# Framing Stakeholder Readiness Level (SRL): A Human-Centred Approach to AI Technology Adoption in GLAM sector

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This paper proposes the Stakeholder Readiness Level (SRL) framework as a human-centred approach to assess how prepared stakeholder groups are to adopt emerging technologies. It addresses a gap in existing models, such as TRL and HRL (Technology and Human Readiness Levels), which often overlook organisational and human factors. SRL introduces a stakeholder-focused perspective to technology adoption. The framework was developed through a synthesis of existing literature and validated empirically through qualitative interviews with GLAM (Galleries, Libraries, Archives, Museums) professionals and non-experts across four countries. Thematic analysis and the Gioia method confirmed the framework's relevance and showed that readiness is shaped by both personal and institutional dynamics. The six proposed SRL dimensions (Awareness, Trust, Engagement, Competence, Support Structures, and Ownership) were further validated through the interviews. The empirical findings revealed three narrower readiness themes: Strategic and Cultural Alignment, Participatory Governance, and Organisational Support Systems. These illustrate how readiness factors cluster and interact from a practical perspective. The proposed framework can function as both a diagnostic instrument and a strategic guide for facilitating inclusive, sustainable, and contextually appropriate technology adoption processes within organisations.

Additional Key Words and Phrases: Stakeholder Readiness Level (SRL), technology adoption, adoption frameworks, artificial intelligence (AI), GLAM institutions, stakeholder readiness, organisational readiness, Technology Readiness Level (TRL), Human Readiness Level (HRL), participatory design, innovation assessment, qualitative research, Gioia method, stakeholder engagement

## 1 INTRODUCTION

The successful adoption of new technologies in any organisation is vital for the development of modern institutions and industries. From healthcare to education or culture, innovation has improved the efficiency and quality of services and products, which consequently has contributed to a higher quality of life. However, this transformation is dependent not only on technological advancements but also on stakeholders' ability to integrate and effectively engage with these innovations. [5, 19]

Frameworks like the Technology Readiness Level (TRL) or the Integration Readiness Level (IRL) have been designed with a main focus on technology [15], but they tend to overlook human and organisational factors that have a major impact on the result of technology adoption. As a result, the Human Readiness Level (HRL), standardised in 2021, was designed to deal with human-system integration [27]. Other models, like the Adoption Readiness Level (ARL) or System Readiness Level (SysRL), are meant to extend readiness levels to the areas of commerce and systems engineering. [24, 29]

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Artificial intelligence (AI) currently represents the most prominent need for technology adoption strategies. [1] With the continuous development of Large Language Models (LLMs) and Generative AI (GenAI), there is a constant need for new frameworks to provide a better understanding and adoption of these technologies both in consumers' daily lives and in organisational settings, either public or private. [2, 3, 21] Therefore, public sector domains like GLAM (Galleries, Libraries, Archives, and Museums) are facing challenges in adopting and integrating new technologies, as their organisational culture and business model were developed but failed to make room for major technological improvements like artificial intelligence. Adoption of these new systems in the GLAM domain is directly focused on improving the user experience of visitors by reshaping their interaction with the displayed exhibits, automating curation processes, or supporting digital innovation. [17, 25, 30] All in all, there is a clear gap in the existing standards and frameworks with regard to the assessment of readiness for stakeholders representing different groups of actors. This paper explores the gap as reflected in existing literature and proposes multiple dimensions for assessment along with a mapping of a future framework. The real stakeholders' perception of readiness dimensions is assessed by means of semi-structured interviews conducted with 6 GLAM professionals and 3 non-expert beneficiaries of GLAM institutions. The dimensions resulting from thematic analysis through the Gioia method are further compared and contrasted to the initial conceptual dimensions. Subsequently, the framework is evaluated using the comparative analysis mapping and modified in accordance with the interviewees' insights for an accurate approach based on empirical evidence.

## 2 RELATED WORK

To help organisations understand their readiness to adopt new technologies, multiple frameworks have been developed as instruments for assessing different parts of adoption projects. The most common and widely used is the Technology Readiness Level (TRL), which was first introduced by NASA in the 1970s, then formally defined in 1989 and further refined in the current 9-level Technology Readiness Level (TRL) scale that became a standard in 2013 under the specification of ISO 16290:2013. This framework, originating from space studies and further adopted in the defence sector, assesses the technical maturity of technologies throughout the entire lifecycle, from concept to real-world application. Even if TRL is an internationally recognised standard, it has been criticised due to its lack of human, organisational, and contextual factors that often determine the success or failure of technology adoption. [13, 15, 18, 22]

As a response to these gaps, there have been numerous proposed frameworks, of which the Human Readiness Level (HRL) scale is widely accepted. It moves the focus onto the human aspect and the principles of user integration, safety, and usability and complements TRL by adding the dimensions of usability, human training, and the concept of the effectiveness of collaboration between humans

and systems. In 2021, it was established as a standard under the designation ANSI/HFES 400-2021. [20, 23] Additionally, the Adoption Readiness Level (ARL), developed by the United States Department of Energy (DoE), goes even further beyond the sole human factor, as it includes external factors that affect the process of implementing and integrating a new technology from a commercial perspective. It follows four major dimensions: value proposition, market acceptance, resource maturity, and licence to operate. Even if it does not follow the classical 9-level mapping as other readiness frameworks, it proposes a matrix approach measuring the risk using Technology Readiness Level (TRL) and the proposed dimensions. It provides 3 types of adoption readiness: low, medium and high readiness. [29]

A broader approach is proposed by the System Readiness Level (SysRL), which combines the TRL with yet another framework, Integration Readiness Level (IRL), to evaluate how different technologies can be combined to create a well-defined and functional system. More recent proposed versions of SysRL address the human aspect by the addition of Human Capability Level (HCL) and Human Integration Readiness Level (HIRL), which also consider the roles of the people involved in the system design. However, this intended level is focused more on domains involving complex technologies, such as the defence sector. [7, 16]

Existing studies also propose quantitative or mixed approaches, such as the Human Readiness Assessment (HRA), which uses numerical values to measure workloads, awareness, and usability. [8] Built upon HRL, the Human Views (HVs) framework offers a structured alternative for defining user roles, tasks, and interactions specifically within the field of systems engineering. [12]

Zoomed-out perspectives involving the adoption of technology are also useful in the thought process of readiness. The Innovation Diffusion Theory (IDT) [9, 11] and the Unified Theory of Acceptance and Use of Technology (UTAUT) [28] can be helpful to explain why individuals and organisations decide to adopt a new technology. The models outline the essential elements of usefulness, usability, and adoption support. Yet, while such models are useful for associating behaviour, they lack a direct method for estimating the actual readiness of different groups of stakeholders. From a different perspective, design frameworks such as participatory design and design justice focus on the aspects of inclusion, accessibility, and fairness. They remind us that preparation is not only about having skills and infrastructure but also about trust, agency, and ensuring that people feel represented in the process, particularly in public institutions. [6]

## 3 PROBLEM STATEMENT

### 3.1 Problem Statement

As for the technical maturity of innovations, it is efficiently evaluated by frameworks like the Technology Readiness Level (TRL), but some important aspects are frequently overlooked within such frameworks, like organisational, contextual, and human factors that affect whether technologies can be or are truly adopted. Complementary models that provide partial perspectives on user, organisational, and market preparedness have emerged in response to this, including Human Readiness Level (HRL), Adoption Readiness Level (ARL), and Integration Readiness Level (IRL). These models, however, are still disjointed and lack a cohesive framework that can adequately represent the complex preparedness of various stakeholder groups operating in innovation. The lack of an organised, thorough, and stakeholder-centered readiness framework that can facilitate inclusive and context-sensitive technology adoption processes represents a research gap that this paper is exploring.

### 3.2 Goals

The general ambition of this paper is to develop a stakeholder-centred framework that facilitates a more inclusive, context-aware adoption of innovative technologies. It incorporated the following specific goals:

- to develop a conceptual framework for Stakeholder Readiness Level (SRL) incorporating structured levels and aspects of readiness, based on existing research and related frameworks (TRL, HRL).
- to investigate stakeholders' perceptions of readiness for AI adoption in GLAM institutions and to identify both envisioned and emergent readiness factors.
- to evaluate the conceptual SRL framework against empirical evidence from GLAM stakeholders and improve the framework for enhanced contextual relevance and application.

### 3.3 Research Questions

Based on the aforementioned goals, the following research questions and their subsequent sub-research questions are formulated:

**RQ1:** *How can stakeholders' readiness for technological adoption be conceptualised through a multi-level framework?*
- **SRQ1:** What levels and dimensions are needed to structure a comprehensive framework for stakeholder readiness?
- **SRQ2:** How does the proposed SRL model relate to standard readiness frameworks such as TRL and HRL?

**RQ2:** *What factors shape stakeholder readiness for AI adoption in the GLAM sector?*
- **SRQ1:** What dimensions of readiness do the stakeholders in GLAM perceive as the most important, and what new themes emerge from their perspectives?

**RQ3:** *How does the proposed stakeholder readiness framework align with real stakeholder perspectives in the context of GLAM?*
- **SRQ1:** What differences can be observed between the proposed framework and the empirical findings from the GLAM sector?
- **SRQ2:** How do these differences inform the refinement or adaptation of the SRL assessment framework?

## 4 METHODOLOGY

### 4.1 **Conceptual phase - Answer RQ1**

An initial proposition of dimensions and levels of Stakeholder Readiness Level (SRL) was developed using a literature-informed conceptual framework. [14] This approach considers frameworks as dynamic constructs rather than static models, developed through the repeated synthesis and abstraction of pre-existing information. Following this approach, the framework development consisted of

the identification, selection, and interpretation of relevant, common concepts from established readiness levels, including Technology Readiness Level (TRL) [15, 18], Human Readiness Level (HRL) [20, 22], and Adoption Readiness Level (ARL) [29]. From the analysis of these frameworks, two aspects were derived, following two directions: vertical progression structures (the readiness levels themselves) and horizontal dimensions of assessing readiness with regard to technical, human, organisational, and contextual factors.

Where existing models failed to capture stakeholder-centric elements, new constructs were added using insights from complementary fields. These include innovation diffusion theory and awareness formation [11], design justice and participatory design for trust and engagement [6, 26], digital literacy and technological competence via UTAUT and HRL [8], and organisational capacity and support structures using the Human Views framework [12] and ARL [29]. Together, these sources informed the definition of six core dimensions: Awareness, Trust, Engagement, Competence, Support Structures, and Ownership (see section 5 for definitions and mappings).

The result of this process is a conceptual framework that categorises stakeholder readiness into two components: a sequence of vertically advancing SRL levels (from 1 to 9) and a horizontal array of readiness dimensions. The components aim to enhance current maturity models by offering a more stakeholder-focused perspective. The framework itself, along with a conceptual mapping to TRL and HRL, is presented in section 5.

## 4.2 Empirical Phase – Answer RQ2

After the proposition of the conceptual framework, a qualitative study was conducted through semi-structured interviews further analysed using thematic analysis [4] and the Gioia method [10]. This methodology facilitated the examination of stakeholders' viewpoints on readiness, covering both the significance of established dimensions and the emergence of novel, previously unrecognised themes. The integration of deductive and inductive methodologies guaranteed that, while grounded in a foundational conceptual framework, the results were open to modification and refinement based on experiential insights. The following subsections outline the sampling approach, interview protocol, ethical considerations, and data analysis strategy.

### *4.2.1 Data collection.*

*Participation Selection.* A purposive sampling technique was employed to recruit individuals capable of providing informed perspectives on readiness for AI adoption in GLAM institutions. A total of nine people participated in the study from institutions from four different countries, namely, the Netherlands, the United Kingdom, Italy and Romania. As seen in Figure 1, two categories can be distinguished:

- **Six experts** working in GLAM organisations, including roles such as curators, managers, innovation officers, archival specialists;
- **Three non-experts**, selected based on their regular engagement with museums, libraries, or archives as visitors, students, or volunteers (e.g., frequent galleries visitors, volunteers at museums)

This dual-group approach enabled comparison between institutional readiness perceptions and those of the general public.

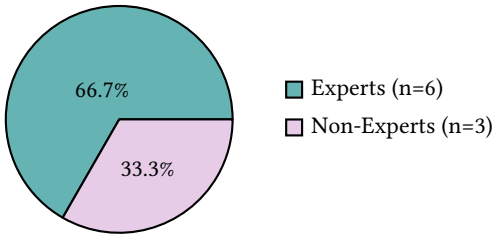


Fig. 1. Distribution of interview participants by stakeholder type.

*Interview procedure.* Interviews were conducted during a span of two weeks, remotely via Microsoft Teams. Each interview lasted a minimum of 15 to 45 minutes and followed a semi-structured protocol, designed to invite both conceptual and practical reflection. Firstly, the participants were asked introductory questions to find out about their background and initial perceptions of technologies in the GLAM sector. Then, participants were introduced to a hypothetical scenario designed to align with their institutional environment, with the objective of grounding the dialogue in a tangible, feasible application of AI technology and stimulating discussion on perceived readiness, challenges, and enhancers.

- **Galleries and museums:** The scenario suggested an AI-driven tool that facilitates the optimisation of exhibition layouts by utilising sensors and motion data to analyse visitor movement and interaction with displays. The AI would thereafter suggest modifications to enhance visitor engagement and spatial dynamics.
- **Archives and libraries:** The scenario suggested an AI tool that could autonomously scan both physical and digital collections to create intelligent connections between relevant objects. This was exemplified by a researcher examining a World War II diary and being presented with relevant records from several collections that reference the same incident or location.

Lastly, after stepping out of the scenario, general reflective questions were asked to assess the participant's perception of readiness.

This three-part interview protocol was incorporated into both the expert and non-expert interview protocols (*see Appendix A*), designed as parallel guides to ensure comparison while being tailored to each group's expertise level.

*Ethical and Privacy Considerations.* Ethical approval was obtained in compliance with institutional research ethics protocols of the Ethics Committee Information and Computer Science at the University of Twente. All participants provided informed consent, were informed of the research objectives, and were reminded of their right to withdraw at any moment. Interviews were audio-video recorded and included auto-generated transcripts. To maintain anonymity, identifying information was eliminated, and all participants were allocated pseudonymous codes (P01 to P09), utilised throughout the research and reporting.

*4.2.2 Analytical approach.* A hybrid approach was employed for result coding, combining thematic analysis [4] and the inductive Gioia method [10]. First, the thematic coding had been done to the responses of all participants. After this step, the methodology implied four stages of analysis, as depicted in Figure 2. The resulting data structure visual model containing all concepts, themes and dimensions is shown in the Results chapter.

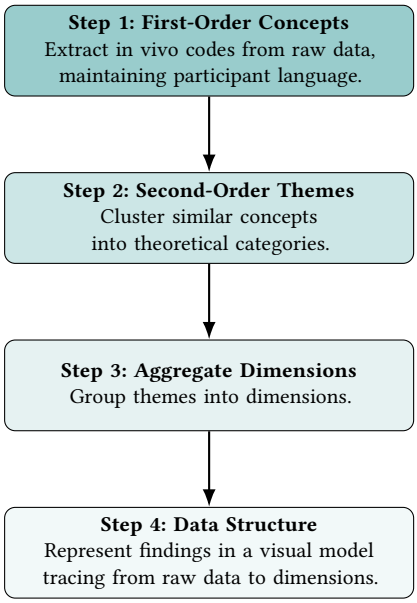


Fig. 2. The four steps of the Gioia Method.

### 4.3 Evaluation Phase – Answer RQ3

The dimensions resulting from the thematic analysis, conducted using the Gioia method, are further compared and contrasted with those originally defined in the conceptual SRL framework. Therefore, it evaluates the correspondence between theory-informed constructs and empirical stakeholder insights. This is done by following a comparative analysis mapping approach, following a three-step model as depicted in Figure 3. A comparative table incorporating all dimensions can be found in the Results chapter, along with highlighted gaps and overlaps.

## 5 RESULTS

This section outlines the outcomes of the three-phase process implemented to develop and validate the Stakeholder Readiness Level (SRL) framework. A conceptual framework was developed in the initial phase, drawing on existing models (TRL, HRL) and pertinent literature, leading to the establishment of an initial set of readiness dimensions. The second phase entailed the collection and analysis of empirical data from both expert and non-expert stakeholders within the GLAM sector, employing thematic analysis and the Gioia method to identify confirmed and emergent dimensions. In the third phase, the empirical findings were systematically compared to the initial conceptual model using comparative analysis mapping. The findings are organised into three phases and feature visual representations of the data structure, stakeholder quotations, and a final refined iteration of the SRL framework.

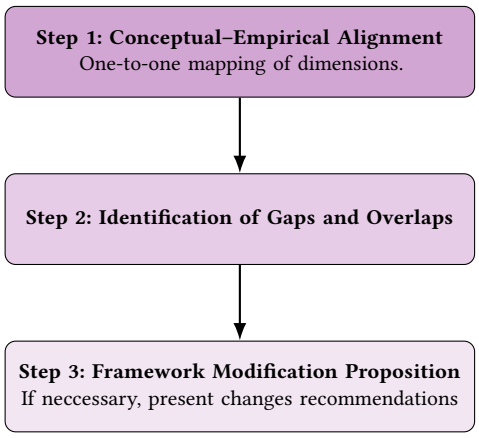


Fig. 3. Steps in the comparative analysis mapping process for evaluating the literature-derived and the empirically found dimensions.

### 5.1 Framework Development

The initial phase of the results relates to the formulation of the Stakeholder Readiness Level (SRL) framework through conceptual synthesis. This phase comprised two essential components: the identification of readiness dimensions from the literature and the development of SRL levels established in a vertical progression from level 1 to 9 as the previously established standards (TRL, HRL).

*5.1.1 Conceptual Dimensions of Stakeholder Readiness.* The six fundamental dimensions that were identified during the conceptual phase of framework development are presented in Table 1. Each dimension was developed by synthesising established readiness models (Technology (TRL), Human (HRL), and Adoption (ARL) Readiness Levels). Additionally, perspectives from related literature, such as Innovation Diffusion Theory (IDT), UTAUT, stakeholder theory and design justice, were incorporated. These dimensions are indicative of the critical elements required to evaluate the readiness of various stakeholder groups to interact with emerging technologies in the GLAM sector. In Table 1, a short definition for each dimension explains the envisioned aspects to be covered by each. Each dimension covers multiple aspects found in the reviewed literature, as follows:

(1) **Awareness** refers to a stakeholder's understanding of a technology's existence, purpose, and potential impact on their institution. According to the Innovation Diffusion Theory (IDT), awareness is the first step towards adoption. [11] HRL levels propose early exposure to the developing technology to familiarise users with the system and ensure basic understanding. [22] In the Adoption Readiness Level (ARL) paradigm, awareness is linked to market and user readiness. [29]
(2) **Trust** involves safety, reliability, fairness, and institutional values. In *design justice* theory, stakeholder confidence in a system's technical integrity and ethical direction are crucial [6]. Low trust is a common barrier to adoption, and perceived

Table 1. Conceptual SRL Dimensions with Definitions and References

| No. | Dimension | Definition | References |
|---|---|---|---|
| 1 | *Awareness* | Stakeholder understanding of the innovation's objectives, possible impacts, and purpose. | IDT [9], HRL [23], ARL [29] |
| 2 | *Trust* | Confidence in the technology's alignment, impartiality, safety, and reliability. | Design Justice [6], IDT [9] |
| 3 | *Engagement* | Degree of active involvement in design, testing, or feedback. | HRL [20], Participatory Design [26] |
| 4 | *Competence* | Capability to use or support the technology, including digital literacy. | HRL [27], UTAUT [31], HRA [8] |
| 5 | *Support Structures* | Training, documentation, leadership backing, and feedback loops. | ARL [29], HVs [12] |
| 6 | *Ownership* | Perceived influence, responsibility, and long-term commitment to success. | IDT [9], Stakeholder Theory [19] |

risk can hinder innovation diffusion in *Innovation Diffusion Theory (IDT)*. [9]

(3) **Engagement** reflects stakeholder participation in technology development, deployment, and evaluation. The *participatory design* approach emphasises stakeholder involvement and co-creation. [26] The *HRL* framework emphasises collaborative preparedness, especially in user feedback and iteration stages of technological development. [20]

(4) **Competence** represents a stakeholder's ability to use or support a technology. *HRL* and *UTAUT* models recognise technological proficiency and digital literacy. According to *UTAUT*, "effort expectancy" and "facilitating conditions" are key determinants of adoption, which are directly related to digital skills. [20, 31] *Human Readiness Assessment (HRA)* recognises cognitive load, usability, and training levels as readiness indicators. [8]

(5) **Support Structures** include training, leadership, documentation, and feedback systems that help adoption. The idea of "resource maturity" aligns with the *ARL* framework. [29] The *Human Views (HVs)* framework highlights organisational structure, user roles, and systems integration as crucial for human-centred readiness. [12]

(6) **Ownership** refers to the stakeholder's perceived responsibility and commitment to the success of a technology. It encompasses aspects of agency, influence, and long-term engagement. In *Stakeholder Theory*, stakeholders are considered active agents who participate in shaping decisions and outcomes.[19] *Design Justice* reinforces this by arguing that those most impacted by a technology should be involved in its creation and use. [6] From the perspective of *Innovation Diffusion Theory (IDT)*, ownership is linked to how well the innovation aligns with stakeholder values and the degree to which users can trial, personalise, and integrate it into ongoing practice. [11]

*5.1.2 Stakeholder Readiness Level (SRL).* Table 2 below summarises these SRL levels and their corresponding meanings in practice.

Table 2. Conceptual SRL Levels with Readiness and Practical Description

| Level | Readiness | Meaning in Practice |
|---|---|---|
| SRL 9 | *Advocate* | Promotes adoption, drives innovation, mentors peers to adhere to this technology |
| SRL 8 | *Embedded* | Technology is part of daily work; supports others in system usage |
| SRL 7 | *Influential* | Provides meaningful input; affects rollout or refinement |
| SRL 6 | *Competent* | Can use the system effectively with only occasional support |
| SRL 5 | *Involved* | Engages in pilots, co-designs, begins training for technology usage |
| SRL 4 | *Consulted* | Provides feedback and attends sessions, but no strong influence on design |
| SRL 3 | *Curious* | Asks questions, expresses interest, and may participate in co-design. |
| SRL 2 | *Aware but passive* | Has heard of the technology but does not engage |
| SRL 1 | *Unaware* | No knowledge of the technology or its purpose |

Following the dimensions in Table 3 and the vertical alignment of other Readiness Level frameworks with levels ranging from 1 (lowest level) to 9 (highest level), an initial 9-level model of Stakeholder Readiness Level was developed. Each level was created based on stakeholder behaviours, attitudes and also interaction with technology, all incorporated in a clear progressive process from unawareness (SRL 1) to active advocacy (SRL 9). This framework proposition covers existing literature on participatory design, design justice, and standardised levels of TRL and HRL to encompass all dimensions with a focus on the human aspect but from a stakeholder perspective.

*5.1.3 Mapping to other Readiness Levels.* The previously defined levels of stakeholder readiness were created to match and complement the levels of the two standards, TRL [22] and HRL [27]. As seen in Appendix B in Table 4, the SRL levels incorporate the three perspectives of the frameworks. For example, SRL 5, stakeholder involved, complements a TRL 5 of relevant environment demonstration achieved, as well as an HRL 5 of human-system integration and early user evaluation done. This mapping allows for cross-framework interpretation from two predefined standards of TRL and HRL, which institutions are already using in their activity. It showcases the different perspectives of readiness from three vital points of view: technological maturity, human capability and stakeholder readiness, which can be further used in multidisciplinary technological projects in complex domains. It is important to note that higher SRL levels, such as SRL 8 (Embedded) and SRL 9 (Advocate), introduce forms of agency, influence, and advocacy that are not explicitly represented in TRL and are only partially addressed in the final stages of HRL. This is indicative of SRL's distinctive emphasis on stakeholder empowerment and actual institutional dynamics.

## 5.2 Empirical Evidence

The goal of the study was to find both confirmatory and emergent readiness aspects from institutional and user perspectives. To assess the perceptions of real stakeholders of their readiness for AI Adoption in the GLAM sector, the results of the nine semi-structured interviews with six expert and three non-expert stakeholders were analysed using a hybrid method of thematic coding followed by the Gioia methodology as explained in Section 4.2.2. [10] As illustrated in Appendix C, Figure 4, the analysis followed a structured coding hierarchy: *first-order codes* (participant language), *second-order themes* (conceptual clusters), and ***three aggregated dimensions***. Examples of quotes to support each 1st order code can be found in Appendix D. Dimensions define the broadest concepts derived from the interview results, as they incorporate multiple themes and repetitive ideas that highlight the needs and perceptions of participants. They are as follows:

- ***Strategic and Cultural Alignment:*** this dimension reflects the importance of aligning AI adoption projects with matters of institutional identity, mission, vision and long-term goals. It aggregates the themes of **Strategic Purpose and Alignment, Awareness and Mindset Readiness** and **Trust, Ethical and Human-Centric Orientation**. Stakeholders emphasised views on *communication about motivation and goals*, *Balancing innovation with mission and values*, *Evidence-based adoption mindset*, *Concern over loss of human element* and *AI as an assistive tool, not replacement.*
- ***Participatory Governance:*** this concept encapsulates the importance of collaborative involvement in the adoption and creation of AI technologies, along with the need for inclusive decision-making structures. It consists of the themes: **Engagement and Collaborative Participation** and **Ownership, Decision Autonomy and Accountability**. The interviewees highlighted ideas such as *Participation as key to user engagement*, *Balance top-down and bottom-up input* and *Shared implementation responsibility.*
- ***Support Systems and Organisational Capacity:*** this dimension ties readiness to practical matters such as infrastructure, sustained training and leadership. It aggregates the themes of **Competence and capacity building** and **Resources, Infrastructure and Support Structure**. Interviewees emphasised *Internal capacity is key to tech success*, *Financial resources enable adoption*, *Top-down innovation leadership* and *Onboarding and guidance support.*

These aggregated dimensions serve as a base for further comparison with the literature-derived proposed dimensions in Section 5.1 in order to assess the match between real-world inputs and the conceptualised dimensions.

Table 3. Comparison Between Conceptual SRL Dimensions and Empirical Dimensions

| Conceptual Dimension | Empirical Dimension | Observation |
|---|---|---|
| Awareness | Strategic & Cultural Alignment | Full alignment: readiness seen as a need for understanding of alignment with mission and goals. |
| Trust | Strategic & Cultural Alignment | Trust is integrated as understanding the purpose of technology increases confidence in adoption. |
| Engagement | Participatory Governance | Both promote collaborative structures; empirical emphasis is on inclusion and decision-making. |
| Competence | Support Systems and Organisational Capacity | Covers user capabilities and internal training needs; direct match to empirical themes. |
| Support Structures | Support Systems and Organisational Capacity | Findings confirm the importance of structured support and leadership backing. |
| Ownership | Participatory Governance | Reflected in empirical findings: the importance of agency and accountability. |

## 5.3 Evaluation

The last methodological step of this research is the comparison between dimensions from Section 5.1 and those resulting from Section 5.2. This process followed the comparative analysis mapping model from Section 4.3 with the goal to evaluate the applicability and empirical grounding of the conceptual SRL framework. The results of the analysis can be seen in Table 3. As the empirical dimensions are fewer (three) and broader than the initial ones (six), for each conceptual dimension its alignment as well as integration is taken into consideration.

*Gaps and Overlaps.* The comparative mapping indicates that all six conceptual dimensions were present in the empirical data, with full alignments noted for Awareness, Trust, Competence, and Support Structures. Engagement is conceptually only focused on design

and implementation, but empirical findings indicate a more organisational perspective. Ownership was also prominent, albeit more implicitly integrated into governance-related concepts.

*Framework Modification Planning.* These findings validate the practical significance of the proposed SRL framework and show that only little modifications may be necessary to enhance its clarity and integration in practical applications. At this stage, there are no indications for the need of alteration nor the addition of any dimensions resulting from the empirical findings. The emergent need is to clarify and operationalise the initially proposed dimensions to further mirror the real stakeholder perspectives gathered.

## 6 DISCUSSION

*General discussion.* This paper aimed to explore the existing gap of an organised, thorough, and stakeholder-centred readiness framework that can facilitate inclusive and context-sensitive technology adoption processes within organisations.

The conceptual proposition of the Stakeholder Readiness Level (SRL) framework, as seen in Table 2, based on dimensions shown in Table 3, was validated through both literature synthesis and empirical evidence within the GLAM sector. The proposed dimensions, *Awareness, Trust, Engagement, Competence, Support Structure and Ownership,* were compared and contrasted with the empirical findings. The results showed that all dimensions were empirically validated, but interesting findings can be highlighted: even though the conceptual dimensions are broad, they can still be further incorporated in scoped dimensions with aggregated applications to better accompany the stakeholder's complex perception.

The three dimensions resulting from the empirical study, namely *Strategic and Cultural Alignment, Participatory Governance, Support Systems and Organisational Capacity,* reflect that stakeholders perceive readiness as multi-dimensional and with multiple aspects connected to each other rather than singular, standalone factors. Moreover, it can be seen that both the experts and non-expert stakeholders perceived readiness as both personal capability and also integrated with the organisational aspects such as resources, leadership or mission and vision.

These results show that readiness is perceived with regard to a specific context and domain and through both the subjective, personal lens as well as the more objective, organisationally focused lens. This emphasises the need for a stakeholder-centred framework to be used when assessing the readiness of the people within a specific organisation/group to adopt innovations. This enables businesses to evaluate not only technical and human preparedness but also institutional alignment, inclusivity, and potential for long-term involvement.

Moreover, the mapping of the proposed Stakeholder Readiness level (SRL) framework to already existing standards facilitates the adoption of the method, especially in organisations familiar with these measurements, namely Technology Readiness Level (TRL) and Human Readiness Level (HRL). For example, SRL addresses unique aspects like ownership and support structures, crucial factors not explicitly measured in standardised readiness frameworks. Especially for public institutions like the GLAM sector, where human values and ethical concerns, as well as institutional missions, are central, SRL becomes a valuable addition to the organisational preparation for innovation.

*Answering Research Questions.* This section directly addresses each of the research questions and their corresponding sub-questions in light of the findings in order to consolidate these insights and reflect on the core contributions of this study.

**RQ1:** ***How can stakeholders' readiness for technological adoption be conceptualised through a multi-level framework?***
This proposed SRL framework developed in this research conceptualises the stakeholder readiness from a 9-level vertical alignment.

*SRQ1: What levels and dimensions are needed to structure a comprehensive framework for stakeholder readiness?*
From literature, the dimensions needed to assess readiness are *Awareness, Trust, Engagement, Competence, Support Structure and Ownership* (See Table 1). The levels range from 1 (Unaware) to 9 (Advocate), each corresponding to practical stakeholder roles and involvement to assess the readiness (See Table 2).

*SRQ2: How does the proposed SRL model relate to standard readiness frameworks such as TRL and HRL?*
The SRL framework complements TRL and HRL by introducing stakeholder-specific factors like ownership. The proposed framework is mapped one-to-one to the 9-level scales of standard TRL and HRL as seen in Appendix B

**RQ2:** ***What factors shape stakeholder readiness for AI adoption in the GLAM sector?***
Empirical findings reflected that readiness in the GLAM domain is perceived as a complex combination of human, organisational and even strategic aspects. These can be seen in Appendix C in Figure 4, representing the Data structure visualisation of results.

*SRQ1: What dimensions of readiness do the stakeholders in GLAM perceive as the most important, and what new themes emerge from their perspectives?*
Stakeholders referred to dimensions of *Strategic and Cultural Alignment, Participatory Governance, Support Systems and Organisational Capacity*. There were not new themes but rather a broadening and more scoped definitions of proposed dimensions.

**RQ3:** ***How does the proposed stakeholder readiness framework align with real stakeholder perspectives in the context of GLAM?***
The Stakeholder Readiness framework closely aligns with the empirical findings as seen in Table 3. All six proposed dimensions were confirmed by the three aggregated dimensions that resulted from empirical evaluation, showing that in real-world applications they are seen more as overlapping and interconnected rather than separate, broad dimensions.

*SRQ1: What differences can be observed between the proposed framework and the empirical findings from the GLAM sector?*
The primary distinction resides in the empirical categorisation of aspects, indicating a necessity for simplicity or adaptable implementation. Instead of six distinct components,

stakeholders generally amalgamated parts of trust, awareness, and alignment into overarching themes.

*SRQ2: How do these differences inform the refinement or adaptation of the SRL assessment framework?*

These results show that the proposed dimensions are enough and cover stakeholders' needs, but there is a point for improvement in a clearer and more complex definition of dimensions, with perhaps a possibility of context-specific grouping of dimensions.

## 7 LIMITATIONS

Despite the contributions of this research, there are limitations to be acknowledged. First, the limited sample of nine participants, although diverse in both organisational and cultural backgrounds, limits the generalisability of the findings. Additionally, the focus on the GLAM sector also contributes to this limitation of the proposed Stakeholder Readiness Level (SRL) Framework. Moreover, the qualitative methodology, although suitable for exploratory research, entails the risk of interpretive subjectivity despite the systematic application of the Gioia method. Finally, although all proposed SRL characteristics were empirically confirmed, stakeholders perceived them as overlapping clusters rather than distinct categories, indicating that more refining may be necessary for practical use.

## 8 FUTURE WORK

Future research can expand and validate the proposed Stakeholder Readiness Level (SRL) framework even beyond what this study did. Firstly, a large-scale study including diverse stakeholders across multiple sectors can help assess the generalisability of the framework. Applying it to domains like education or healthcare can reveal domain-specific adaptations or confirm the relevance. Additionally, the actual experiment of applying the SRL to a technological innovation project throughout its lifecycle can also verify and weigh the accessibility and practicality of the framework. Finally, a more concrete operationalisation of the framework is invited, perhaps even the development of a digital platform to assess the stakeholder readiness within a specific context.

## 9 CONCLUSION

This paper introduced the Stakeholder Readiness Level (SRL) as a human-centred framework to assess the readiness of different stakeholder groups for adopting emerging, innovative technologies like AI (Artificial Intelligence) in sectors like GLAM (Galleries, Libraries, Archives, Museums). By addressing limitations of standardised frameworks such as *TRL* (Technology Readiness Level) and *HRL* (Human Readiness Level), the SRL framework proposes six dimensions of stakeholder readiness: *Awareness, Trust, Engagement, Competence, Support Structures and Ownership*, along with a *9-level scale* to progressively encompass the readiness steps from unawareness to advocacy.

Through a combination of literature synthesis and empirical validation using qualitative, semi-structured interviews with expert and non-expert stakeholders in the GLAM sector, along with thematic, inductive analysis with the Gioia method [4, 10], the underlying dimensions of the proposed SRL framework were validated. Moreover, empirical results showed that stakeholders understand readiness as more complex, clustered dimensions rather than standalone dimensions.

The study illustrates that SRL not only adheres to established readiness standards but also enhances value by highlighting stakeholder agency, organisational context, and ethical and mission alignment. The framework can function as both a diagnostic instrument and a strategic guide for facilitating inclusive, sustainable, and contextually appropriate adoption processes.

All in all, this research provides a theoretically grounded and practically relevant contribution to the study of readiness of technology adoption, with direct relevance to GLAM institutions confronting the challenges of AI integration. Even though the sample size and the focus on the GLAM domain create limitations on generalisation, they do not undermine the value of the theoretical solidity and applicability of the framework. Further research might expand and implement the proposed SRL framework in multiple domains, investigate how it applies to actual innovation initiatives and operationalise it through digital tools or other methods to enhance the SRL's potential for broader impact.

## 10 AI ACKNOWLEDGEMENT

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# A INTERVIEW GUIDE

This appendix includes the semi-structured interview guides used for expert and non-expert participants. The guides are mirrored to ensure comparability but adapted in language for accessibility. Therefore, I will present the structure at once, with clear differentiations between experts and non-experts where necessary.

## A.1 Introduction – Experts and Non-Experts

Hello! My name is Bianca Filip, and I am a student at the University of Twente, doing my Bachelors' in Business Information Technology. For my thesis, I am conducting research with the aim to create, based on literature and my own ideas, a new operational framework to assess Stakeholder Readiness Level (SRL), a concept to be encountered when there are innovative technologies to be introduced in an organisation. It takes into consideration both the technical and human aspects of a new project while also incorporating the commercial value. As a use case, I have chosen the GLAM domain with regard to the adoption of new AI technologies.

Today, I will ask you some introductory questions, then present a fictive scenario of AI adoption along with some reflective questions, and finally, you will be asked some general questions about your perceptions about readiness.

*Do you confirm that you have read the Information Letter and you have given your consent for this interview?*

There are no right or wrong answers. Everything you say will remain anonymous, and you may stop the interview at any time.

Let's begin:

## A.2 Background – Experts

(1) Could you briefly describe your role in a GLAM institution and how it connects to any digital or innovation-related activities in this organisation?
(2) How would you describe the general attitude in this organisation when it comes to trying out new technologies or tools?
(3) Can you think of a time when the organisation introduced or tested a new digital tool or system? What was that experience like?
(4) When something new is introduced, who usually gets involved, and how are decisions typically made?
(5) How are staff usually supported during the rollout of a new system? Is there training, documentation, or guidance provided?
(6) Is there any strategy or internal process in place that helps guide how innovation is handled in your institution?

## A.3 Background – Non-Experts

(1) Do you visit galleries, museums, libraries, or archives often? How many times a month? What's the purpose of your visit?
(2) Have you ever used any digital or interactive tools in these places (for example, screens, AI guides, or apps)? What was your experience like?
(3) Did you ever feel that technology made your visit better or worse? Why?
(4) If something new was introduced (like an app or an AI companion in these places), would you want to be informed about it or give feedback on it?

## A.4 Scenario Proposition – Experts and Non-experts

Now, I will propose a scenario fitting for your institution type in which I will present an idea of a new technology to be implemented within this institution.

*A. Galleries and Museums.* Let's imagine a scenario where an AI-powered tool is proposed for helping galleries and museums to optimise the layouts of exhibitions by motion sensing and learning patterns of movement of visitors. This technology will use sensors embedded in traditional exhibitions to gain data on how visitors move and how much time they spend on each type of exhibit. Then, an AI-powered application will propose optimised exhibition layouts.

*B. Archives and Libraries.* Imagine your library or archive is offered an AI tool that automatically scans your entire collection, both physical and digital, and builds intelligent links between materials. For example: A researcher viewing a World War II diary might be shown related documents from a different collection that mention the same event or location. The goal is to support deeper research, reveal hidden connections, and reduce the time needed to find relevant materials.

## A.5 Scenario reflection - Experts

(7) What would your first reaction be if you heard such a tool was being introduced?
(8) Who do you think would take the lead on pushing this idea forward internally? Why them?
(9) Would people feel confident using this tool? Why or why not?
(10) Would staff members have the opportunity to provide input or influence how the tool is used? In what way?
(11) What concerns, if any, do you think would come up about this tool?

## A.6 Scenario reflection – Non-Experts

(5) What would your first reaction be if you heard such a tool was being introduced?
(6) Would you like to try it? Why or why not?
(7) What would help you feel more comfortable using it?
(8) What do you think other visitors or staff might worry about with a tool like this?
(9) If you could change something about how the tool works or is introduced, what would it be?

## A.7 General – Experts and Non-experts

Let's now step out of the scenario I have proposed and move towards readiness to adopt new technologies in general.

- In your view, what makes an organisation "ready" to adopt new technologies like AI?

- Are there things you feel are often overlooked when assessing whether an organisation is ready to introduce innovative technologies?
- If you had to design a checklist to assess the readiness of an organisation as a whole, what would be on it? Make a top 3.

### A.8 Ending – Experts and Non-experts

- Is there anything else you'd like to share about your organisation's experience with innovation or your thoughts on what makes technology adoption successful?

## B SRL MAPPING OVERVIEW

Table 4. SRL Levels with Mapping to TRL, HRL, and Meaning in Practice

| Level | Readiness | Meaning in Practice | TRL (Technology) | HRL (Human) |
|---|---|---|---|---|
| SRL 9 | *Advocate* | Promotes adoption, drives innovation, mentors peers to adhere to this technology | Actual system "flight-proven" through successful mission operations | System successfully used in operations with systematic monitoring of human-system performance |
| SRL 8 | *Embedded* | Technology is part of daily work; supports others in system usage | Actual system completed and "flight qualified" through test and demonstration | Human systems design fully tested, verified, and approved |
| SRL 7 | *Influential* | Provides meaningful input; affects rollout or refinement | System prototype demonstration in a space environment | Human systems design fully tested and verified in operational environment |
| SRL 6 | *Competent* | Can use the system effectively with only occasional support | System/subsystem model or prototype demonstration in a relevant environment | Human systems design fully matured and demonstrated in relevant environment |
| SRL 5 | *Involved* | Engages in pilots, co-designs, begins training for technology usage | Component and/or breadboard validation in the relevant environment | Human-centered evaluation of prototypes in mission-relevant part-task simulations completed |
| SRL 4 | *Consulted* | Provides feedback and attends sessions, but no strong influence on design/development | Component and/or breadboard validation in the laboratory | Modeling, part-task testing, and studies of human systems design applications completed |
| SRL 3 | *Curious* | Asks questions, expresses interest, and may participate in requirements co-design | Analytical and experimental critical functions and/or characteristics proof of concept | Human-centered requirements to support human performance and interactions established |
| SRL 2 | *Aware but passive* | Has heard of the technology but does not engage | Technology concept and/or application formulated | Human-centered concepts, applications, and guidelines defined |
| SRL 1 | *Unaware* | No knowledge of the technology or its purpose | Basic principles observed | Basic human performance principles identified |

## C GIOIA DATA STRUCTURE

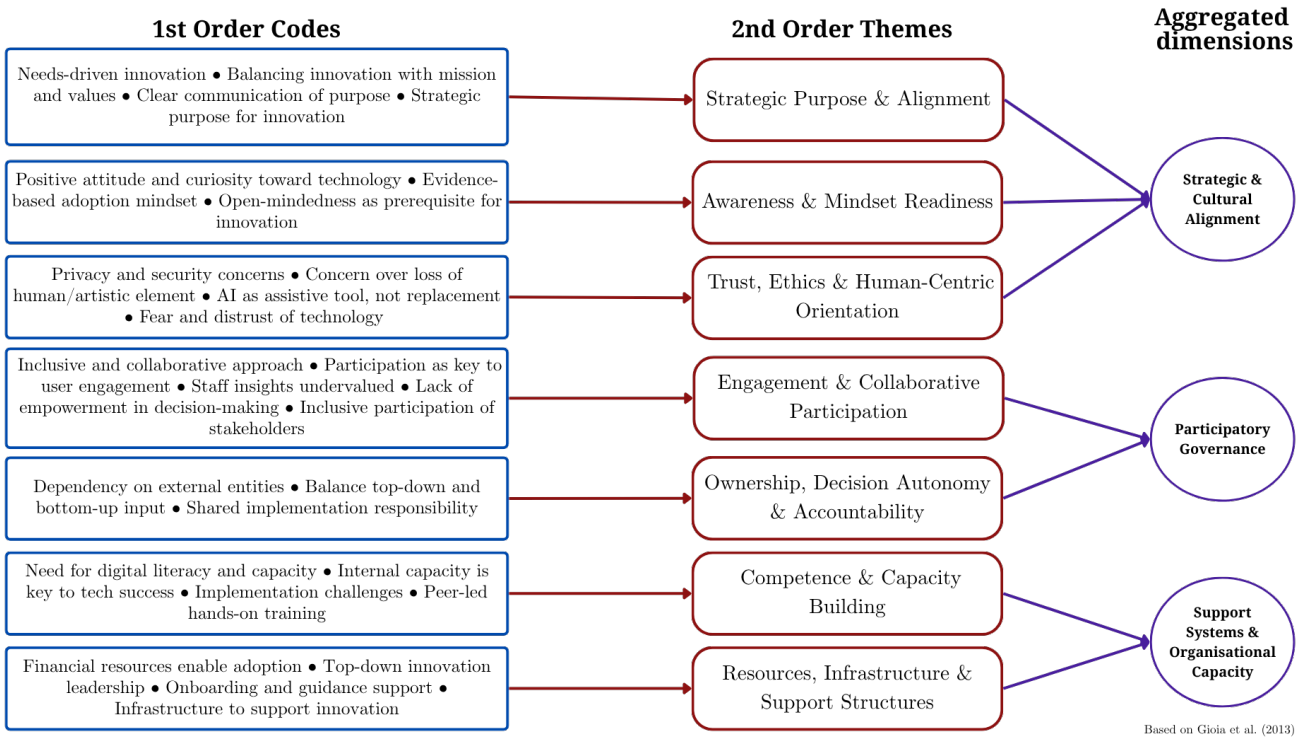


Fig. 4. Data structure resulting from Gioia method

## D EXAMPLE QUOTES FOR 1ST ORDER CODES

Table 5. Illustrative Quotes for 1st Order Codes (Page 1)

| 1st Order Code | Quote(s) | Person(s) |
|---|---|---|
| Needs-driven innovation | "And does it work for our organization? Does it match? Sort of as a tool for the actual needs and capacities that we have." "Doing it because you see a really key need for it rather than doing it because it's like a trend or feeling that you have to do it. " "Like do we need this thing? And if we don't, then are we just doing it for the sake of paying some tech company bunch of money?" | P04, P09, P01 |
| Balancing innovation with mission and values | "In my opinion, the tools should also somehow maybe align with the mission and vision of the specific institution." "And does it work for our organization? Does it match?" | P07, P04 |
| Clear communication of purpose | "I guess communication of like why are we doing this and in what way is it gonna benefit you personally" "Make a really clear case for why they need this piece of technology." | P01, P08 |
| Strategic purpose for innovation | "So I think if you want to be on the market and to to have a lot of people in the library, you have to implement and to extend." "What innovation you can really develop that adds a unique value to the market." | P02, P05 |
| Positive attitude and curiosity toward technology | "The attitude is certainly pro for technologies." | P03 |
| Evidence-based adoption mindset | "And I think in the end if it's providing some like really useful value, then the other stuff follows in terms of people skilling up and having the time and money to invest in it. ", "in general I think that people will be a bit hesitant and 1st need proof that it will work and that it will be accurate because we a lot of people [...] have the scientific attitude to things needing to be correct " "my feeling would be to sort of be kind of skeptical until you have some proof that it you can trust it" "So the first point of my checklist is to visit, to read in order to avoid inventing the wheel. The wheel has been invented, but we don't know yet. So read, learn and understand." | P09, P05, P01, P03 |
| Open-mindedness as prerequisite for innovation | "You have to have a team of open minded persons who wants to learn even if they're 50 or 45." "So I think one thing is the readiness of people to the openness of people to join in and and think with the developing teams." "If you have people that are very cautious that don't like change that are not into this kind of innovative mindset, then it's going to be hard. So you need people with innovation mindset." | P02, P05, P04 |
| Privacy and security concerns | "holding privacy and what kind of data is being collected, how that data being stored, security and that regard as well." | P09 |
| Concern over loss of human/artistic element | "But what about because sometimes the way you engage with something in itself is, you know, there's an artistic value to it?" | P01 |
| AI as assistive tool, not replacement | "I guess it's just it not being some sort of special magical. I think sometimes people think technology, they think it's like magic and it's not. It's just tool like does it do the job?" "it needs to be a tool and the human can use the tool so the employees need to feel in control." | P01, P04 |
| Fear and distrust of technology | "This new thing could affect their freedom. " | P03 |
| Inclusive and collaborative approach | "If, for example, the management team wants innovation but there's no proper way of having an open dialogue with all the people in the organization about what you want together, what you're working towards, the innovation is very difficult. " | P05 |
| Participation as key to user engagement | "Unless you make it participatory and engaging, people will resist. They need to be involved." "then absolutely there's no such thing as a product without user input." | P09, P04 |

Table 6. Illustrative Quotes for 1st Order Codes (Page 2)

| 1st Order Code | Quote(s) | Person(s) |
|---|---|---|
| Staff insights undervalued | "my feeling was that it's pretty low level because it's quite competitive like getting into working in a museum you know like they they don't have a problem finding people to do this work." | P01, |
| Lack of empowerment in decision-making | "Efficiency over formality: we just act." | P03 |
| Inclusive participation of stakeholders | "Each and everyone has a job to do, but we are all involved. " | P03 |
| Dependency on external entities | "Are we completely dependent now on a particular commercial entity or a particular tool? Or are we remaining flexible that if the market changes or we want to change providers that we can do that?" "We are collaborating, with young students, high school students, for example." | P04, P03 |
| Balance top-down and bottom-up input | "And the way you talk about innovation across all the levels in the organization. If, for example, the management team wants innovation but there's no proper way of having an open dialogue with all the people in the organization about what you want together, what you're working towards, the innovation is very difficult." "But it could be useful to also have a steering group of people from collections, from ICT, from research, from management together to say, ok, this is, this is what we want." | P05 |
| Shared implementation responsibility | "I think all of the people that I mentioned before would have the opportunity to [n. r.: provide input/influence for the development of a tool], let's say, if you're in a museum setting, that could be the curator, it could be the technicians and the installers, it could be the marketing team." | P09 |
| Need for digital literacy and capacity | "Openness varies, but capacity and digital literacy are often missing." | P09 |
| Internal capacity is key to tech success | "Maybe the incapacity of people in using it maybe. They couldn't use it. Well, they wouldn't know how to use it properly, maybe. Some education about how to use it is needed. " "but through education they have this capacity to understand and to accept the new." | P06, P03 |
| Implementation challenges | "So but if you start with innovation, of course you're first excited and then afterwards it turns out like, it doesn't really work that way, Or you encounter problems, or you don't really understand yet what is necessary to get from a vision to actual implementation so you run in all kinds?" | P04, |
| Peer-led hands-on training | "We we all made a lot of hours of training with the specialist who came here in our library to show us how every system works. So, the the training was very important in my opinion. " | P02 |
| Financial resources enable adoption | "It's also an extra point, but maybe the financial economy of the museum or the archive. I think a larger budget would be would be useful for the museum to adopt this." "I mean, if there's no budgets you can wish for something, but it's not going to happen." | P06, P04 |
| Top-down innovation leadership | "President and secretary are decision-makers." | P03 |
| Onboarding and guidance support | "My colleagues, not all of them are so younger. So they have to be trained by specialists, specialists to to teach them how to use all this technology" | P02 |
| Infrastructure to support innovation | "I believe also like having the right infrastructure for these hopes, because I think this is much more easily to implement to like bigger libraries or bigger museums.", "see if they have the infrastructure for it to be implemented." | P07, P08 |