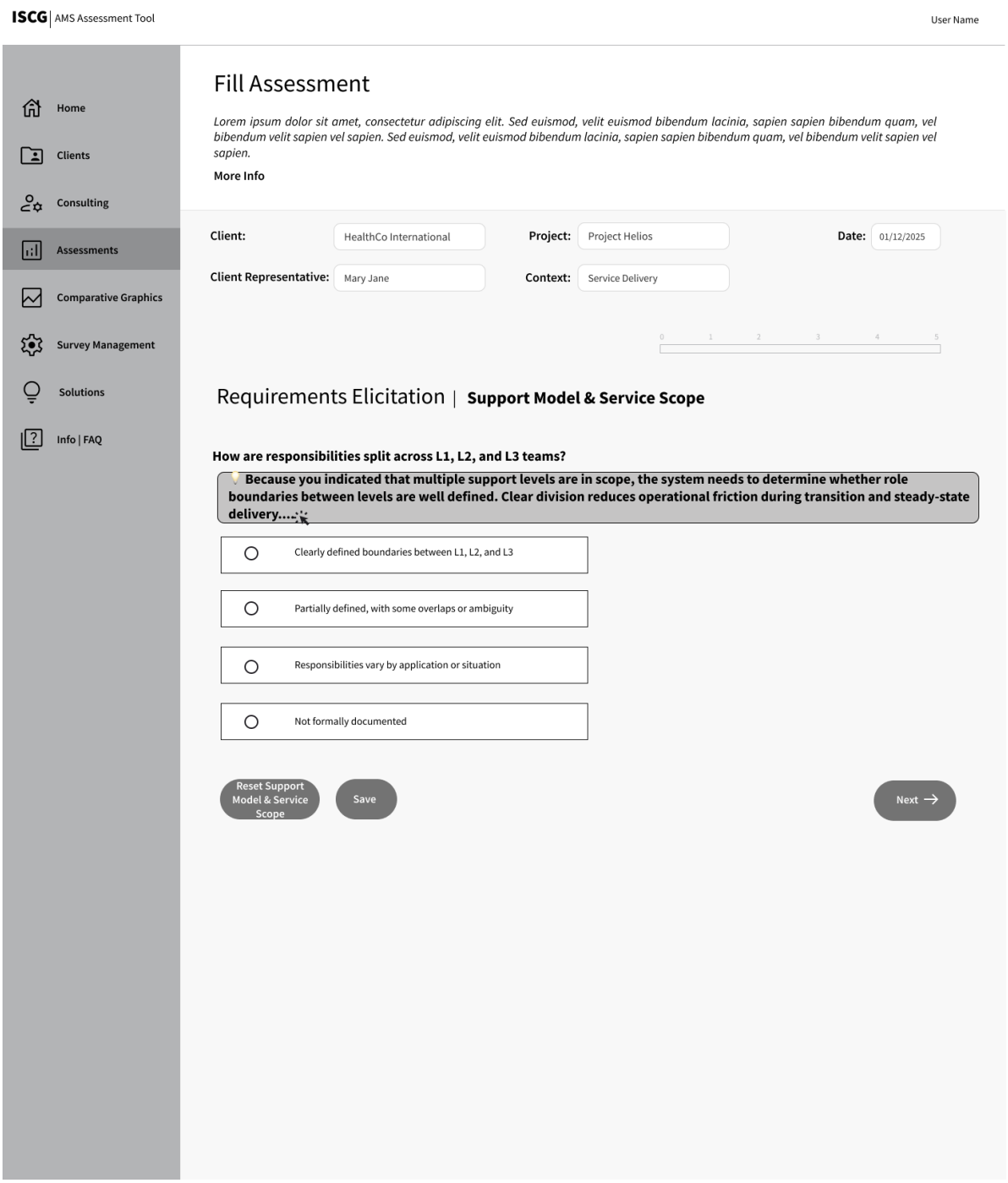


Figure 6: Follow-up question if three models are selected

When sufficient clarity is achieved within a given area of inquiry, the interaction advances to subsequent subtopics within the same assessment context. This progression maintains structured coverage while allowing the dialogue to remain responsive to the information provided by stakeholders. The consultant retains control over the pace and flow of the interaction, using the interface as a support for structured discussion rather than as a prescriptive questionnaire.

Overall, the AE interaction supports efficient and focused requirements clarification by concentrating discussion where uncertainty exists and avoiding unnecessary repetition. Additional adaptive paths that illustrate progression across subtopics and topics are provided in Appendix C as a follow-up the figures presented in this section.

3.4.4. Explainability in the Assessment

This section demonstrates how explainability is realised within the assessment interaction and experienced by client stakeholders during AMS onboarding. Building on the design principles introduced in 3.2 and explored in detail in 3.3.5, the demonstration illustrates how explanatory information is made available within the user interface to support understanding without interrupting the flow of elicitation.

Explainability is integrated as an interaction level layer that accompanies the elicitation dialogue. Explanations are presented in context and on demand, allowing stakeholders to understand both why a particular question is being asked and how individual response options should be interpreted. This approach supports sense making during assessment while avoiding unnecessary cognitive load.

Figure 7 illustrates an example of question level explainability. The figure shows an expanded explanation associated with a follow-up question concerning responsibility boundaries across different levels of support. The explanation clarifies why this question is relevant at this stage of the assessment and how it relates to reducing operational ambiguity during service transition and steady state delivery. The explanation is presented in a collapsible format, allowing stakeholders to access additional detail when required, in line with the principle of progressive disclosure.

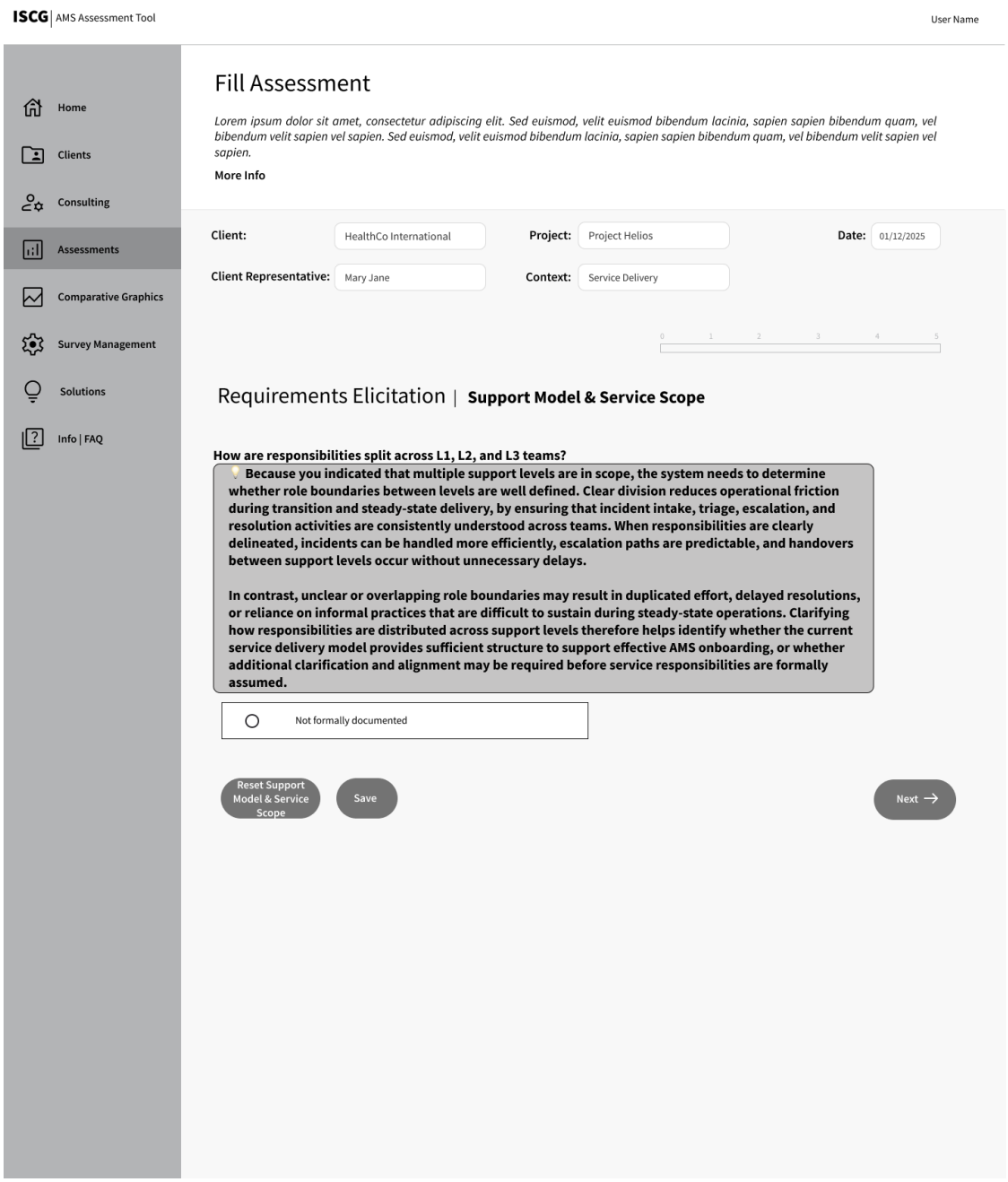


Figure 7: Question Level Explainability

Figure 8 presents an example of option-level explainability. In this case, an explanatory note is associated with the response option “Partially Defined with Some Overlaps or Ambiguity”. The explanation clarifies the meaning and implications of the option in the context of AMS onboarding, supporting stakeholders in selecting a response that accurately reflects their understanding of the current service arrangement. By providing clarification at the level of individual response options, the interaction helps reduce misinterpretation, particularly in situations where terminology may be interpreted differently by different stakeholders.

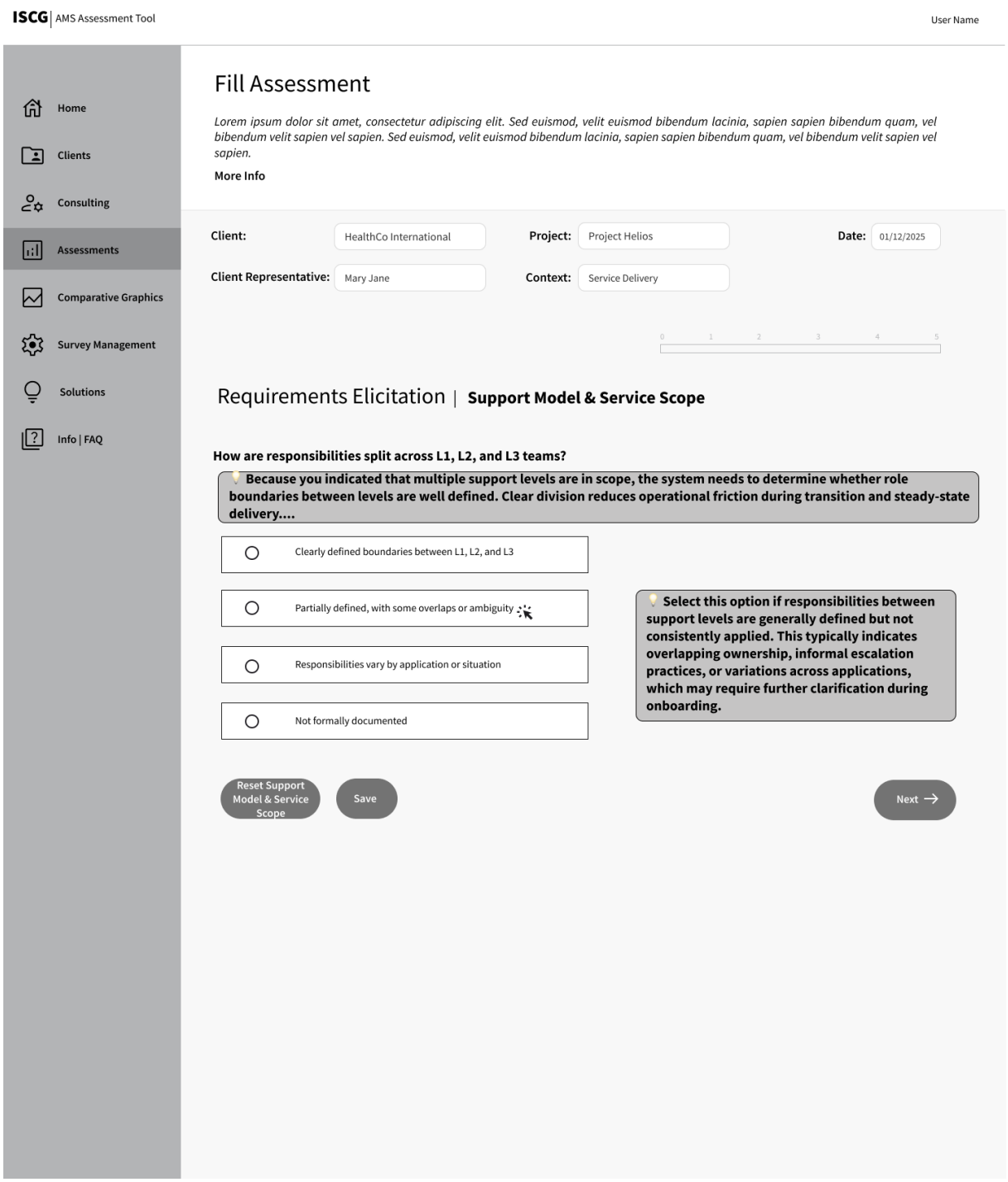


Figure 8: Option Level Explainability

Together, these examples illustrate how question-level and option-level explainability complement each other within the assessment interaction. Explanations are embedded within the same interaction space as the elicitation dialogue, ensuring that transparency is provided now it is needed. This integration supports informed participation and reinforces the role of the AMS Assessment Tool as a decision-support aid rather than as an opaque or prescriptive system.

3.4.5. Assessment Completion and Outcome Overview

Upon completion of the adaptive elicitation for the selected assessment context, the interaction transitions from information gathering to outcome review and interpretation. It shifts from supporting structured dialogue to supporting reflection on the information collected and the extent to which the assessed context has been clarified.

The screen highlights areas of clarity alongside remaining uncertainties, unresolved dependencies, and aspects that may require further attention before progressing with onboarding decisions. This approach reinforces the diagnostic nature of the assessment and avoids creating an illusion of completeness. Figure 9 presents an example of the assessment summary generated for the Service Delivery context.

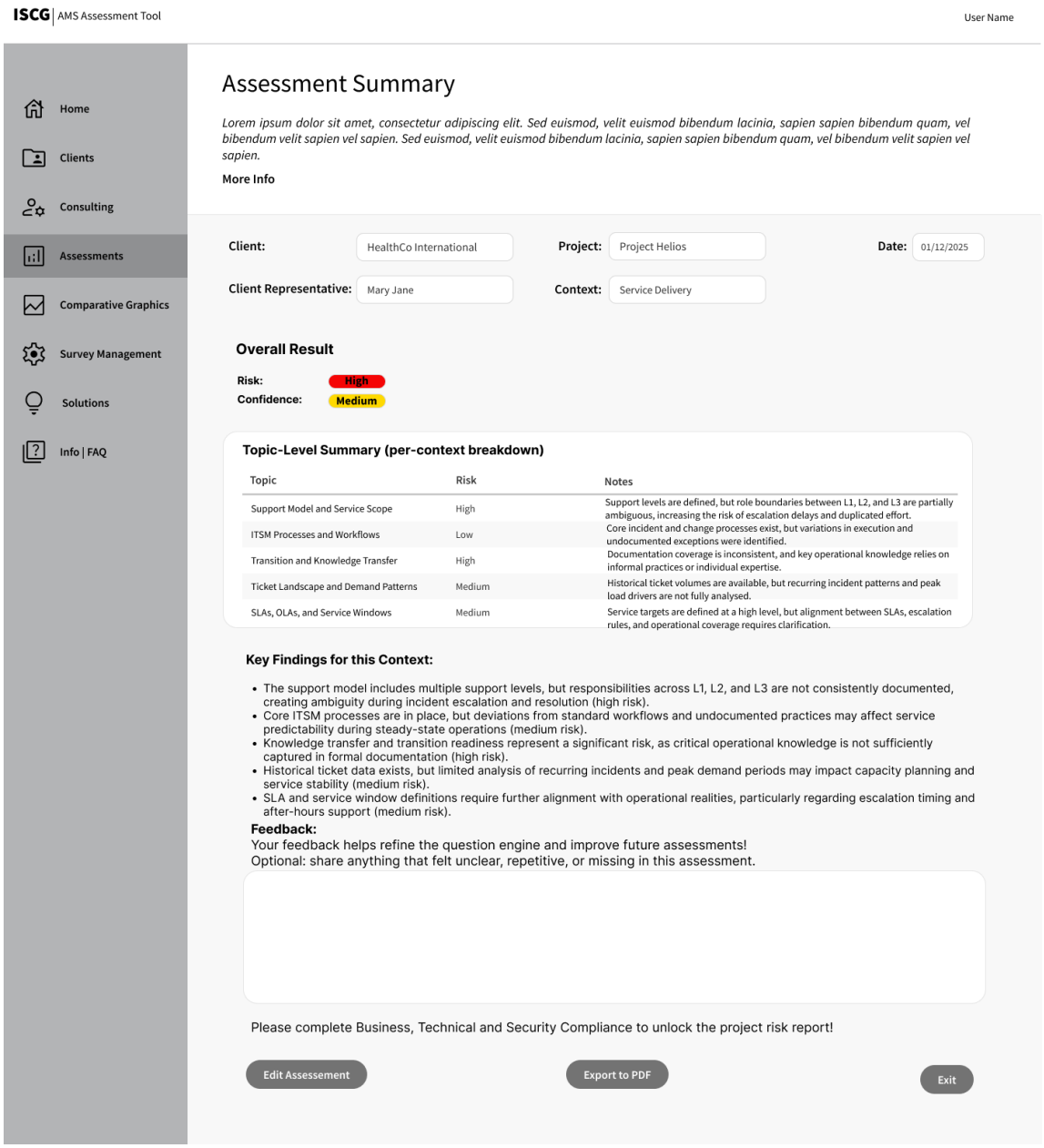


Figure 9: Assessment Summary for Service Delivery

The assessment summary includes a topic level breakdown that allows consultants to review how different dimensions of the Service Delivery context contribute to overall uncertainty. Risk indications at this level reflect the presence of unresolved or ambiguous areas identified during elicitation, supporting informed discussion rather than automated decision-making.

In addition, the summary highlights a set of key findings that synthesise the most relevant insights emerging from the elicitation process. These findings draw attention to issues such as documentation gaps, unclear roles and responsibilities, or operational dependencies that may introduce onboarding or steady-state delivery challenges. By explicitly surfacing these aspects, the summary supports accountable decision-making without implying final judgements.

The assessment summary also provides a space for qualitative feedback on the elicitation experience from both the consultant and client stakeholder perspectives. This feedback supports reflective evaluation of the assessment interaction itself and informs future refinement of the assessment structure and interaction design.

While the example presented focuses on a single assessment context, individual context summaries contribute to a consolidated project level overview once all contexts have been completed. To preserve transparency and traceability, the tool maintains a clear separation between context level assessment outcomes and their aggregation at the project level, supporting higher level readiness evaluation and next-step planning.

3.5. Evaluation Methodology

The evaluation of the AMS Assessment Tool was conducted to assess the relevance, suitability, and perceived usefulness of the proposed artefact for professional AMS onboarding practice. In line with DSR, the evaluation focuses on whether the artefact is perceived to address the challenges identified in current REl practices, particularly those related to ambiguity, contextual variability, and early decision readiness. Technical performance and optimisation outcomes were explicitly outside the scope of the evaluation.

To support this assessment, a mixed-method evaluation approach was adopted, combining an exploratory survey with expert interviews involving AMS professionals experienced in REl for project onboarding.

The survey provided an overview of current elicitation practices, perceived limitations of existing approaches, and practitioner expectations. The expert interviews enabled in-depth assessment of the artefact's conceptual structure, interaction design, adaptive interaction, and explainability features. Together, these methods support a formative evaluation centred on practitioner judgement and practical applicability.

3.5.1. Evaluation Objectives

The evaluation of the AMS Assessment Tool was guided by three objectives derived from the research problem, the gaps identified in the state of the art, and the design objectives defined in Section 3.2. Together, these objectives ensure that the evaluation addresses both the problem context and the proposed solution, in alignment with the principles of DSR.

The first evaluation objective was to examine current challenges and limitations in AMS REl practices. This objective focuses on understanding practitioners' perceptions regarding requirements ambiguity, information incompleteness, and the adequacy of existing tools and approaches used during AMS onboarding.

The second evaluation objective was to assess whether the proposed artefact is perceived as relevant and suitable for supporting AMS onboarding decisions. This objective involves validating the artefact's conceptual and interaction framework, including client and project setup, assessment initiation and context selection, and the use of four context-specific assessments as a structured approach to AMS onboarding evaluation.

The third evaluation objective was to examine practitioner perceptions of the adaptive elicitation and explainability design embedded in the artefact. This objective focuses on determining whether these interaction mechanisms are perceived as useful for clarifying uncertainty, supporting interpretation, and increasing confidence in assessment outcomes during AMS onboarding.

3.5.2. Evaluation Design and Methods

The evaluation combined an exploratory survey of AMS practitioners with expert interviews to provide both breadth and depth in understanding current RE**I** practices and to support professional judgement of the proposed artefact.

The survey was distributed to AMS consultants involved in project request assessment and onboarding activities. It explored how REl is currently conducted, common challenges encountered, perceptions of ambiguity and information gaps, and expectations regarding structured assessments, adaptive questioning, and assessment summaries

Following the survey, expert interviews were conducted in two iterations. The first iteration focused on exploratory feedback regarding the artefact's initial conceptual design, including the appropriateness of the conceptual model and the feasibility of performing structured assessments during AMS onboarding. Feedback from this iteration informed substantive refinements to the artefact, most notably the transition from a single generic assessment to multiple context-specific assessments, which helped to clarify scope and reduce cognitive load.

The second iteration focused on confirmatory assessment of the revised artefact. These interviews examined whether the refined design was perceived as clear, usable, and useful, with particular emphasis on the topic–subtopic structure, adaptive interaction, and explainability features. Participants were presented with selected wireframes and interaction scenarios to anchor discussion and assess perceived applicability to real-world AMS onboarding decisions.

3.5.3. Data Analysis and Validity Considerations

Data from the survey and expert interviews were analysed using a combination of quantitative and qualitative methods, reflecting the exploratory and formative nature of the evaluation. Descriptive statistics were used to analyse quantitative survey responses and identify common patterns in current AMS REl practices. Qualitative data from open-ended survey responses and interview transcripts were analysed thematically to capture practitioner perceptions related to ambiguity, assessment structure, adaptive interaction, and explainability.

Construct validity was supported through alignment between the evaluation instruments, the research question and the design objectives defined earlier in this research. External validity is limited by the relatively small and context-specific sample of participants, which reflects the exploratory nature of the study.

The evaluation focused on perceived usefulness, clarity, and suitability for professional AMS onboarding contexts.

The artefact was evaluated using selected wireframes and interaction scenarios rather than a fully implemented system, which may influence perceptions of interaction quality. Assessment summaries were not reviewed during the interviews to maintain focus on the assessment interaction model itself. The evaluation results are presented and analysed in Chapter 4 and discussed in relation to the research questions and design principles established in Chapter 3.

CHAPTER 4

Results and Discussion

This chapter presents and discusses the results of the evaluation of the AMS Assessment Tool. Building on the evaluation methodology defined in Chapter 3, it reports findings derived from an exploratory survey and iterative expert interviews conducted with experienced AMS professionals. The purpose of this chapter is to assess how the proposed artefact addresses challenges in REl and early project request evaluation within AMS environments, with particular attention to its perceived usefulness, clarity, and suitability for professional practice.

In line with the DSR approach adopted, evaluation findings are first reported to describe practitioner perspectives and validation outcomes, followed by an interpretative discussion that relates these results to the research question, the state of the art, and the design principles underpinning the artefact. Emphasis is placed on expert judgement and formative validation rather than on empirical performance measurement, reflecting the exploratory and design-oriented nature of the research.

4.1. Overview of Evaluation Results

This section provides an overview of the evaluation results obtained through the mixed method approach described in Chapter 3. The evaluation produced two complementary sources of evidence, namely an exploratory survey and iterative expert interviews with experienced AMS consultants. Together, these sources support an assessment of how the proposed artefact addresses challenges in AMS REl from a professional practice perspective.

The survey results offer contextual insights into current AMS REl practices, highlighting recurring challenges, sources of ambiguity, and perceived limitations of existing approaches. The survey is treated as exploratory and descriptive, providing breadth and situating the artefact within the realities of AMS environments rather than serving as direct validation.

The expert interviews represent the primary source of validation evidence. Conducted in two iterative rounds, they enabled both formative assessment of the artefact's initial conceptual framework and validation of its refined design.

Feedback from the first iteration informed substantive refinements, including the introduction of context-specific assessments and improvements to the presentation of explainability, such as expanding question level explanations and introducing option level explainability. The second iteration focused on validating the updated artefact, particularly regarding the clarity, usability, and perceived utility of its AE and explainability mechanisms.

Across both evaluation methods, the results highlight the importance of structured yet flexible elicitation approaches in AMS contexts characterised by uncertainty and project-specific variability. In line with the DSR approach adopted, evaluation findings are presented in the following sections prior to interpretation. These results are later synthesised and discussed in relation to the research questions, the state of the art, and the design principles underlying the AMS Assessment Tool.

4.2. Survey Results

The survey was completed by sixteen AMS consultants with professional experience in application maintenance services and project onboarding activities. Its objective was to characterise current AMS request evaluation practices, identify recurring challenges during requirements elicitation, and capture the consultants' perceptions regarding the need for adaptive and explainable assessment capabilities. The survey primarily served to ground the research problem in professional practice and to motivate the design objectives, while validation of the proposed artefact against these objectives was conducted through expert interviews. The complete survey evaluation instrument is provided in Appendix D.

The main findings from the survey consists that respondents reported that incomplete and ambiguous project requests are a frequent characteristic of AMS onboarding. As illustrated in Figure 10, most respondents indicated that they encounter requests lacking sufficient clarity either frequently or very frequently, while only a small minority reported that such situations occur rarely. This result reinforces the problem context identified in the previous chapters, namely that AMS providers often need to make early bid and delivery decisions based on partial or uncertain information. The prevalence of ambiguity at the point of request initiation highlights the limitations of using static tools and iterative elicitation approaches in complex AMS environments.

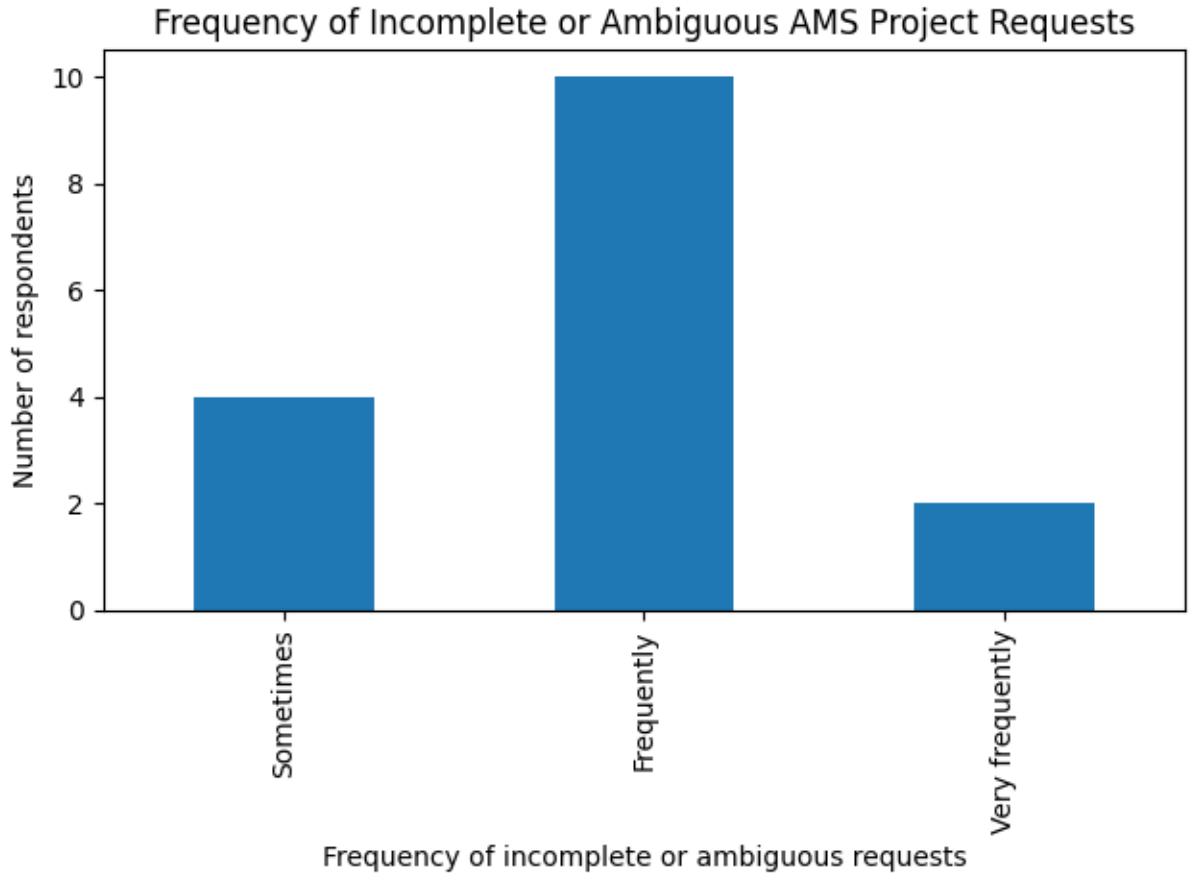


Figure 10: Frequency of Incomplete or Ambiguous AMS Project Requests

Beyond current challenges, the survey also explored respondents' agreement with a set of capability statements describing adaptive and explainable assessment features. These statements focused on dynamic adaptation of questions based on previous answers, explanation of why questions are asked, clarification of how answers influence outcomes, and the perceived impact of such features on efficiency and client collaboration. The results are summarised in Figure 11.

Across all five statements, respondents showed a strong tendency towards agreement or strong agreement. Neutral responses were present but limited, while no respondents expressed disagreement with the proposed capabilities. This pattern suggests broad practitioner alignment with the underlying concepts of AE and integrated explainability, independent of any specific tool implementation. Importantly, these results should be interpreted as an indication of perceived relevance and usefulness of such capabilities in AMS contexts, rather than as evidence of artefact effectiveness.

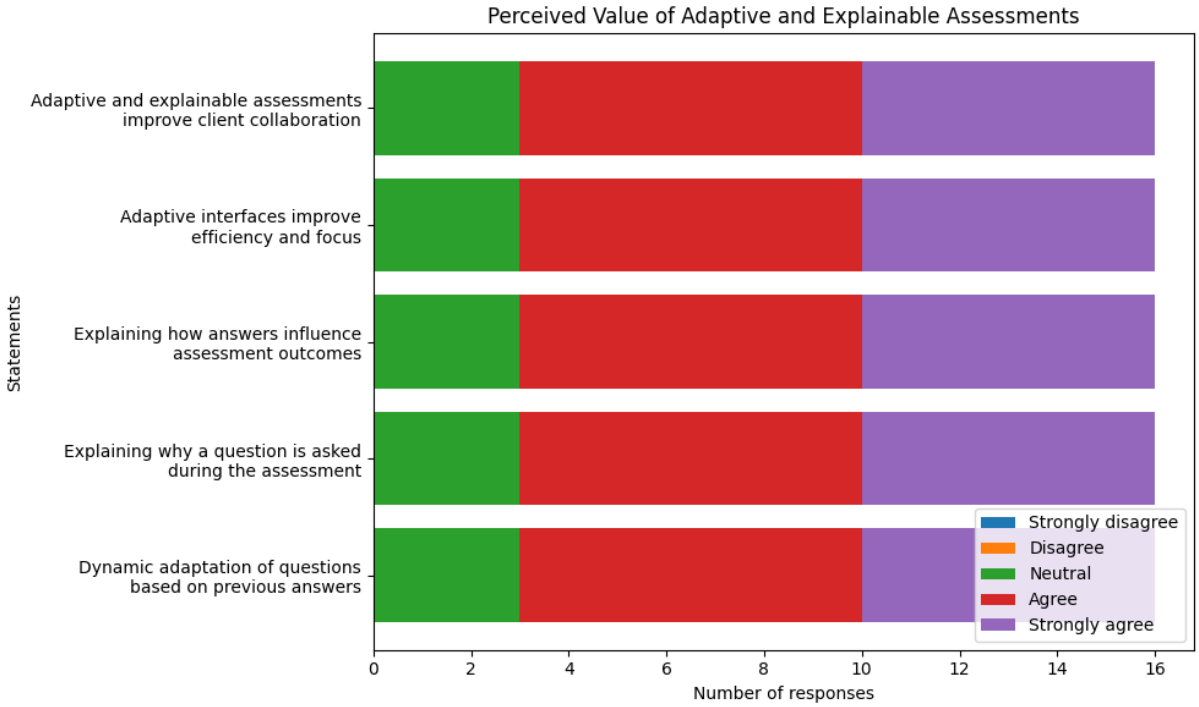


Figure 11: Perceived Value of Adaptive and Explainable Assessments

Taken together, the survey results provide empirical support for the relevance of the research problem and the design objectives defined in Chapter 3. The high frequency of ambiguous requests substantiates the need for mechanisms that can progressively clarify requirements, while the strong agreement with adaptive and explainable capabilities indicates that such mechanisms align with professional expectations in AMS practice. These findings motivated the subsequent expert interview evaluation, which focused on assessing whether the proposed artefact design appropriately operationalises these capabilities for real world AMS onboarding scenarios.

4.3. Expert Interview Evaluation Findings

This section presents the results of the expert interview evaluation conducted to assess the suitability, clarity, and perceived utility of the proposed artefact for professional AMS onboarding practice, that includes showing its conceptual framework, topic and subtopic structure, AE logic, and explainability mechanisms. The interviews were conducted in two distinct iterations, following a DSR evaluation approach that combines formative refinement with subsequent validation.

The first interview iteration involved three experts which and served an exploratory and formative purpose. Feedback from this iteration informed refinements to the topic and subtopic model, the assessment interaction flow, and the presentation of question level and option level explainability within the interface. The second interview iteration involved thirteen experts who had not participated in the first round and focused on evaluating the refined artefact. This iteration examined the clarity of the assessment structure, the coherence and usability of the adaptive assessment interaction, and the perceived value of the artefact in supporting informed decision-making during AMS request evaluation.

Experts participating across both interview iterations represented a range of professional roles involved in AMS onboarding and delivery, including Vice President of Consulting (VP Consulting), Director Consulting Delivery (DC Delivery), Director Consulting Expert (DC Expert), Project Manager (PM) and Senior Consultants (SC), presented in Table 6. While participants held different levels of seniority, all were engaged in requirements elicitation, project scoping, or early-stage decision making in AMS contexts.

Table 6: Interviewees Information

Iteration	Role	Years of AMS Experience	Centre	Interview Format
First iteration	DC Delivery	8-12	Energies	In Person
	DC Delivery	0-3	Energies	Video Call
	DC Delivery	13+	Cloud	In Person
Second iteration	VP Consulting	13+	Energies	Video Call
	DC Delivery	13+	Cloud	In Person
	DC Delivery	13+	Cloud	In Person
	VP Consulting	13+	SAP	In Person
	VP Consulting	13+	Cloud	Video Call
	DC Delivery	13+	SAP	Video Call
	DC Delivery	13+	Cloud	In Person
	DC Expert	4-7	Cloud	Video Call
	PM	8-12	Energies	Video Call
	SC	0-3	Cloud	In Person
	SC	0-3	Cloud	Video Call
	DC Delivery	4-7	Cloud	Video Call
	DC Delivery	13+	Cloud	Video Call

4.3.1. First Iteration, Formative Evaluation Findings

The first iteration of expert interviews was conducted as a formative evaluation aimed at assessing the conceptual soundness, structural coherence, and initial interaction assumptions of the proposed artefact prior to refinement. Three AMS consultants participated in this iteration, all of whom were directly involved in AMS onboarding and early-stage project evaluation. During the interviews, experts were guided through representative wireframes of the assessment interface and narrated adaptive paths across the questions that were formed from a subtopic, enabling them to reflect on the intended interaction behaviour rather than on static artefacts alone. The objective of this iteration was to identify conceptual gaps, structural ambiguities, and potential risks in the proposed approach, rather than to validate its effectiveness. The interview protocol that contains the artefact description, the wireframes designed for the first iteration and guiding questions used in this first iteration are provided in Appendices E and F.

Experts suggested the separation of the assessment structure into multiple contexts as appropriated for AMS onboarding. The distinction between business, technical, and service delivery perspectives was viewed as consistent with professional practice, supporting the idea that REl in AMS environments cannot be effectively captured through a single generic assessment.

The topic and subtopic-based assessment structure was largely regarded as relevant and logically organised, particularly in its ability to guide discussions across complex and interdependent areas. However, experts also highlighted areas where coverage could be further extended. Commercial and financial considerations, such as pricing or engagement models and the attachment of RFP documents for requirements ingestion were identified as relevant to AMS onboarding decisions but there were considered complex, and their partial omission was noted as a limitation of the artefact, not necessarily a design flaw.

AE was broadly accepted as a promising approach, especially in scenarios where initial responses are incomplete or ambiguous. Experts acknowledged that the ability to trigger follow up questions based on prior answers reflects the iterative nature of real world REl. However, concerns were raised regarding the transparency of adaptive behaviour.

Participants emphasised that adaptive transitions between questions must be clearly justified to avoid perceptions of arbitrariness or loss of control, particularly in high stakes contexts such as bid or no bid decision making. This feedback underscored the importance of integrating clear explanatory cues alongside adaptive question sequencing.

Explainability emerged as a critical theme during the first iteration, though it was initially framed at a question level. Experts recognised the value of providing explanations for why specific questions appear during the assessment. In addition, one expert explicitly suggested that explanations should also be associated with individual response options, for example by displaying contextual information when a user interacts with an option. This observation highlighted the potential role of option level explainability as a means of reducing ambiguity and supporting more confident responses. Notably, this requirement was not pre-defined in the initial design but emerged directly from expert interaction with the wireframes and narrated adaptive paths.

Overall, the first iteration provided valuable formative insights into the conceptual and interaction level assumptions of the artefact. Key findings included the need for clearer differentiation between assessment contexts, improved transparency of AE, enhanced explainability at both question and option levels, and acknowledgement of commercial considerations as an unresolved but relevant dimension. These findings directly informed the refinements applied to the artefact prior to the second interview iteration.

4.3.2. Artefact Refinements Resulting from the First Iteration

The formative feedback obtained during the first iteration of expert interviews informed a focused set of refinements to the proposed artefact. These refinements did not change the underlying intent of the assessment model but addressed conceptual and interaction level concerns related to context specificity, adaptive transparency, and explainability. The objective was to translate expert observations into concrete design improvements while maintaining the artefact's positioning as a decision support tool.

One of the main outcomes of the first iteration was the clarification of assessment structure. Although experts broadly accepted the multidimensional framing of AMS onboarding, feedback highlighted the limitations of a generic assessment approach. In response, the artefact was refined to explicitly separate assessments into distinct contexts, each supported by its own topic and subtopic structure, thereby improving relevance and reducing ambiguity during elicitation.

Concerns related to the interpretability of adaptive behaviour also informed refinements to the elicitation logic. While adaptive sequencing was viewed as appropriate, experts emphasised the need for clearer justification of follow up questions. As a result, adaptive paths were refined to prioritise progressive clarification within a topic before advancing to subsequent subtopics, reducing the perception of arbitrary question transitions.

Explainability was significantly refined following the first iteration. Question level explanations were revised to more clearly justify why specific questions appear, particularly in response to ambiguous or incomplete answers. In addition, option level explainability was explicitly introduced as a new interaction mechanism. This feature, which was not pre-defined in the initial design, emerged directly from expert feedback and enables contextual information to be associated with individual response options, supporting more confident and informed user input.

In addition to conceptual and interaction-level refinements, experts also provided feedback on supporting interface affordances that affect practical usability during AMS onboarding. These included the ability to save and resume assessments, restart elicitation from a specific topic, and improve visual alignment of interface elements such as topic title in the header and explainability text. While these changes did not alter the underlying assessment logic, they were incorporated to improve interaction continuity, navigability, and clarity during extended elicitation sessions.

Table 7 summarises the relationship between key formative feedback themes and the corresponding artefact refinements implemented prior to the second interview iteration.

Table 7: Mapping of Formative Feedback to Artefact Refinements

Formative feedback theme	Resulting artefact refinement
Generic assessment insufficient for AMS onboarding	Explicit separation into multiple assessment contexts
Adaptive question sequencing perceived as potentially opaque	Clearer articulation of follow up logic and progression rules
Need for stronger justification of questions	Revised and expanded question level explainability
Ambiguity in interpreting response options	Introduction of option level explainability
Commercial and financial aspects identified as relevant	Acknowledged and deferred as future work
Attachment of RPF documents in the tool	Acknowledged and deferred as future work
Need for improved interaction continuity and navigability	Introduction of save and resume functionality, topic-level restart controls, and UI layout refinements

Not all issues identified during the first iteration were addressed within the scope of the refined artefact. Commercial and financial considerations related to AMS engagement models were recognised as relevant but complex and were intentionally deferred for future work. Overall, these refinements operationalised formative expert feedback and prepared the artefact for validation by a broader group of experts in the second interview iteration.

4.3.3. Second Iteration, Validation of the Refined Artefact

The second iteration of expert interviews focused on evaluating the artefact as presented, with the objective of validating its clarity, coherence, and perceived applicability for consultant led AMS onboarding interactions, considering the refinements from the previous iteration. Thirteen professionals with direct experience in AMS REl and early-stage project evaluation participated in this iteration, each responding to the full set of interview questions. Experts were guided through wireframes and narrated examples of adaptive assessment paths drawn from a representative assessment context and were informed that the same interaction logic applies across other contexts. The evaluation emphasised professional judgement rather than measurement of outcomes, reflecting the artefact's positioning as a decision support tool. The interview protocol that contains the updated framework, wireframes for the second iteration and question guide used in this second iteration are provided in Appendices G and H for transparency and replication purposes.

Overall, expert feedback exhibited a high degree of convergence across responses. Participants generally agreed that the proposed assessment framework provides a clear and structured approach to early REl in AMS environments. The organisation of the assessment into multiple contexts and associated personas was perceived as appropriate for reflecting the realities of AMS onboarding, where different stakeholder perspectives must be considered. Experts noted that this structure supports more focused and disciplined elicitation, while remaining flexible enough to accommodate variations in client availability and role coverage.

The client and project level organisation was also viewed positively, particularly in terms of supporting traceability and continuity across assessments. AMS consultants considered the proposed information structure suitable for initiating and managing assessments within a project, and for maintaining an overview of assessment progress. Suggestions in this area were largely pragmatic and oriented towards robustness in real world settings, such as accommodating incomplete client identifiers or making assessment status more visible when multiple assessments are conducted over time. These comments reinforce the relevance of overview and traceability features for consultant led usage.

The AE interaction was consistently perceived as aligned with professional elicitation practices. Experts agreed that the ability to adjust questioning based on previous responses reflects how requirements discussions unfold in practice, especially when dealing with ambiguity or partial knowledge. Participants highlighted the value of allowing clarification to occur before progressing to subsequent topics and emphasised the importance of response options that explicitly capture uncertainty, such as options like “I do not know” or “Not sure”. Feedback in this area focused on minor usability safeguards rather than on the underlying adaptive logic, indicating acceptance of the approach itself.

Explainability mechanisms were widely regarded as a meaningful contribution to the assessment interaction. Experts indicated that question level explanations help users understand why follow up questions appear and how they relate to earlier answers, thereby supporting trust in the adaptive behaviour. In addition, participants recognised the value of option level explainability, noting that providing contextual information associated with individual response options can reduce ambiguity and support more confident selection, particularly when questions involve nuanced or overlapping interpretations. At the same time, experts cautioned that explanatory content at both levels should remain proportionate to the complexity of the question to avoid interrupting conversational flow during live interactions. Taken together, these observations suggest that explainability, when carefully integrated, enhances interpretability without detracting from efficiency.

Across the second iteration interviews, no substantive objections were raised regarding the artefact’s conceptual approach, interaction logic, or intended usage scenario. Feedback predominantly took the form of incremental suggestions aimed at improving robustness and usability in practical settings. The limited emergence of novel themes and the repetition of similar positive observations across thirteen participants indicate that an adequate level of thematic saturation was reached for the purpose of validating the artefact’s suitability for professional AMS onboarding contexts.

Taken together, the second iteration provides qualitative validation that the artefact, as presented, is perceived by practitioners as clear, coherent, and applicable to consultant led requirements elicitation and early project evaluation. The convergence of expert judgement supports the conclusion that the assessment structure, adaptive interaction logic, and explainability mechanisms are appropriate for their intended decision support role within AMS environments.

4.3. Discussion

This section discusses the evaluation results presented in the preceding sections by interpreting them in relation to the research question and the design objectives defined for this research. Drawing on evidence from both the survey-based evaluation and the two iterations of expert interviews, the discussion examines how the proposed artefact and its underlying design choices address the challenges identified in AMS REl.

Rather than introducing new empirical findings, this section synthesises and interprets the results to assess the extent to which the adaptive and explainable UX/UI techniques implemented in the AMS Assessment Tool contribute to improved elicitation practices. The discussion is structured around the research question at a conceptual level and the design objectives at an operational level, providing a coherent link between problem formulation, artefact design, and evaluation outcomes. This alignment supports a grounded assessment of the artefact's contribution as a decision support tool for AMS onboarding.

4.3.1. Addressing the Research Question

The research question guiding this research asked how adaptive and explainable UX/UI techniques, leveraging AI, can be designed to improve REl in AMS projects. The evaluation results presented in this chapter indicate that such techniques can contribute meaningfully to improved elicitation practices when they are framed as interaction level design mechanisms that support professional judgement, rather than as automated decision-making systems.

Findings the survey suggest that current AMS onboarding practices often rely on static tools and iterative and informal discussions, which struggle to accommodate ambiguity, incomplete knowledge, and variability across projects. In response to these challenges, the proposed artefact introduces AE as a central interaction concept. AE treats requirements gathering as a diagnostic process, in which questioning dynamically responds to the state of understanding rather than following a predefined linear sequence. Expert validation confirms that this approach aligns with professional elicitation practices and supports a more focused exploration of decision critical aspects of AMS engagements.

Explainability emerged as a central factor in enabling AE to remain intelligible and trustworthy. The evaluation shows that embedding explainability directly within the assessment interaction, at both question and option levels, helps users understand why specific follow up questions are presented and how response options should be interpreted. These functions are perceived as contextual scaffolding that supports sense making, reduces false certainty, and encourages accountable responses during live elicitation sessions.

Importantly, the results indicate that the use of AI as an enabler for adaptivity, instead than as an explicit focal point of the interaction. Experts consistently perceived the artefact as a decision support tool that augments consultant expertise by structuring uncertainty and highlighting areas requiring clarification, without attempting to replace human judgement. This positioning aligns with the research question's emphasis on improving elicitation processes through design and not necessarily on automation.

Taken together, the evaluation findings demonstrate that adaptive and explainable UX/UI techniques can improve requirements elicitation in AMS projects by transforming onboarding from a linear information gathering activity into a structured, interfaceable, transparent, and decision oriented diagnostic process. The research question is therefore addressed at the level of interaction design and UX, showing how AI enabled adaptivity and explainability can be operationalised in practice to support more effective and defensible AMS onboarding decisions.

4.3.2. Discussion in Relation to Design Objectives

The evaluation findings provide a basis for discussing how the proposed artefact addresses the design objectives defined in Chapter 3 and, in doing so, operationalises the research question at an interaction level. Drawing on evidence from the survey based evaluation and the two iterations of expert interviews, each design objective is discussed below in relation to the artefact's mechanisms and the scope of the evaluation conducted.

DO1 sought to provide a structured and systematic approach for eliciting AMS project requirements during the onboarding phase. Survey findings and expert interview feedback indicate that the artefact's multi context assessment model, supported by a topic and subtopic structure, responds effectively to this objective. Survey respondents highlighted the fragmented and inconsistent nature of current AMS onboarding practices, while experts confirmed that the proposed structure offers a more disciplined and auditable approach to elicitation. Importantly, this structure was perceived as providing a shared frame of reference that improves coverage while allowing flexibility in how elicitation unfolds.

DO2 focused on supporting REl as a diagnostic interaction that captures and responds to ambiguity and incomplete knowledge. Evidence from both interview iterations indicates strong alignment with this objective. Experts consistently recognised that the artefact's AE model reflects how understanding evolves during real AMS onboarding interactions. The interaction logic allows ambiguity to be surfaced, revisited, and progressively clarified. This diagnostic framing was perceived as more aligned with professional judgement than traditional linear questionnaires and supports more reliable sense making under conditions of uncertainty.

DO3 aimed to enable the adaptive prioritisation of follow up questions based on previously elicited information. Expert interview findings suggest that this objective was addressed through the artefact's ability to focus questioning on unresolved or decision critical areas. Adaptive prioritisation was viewed as particularly valuable in time constrained onboarding contexts, where not all topics require equal depth. Feedback indicates that adaptivity was interpreted not as a mechanism for speed optimisation, but as a means of improving relevance and directing attention to areas with the greatest potential impact on AMS delivery risk and feasibility.

DO4 addressed the integration of explainability within the elicitation interaction. Findings from both expert interview iterations show that embedding explainability at both question and option levels contributes to transparency, trust, and accountability during AE. The emergence of option level explainability as a refinement between the first and second iterations illustrates how evaluation feedback informed design improvements. Experts emphasised that explainability supports interpretability by clarifying intent and reducing false certainty, while cautioning that explanatory content should remain proportionate to avoid interrupting conversational flow during live interactions.

DO5 concerned the provision of summarized outputs that synthesise elicitation results into risk, confidence, and contextual summaries. This objective was addressed at the design level rather than through empirical evaluation. As described in Chapter 3, the artefact was intentionally designed to translate AE outcomes into summaries that make residual uncertainty, information related risk, and confidence explicit, with the aim of supporting informed AMS onboarding and bid discussions. Although these summary outputs were not included in the expert interview evaluation, their structure and rationale are grounded in the decision support orientation of the artefact and in the challenges identified in current AMS practices. DO5 therefore represents a conceptual design contribution that complements the empirically evaluated interaction mechanisms, without attempting to replace human judgement.

DO6 aimed to ensure that the assessment model can be adapted and extended across different AMS contexts and client environments without changes to the underlying elicitation logic. Expert feedback from the second interview iteration indicates that this objective is supported by the separation between interaction logic and content configuration. Participants acknowledged that the topic and subtopic model allows assessments to be tailored to different domains and project types while preserving consistent interaction behaviour. This adaptability reinforces the artefact's potential applicability beyond the specific demonstration scenarios used in the evaluation.

The findings suggest that the evaluated objectives were addressed through an integrated interaction model that balances structure, adaptivity, and explainability to support professional judgement during AMS onboarding, while design level objectives related to decision-oriented outputs remain a foundation for future evaluation.

4.3.3. Synthesis and Positioning of the Contribution

The discussion presented in this chapter demonstrates that the proposed artefact addresses the research question through a coherent set of design choices that respond to the challenges of REl in AMS onboarding. By integrating adaptive and explainable UX/UI techniques at the interaction level, the artefact reframes elicitation as a diagnostic and decision-oriented process rather than a linear information gathering activity. This synthesis confirms that the contribution of the research lies not in algorithmic optimisation or automation, but in the structured design of interactions that support professional judgement under conditions of uncertainty.

Across the evaluation, the artefact was shown to provide value through the combination of structure, adaptivity, and explainability. The multi context assessment model and topic subtopic structure establish systematic coverage while remaining flexible to project specific needs. AE mechanisms focus attention on unresolved and decision critical areas, supporting efficient and relevant onboarding discussions. Explainability, embedded at both question and option levels, enhances transparency and interpretability without overburdening users, thereby reducing false certainty and supporting accountable responses. Together, these elements form an integrated interaction model that aligns with how AMS consultants' reason about project readiness and delivery risk.

From a Design Science perspective, the research contributes reusable design knowledge in the form of design objectives, interaction principles, and design mechanisms that can be applied beyond the specific instantiation of the AMS Assessment Tool. While certain design outcomes, such as decision-oriented summaries, were addressed conceptually rather than empirically evaluated, the evaluation results validate the core interaction mechanisms upon which such outputs depend. This distinction reinforces the clarity of the research scope and highlights opportunities for future evaluation and extension.

Overall, the synthesis of results and discussion positions the artefact as a decision support tool that enhances the quality, transparency, and defensibility of AMS onboarding assessments without attempting to replace human expertise. The findings provide a grounded basis for the conclusions presented in the following chapter, where the research contributions, limitations, and directions for future work are discussed.

CHAPTER 5

Conclusion

This research investigated how adaptive and explainable UX and UI techniques, leveraging AI, can be designed to improve REl in AMS projects. The motivation arose from well documented challenges in AMS onboarding, including ambiguous initial requests, incomplete knowledge, diverse stakeholder perspectives, and the widespread use of static tools that provide limited support for structured, interactive and defensible decision making.

Using a DSR approach, this research resulted in the design, instantiation, and evaluation of an adaptive assessment artefact inside a decision support tool, the AMS Assessment Tool. It delivered a deliberate focus on interaction design rather than algorithmic optimisation. AI was positioned as an enabling component that supports adaptive interaction behaviour, while preserving human judgement as central to decision making.

The core contribution of the research lies in demonstrating how AE can be operationalised at the interaction level through a structured assessment model based on multiple contexts, topics, and subtopics. This structure ensures systematic and auditable coverage of AMS requirements while remaining responsive to project specific characteristics, providing a diagnostic approach in which follow up questions are prioritised based on unresolved or decision critical areas. Evaluation findings indicate that this interaction model aligns with how AMS consultants' reason about project readiness and delivery risk during onboarding.

Explainability was identified as a critical design element for maintaining transparency and trust within adaptive interactions. This research embedded explainability directly into the elicitation interaction to clarify why questions are asked and how response options should be interpreted. The research shows that combining question and option level explainability supports interpretability, reduces false certainty, and maintains cognitive continuity during live elicitation sessions, functioning as interaction scaffolding without disrupting conversational flow.

The artefact was evaluated through a mixed approach combining a surveys and two iterations of AMS professionals. The survey provided insight into current elicitation practices, perceived challenges, and expectations regarding adaptive and explainable assessment tools.

The expert interviews supported formative refinement and subsequent validation of the interaction model. Across both evaluation methods, findings consistently indicated that the proposed approach is understandable, usable, and relevant to professional practice. The evaluation focused on interaction level mechanisms and professional perceptions rather than on longitudinal deployment or quantitative performance outcomes, reflecting the exploratory and design-oriented scope of the research.

From a Design Science perspective, this research contributes reusable design knowledge in the form of design objectives, interaction principles, and design mechanisms that extend beyond the specific instantiation of the AMS Assessment Tool. Although designed and evaluated within an AMS context, the underlying interaction model of structured diagnostic elicitation, adaptive prioritisation, and embedded explainability is applicable to other consulting and project-based environments characterised by uncertainty and decision critical information gaps. Certain design outcomes, particularly decision-oriented assessment summaries, were addressed at a conceptual level rather than empirically evaluated, defining clear boundaries for interpretation of the results and opportunities for future work.

In conclusion, this research demonstrates that adaptive and explainable UX and UI design can meaningfully enhance requirements elicitation in AMS projects by supporting structured, transparent, and decision-oriented interactions. By acknowledging uncertainty and reinforcing professional judgement rather than attempting to automate decisions, the proposed artefact offers a robust alternative to static and ad hoc onboarding practices and provides a foundation for future research and application in AMS and related consulting domains.

5.1. Limitations

Several limitations of this research should be acknowledged to frame the interpretation and generalisation of the findings appropriately. These limitations reflect deliberate scoping decisions aligned with the DSR approach and the focus of the thesis, rather than deficiencies in the artefact itself.

First, the evaluation of the artefact was primarily interaction focused and perception based. The assessment relied on a survey of AMS professionals and expert interviews conducted through walkthroughs and narrated scenarios.

While this approach is appropriate for validating design logic, usability, and perceived professional relevance, it does not capture the effects of sustained use in real AMS onboarding engagements or measure longer term operational outcomes such as onboarding efficiency, bid success, or service delivery performance. In addition, the evaluation was conducted within the context of AMS and involved professionals with experience in AMS onboarding and delivery. Although the design knowledge produced is intended to be transferable to other consulting and project-based environments, the findings remain contextually bounded and would require further empirical validation in other domains to substantiate broader generalisation claims.

Second, decision oriented assessment summaries were addressed at a design level but were not empirically evaluated. Although these outputs were intentionally designed to make residual uncertainty, information related risk, and confidence explicit, their effectiveness in supporting real decision making was not validated with practitioners. This limitation reflects the research focus on AE and explainability during interaction and defines a clear boundary between empirically evaluated interaction mechanisms and conceptual design outcomes.

Third, the research deliberately abstracted from backend intelligence and integration concerns, including the ingestion of pre-existing project data, RFP documents, and structured requirements repositories. The research also did not include the design or evaluation of AI-driven NBQ mechanisms responsible for generating or selecting questions at runtime. Explainability was addressed at the interaction design level through predefined explanatory cues associated with questions and response options, which are intended to surface explanation content provided by the backend in a structured and timely manner during the elicitation interaction. While the backend may employ AI-based mechanisms to generate or select underlying question and explanation content, the research does not address the design, generation, or validation of such AI logic. Instead, the focus lies on how adaptivity and explainability are presented, contextualised, and experienced by users within the UX and UI of the assessment.

Taken together, these limitations do not undermine the validity of the research, but they define the scope within which the results should be interpreted. They also provide a clear foundation for identifying meaningful directions for future work, which are discussed in the following section.

5.2. Future Work

Several directions for future work emerge from the scope and limitations of this research. These directions represent natural extensions of the proposed artefact and offer opportunities to further evaluate and operationalise adaptive and explainable requirements elicitation in AMS and related consulting environments.

First, future research should empirically evaluate the decision-oriented assessment summaries and risk outputs designed as part of the artefact. While these outputs were conceptually developed to make residual uncertainty, information related risk, and confidence explicit, their effectiveness in supporting onboarding and bid decisions remains untested. Scenario based evaluations or longitudinal studies involving real AMS engagements could examine how consultants interpret and act upon these summaries and assess their impact on decision quality and confidence.

Second, future work should include the implementation and evaluation of AI driven NBQ mechanisms responsible for generating and prioritising assessment questions at runtime. Although this research focused on adaptive elicitation at the interaction level, integrating backend NBQ logic would enable a comprehensive assessment of how algorithmic adaptivity and UX and UI design jointly influence elicitation effectiveness. Such work may be pursued as a complementary research effort, enabling coordinated evaluation of frontend interaction design and backend intelligence without conflating their respective contributions.

Third, the artefact could be extended to incorporate automated analysis of pre-existing project information, such as RFP documents in a structured representation. In this direction, AI based analysis could be employed to identify missing, incomplete, or ambiguous requirements prior to assessment initiation, allowing the elicitation process to be dynamically initialised based on document driven insights. This extension would strengthen the diagnostic nature of the assessment while preserving the interaction centred design proposed in this research.

Finally, future research could explore broader validation of the interaction model across different consulting and project-based domains beyond AMS, such as enterprise software implementation or managed services onboarding. Additional investigation could also examine alternative interaction modes, including asynchronous or self-guided assessments, and assess how explainability requirements vary across roles, organisational contexts, and interaction settings. Such studies would further substantiate the transferability and adaptability of the design knowledge contributed by this research.

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Appendices

Appendix A

Assessment Structure – Context and Topic / Subtopic model

Business – Persona: Business Owner

Business Context & Value

- Business objectives and expected outcomes of AMS
- Criticality of applications to business processes and revenue
- Business continuity expectations (maximum acceptable downtime, workarounds)

Application Portfolio & Scope

- Application portfolio overview (types, domains, ownership)
- In-scope vs out-of-scope applications and components
- Planned roadmap (sunset, modernization, new products)

Industry & Domain Considerations

- Industry-specific regulations that drive how services are delivered (e.g. banking, healthcare, public sector)
- Business-driven operational constraints (peak periods, blackout windows, seasonal patterns)

Stakeholders & Roles

- Identification of key business stakeholders and decision makers
- Ownership of business processes supported by the applications
- Escalation and decision-making authorities for business impact issues

Business Risk & Dependency View

- Business-critical risks (loss of revenue, regulatory fines, reputational impact)
- Dependencies on key partners, external providers, or critical third-party applications

Technical – Persona: Technical Architect

Application & System Architecture

- Application types (monolith, microservices, SaaS, packaged, custom)
- Logical and physical architecture (layers, components, interfaces)
- Technology stack (languages, frameworks, middleware, integration platforms)

Integrations & Data Flows

- Upstream/downstream system dependencies and integration patterns (APIs, batch, messaging)
- Data flows, data ownership, and key integration contracts
- External services (payment gateways, identity providers, SaaS dependencies)

Infrastructure & Environments

- Environment landscape (DEV/TEST/UAT/PRE-PROD/PROD)
- Hosting model (on-prem, private cloud, public cloud, hybrid)
- Servers, databases, storage, app servers, and network dependencies
- Environment consistency and promotion paths

Non-Functional Requirements (NFRs)

- Performance and response-time expectations
- Capacity and scalability requirements (users, transactions, data volumes)
- Availability and continuity requirements (RTO/RPO, DR strategy)
- Maintainability, observability, and testability expectations

Tooling & Technical Operations Enablement

- Monitoring, logging, and alerting tools in use (APM, infrastructure monitoring, log aggregation)
- Build, release, and CI/CD tooling
- Configuration and asset management practices

Technical Risks & Dependencies

- Legacy components, technical debt, and known constraints
- Single points of failure from a technical standpoint
- Vendor or proprietary technology lock-in risks

Service Delivery – Persona: Service Delivery Manager

Support Model & Service Scope

- Definition of support levels (L1/L2/L3) and responsibilities
- In-scope activities (incident, problem, change, enhancements, requests)
- Onsite/offshore/nearshore delivery model and coverage pattern

ITSM Processes & Workflows

- Incident, problem, and change management processes
- Service request and knowledge management processes
- Release and deployment coordination with development teams

Transition & Knowledge Transfer

- Current level of documentation (workflows, runbooks, configuration, FAQs)
- Knowledge transfer plan (shadowing, reverse shadowing, training sessions)
- Identification and mitigation of "tribal knowledge" or undocumented practices

Ticket Landscape & Historical Demand

- Historical ticket volumes by application, category, and severity
- Typical incident patterns and recurring issues (problem candidates)
- Seasonality and peak periods in ticket/incident load

SLAs, OLAs & Service Windows

- Response and resolution targets by priority/severity
- Service windows (business hours, 24×7, weekend/holiday support)
- Availability targets and service credits/penalties model (if applicable)

Resources, Skills & Availability

- Required roles (SDM, tech leads, SMEs, analysts, service desk, etc.)
- Skills and experience expectations by technology or domain
- Staffing model (FTEs, shifts, on-call rotas) and onboarding processes

Governance & Reporting

- Governance model (steering committees, operational reviews, CAB participation)
- Escalation paths (operational, managerial, executive)
- Reporting needs (SLAs, KPIs, trend analysis, continuous improvement actions)

Operational Risk & Dependency View

- Operational single points of failure (key people, critical processes)
- Third-party and supplier dependencies affecting service delivery

Security & Compliance – Persona: Security & Compliance Officer

Regulatory & Compliance Requirements

- Applicable regulations and standards (e.g. GDPR, HIPAA, PCI-DSS, ISO 27001, ISO 20000 alignment)
- Industry-specific compliance obligations (banking, government, healthcare etc.)
- Audit, attestation, and evidence requirements (logs, reports, access reviews)

Identity, Access & Authentication

- Authentication mechanisms (SSO, MFA, IAM providers)
- Role-based access control and least-privilege principles
- Joiner/mover/leaver processes for access provisioning and revocation

Data Protection & Privacy

- Data classification (public, internal, confidential, restricted)
- Data residency and cross-border transfer constraints
- Encryption requirements (at rest, in transit) and key management

Security Operations & Monitoring

- Security logging and monitoring coverage (events, anomalies, privileged actions)
- Vulnerability management and patching responsibilities (app vs infra)
- Security incident detection, response, and escalation (including integration with SOC/SIEM)

Security in the AMS Lifecycle

- Security requirements for changes, releases, and deployments
- Secure coding / secure configuration expectations for minor enhancements
- Third-party risk management for suppliers involved in AMS

Security & Compliance Risk Assessment

- High-risk areas (e.g. internet-facing applications, sensitive data, privileged access)
- Dependencies on external security services or tools
- Known gaps or accepted risks that must be monitored during AM

Appendix B

Demonstration – Additional Wireframes Clients and Project Screens

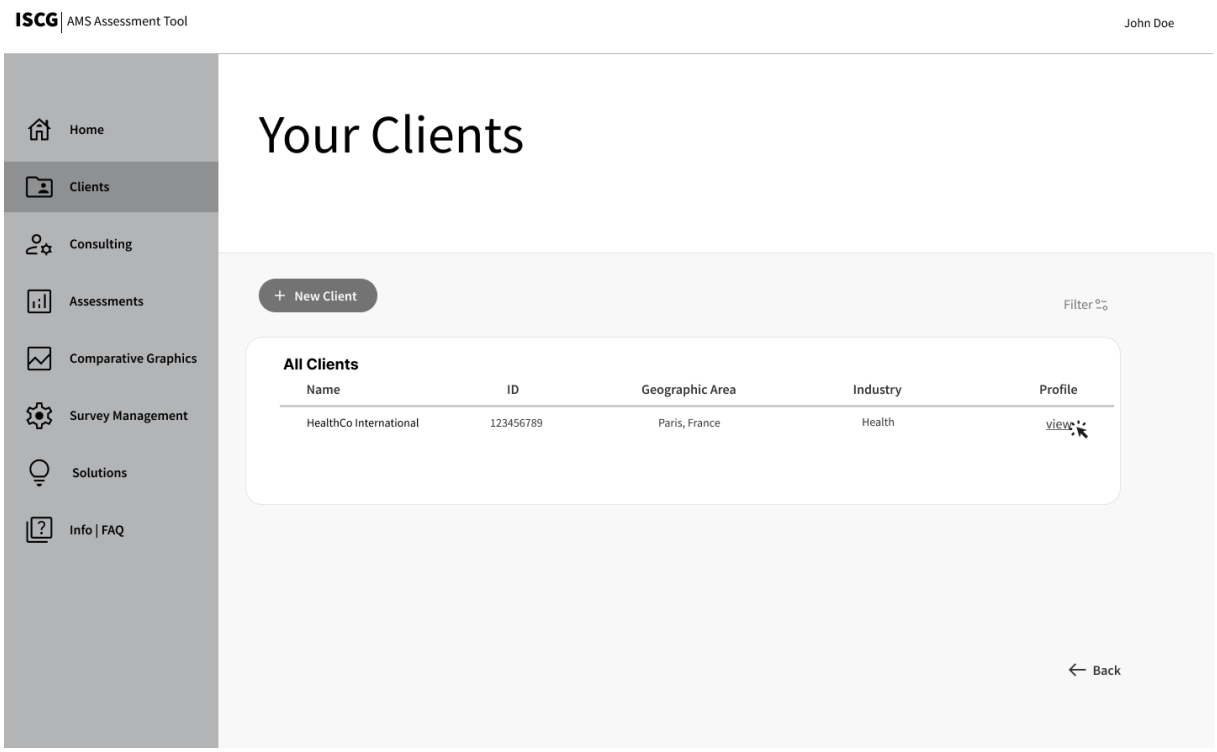


Figure 12: Your Clients Screen

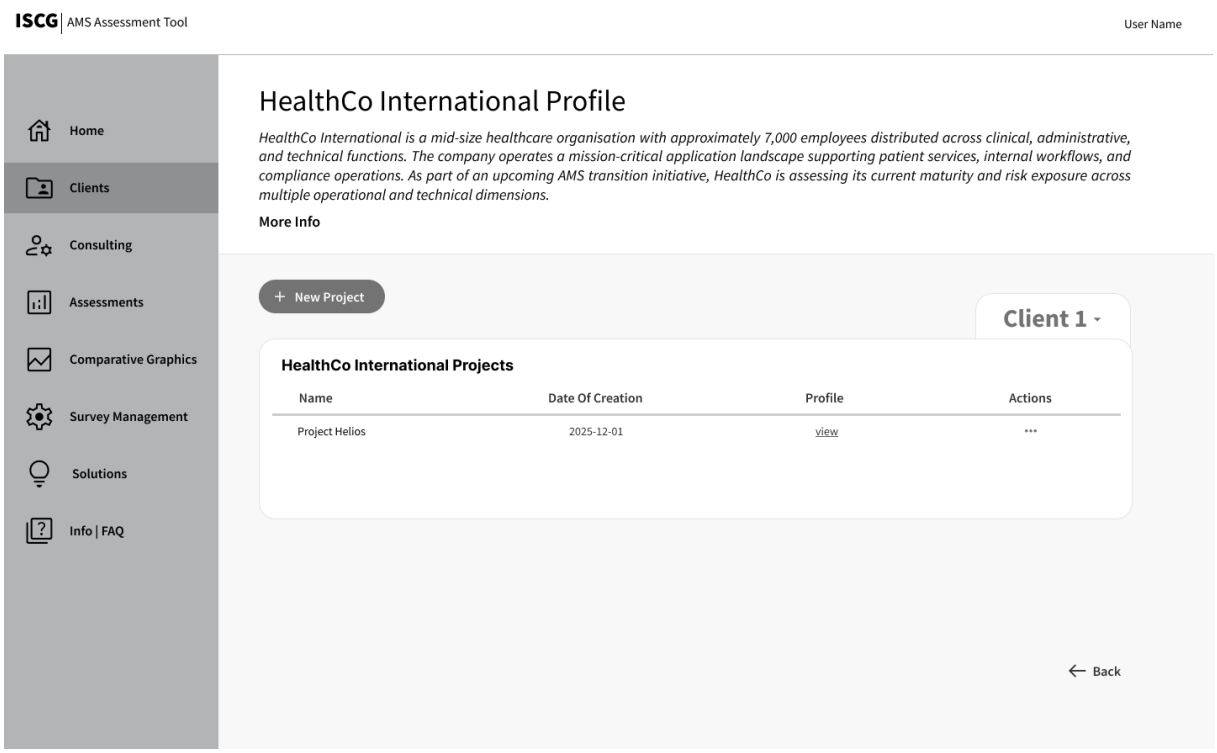


Figure 13: Client Profile Screen

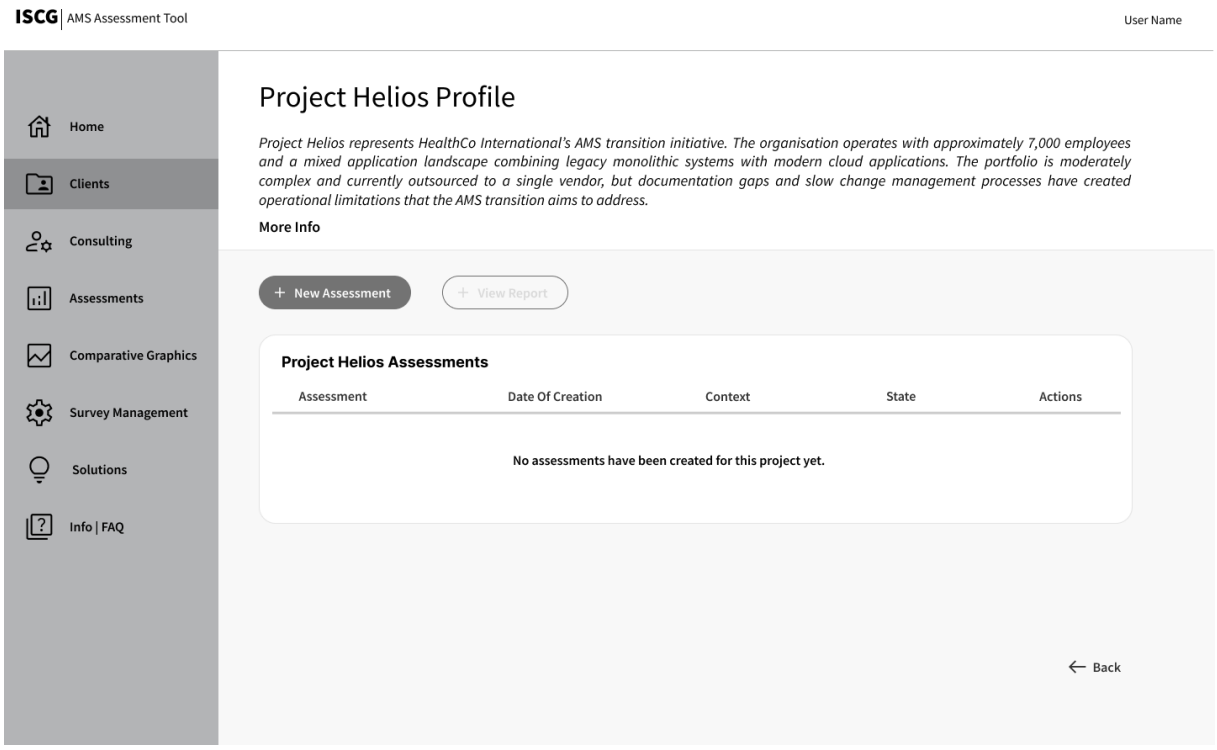


Figure 14: Project Screen

Appendix C

Demonstration – Additional Adaptive Paths

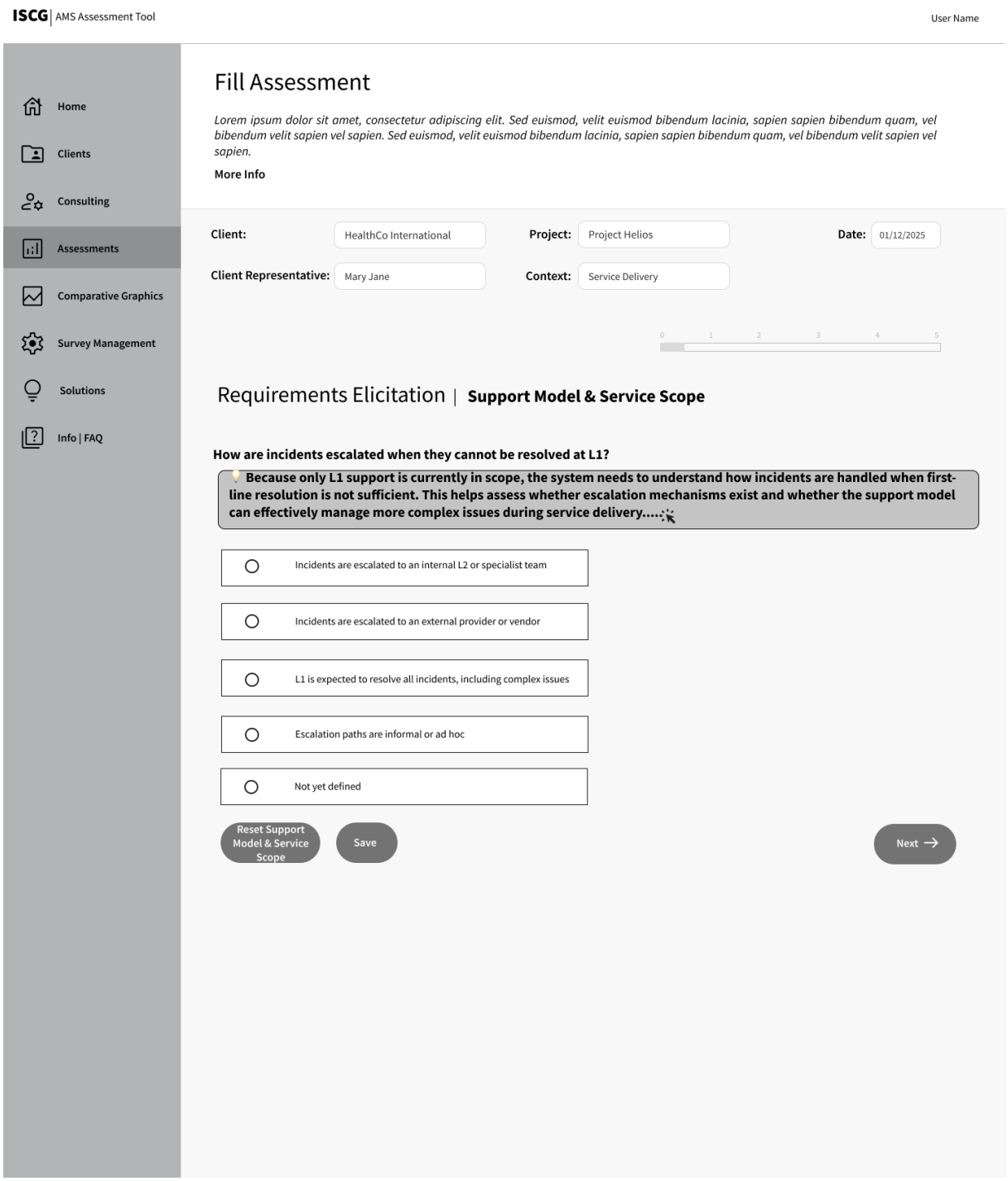


Figure 15: Adaptive Path if user selects L1 on Figure 5

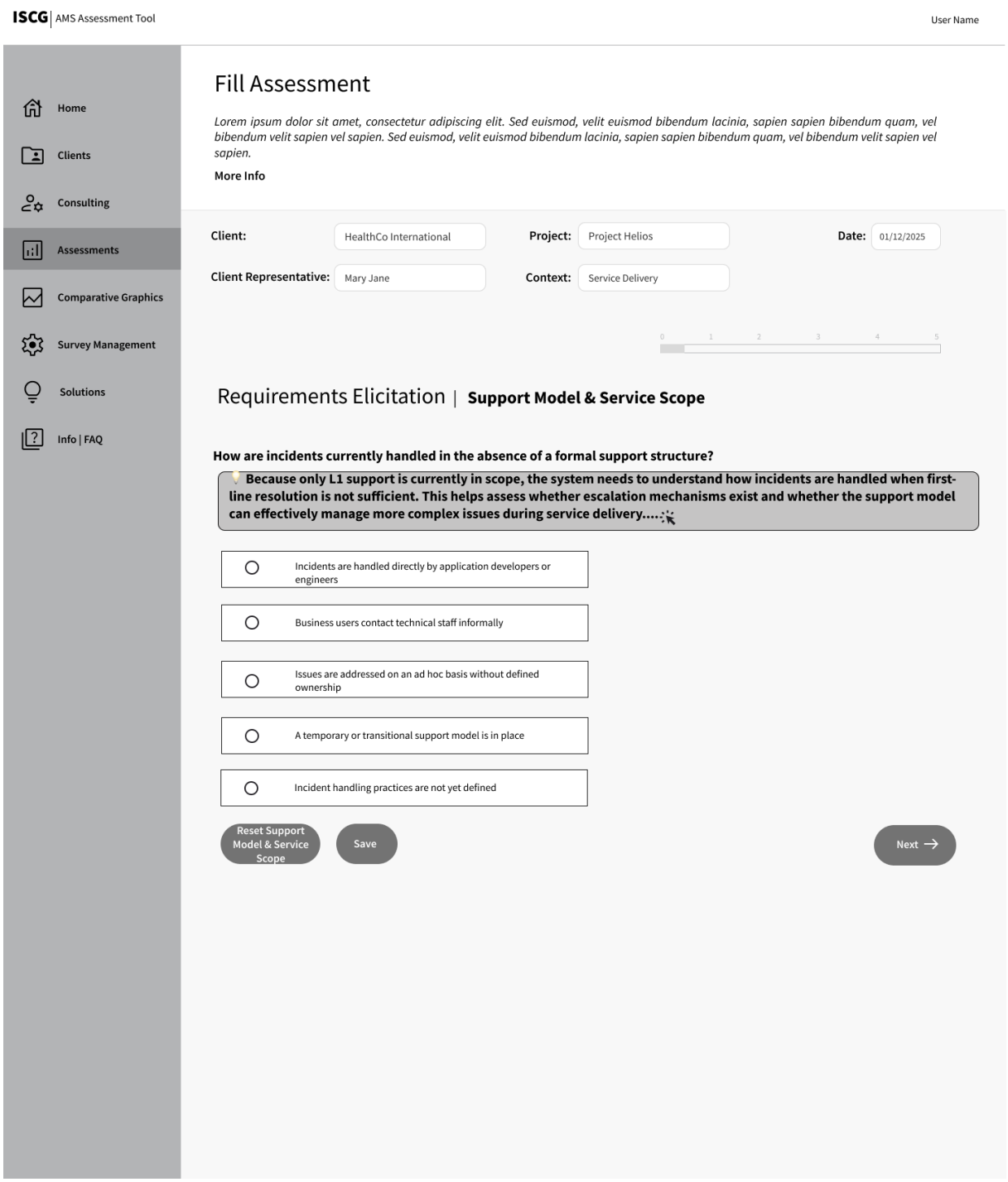


Figure 16: Adaptive Path if user selects "No formal support levels defined" on Figure 5

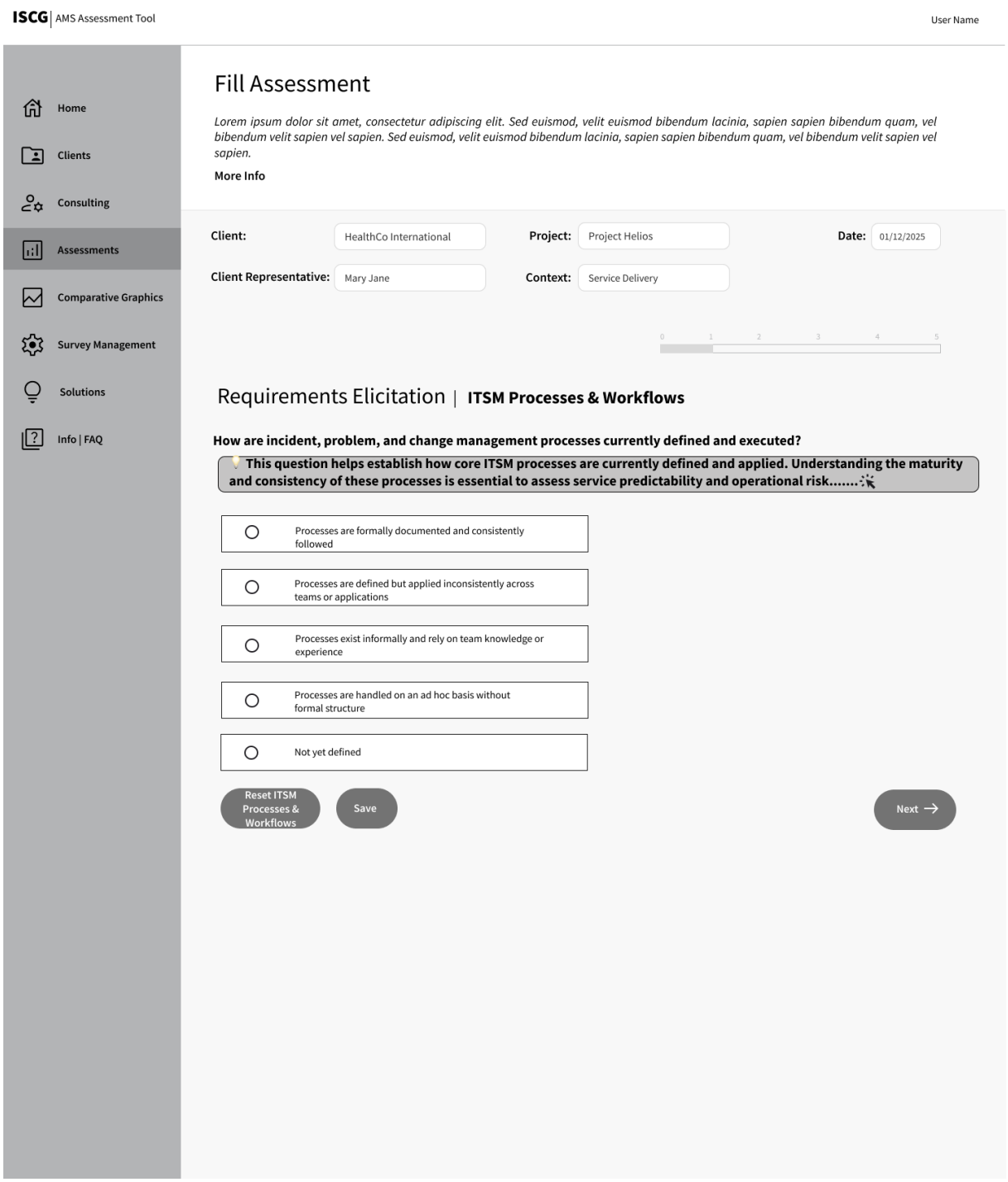


Figure 17: First question from ITSM Processes & Workflows if previous topic was cleared

Appendix D

Survey Evaluation Instrument

Table 8: Survey Section 1. Respondent Profile

Q#	Question	Response Type
1	What is your current role?	Single choice
2	How many years of experience do you have in AMS or IT Service Delivery?	Single choice
3	Approximately how many AMS projects have you led or supervised?	Single choice
4	Which industries or sectors do your AMS projects belong to?	Multiple choice
5	If you answered "Other" to the previous question, please specify the sector(s).	Open-ended
6	How often do you participate in requirements elicitation or evaluation of AMS project requests?	Frequency scale

Table 9: Section 2. Challenges in the current AMS request evaluation process

Q#	Question	Response Type
7	When a new AMS project request arrives, which tools or systems are used to register and evaluate it?	Multiple choice
8	If you answered "Other" to the previous question, please specify which tool(s) or system(s) you use.	Open-ended
9	Please evaluate the following statements regarding the presented concept.	Likert scale
10	Which factors most influence the decision to accept or reject a new AMS request?	Multiple choice
11	If you selected "Other(s)" in the previous question, please specify the factor(s).	Open-ended
12	At which phase of the AMS project request process do you believe the most time is spent?	Single choice

Table 10: Section 3. Perceptions of AI and personalization

Q#	Question	Response Type
16	Which of the following AI applications would you consider most useful during the evaluation of new AMS requests?	Multiple choice
17	What would make you feel more comfortable using AI in this type of evaluation?	Open-ended
18	How important is it for you that the AI system clearly explains the reasoning behind its suggestions?	Likert scale
19	Which potential risks concern you most regarding the use of AI in AMS request evaluation?	Multiple choice
20	If you answered "Other(s)" to the previous question, please specify which ones.	Open-ended

Table 11: Section 4. Expectations for an AI-generated front-end interface

Q#	Question	Response Type
21	Please evaluate the following statements regarding the presented concept.	Likert scale
22	How do you imagine an adaptive interface could simplify your work during the evaluation of an AMS request?	Open-ended
23	What type of explanations would you expect to receive from the system?	Open-ended
24	Which of the following features do you consider most useful in an AI-based AMS assessment system?	Multiple choice
25	How important is it that the AI system learns and improves based on previous responses?	Likert scale
26	How would you prefer to provide feedback to the system to improve its recommendations?	Single choice
27	Which output format would best support your decision making?	Single choice
28	If you selected "Other" in the previous question, please specify the alternative output format.	Open-ended

Appendix E

1st Iteration Interview Protocol

Research Context

The growing complexity and interconnection of software systems have highlighted the essential role of Application Maintenance Services (AMS) as a fundamental component of contemporary IT strategies. AMS denotes the ongoing support, improvement, and optimization of deployed applications to guarantee their conformity with changing corporate objectives, technical progress, and user requirements. In numerous instances, AMS entails overseeing and customizing interactions with external enterprises or service providers during system transitions and continuous maintenance. Effective management of requirements and requests in AMS projects is essential for sustaining system performance, reducing downtime, and facilitating a seamless transition throughout the modernization or outsourcing of legacy systems. Conventional requirements engineering methodologies, typically defined by rigid templates and laborious stakeholder interviews, fail to accommodate the dynamic and context-specific characteristics of maintenance projects, often leading to misalignment, rework, and elevated costs.

In the contemporary digital landscape, the necessity for personalised, Artificial Intelligence (AI)-augmented methods for requirements collecting and request generation to enterprises has grown significantly. Progress in AI, Machine Learning (ML), and Natural Language Processing (NLP) facilitates the creation of intelligent technologies capable of automating repetitive operations, identifying ambiguities, and customising requests and surveys to certain organisational context.

This research aims to design and evaluate a decision support tool that integrates adaptive and explainable UX/UI interfaces generated by AI to enhance requirements gathering and personalization in requests for AMS projects. By focusing on interface personalization, dynamic adaptability, and transparent feedback mechanisms, the study seeks to demonstrate how AI can bridge communication gaps between stakeholders, reduce ambiguity in requirements, and foster trust and engagement throughout the maintenance lifecycle. Ultimately, this work contributes to advancing user-centered and explainable approaches in requirements engineering, promoting more efficient, resilient, and transparent AMS processes.

Definitions

1. Application Maintenance Services (AMS)

Application Maintenance Services (AMS) encompass the structured set of processes and operational activities required to sustain, optimize, and evolve software applications after deployment. AMS ensures that applications remain stable, performant, and functionally aligned with business needs by handling incidents, service requests, minor enhancements, monitoring, and routine operational tasks.

A core organizing element of AMS is the use of support tiers, which segment responsibilities according to technical depth and complexity. L1 support manages initial triage, user assistance, and basic issue resolution. L2 support handles more complex technical troubleshooting, configuration corrections, and component-level fixes. L3 support addresses the deepest technical issues, including code-level analysis, software defects, and complex architectural or integration problems. This tiered structure ensures that work is routed to the appropriate expertise level, balancing efficiency, cost, and quality.

Modern AMS integrates proactive practices such as monitoring, automation, and problem management to reduce incident recurrence and improve operational resilience. As a result, AMS functions simultaneously as a stabilising mechanism and an incremental improvement engine, supporting continuous reliability in evolving digital environments.

2. Requirements Elicitation in AMS

Requirements elicitation in Application Maintenance Services (AMS) is the structured process of identifying and clarifying the operational, functional, and technical needs that govern the ongoing support of an application or portfolio. Unlike traditional software development elicitation, which focuses on defining new system capabilities, AMS elicitation emphasizes understanding existing system behavior, incident patterns, service-level expectations, integration dependencies, and operational constraints.

This process involves gathering information from diverse stakeholder groups, including business users, product owners, operational teams, and current subject-matter experts (SMEs). Because AMS environments often include legacy components, undocumented logic, and evolving business processes, elicitation must account for both explicit requirements (e.g., support hours, SLA levels, enhancement pipelines) and implicit operational knowledge (e.g., common failure modes, seasonal workload variations, and informal workarounds).

AMS requirements elicitation therefore integrates exploratory interviews, historical data analysis (incidents, service requests, change records), service workflow mapping, and environment discovery to construct a comprehensive understanding of the maintenance landscape. Its goal is to translate fragmented operational insights into a coherent service definition that informs support model design, resourcing, transition planning, and continuous improvement strategies. As such, requirements elicitation in AMS functions as a foundational activity that aligns service delivery with organizational expectations and ensures sustained reliability across application lifecycles.

3. Adaptive Interfaces

An adaptive interface is a user interface that dynamically modifies its structure, content, and interaction modalities in response to the user's inputs, context, and inferred intent. Grounded in principles of progressive disclosure and uncertainty reduction, adaptive interfaces selectively reveal only the most relevant next step in a workflow, reducing cognitive load and improving task efficiency.

The adaptation is driven by a continuous perception–inference–adaptation loop:

1. Perception captures user input (choices, text, timing).
2. Inference uses computational models, such as confidence scoring, entity extraction, or Bayesian updating, to estimate what information is known, unknown, or ambiguous.
3. Adaptation updates the interface by selecting the Next Best Question (NBQ) and deciding its optimal format (e.g., single-choice, binary, multiple-choice, or open-ended).

This process ensures that the interface remains contextually relevant, asking only the most informative question at each step and adjusting question type when user answers indicate ambiguity, missing detail, or nuanced requirements. Adaptive Interfaces therefore provide a personalized, efficient, and cognitively lightweight means of navigating complex data-gathering tasks, such as Application Maintenance Services (AMS) scoping.

4. Next Based Question

A Next Best Question (NBQ) is an adaptive decision-making mechanism that identifies the single most informative question to ask at any given step of an interactive process. Unlike fixed questionnaires or linear workflows, NBQ systems dynamically determine the optimal next inquiry based on the user's previous responses, the system's current uncertainty, and the informational dependencies that structure the decision space.

NBQ operates within an iterative inference loop where each response updates the system's internal belief state. This state represents which informational variables (or "slots") are known, unknown, or ambiguous. The NBQ engine evaluates the expected value of asking each remaining question—typically using principles from information theory (e.g., entropy reduction), Bayesian inference, or rule-based heuristics—to identify the question that maximizes informational gain or minimizes residual uncertainty.

In contrast to traditional decision trees, which present a predefined path, NBQ algorithms recompute the optimal path after every interaction. This enables context-sensitive dialog flows, dynamic branching, and personalized question ordering tailored to the user's unique context and level of knowledge. NBQ systems often adjust not only which question is presented, but also how it is formulated, using binary, single-choice, multiple-choice, or open-ended formats, depending on the clarity, granularity, and confidence associated with previous answers.

Through this combination of inference-driven sequencing and adaptive question design, NBQ provides an efficient, user-centered approach to collecting high-quality information in complex domains such as diagnostics, service scoping, triage, and decision support.

Proposed Framework

The proposed framework introduces an adaptive and explainable assessment methodology for capturing the detailed requirements needed to initiate a new Application Maintenance Services (AMS) engagement. To address the complexity of AMS environments characterized by heterogeneous applications, uneven documentation, and implicit operational knowledge, the framework replaces static questionnaires with a dynamic, intelligence-driven elicitation process.

At the center of this approach is the Next Best Question (NBQ) engine, which selects the most informative question at each step by evaluating prior responses, updating an internal belief state, and estimating remaining uncertainty. The framework uses decision trees and dependency graphs to structure prerequisite relationships and ensure logical coverage, while AI techniques, including probabilistic inference, uncertainty scoring, information-theoretic evaluation, and natural language understanding, interpret user input and determine both the content and the type of the next question. Depending on confidence levels, the system may present a confirmatory single-choice question, a binary clarifier, a multiple-choice expansion, or an open-ended probe to elicit nuance.

To further guide the assessment, the framework organizes elicitation into a series of major topics, such as project typology, transition readiness, infrastructure, operational processes, ticket history, SLA expectations, resource requirements, risk assessment, and governance. Each topic contains subtopics that represent specific information slots. The NBQ engine iterates through these subtopics, resolving uncertainty until a topic is sufficiently understood, based on confidence thresholds, dependency completion, and risk indicators, before progressing to the next domain. This topic-guided NBQ structure ensures comprehensive AMS coverage while minimizing unnecessary user effort.

The framework operationalizes this approach through the following assessment topics and subtopics:

1. Typology of the Project
    - Application type and architecture
    - Portfolio composition
    - Business domain context

2. Industry-Related Considerations
    - Regulatory norms and compliance rules

- Industry-specific operational constraints

3. Transition Readiness & Knowledge Transfer
   - Identification of key stakeholders and SMEs
   - Documentation of workflows, processes, and runbooks
   - Training needs and onboarding requirements
   - Presence of undocumented or “tribal” knowledge

4. Infrastructure and Access Requirements
   - System, environment, and tool access
   - Servers, databases, and application consoles
   - Monitoring and logging capabilities
   - Hardware/software compatibility
   - Security and authentication requirements

5. Operational & Support Complexity
   - Incident, change, and problem management processes
   - Continuous monitoring practices
   - Adherence to IT governance frameworks (e.g., ITIL, COBIT)

6. Ticket Landscape and Historical Data
   - Ticket volumes
   - Categorization and prioritization
   - Historical patterns and resolved-ticket analysis

7. SLA and Service Model Definition
   - Response and resolution targets
   - Criticality classifications
   - Service windows

8. Resources, Skills, and Availability
   - Required roles and staffing profiles
   - Technical expertise and platform knowledge
   - Onboarding and access provisioning steps

9. Risk and Dependency Assessment
    - Identification of high-risk areas
    - Mapping of system, team, and vendor dependencies

10. Governance and Communication Structure
    - Escalation paths and reporting cadence
    - RACI and responsibility alignment

List 1: Topics and subtopics for AMS Assessment Tool

The framework operationalizes this approach through the following assessment topics and subtopics. The subsequent section provides wireframes that exemplify how the client and project information is stored and how the adaptive NBQ logic is manifested within the user interface.

Wireframes

How the tool stores clients, projects information. Each record contains the link for the assessment done:

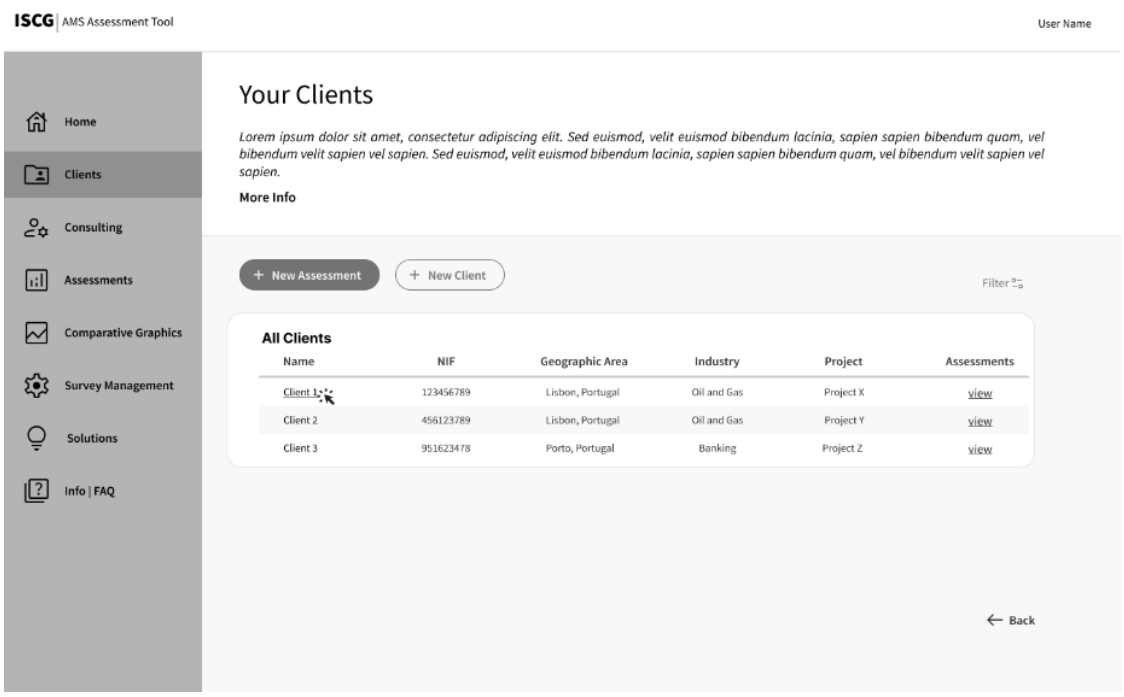


Figure 18: 1st Iteration - Client profile page

New assessment screen

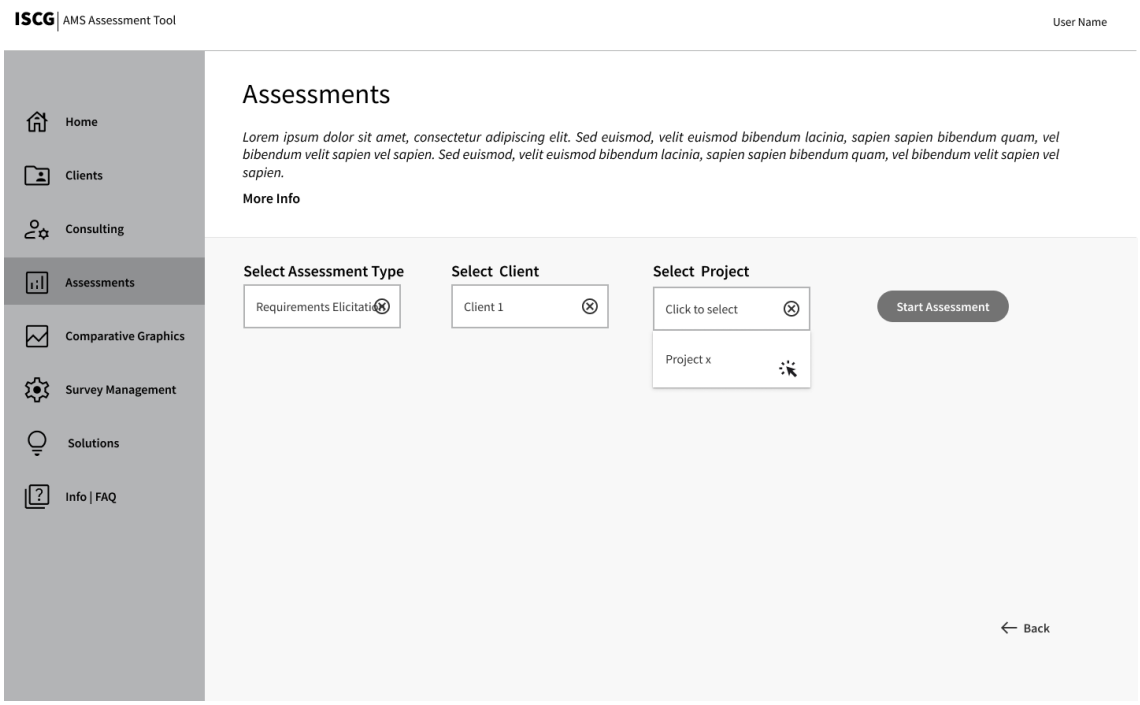


Figure 19: 1st Iteration - Assessment selection screen

Assessments – SLA and Service Model Definition

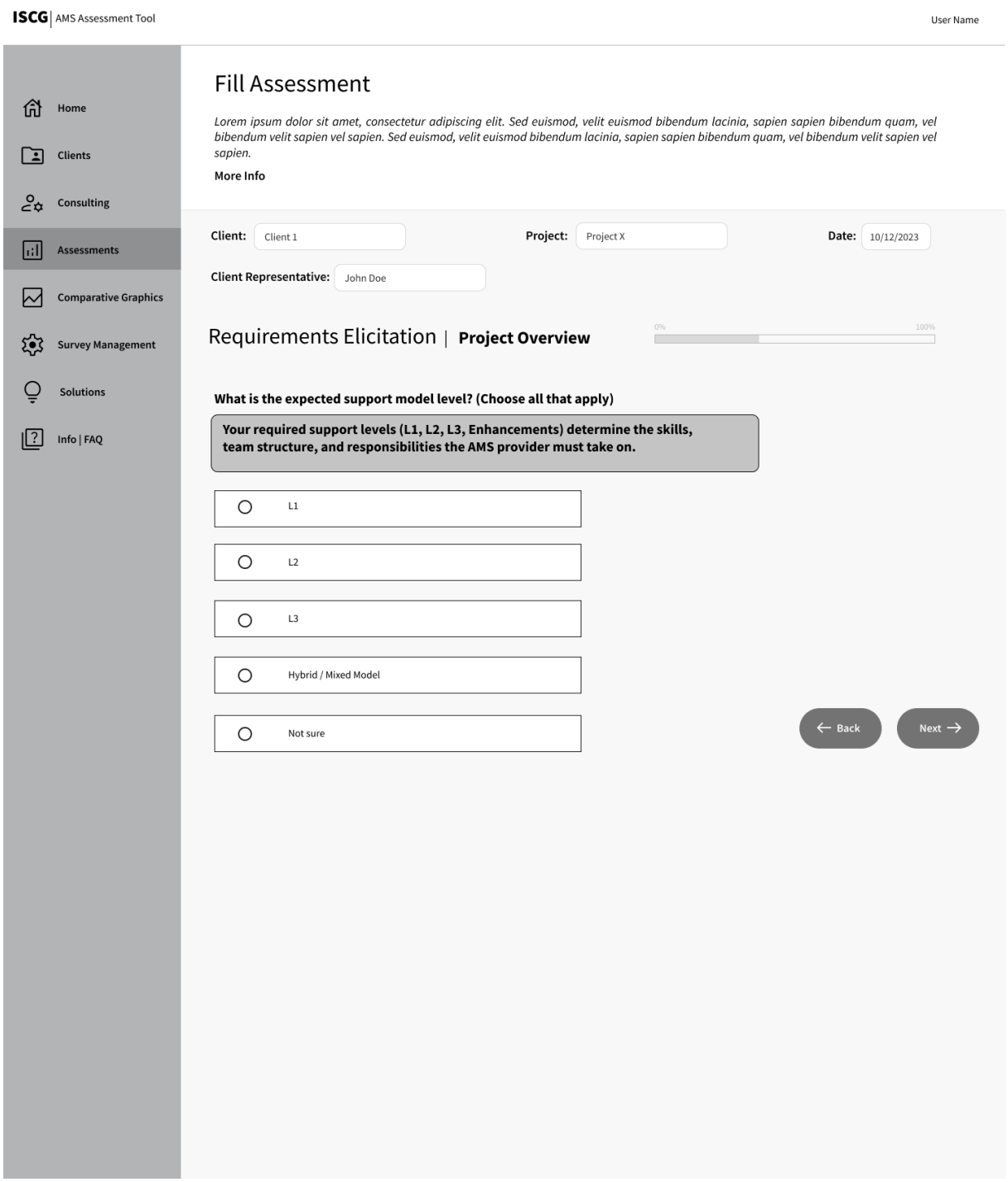


Figure 20: SLA and Service Model 1st Question

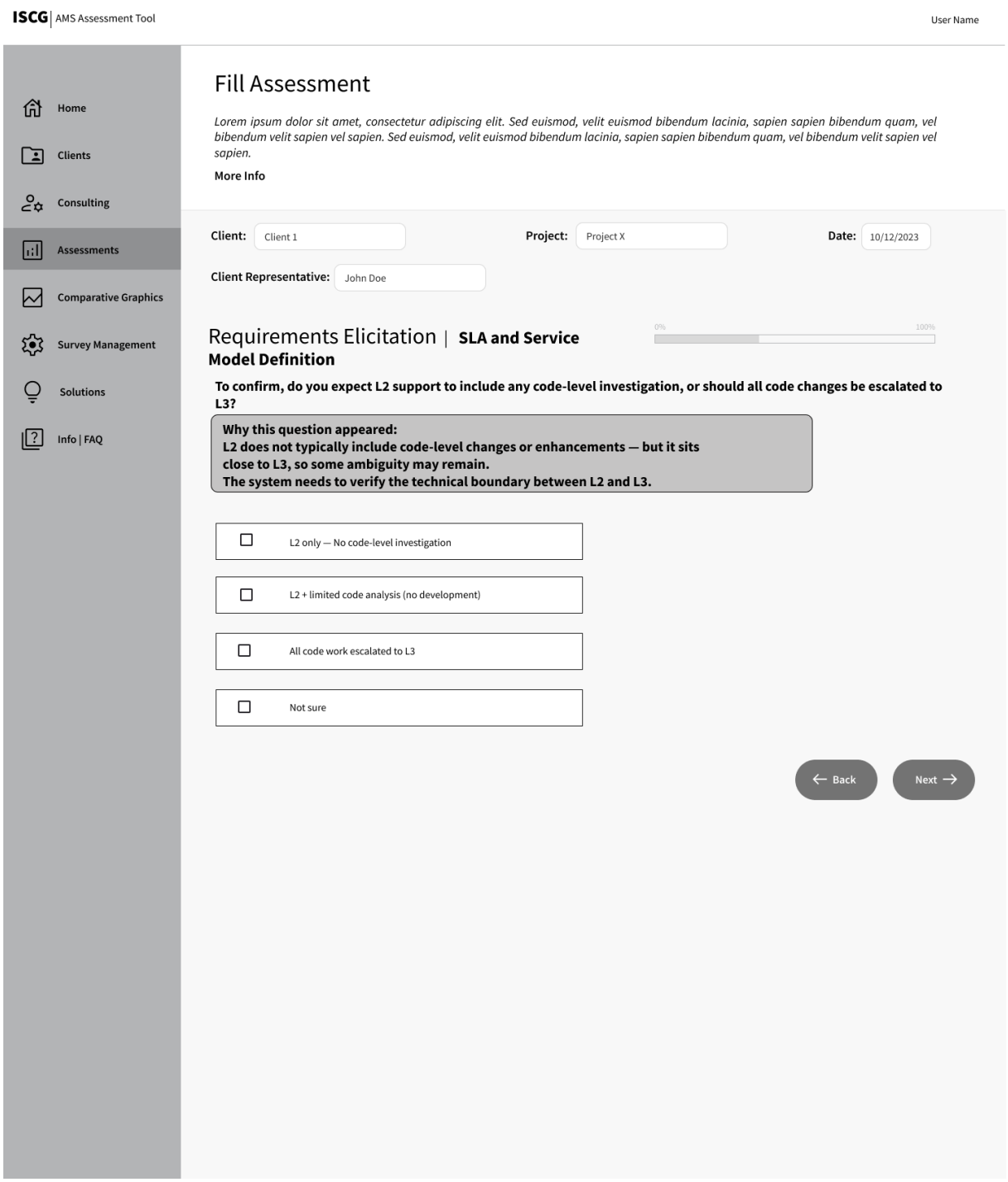


Figure 21: Adaptive path if user chooses L2 on Figure 20

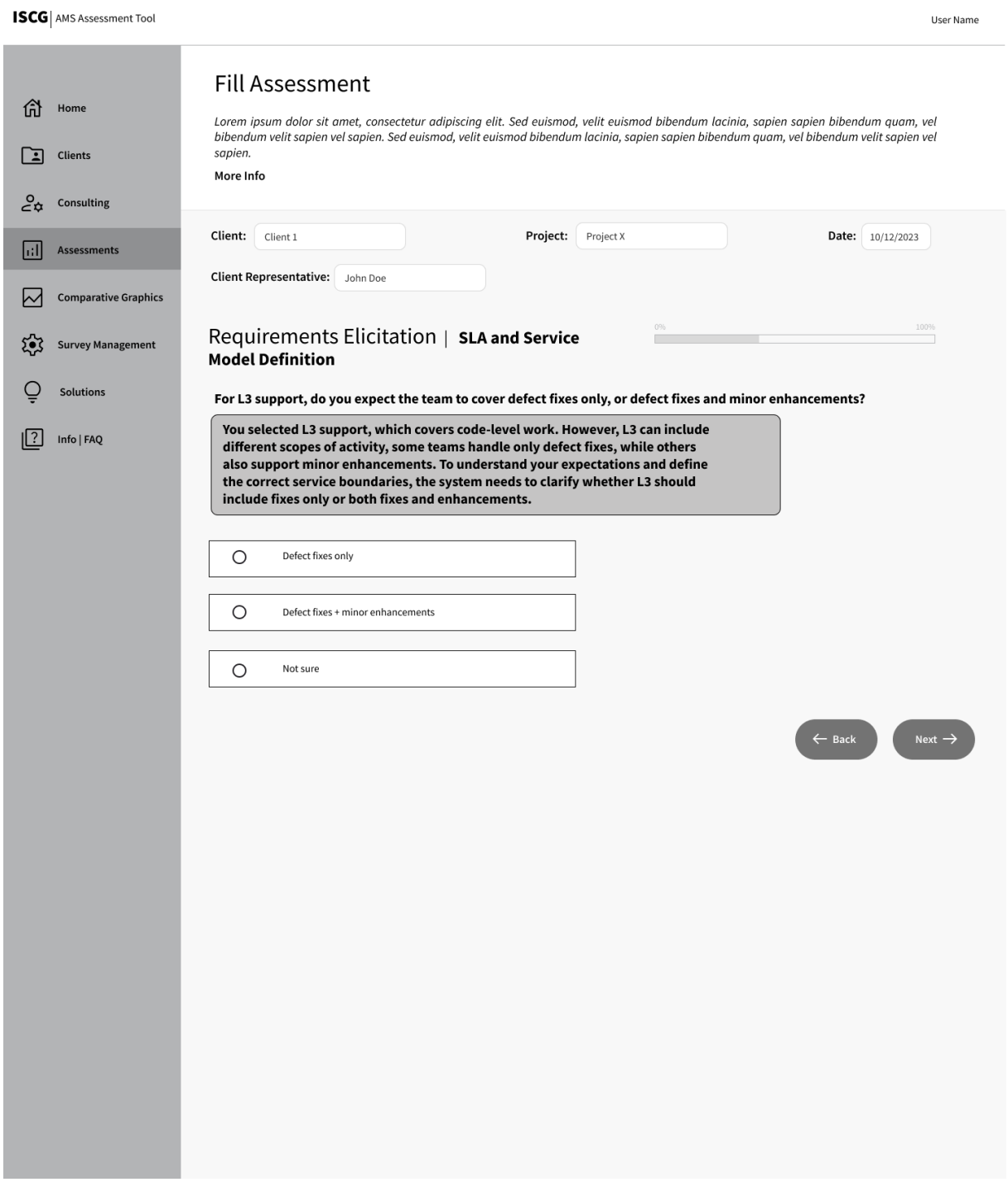


Figure 22: Question triggered if user selects L3 on Figure 20

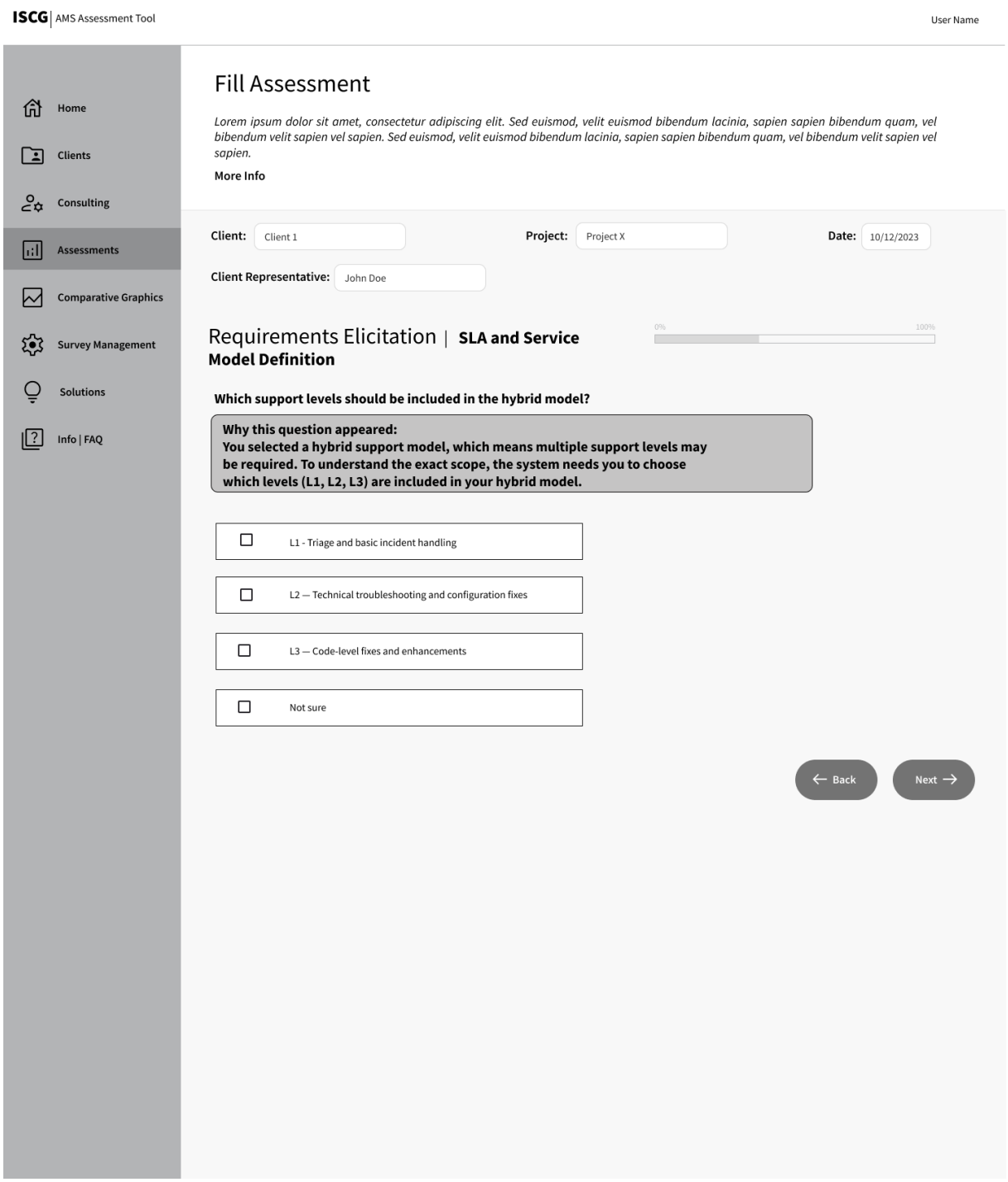


Figure 23: Question triggered if user selects Hybrid Model on Figure 20

Appendix F

Table 12: 1st Iteration Questions

Q#	Section	Question
1	Framework	Do you agree with the framework stated in "AMS Assessment Tool - Context and Definitions" will improve the Requirements Elicitation process? Please explain.
2	Framework	Do you think that some details or subjects might be missing in this framework? If yes, please explain.
3	Framework	Do you agree with the topics and subtopics stated in List 1 are aligned in what you do in the requirements elicitation process? If not, please explain.
4	Framework	Do you agree with the order that those topics and subtopics are displayed? If not, please state your proposed order.
5	Client Profile and Assessment Select Screen	Do you agree with the name of the assessment type mentioned, "Requirements Elicitation"? If not, please explain.
6	Client Profile and Assessment Select Screen	In your opinion, only one client representative would fill the assessment? Please explain your answer.
7	Client Profile and Assessment Select Screen	Do you agree with the design shown in those wireframes? If not, please state your feedback.
8	Requirements Elicitation Assessment Screen	Do you agree with the adaptive paths and questions shown in Figures 20-23, given the inputs inserted? If not, please explain.
9	Requirements Elicitation Assessment Screen	Do you agree with the design and explainability text shown in Figures 20-23? If not, please explain:
10	Requirements Elicitation Assessment Screen	Do you agree with the adaptive paths and questions shown in Figures 20-13, given the inputs inserted? If not, please explain:
11	Requirements Elicitation Assessment Screen	Do you agree with the design and explainability text shown in Figures 20-13? If not, please explain:

Appendix G

2nd Iteration Interview Protocol

Proposed Framework

The proposed framework introduces an adaptive and explainable assessment methodology for capturing the detailed requirements needed to initiate a new Application Maintenance Services (AMS) engagement. To address the complexity of AMS environments characterized by heterogeneous applications, uneven documentation, and implicit operational knowledge, the framework replaces static questionnaires with a dynamic, intelligence-driven elicitation process.

At the center of this approach is the Next Best Question (NBQ) engine, which selects the most informative question at each step by evaluating prior responses, updating an internal belief state, and estimating remaining uncertainty. The framework uses decision trees and dependency graphs to structure prerequisite relationships and ensure logical coverage, while AI techniques, including probabilistic inference, uncertainty scoring, information-theoretic evaluation, and natural language understanding, interpret user input and determine both the content and the type of the next question. Depending on confidence levels, the system may present a confirmatory single-choice question, a binary clarifier, a multiple-choice expansion, or an open-ended probe to elicit nuance.

To further guide the assessment, the framework organizes elicitation by persona like Business Owner, Technical Architect, Service Delivery Manager and Security & Compliance Officer. For each one, they contain a series of major topics, such as project typology, transition readiness, infrastructure, operational processes, ticket history, SLA expectations, resource requirements, risk assessment, and governance. Each topic contains subtopics that represent specific information slots. The NBQ engine iterates through these subtopics, resolving uncertainty until a topic is sufficiently understood, based on confidence thresholds, dependency completion, and risk indicators, before progressing to the next domain. This topic-guided NBQ structure ensures comprehensive AMS coverage while minimizing unnecessary user effort.

The framework operationalises this approach through the following assessment topics and subtopics divided by context / persona (Appendix A).

Wireframes

How the tool stores clients, projects information. Each record contains the link for the assessment done:

Clients

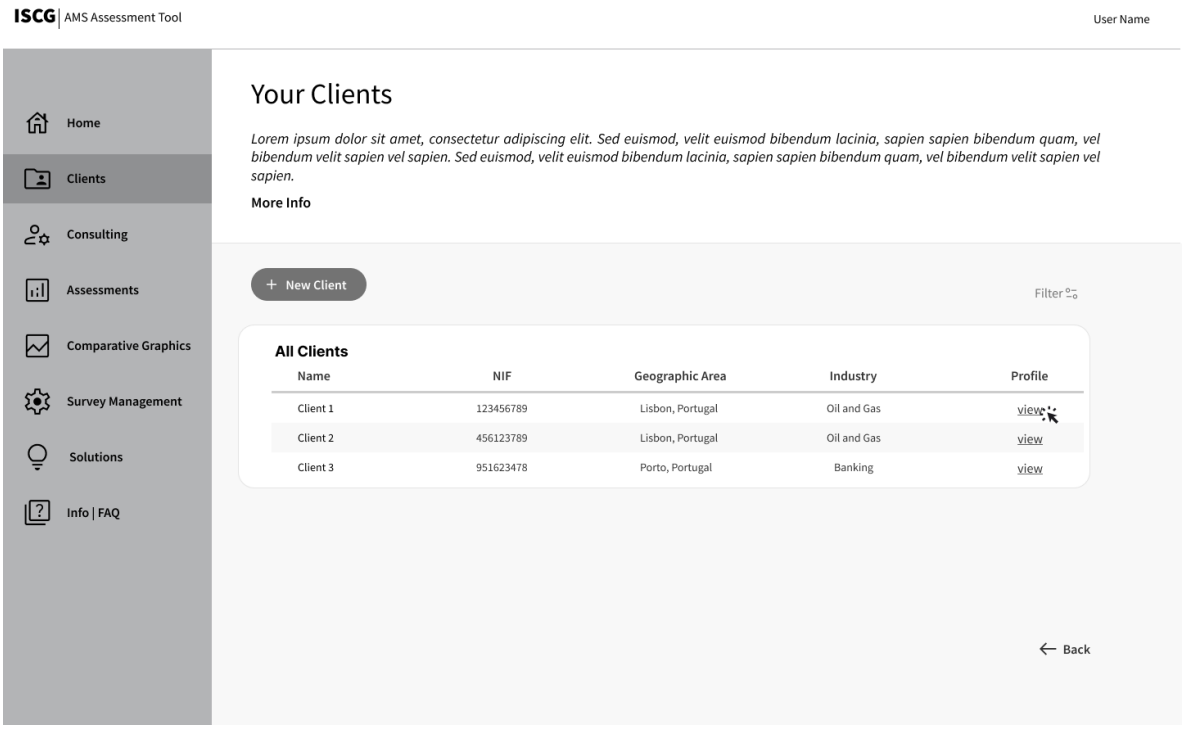


Figure 24: 2nd Iteration - Your Clients Page

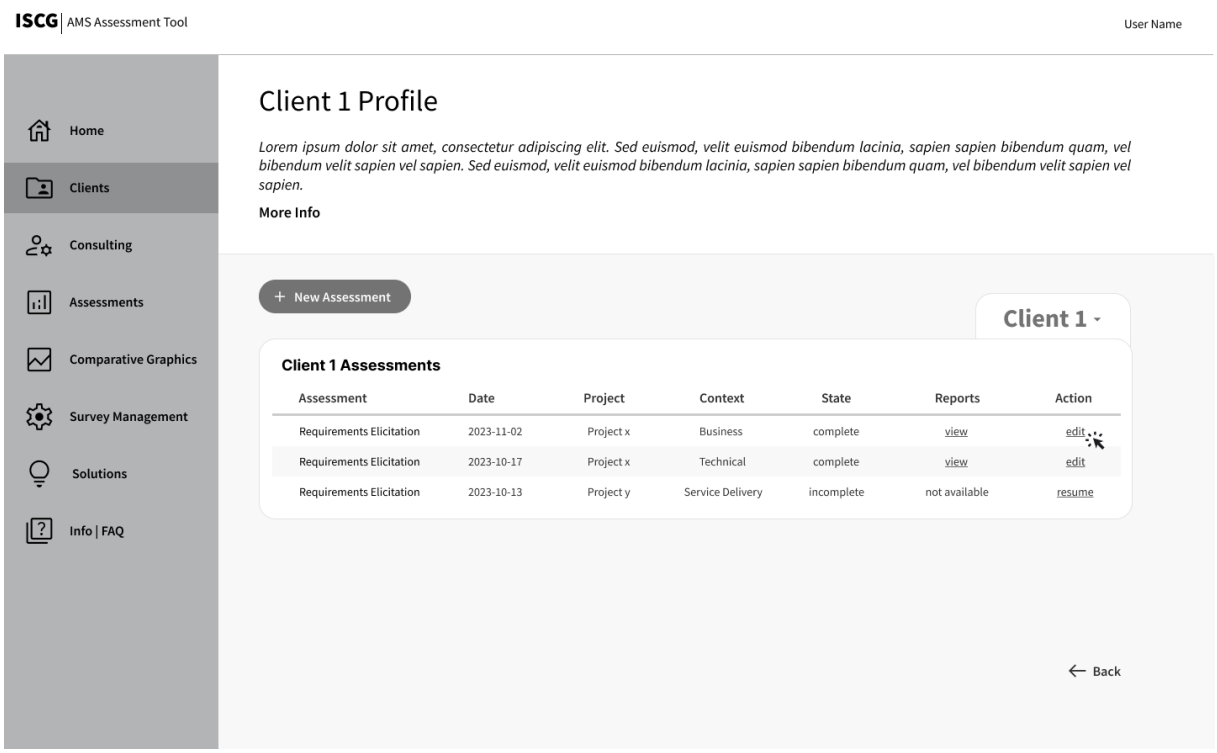


Figure 25: 2nd Iteration - Client Profile Page

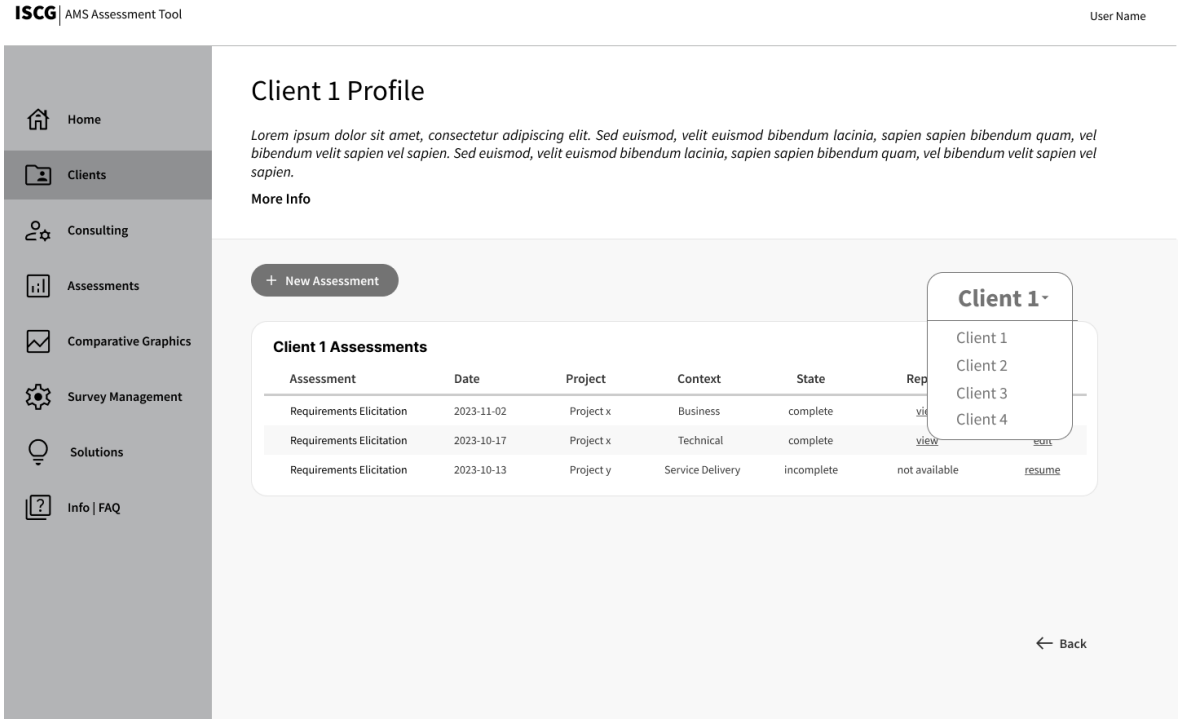


Figure 26: 2nd Iteration - Client selection

Select assessment screen

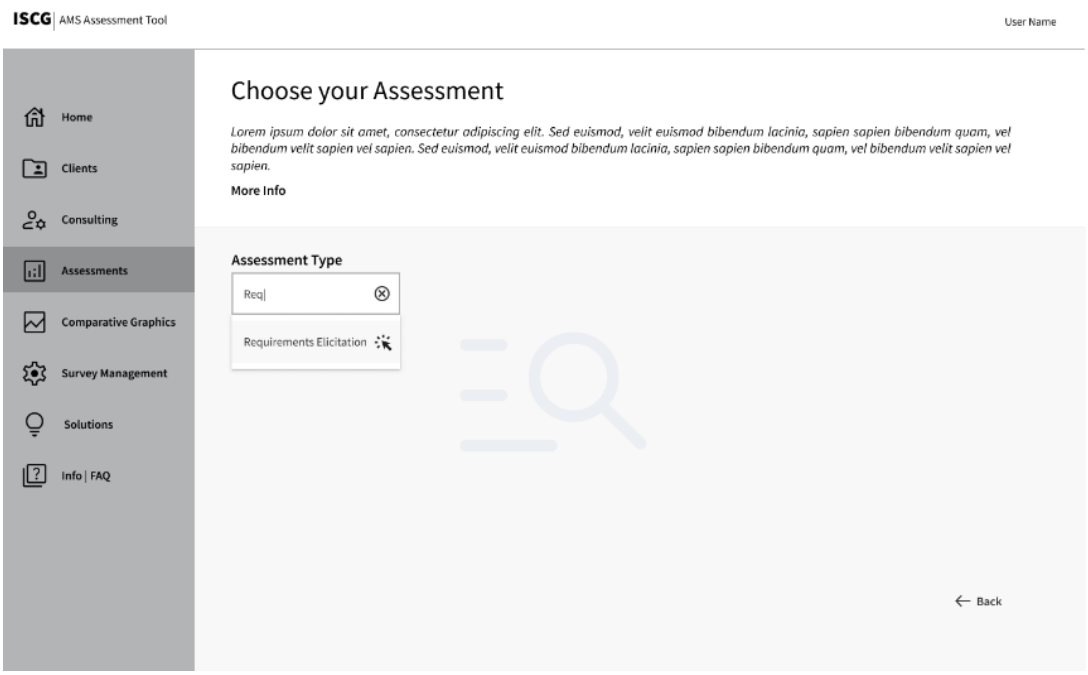


Figure 27: 2nd Iteration - Assessment Type Select

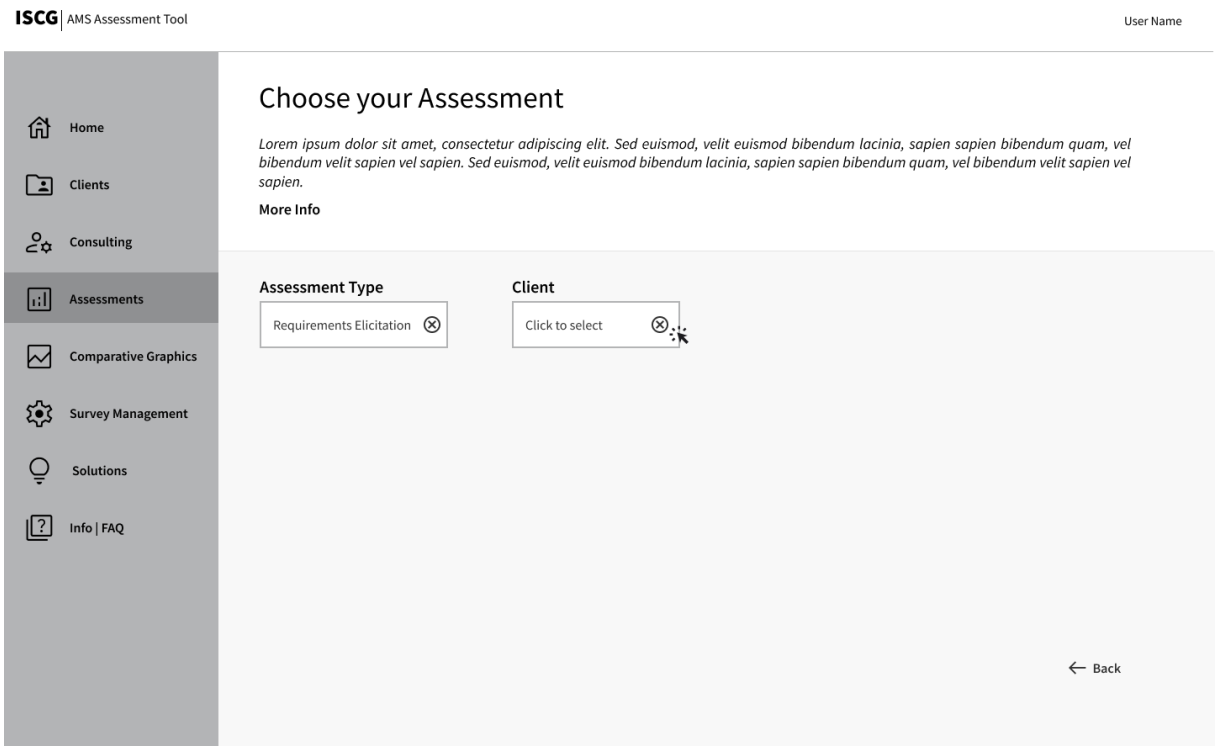


Figure 28: 2nd Iteration - Client Select

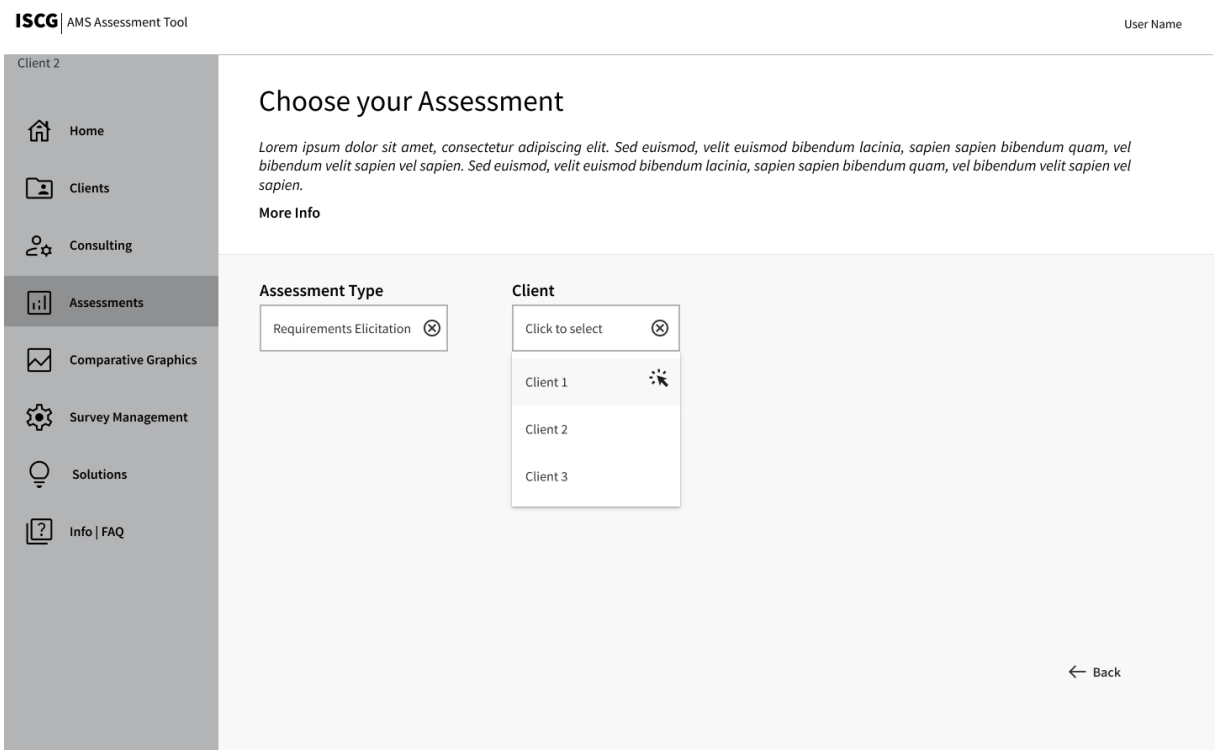


Figure 29: 2nd Iteration - Client Select Values

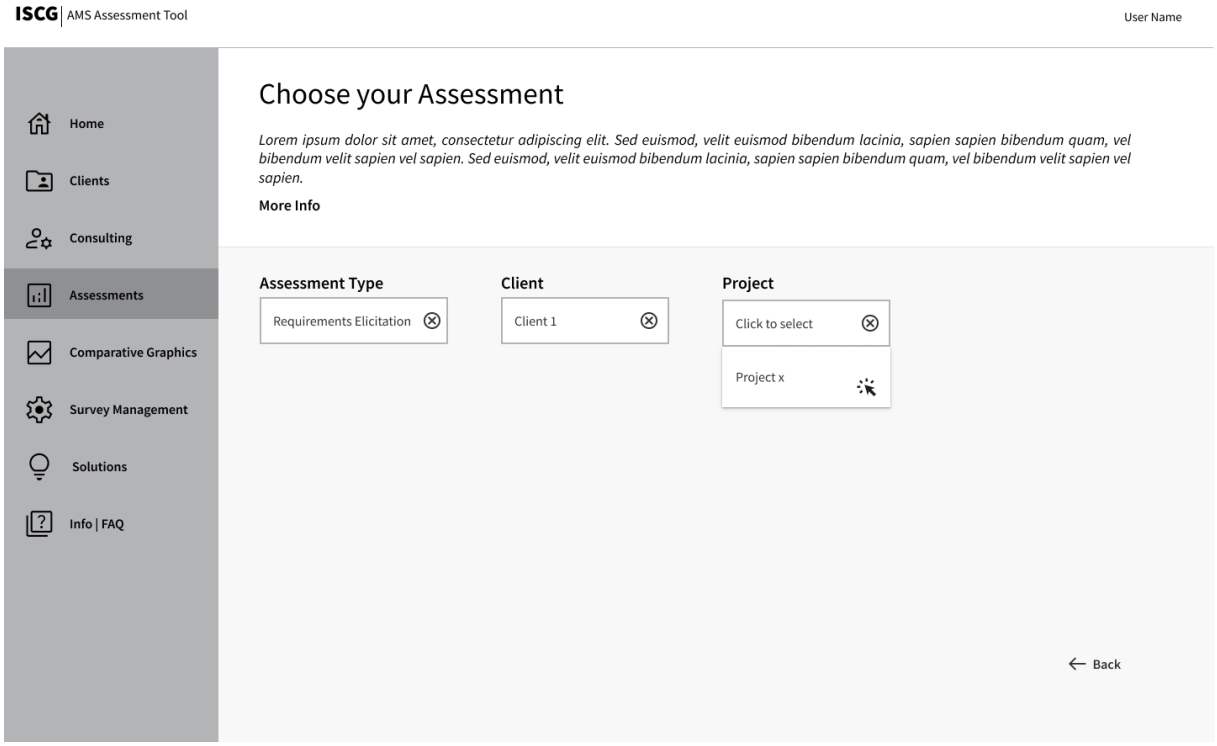


Figure 30: 2nd Iteration - Project Select

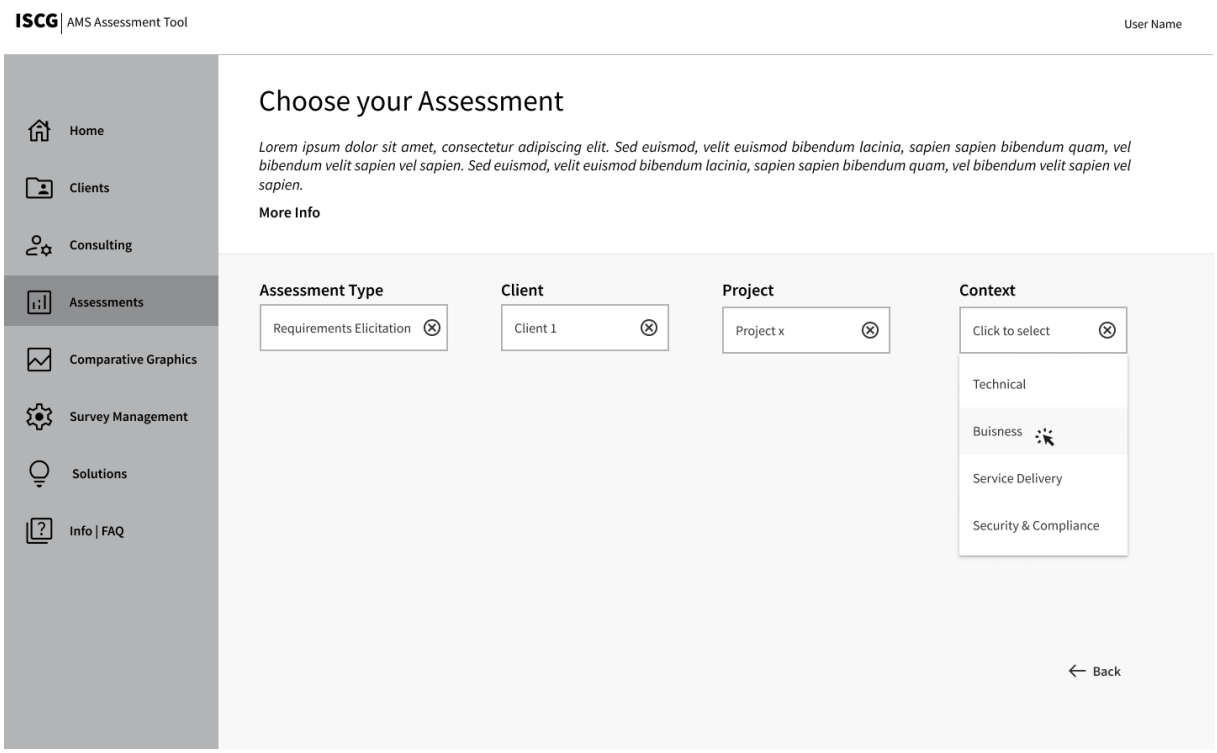


Figure 31: 2nd Iteration - Context Select

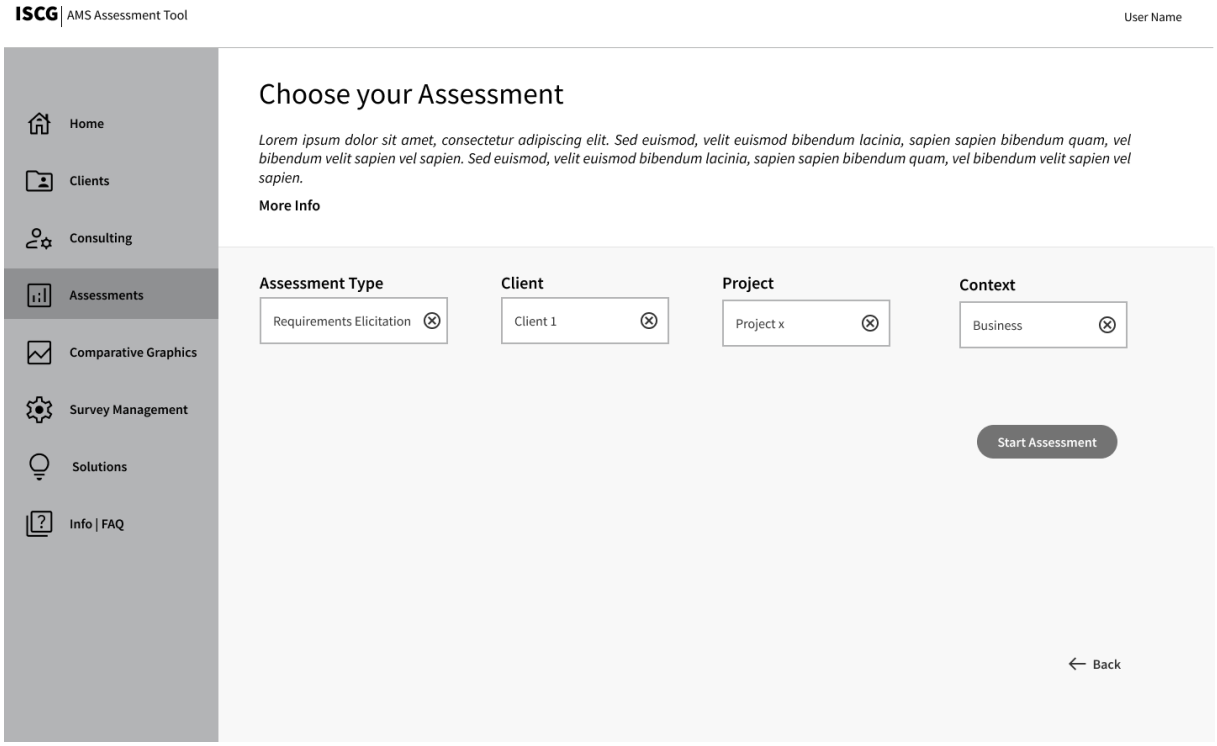


Figure 32: 2nd Iteration - "Start Assessment" button visible

Business assessment – adaptative paths

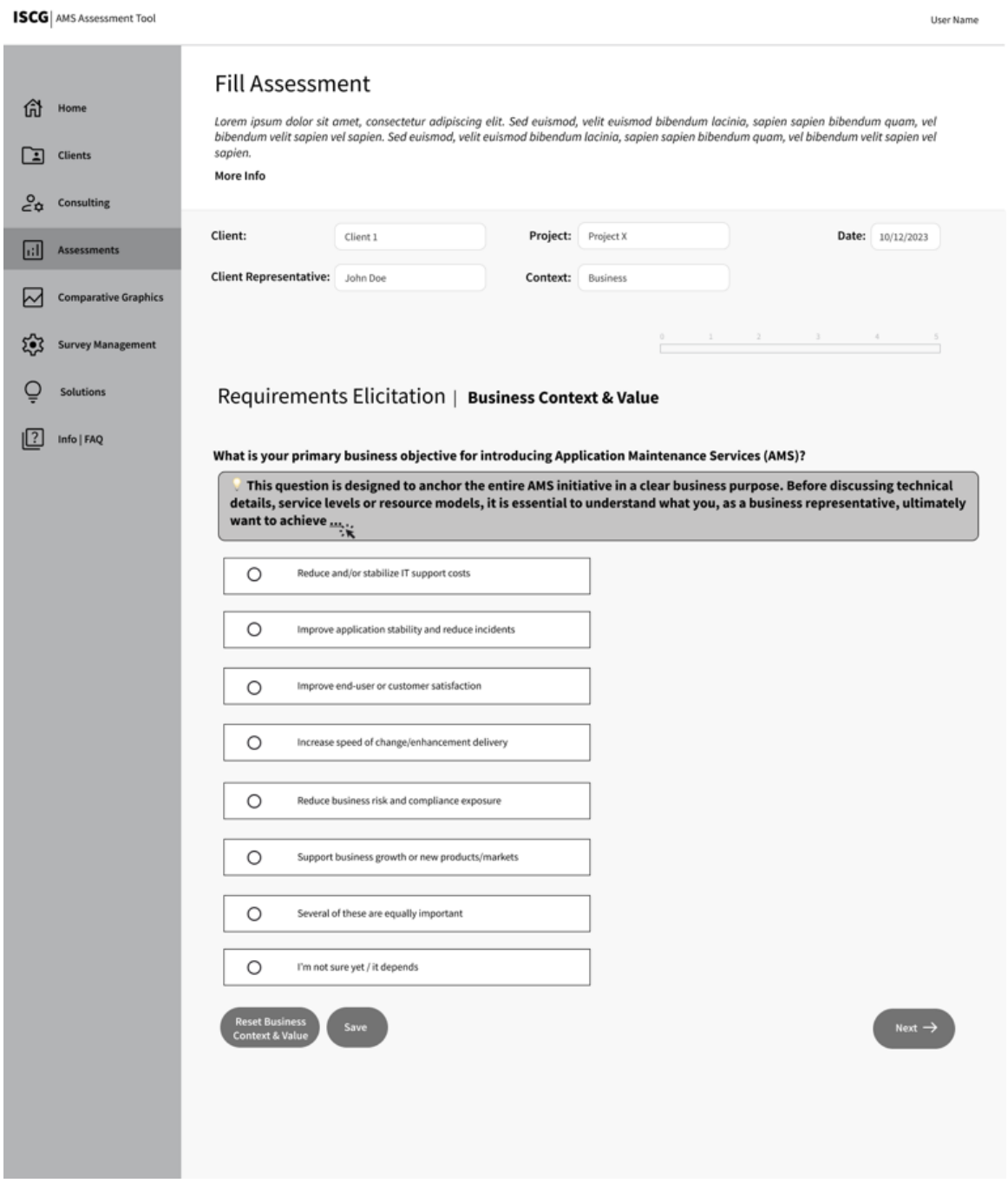


Figure 33: 2nd Iteration - First question Business Question

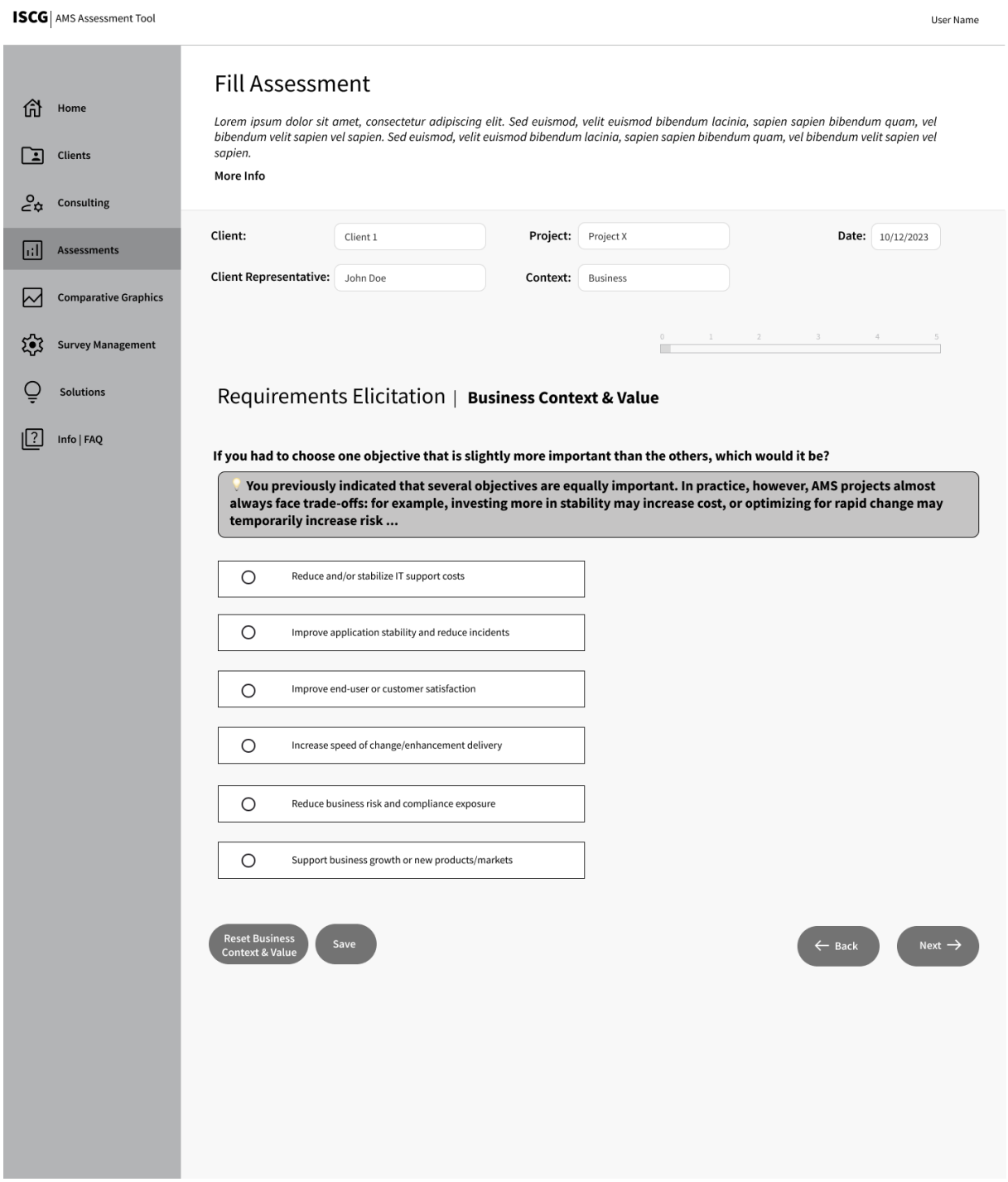


Figure 34: 2nd Iteration - Question displayed if user selects "Several of these are equally important", the system treat this as ambiguity in priority

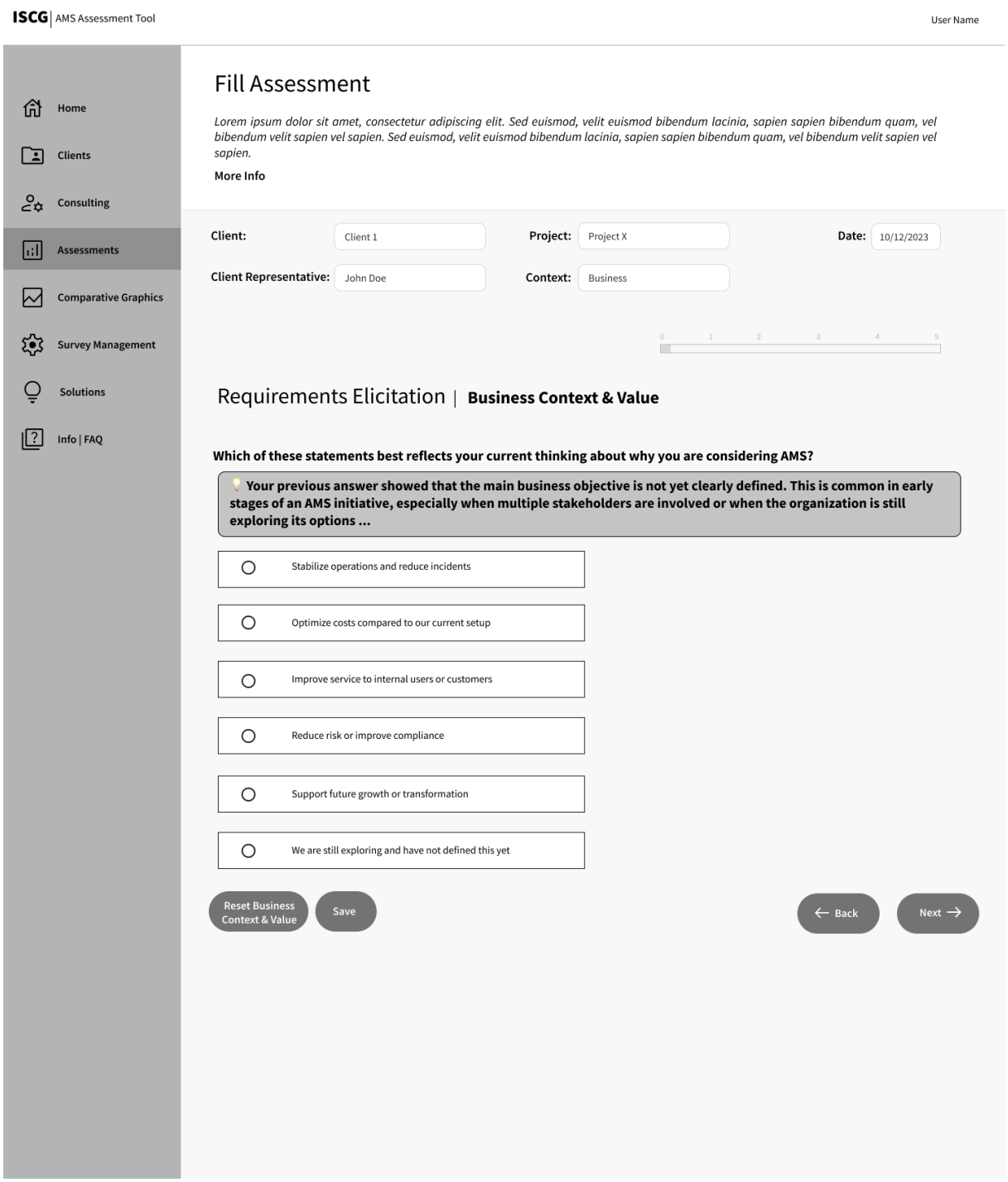


Figure 35: Question displayed if user selects "I'm not sure yet / it depends", the system treats this as ambiguity in priority

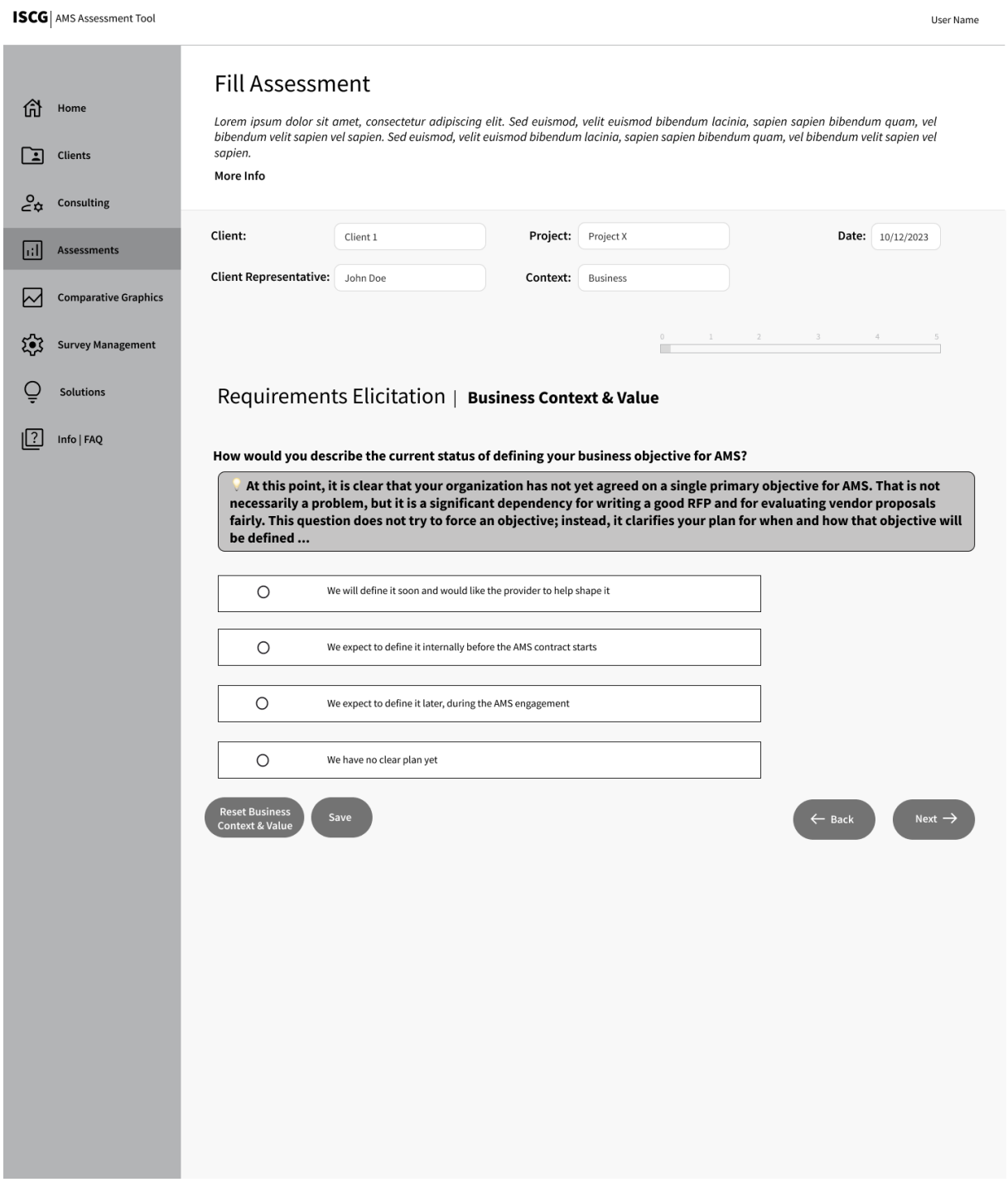


Figure 36: Question displayed if user selects "We are still exploring and have not defined this yet" in Fig. 35 question.

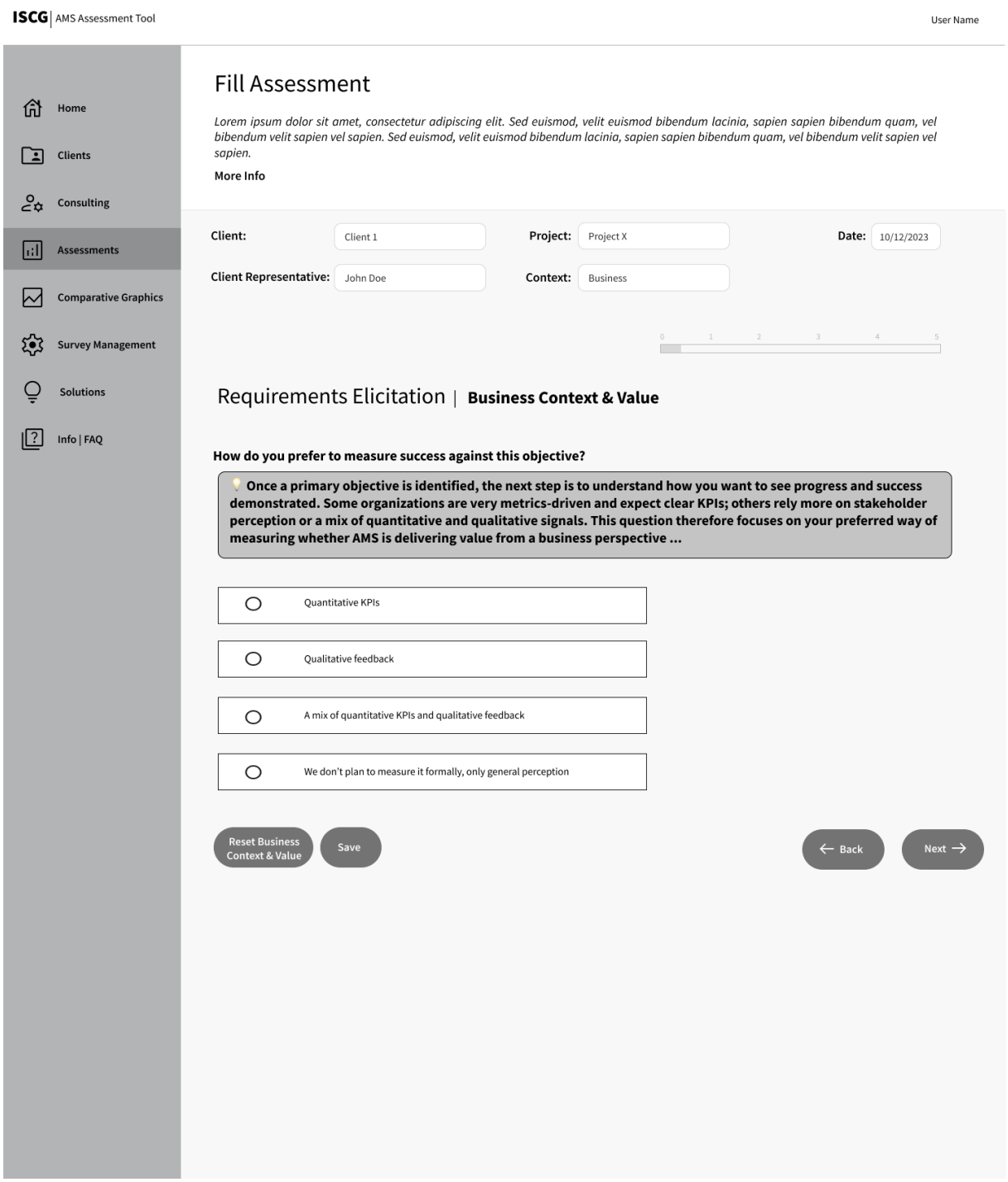


Figure 37: Question displayed if user selects between 1 to 6 on Fig. 33 question

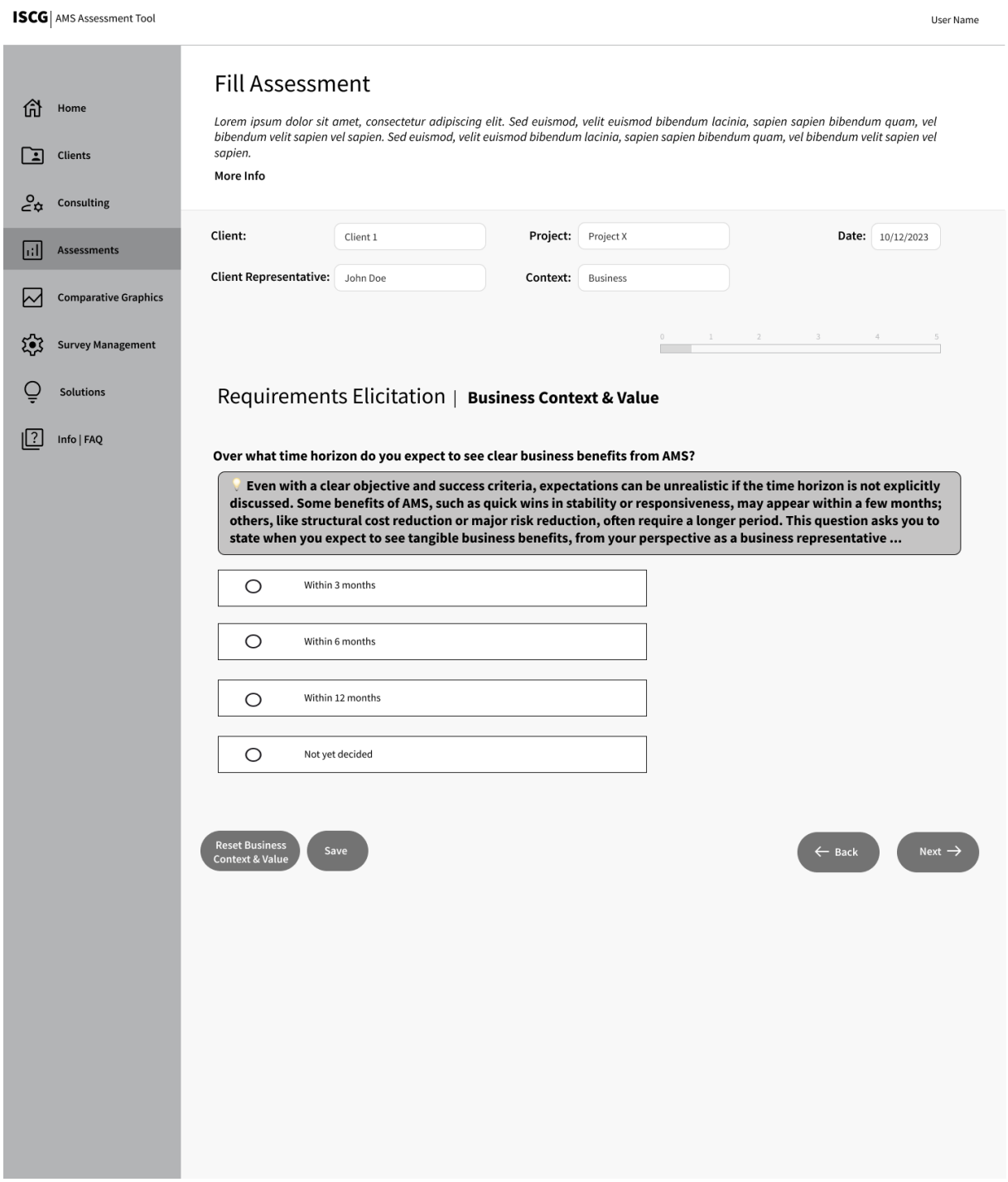


Figure 38: Question displayed after user responds to Fig.35 Question

Explainability

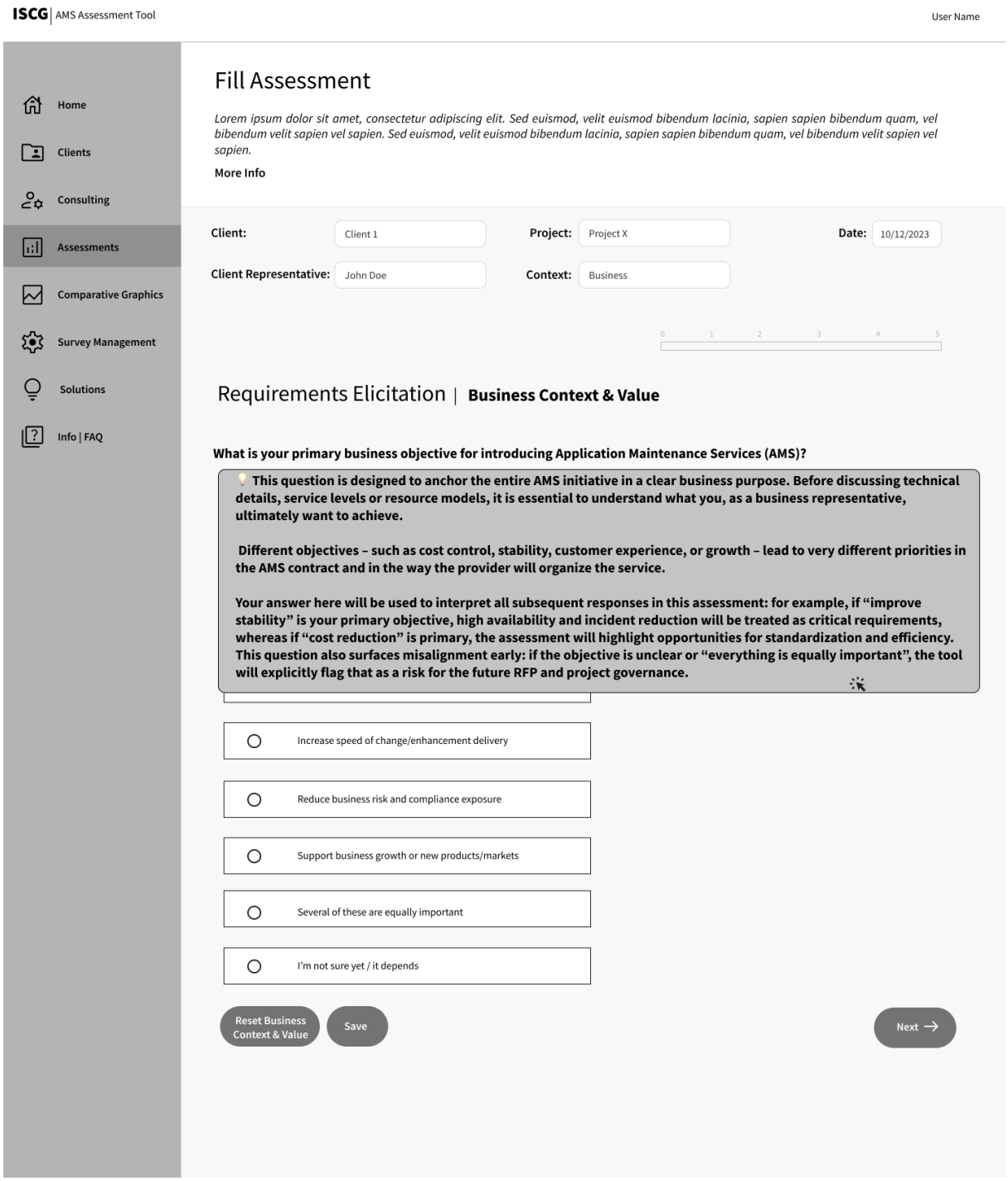


Figure 39: Explainability box expanded when user clicks the "…" in Fig 33

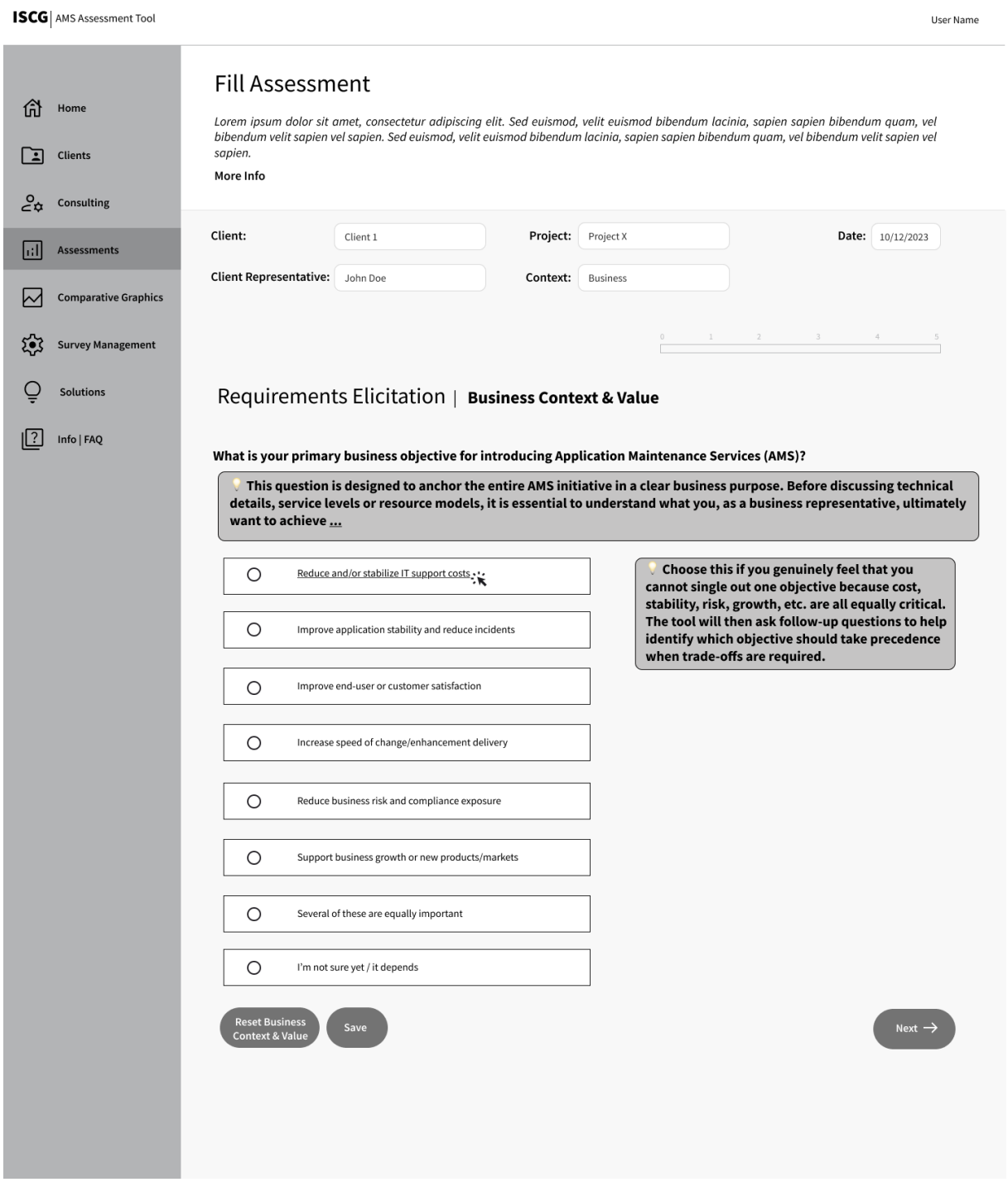


Figure 40: Explainability box when user highlights option a)

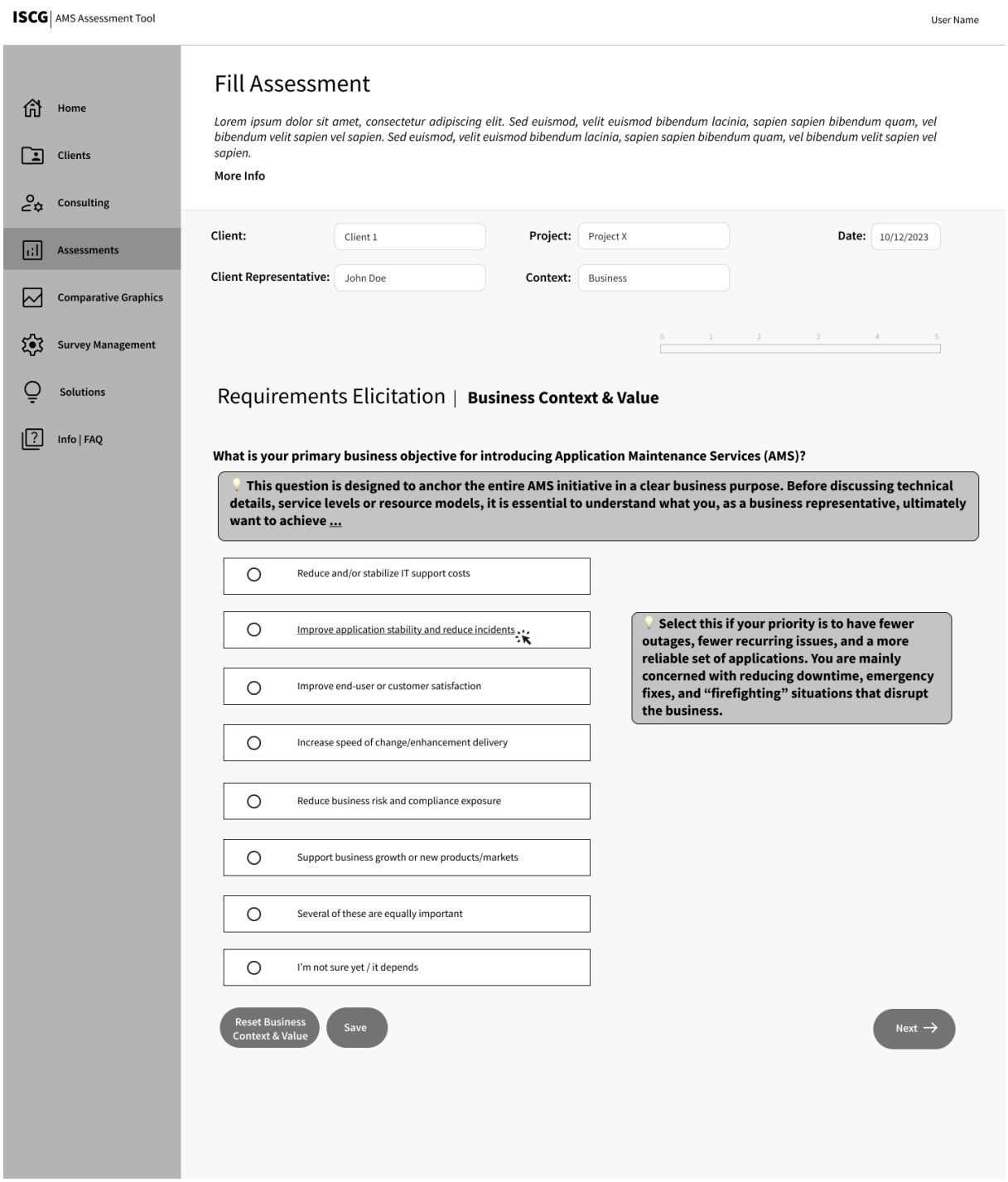


Figure 41: Explainability box when user highlights option b)

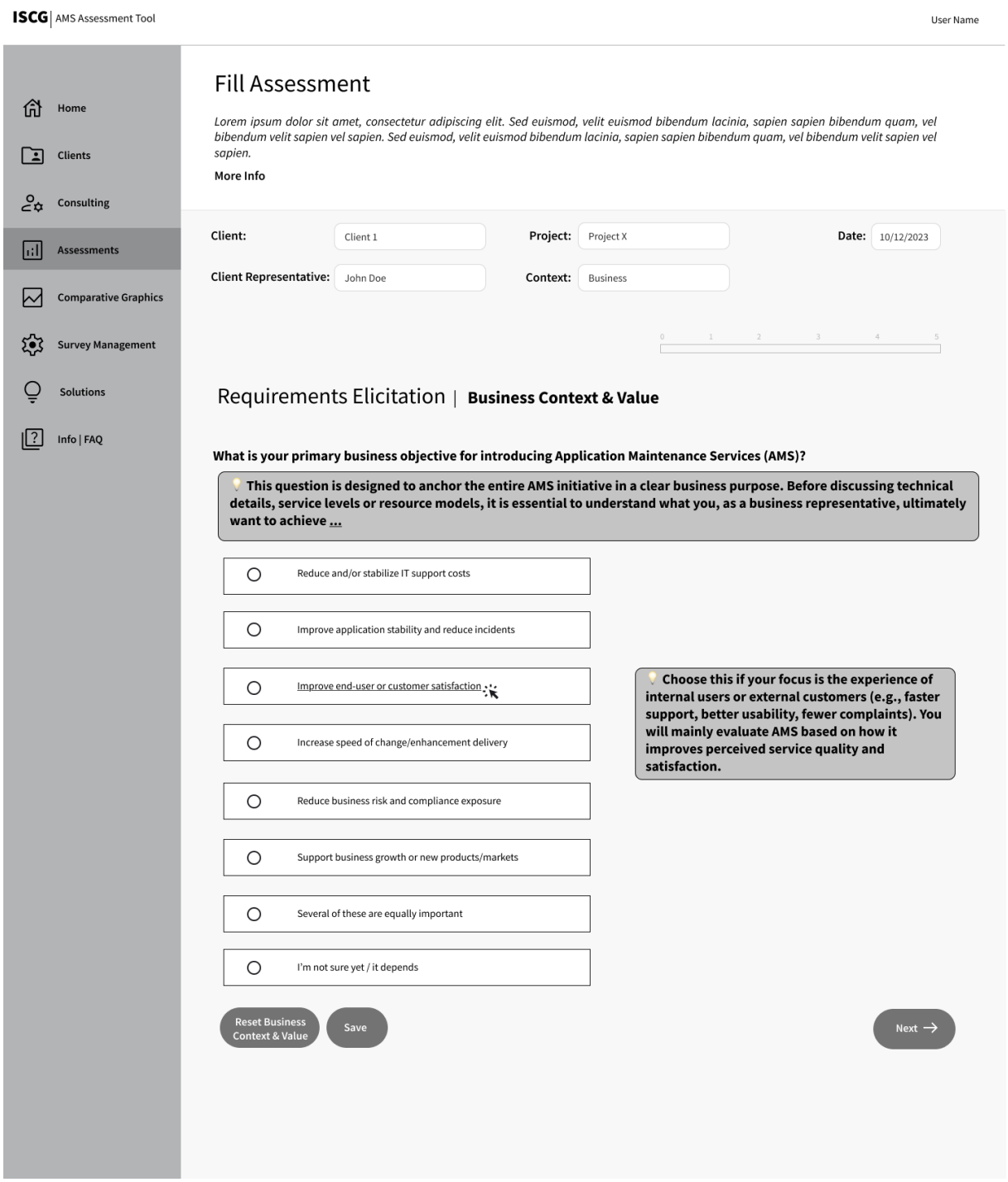


Figure 42: Figure 19: Explainability box when user highlights option c)

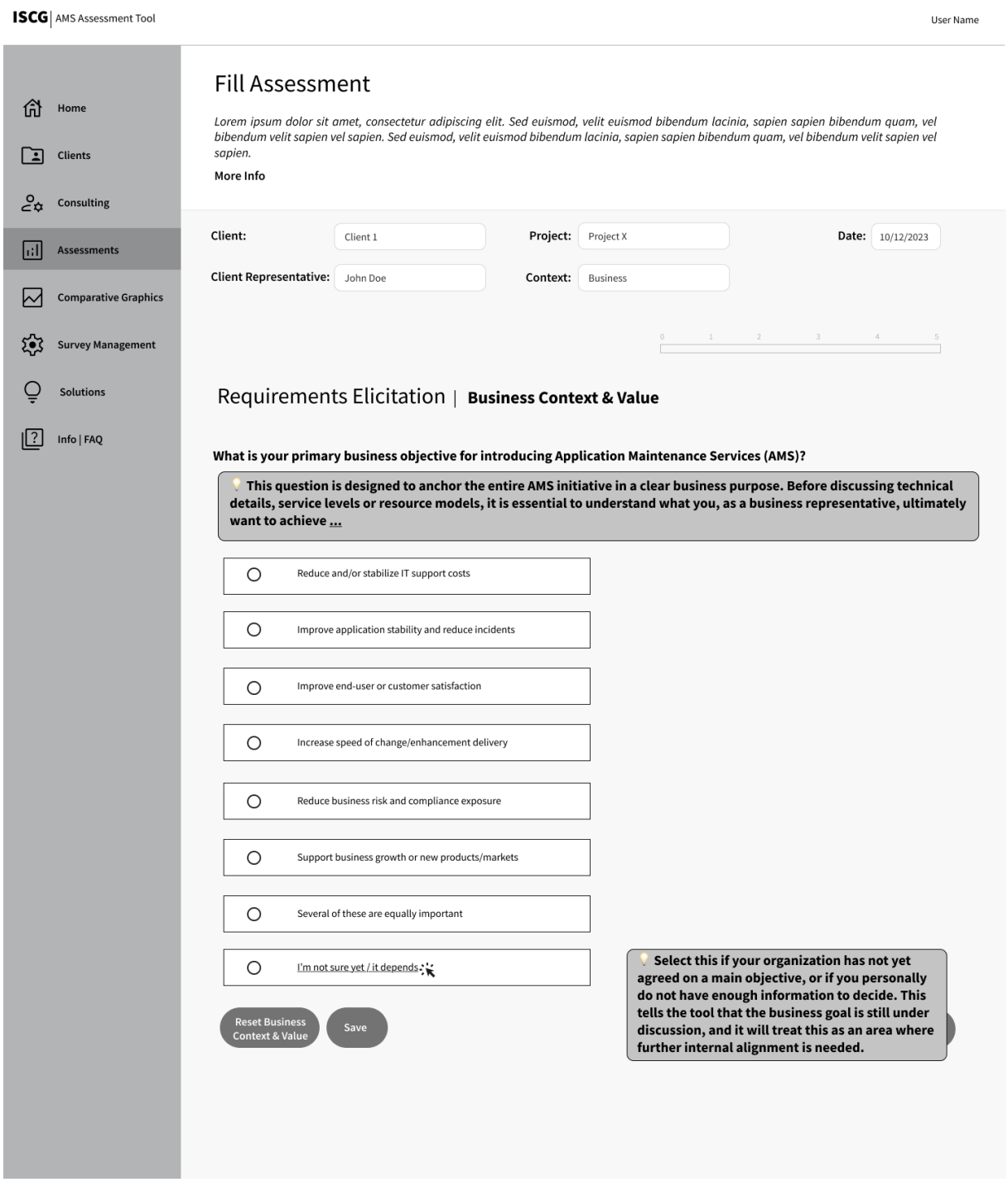


Figure 43: Explainability box when user highlights last option

Appendix H

Table 13: 2nd Iteration Interview Questions

Q#	Section	Question
1	Framework	Do you agree that the framework stated in "AMS Assessment Tool - Context and Definitions" will improve the Requirements Elicitation process? Please explain.
2	Framework	AMS Assessment Tool has assessments for four contexts or personas, Business, Technical, Service Delivery, Security and Compliance. Do you agree with the several contexts or personas and its topics stated in List 1 and its order? Please explain.
3	Client Profile and Assessment Select	Do you agree with the design and information represented in "Your Clients" page (Fig. 24)? Please explain.
4	Client Profile and Assessment Select	Do you agree with the design and information represented in "Client Profile" page (Fig. 25 and 26)? Does it make sense to list several project assessments in the same screen? Please explain.
5	Client Profile and Assessment Select	Do you agree with the design and options represented in "Choose your Assessment" page (Fig. 27-32)?
6	Requirements Elicitation Assessment	Do you agree with the design and fields in "Fill Assessment" header (Fig. 33-43)? Please explain.
7	Requirements Elicitation Assessment	Do you agree with the questions contents and its adaptive paths shown in Figures 33-43? Please explain, adding suggestions if you do not agree.
8	Requirements Elicitation Assessment	Do you agree with the design of the titles, questions description, options and buttons (Fig. 33-43)? Please explain, adding suggestions if you do not agree.
9	Requirements Elicitation Assessment	Do you agree with the explainability suggestions and design (Fig. 39-43)? Please explain, adding suggestions if you do not agree.