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# FACING LEGAL UNCERTAINTY IN INFORMATION SYSTEM DEVELOPMENT:

The role of the project team in achieving  
compliance



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# Abstract

With the growing use of personal data, laws and regulations aim to ensure privacy to the user, especially within information systems (IS). These regulations can be difficult to put into practice by developers and so previous research has aimed to use frameworks using privacy by design (PbD) principles to help developers make compliant IS. However, past literature has not focused on the project team at large and their capabilities when faced with legal uncertainty that poses unclear, uncertain requirements, and need for context specific solutions.

This study follows a qualitative research approach through a case study based on document analysis and semi-structured interviews with eight participants involved in the digitalisation of the Swedish national tests at Skolverket (the Swedish National Agency of Education). During the development, Skolverket were faced with dealing with the Schrems II ruling, a ruling which created legal uncertainty regarding the processing of personal data. A thematic analysis was conducted to identify key patterns and insights related to agile practices and knowledge sharing when dealing with the ruling. The findings show how external collaboration, engagement with the stakeholder and collaboration between expert roles ensured compliance. The project team had a process-oriented focus where they contextualised the problem involving a social aspect. The study has shown that existing PbD frameworks lack the socio-technical view of compliance, and that through the inclusion of organisational capabilities like agile practices, external collaboration and effective knowledge sharing, project teams can face legal uncertainty.

# Keywords

Privacy by design, knowledge sharing, legal change, compliance, information system development, public sector, GDPR, agile

# Foreword

We would like to extend our deepest gratitude to everyone who contributed to this thesis. Firstly, we thank the respondents who generously shared their time, insights, and experiences with us. Your openness and thoughtful reflections were invaluable to our understanding of how your project team responded to the Schrems II ruling.

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# 1 Introduction

To protect personal data, a growing body of laws and regulations has emerged, with the GDPR setting the global standard for data privacy (Labadie & Legner, 2023). Achieving compliance with these regulations means that an organisation is able to demonstrate that its business processes align with relevant rules and requirements (Muthuri et al., 2017). Research within the fields of compliant IS development has reported that organisations developing IS systems find it difficult to understand legal compliance and how it should be implemented into IS (Aljeraisay et al., 2021; Dickhaut et al., 2024; Saltarella et al., 2024). This is mainly because developers often bear the responsibility of creating compliant IS while lacking legal knowledge, making it hard to create compliant software requirements (Dickhaut et al., 2024; Saltarella et al., 2024; Bu et al., 2020).

Problems with ensuring compliance within IS become amplified if the legal context is uncertain, meaning that how to achieve compliance is uncertain and requires urgent action. Such an example is that of the EU Schrems II ruling which changed requirements regarding international personal data transfers, which in today's digital environment is relied upon by many businesses and operations worldwide (Bonefeld-Dahl et al., 2020; Yan et al., 2023; Cory et al., 2020). However, in 2020, the Schrems II ruling invalidated previously made agreements that made data transfers outside the EU/EEA possible (Case C-311/18). The ruling stipulates that data that is transferred to third countries needs to be provided with an essentially equivalent level of protection to that of the GDPR or that the data is stored within EU/EEA and hence not transferred (ibid). Following the ruling, it was unclear how compliance could be reached using additional safeguards creating a period of uncertainty (Milderbranth, 2020; Morschbach, 2023; Murphy, 2022). As with the Schrems II ruling, the legal landscape is expected to change and create uncertainties, and so it becomes essential for project teams and organisations to stay adaptable.

Previous research has aimed to create strategies, design patterns and methodologies, which we refer to as frameworks, that aid developers in developing compliant IS and achieve compliance to the GDPR. They mainly follow the principles of PbD (Cavoukian, 2010) and aim to integrate PbD principles and strategies, such as minimisation of and user consent to the collection of personal data (Saltarella et al., 2024; Aljeraisay et al., 2021). Design patterns for privacy integrate these principles by presenting a context and a solution to a privacy concern, making it possible to turn privacy into software requirements (Aljeraisay et al., 2021; Dickhaut et al., 2024). However, existing research does not address the particular challenges that a project team can encounter when faced with legal uncertainty. This is because there is lacking certainty of what exactly adheres to the new legal requirements while there is still an urgent need for compliance. An uncertain legal context may invalidate existing frameworks as they can be less adaptive. Additionally, the project team beyond just developers and organisational capabilities that support the project team have been undermined in the discussion of compliance. Therefore, this study aims

to be the first case study documenting how a project team ensured compliance to the GDPR during their development process, through asking the question of:

*How can project teams ensure complaint IS development in uncertain legal contexts?*

This will be done through reviewing how Skolverket's project team complied to the new legal framework brought by the Schrems II ruling that came into force mid development during their mission to digitalise the Swedish national tests. The aim is to provide an understanding of the project teams efforts to achieve compliance in an uncertain legal context to broaden the existing knowledge of how compliance is ensured during IS development.

## 2 Literature Review

In this chapter, we present a synthesis of previous research relevant to this master thesis. As data privacy and IS regulations continues to evolve, many frameworks exist to address the legal requirements. However, they lack how uncertain legal contexts affect compliance and the role of the project team at large. Because of this gap, literature on knowledge sharing and agile practices becomes particularly relevant for understanding how compliance is achieved in dynamic and legally uncertain environments. To ensure a comprehensive review, we conducted a thorough search across various academic databases, including the University of Gothenburg's library, Scopus and Google Scholar.

### 2.1 Frameworks to Develop Compliant Information Systems

In IS development, addressing privacy requirements has become critical, especially as there is an increasing need for users' privacy along with a growing mass collection of personal data. The idea of privacy within IS was made popular through *Privacy by Design* in the 90's (Cavoukian, 2010). The framework emphasises privacy into the development, design, and operations of technology as well as work processes to create technologies that respect the privacy of the user. There are seven principles to the PbD framework, 1. A preventative, not remedial, approach to privacy invasion; 2. Privacy is the default; 3. Privacy is embedded into the systems design; 4. Privacy is not a trade-off but rather used to sustain all legitimate interest in a "win-win" manner; 5. Privacy is ensured at the very beginning of the systems life cycle, and until the very end; 6. The system is visible and transparent to all stakeholders; 7. A respect for user privacy (ibid.). Later, with the enforcement of the GDPR in 2018,

the importance of PbD was further intensified as they both share foundational principles (Hadar et al., 2018, Veale et al., 2018). This transformed PbD from best practice into binding legal requirements (ibid). However, achieving compliance with the GDPR can present many major challenges as the legal requirements are difficult to interpret and may result in increased financial costs (Zaguir et al., 2024). Therefore, project teams that want to ensure complaint IS development face many challenges.

Later research has continued linking PbD principles with GDPR compliance in an attempt to make it easier for organisations to achieve compliance. It is argued that in software teams, developers bear the primary responsibility of complaint IS development while lacking legal knowledge, creating a struggle as they need to turn legal requirements into software requirements (Ataei et al., 2018; Alshammari & Simpson, 2018; Barbosa et al., 2020; Aljeraisy et al., 2021; Dickhaut et al., 2024; Saltarella et al., 2024). Privacy design patterns have been highlighted as a helpful tool for developers, as they are relatively context specific and provide a possible technical solution to a privacy problem (Alshammari & Simpson, 2018; Aljeraisy et al., 2021; Dickhaut et al., 2024). The patterns relate to different strategies of PbD that may also be used to aid in complaint IS development, like minimising, separating and abstracting personal data (Alshammari & Simpson, 2018; Saltarella et al., 2024). To use these frameworks, literature also highlights the need for developers to identify and understand what legal or privacy requirements need to be met before providing technical solutions (Ataei et al., 2018; Barbosa et al., 2020; Aljeraisy et al., 2021; Dickhaut et al., 2024). Additionally, developers need to perform risk assessments and adapt solutions to their unique context (ibid.).

However, the project team at large including project managers, system architects, requirements analysts, legal experts and other roles are undermined. This means that the other roles responsible for the IS architecture and function are not seen in relation to the developer and their task. Additionally, the organisational capabilities that support the project team such as team practices and resources are also excluded from the discourse. Existing frameworks and strategies help the project team define approaches to ensure privacy by design but lack the concreteness and practicality of design patterns and require a great deal of contextualisation (Saltarella et al., 2024; Barbosa et al., 2020; Aljeraisy et al., 2021). Despite the concreteness of patterns, they are difficult to map to specific legal frameworks like the GDPR, are hard to contextualise within the specific development context and developers struggle to simultaneously evaluate the trade-offs of a design pattern with that of the functionality of the system (Dickhaut et al., 2024; Aljeraisy et al., 2021; Alshammari & Simpson, 2018). Still, literature calls to continue the development of patterns to specific use cases (Saltarella et al., 2024; Aljeraisy et al., 2021; Dickhaut et al., 2024), and to then map them to various privacy requirements to aid developers (Alshammari & Simpson, 2018; Aljeraisy et al., 2021). Inevitably, the project team will primarily be tasked with evaluating any framework and solutions to their context, suggesting that effective use of them extends to organisational capabilities.

Additionally, project teams and organisations may find themselves in uncertain legal contexts which creates unique challenges. The literature on organisational change emphasises how sudden, dramatic disruptions such as major regulatory shifts can destabilise existing industries, upend strategic norms, and force firms to fundamentally reassess their practices (Haveman et al., 2001). These environmental discontinuities not only shake up routines but also create a period of strategic ambiguity, compelling organisations to either adapt or face profound consequences. One form this disruption often takes is as regulatory shock, where sudden legal changes challenge the foundational assumptions on which firms have built their operations (Haveman, 2001; Park & Wu, 2025). The firm may adapt to the regulation in several ways, such as in a preventative way, through avoidance, strict compliance, to the advantage of the firm's other business disciplines or in a way that transforms the core mission of the firm (Bird, 2011). Organisations can reap benefits by having their project team quickly respond to regulatory shock and navigating an uncertain legal context. They could avoid discombobulating their operations and could go beyond just compliance by creating a strong competitive advantage (Chukwurah, 2024; Ullagaddi, 2024). Additionally, involving legal experts can enhance compliance and potentially decrease cost and save time during development of complaint IS, but this involvement requires team practices (Barbala et al., 2023; Chukwurah, 2024; Ullagaddi, 2024).

An example of legal uncertainty created through regulatory shock was the new legal framework within the GDPR following the Schrems II ruling on July 16<sup>th</sup>, 2020 (Case C-311/18). The Court of Justice of the European Union had ruled that the EU-US Privacy Shield used for lawful personal data transfer is invalid following the argumentation of Maximilian Schrems. This was based on the grounds that it was incompatible with articles of the GDPR and that it did not provide essentially equivalent data protection or protection from indiscriminate mass government surveillance (ibid). Standard contractual clauses (SCCs) were however, not deemed invalid since they fundamentally do not present with either lawful or unlawful data transfer.

The Schrems II ruling led to an even stricter legal framework regarding transferring of personal data to countries outside the EU/EEA. Permission for data transferring outside the EU/EEA can be given if the European Commission has deemed a third country, territory, or organisation of having adequate level of protection of personal data such as the United Kingdom (IMY, 2021). Data transferring to third countries may also be permitted if proper safeguards are adopted to provide an essentially equivalent level of protection of personal data to that of the GDPR. Examples of proper safeguards include the SCCs adopted after June 4<sup>th</sup>, 2021, by the European Commission (ibid.). However, before the adequacy decisions and the new SCCs were adopted, discourse around how to achieve compliance involved a lot of uncertainty and speculation. It was not clear what SCCs could be used as additional safeguards posing challenges for organisations relying on third country data transferring (Mildebrath, 2020). Continued unlawful data transfer might result in a penalty of €20 million or 4% of the company's global turnover (ibid.). The Schrems II ruling and its aftermath becomes a fitting example of how an uncertain legal context created

not just ambiguity regarding compliance, but where organisations core operations become challenged. The result is that actions need to be taken and where, in this case the IS may need to be re-engineered urgently.

There is no certainty as to when an uncertain legal context may present itself, and evidently it can be through changes brought to the GDPR that cause major disruptions and change fundamental operations within IS. While existing PbD frameworks offer structured approaches to achieving compliance in the early stages of development, they are typically linear and static in nature (Dickhaut et al., 2024; Ataei et al., 2018; Alshammari & Simpson, 2018). As such, they do not account for the “non-linear” and evolving nature of uncertain legal environments. To effectively navigate a fast-transforming technological environment, both linear and non-linear approaches along with agile practices are necessary (Thomas, 2024). Compliance is embedded in a broader social context, going beyond the capabilities of just developers when involving cross-collaboration and business strategy. This means that legal uncertainties do not only affect the technical architecture of IS, but also require interpretation, negotiation, and coordination across domains (Gürses et al., 2011; Barbala et al., 2023). Particularly, the risk assessment needed to implement PbD is inherently a cultural phenomenon including cultural and societal norms and needs to be accompanied with engineering practices, requiring expertise that goes beyond PbD checklists (Gürses et al., 2011). As people and collaboration within socio-technical systems can yield creative innovation in IS development (Ciriello et al., 2024), the socio-technical view may expand these aspects of compliance. We argue that existing privacy frameworks are insufficient on their own because they treat compliance as a technical, developer centric task rather than a socio-technical process and do not provide much support in uncertain legal contexts. Therefore, our thesis aims to document how a project team navigated an uncertain legal context while aiming for compliance to the GDPR during their development process. This will be done through going beyond existing frameworks by using the lens of agile approaches and cross-functionality as key enablers to compliance, building on recommendations from prior literature (Chukwurah, 2024; Ullagaddi, 2024).

## **2.2 Knowledge Sharing through Agile Methods**

One way to address legal uncertainties in IS development, and especially while involving legal resources, is through agile methodologies as it allows cross-functional teams to freely form and problem solve together. Due to the foundational principle that agile embraces change throughout all stages of the development process, agile has been argued to be well suited to manage environmental change (Yaakub & Mustafa, 2022; Jørgensen, 2018; Olszewski, 2023; Popoola et al., 2024). Yaakub & Mustafa (2022) and Chukwurah (2024), connect this to regulatory change as agile methodologies can be both proactive and reactive, meaning businesses can use Agile to anticipate regulatory changes and adapt quickly to new legal requirements, preventing potential negative impacts on performance.

Literature has also highlighted the need for IT, legal, and business roles to work cross-functionally to ensure that privacy considerations are systematically integrated into decision-making processes (Chukwurah, 2024; Barbala et al., 2023; Gürses et al., 2011), as they will together be able to share interdisciplinary knowledge to solve problems (Ullagaddi, 2024). Knowledge sharing is defined as “the provision of task information and know-how to a person, so that (s)he can collaborate with others to solve problems, develop new ideas, or implement policies or procedures.” (Santos et al., 2014 p. 1007; Cummings, 2004). As knowledge sharing becomes hampered by knowledge barriers, they need to be addressed using various strategies. A major challenge is the legal jargon lawyers use that is difficult for other IT roles to comprehend (Barbala et al., 2023; Dickhaut et al., 2024; Knackstedt et al., 2014). To bridge this gap, communication can be built on common ground, which is a mutual understanding between the legal role and other team members in IS development (Knackstedt et al., 2014). Additionally, Majchrzak et al. (2012) argue that effective knowledge sharing does not require team members to fully understand each other’s domain-specific expertise. Rather, by a collaborative approach, team members can contribute their own perspectives and gradually build a unified understanding.

Since effective knowledge sharing within cross-functional teams has been linked to frequent social interaction (López et al., 2016), agile methodologies promoting such practices have been linked to increased competitive advantage and creativity (Khalil & Khalil, 2020; Ghobadi & Mathiassen, 2015; Olszewski, 2023; Uraon et al., 2024). Agile methodologies also allow for reflection among team members, where they can together experiment and test solutions, enabling interdisciplinary team members to acquire new knowledge and skills from one another by learning together, leading to a knowledge-intensive culture (Annosi et al., 2020; Olszewski, 2023; Khalil & Khalil, 2020).

In summary, organisations adopting agile methodologies within their project teams may be better suited to handle a changing regulatory environment and legal uncertainties (Yaakub & Mustafa, 2022; Chukwurah, 2024). This is because agile methodologies inherently embrace change, cross-functionality and frequent feedback loops (ibid). Additionally, cross-functionality involving various roles can promote knowledge sharing that may result in innovative solutions (Khalil & Khalil, 2020; Ghobadi & Mathiassen, 2015) which is necessary for solving privacy problems (Ullagaddi, 2024). However, due to challenges with working cross-functionally between the legal and technical domain, there needs to be more research on overcoming these challenges to better achieve compliance (Chukwurah, 2024; Barbala et al., 2023). Therefore, this research will focus on project team efforts such as cross-functionality and agile practices, aiming to overcome knowledge sharing challenges when dealing with an uncertain legal context.

### 3 Conceptual Framework

This chapter will explain the conceptual framework used which has acted as a lens for viewing the case study.

Existing PbD frameworks emphasise utilising design patterns, strategies, and methodologies but undermine the project team at large and the organisational capabilities that support the team. How the project team together evaluate potential solutions from a legal and technical standpoint is less considered while still being the primary task when reaching compliance. Additionally, the principles of PbD require an ex-ante approach to privacy, but where legal uncertainties mid development makes the design non-compliant and compromises privacy. Deriving from this literature, we have created a conceptual framework (see figure 1) that seeks to understand compliant IS development in an uncertain legal context by utilising knowledge sharing and agile methods. In this way, organisational capabilities help integrate domain knowledge within the project team.

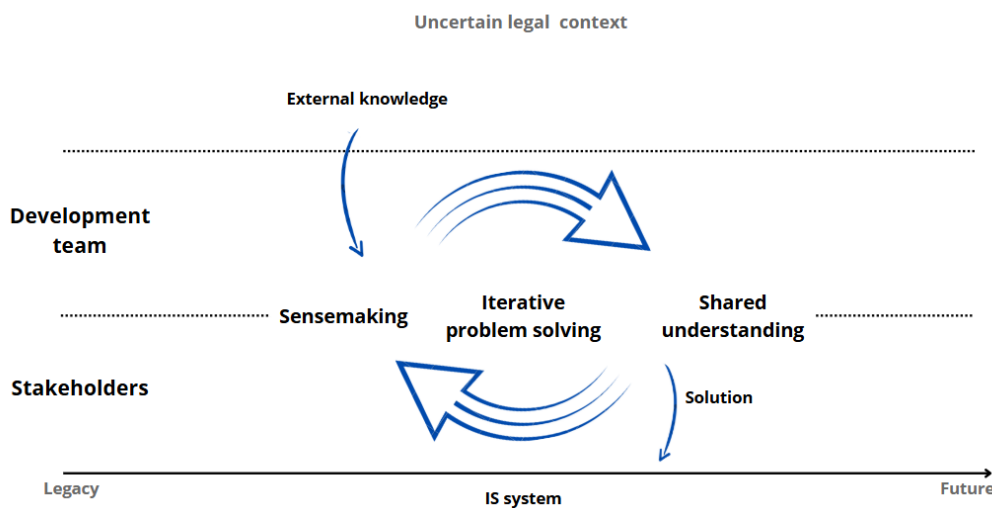


Figure 1. Conceptual framework that uses three activities involving knowledge sharing and agile practices which creates a compliant IS.

Central to this framework are three interrelated activities that enable agile teams to find a solution to problems posed by a uncertain legal context: sensemaking of the new legal environment by gathering external knowledge, developing a shared understanding of the problem within the project team as well as stakeholders, and iteratively working on solutions. The framework shows the IS being developed, represented by a black arrow, to show the legacy as well as future of the system and where the IS as well as activities, project team and stakeholders exists within the

context of legal uncertainty. The three activities are performed during the development process by the project team and stakeholders. Stakeholders can involve suppliers and procurement partners of the IS but could also extend to users, members of the public and investors depending on their involvement with and contribution to a solution to compliance. Eventually, through the activities a compliant solution to the legal problem will be produced, meaning a solution is implemented into the IS making it compliant. The activities are repeated the moment the IS is no longer compliant as it has created a new legal problem. These activities interact using agile practices and provide a foundation for knowledge sharing while supporting compliance in an uncertain legal environment.

Sensemaking refers to how individuals and constellations within the project team interpret and understand external knowledge about legal requirements, especially when those requirements shift. Much like with existing frameworks for compliant IS development, the project team needs to make sense of the legal requirements (Ataei et al., 2018; Barbosa et al., 2020; Dickhaut et al., 2024). However, we argue that approaching this using the lens of knowledge sharing better emphasises that legal knowledge needs to be acquired and later shared within the team (Ullagaddi, 2024; Knackstedt et al., 2014). Due to regulations being generally unclear and open for interpretation, external collaboration such as through industry associations, professional networks, and with regulatory bodies not only supplies necessary legal knowledge but also helps share best practices and common approaches (Saltarella et al., 2024; Ullagaddi, 2024). This makes sensemaking the first activity toward a socio-technical view of compliant IS development, as it acquires external knowledge team members will come to share with each other.

Shared understanding aligns perspectives between legal, technical, and other roles within the project team as well as with stakeholders through knowledge sharing. It is important to consider the two major types of knowledge being shared, tacit and explicit, that contribute to organisational learning (Collins, 2010; Argote, 2024; Ghobadi & Mathiassen, 2015; Si Xue, 2017). Explicit knowledge refers to knowledge that is formalised, codified, and easily communicated or stored, such as through documents, databases, manuals, or guidelines. It is objective and can be readily transferred between individuals or organisations (Collins, 2010). In contrast, tacit knowledge is highly personal, context-specific, and often difficult to articulate. It includes skills, experiences, insights, and intuitions that individuals acquire over time. Tacit knowledge is typically shared through observation, social interaction, and collaborative practices (ibid). Due to the social interactions needed to transfer tacit knowledge, cross-functionality and agile practices become effective enablers (Khalil & Khalil, 2020; López et al., 2016; Olszewski, 2023). Since compliant IT development usually involves technical and legal understanding, cross-functionality between these domains and stakeholders better create compliant solutions (Chukwurah, 2024; Ullagaddi, 2024; Barbala et al., 2023). However, even without legal roles team members will need to share knowledge to create a common problem picture and begin to find creative solutions, enabled by agile practices (Khalil & Khalil, 2020; Ghobadi & Mathiassen, 2015; Olszewski, 2023; Uraon et al., 2023).

Iterative problem solving represents the ongoing, collaborative effort to experiment with solutions to the legal problem, considering legal, organisational, or technical challenges. This activity involves evaluating possible solutions, where the project team will have to assess the legality, technicality, and other variables of a proposed solution. If a solution is deemed to solve the legal problem, it is then implemented into the IS making it compliant and where the activities are ceased. As previous research has emphasised the need for project teams to contextualise and evaluate privacy frameworks (Dickhaut et al., 2024; Aljeraisy et al., 2021; Alshammari & Simpson, 2018), we argue that this should be a core activity focusing on team collaboration. Frequent meetings and social interactions provide spaces for learning and the opportunity to evaluate solutions together, and the iterative way of working enables flexibility in the face of change (Olszewski, 2022). As knowledge lays the foundation to create a solution, any gaps, misunderstandings, or new knowledge that arises will require the project team to revisit previous activities before returning to problem solving, making the process recursive. Because compliant IS following PbD consider privacy through the entirety of the IS lifecycle, agile methodologies that embrace change and flexibility will be well suited for when legal requirements change (Chukwurah, 2024).

## 4 Method

To answer the research question, we conducted a qualitative case study. The method was chosen to enable an in-depth exploration of the phenomenon within its real-world context (Bryman 2022). By using the case of Skolverket's digital test assessment project where the Schrems II ruling entered into force mid-development, our study will analyse the project team's efforts made to achieve compliance. Our study applies thematic analysis to systematically identify and analyse patterns within the collected data, ensuring a structured yet flexible approach to understanding key themes emerging from participants' experiences and organisational documents (Cf. Bryman 2022).

The chosen case study was particularly relevant because it required that the project team adapted to the Schrems II ruling mid-development. This timing allowed us to explore how Skolverket's project team managed legal uncertainty. In the initial phase, our research was focused on understanding how Skolverket had adapted to the changes in the GDPR following the Schrems II ruling in their project to digitalise the Swedish national tests. As the study progressed, particularly after reviewing relevant documents such as reports, risk assessments and a pilot interview with one of the key-people involved in the project, it became apparent that interaction between project team members such as legal, technical and managerial roles were important for solving the Schrems II problem. Consequently, the research focus was refined to explore the project team and their challenges further.

With this shift in focus, the conceptual framework was also adjusted. Knowledge sharing through agile methodology was chosen to better analyse the interaction within the project team, and the framework was used as a lens to interpret how these interactions played out in practice.

## 4.1 Case Setting

In 2017, the Swedish government commissioned Skolverket to develop and provide digital national tests as well as digital assessment support for primary and secondary education (Regeringsbeslut U2017/03739/GV). Skolverket's 2020 report specified that a procurement of a supplier of the platform had been completed in 2018 and that specified requirements that had been made were currently being implemented (Skolverket, 2020). Skolverket proposed at the time that a national implementation of the digital national tests would be done in 2023 and that digital on-demand tests would be introduced gradually during the fall of 2022 (ibid). However, because of the Schrems II ruling entering into force in July 2020, Skolverket reported the following year that the ruling had "posed a serious, unforeseen obstacle to the mission that had been actualised after Skolverket entered into the agreement with the supplier" (Skolverket, 2021, p. 1-2).

Skolverket explained that the now invalidated EU-US Privacy Shield could no longer be used as a safety mechanism for transferring personal data outside the EU/EEA and that if the data does not have an essentially equivalent level of protection to that of the GDPR, additional safeguards would need to be applied (Skolverket, 2021). All the services used by Skolverket that involved a third-country supplier were evaluated to identify if there was any transfer of personal data to countries that were not GDPR compliant. If they were, the transferring of personal data would be stopped until compliance could be ensured. It was explained that "since the platform has an Australian contractor, a British owner, an American and an Indian subcontractor, the test platform also needs to be evaluated as a whole". (ibid, p.7). Since it was deemed that the test platform needs to be able to process personal data (Skolverket, 2021), and since the supplier, SoNET/RM, used a US-based cloud service provider for the platform, the Schrems II ruling had posed a problem for how the platform would come to process personal data. The 2021 mission report explains that "Skolverket is holding a dialogue with the supplier regarding how the ruling in question and rules regarding data protection can affect the procured service. The purpose is to, with the supplier, create a plan for action to make the processing of personal data compliant with the GDPR" (Skolverket, 2021, p.7).

After intense work, Skolverket reported in 2022 that they had together with SoNET/RM found a solution to the Schrems II problem involving the utilisation of the adequacy decision for the UK provided by the EU commission that would ensure safe data transfer. In this way, Skolverket was able to demonstrate compliance to the GDPR. Skolverket's 2022 mission report explains: "We (Skolverket) have made the assessment that the processing of personal data in the procured platform will be

able to proceed in accordance with the EU’s GDPR. We have made this assessment because the supplier has now committed to making changes to the platform that are deemed to comply with the EU’s GDPR. This includes, among other things, that the supplier will migrate their support and operations of the platform within the EU and the UK, respectively.” (Skolverket, 2022, p.6). In Skolverket’s 2024 mission report, it is noted that the migration of the servers was completed in early 2023 according to plan (Skolverket, 2024). In their latest mission report, Skolverket explains that the Schrems II ruling delayed the project, and that the first digital on-demand tests had been carried out by grade 6 students in compulsory school in the spring of 2024, and the first digital national tests had been carried out by students in upper-secondary school in the fall of 2024 (Skolverket, 2025). They also note that the Schrems II ruling had resulted in an increase in costs, both in the long and short term, and that for example the need to continue with traditional paper-based national tests constituted an increased cost (ibid).

## 4.2 Data Collection

Our study employed a mixed approach to data collection, combining document analysis with semi-structured interviews to gain a comprehensive understanding of the project under investigation (Bryman, 2022). We used snowball sampling to recruit eight respondents who held key roles in the project to digitalise the national tests. This approach capitalised on respondents’ professional networks to identify other relevant respondents who could shed light on the ongoing development process. To preserve anonymity, the roles of the respondents have been broadly labelled as legal, management, communication and technical (see table 1). Furthermore, “technical” was chosen to include and go beyond the role of developers as its focus is on roles within the technical domain.

Table 1  
*Respondents and their anonymised number*

<b>Respondents role</b>	<b>Respondents number</b>
Management	R2, R6
Technical	R3, R4, R8
Legal	R1, R7
Communication	R5

We collected internal official documents from Skolverket of which the most relevant to the study are presented in table 2. These materials offered insights into policy requirements and project timelines, providing a context for understanding and interpreting the case.

Table 2  
*Internal official documents from Skolverket*

<b>Document name</b>	<b>Document description</b>	<b>Document date</b>
The timeline document	The document details activities related to the work of finding a solution for compliance after the Schrems II judgement for the DNT project	Starting 2020-08-25, ending 2021-09-09
Course of action following Schrems II	The document presents evaluations and supporting information for the course of action for the DNT project following the Schrems II ruling	2021-02-04
Consequence assessment of personal data	This document provides insights into the consequences of implementing personal data processing in the test assessment service	2024-09-02

We also conducted semi-structured interviews that allowed us to explore predefined topics while also granting flexibility to capture emerging issues (Bryman, 2022). We developed an initial interview guide centred on decision-making processes, regulatory compliance, and organisational adaptation. A pilot interview was conducted to assess the clarity and sequencing of questions. Feedback from this interview prompted minor revisions, ensuring that the guide effectively captured the respondents' experiences and perspectives (see Appendix 1). To maintain consistency, we agreed that one person would lead the interview by asking questions, while the other would take detailed notes during all interviews. Before the interviews, respondents received an information letter detailing their rights and the purpose of the study. Additionally, we provided the interview questions in advance to give them time to reflect, as the project had taken place five years prior. Furthermore, due to respondents' requests, we did not record the interviews and instead supplied them with a clean version of the detailed notes allowing them to correct or clarify any points. This member-checking process enhanced the trustworthiness of our data, as it ensured that the recorded accounts accurately reflected participants' intentions (Bryman, 2022). By combining the interview data with documents from Skolverket, we were able to triangulate our findings and develop a richer, more robust understanding of the project team's adaptation to an uncertain legal context.

Additional questions were also sent to some of the respondents after the interview to clarify answers or to acquire additional information that was not provided in the interview due to time constraints. Lastly, Skolverket tried the findings for confidentiality to which they were accepted.

## 4.3 Analysis of Data

We conducted a thematic analysis of the collected data, drawing on the guidelines of Braun and Clarke (2006) and Bryman (2022). First, each of us familiarise ourselves with the data reviewing all material multiple times. Quotes related to our research focus were highlighted, which related to adapting to legal uncertainty, where we applied first-order codes that related to their specific wording and content. Next, for the second-order coding, we used tools to see the occurrence of all codes. The most occurring codes that described solutions to the Schrems II problem were selected through discussions between the researchers. These codes were then put into tables displaying code co-occurrence, where codes were viewed through the lens of our conceptual framework to determine their relevance. To interpret these codes and understand their interrelations, sub-themes were created and then categorised into main themes that were given a name that broadly defines the theme. This ensured that each theme was found across all types of collected data confirming the relevance of them while maintaining a close link between our interpretations and the raw data. The final set of themes not only addressed our research questions but also offered a coherent narrative of how the project team found solutions to the challenges posed by the Schrems II ruling. Three main themes emerged from the analysis: Ways of Working, Knowledge, and Resources. Once these themes were identified, they were used to describe how the project team engaged in the three activities outlined in our conceptual framework: sensemaking, shared understanding, and iterative problem solving. This approach enabled us to map empirically grounded themes onto the theoretically driven activities, ensuring that the analysis reflected both the respondents' perspectives and the structure provided by our framework. See table 3 for details about the themes.

Table 3

*Emergence of themes and sub-themes following our coding process.*

<b>Main theme</b>	<b>Sub theme</b>
<b>Ways of working</b>	Cross-functional Learning together Agile
<b>Knowledge</b>	Simple terms Legal knowledge Technical knowledge
<b>Resources</b>	Legal resources used External collaboration Lack of legal resources

The theme Ways of Working captured how the project team approached the Schrems II problem. It includes references to cross-functional collaboration, where different disciplines such as legal, technical, and managerial worked together to develop solutions. It also reflected a shared learning process, described as “learning

together,” where knowledge was developed collectively within and between team members through social interactions. Additionally, this theme highlighted the use of agile methods, which were important due to their ability to respond to change and allow for flexibility.

The second theme, Knowledge, reflected what was needed to navigate the legal and technical complexities of the Schrems II ruling. This included the ability to communicate legal and technical language using simple terms so that knowledge can be shared effectively. Legal knowledge was essential, referring to the legal expertise needed to interpret and apply relevant regulations. At the same time, technical knowledge played a significant role, as understanding data flows, system architecture, and IT security measures was crucial for compliance.

Lastly, the theme Resources focused on the availability and use of internal and external resources when dealing with the Schrems II ruling. Respondents mentioned the legal resources they used to guide their compliance efforts and the importance of them. Due to this, the absence of legal resources was seen as a challenge, highlighting situations where organisations lacked access to necessary legal expertise or support. External collaboration also emerged as a strategy, where the project team acquired necessary resources from a law firm and used cross-organisational networks for support. For further examples see Appendix 2.

## 5 Findings

This chapter will present the findings from the collected data and how the themes were represented within the three activities of sensemaking, shared understanding and iterative problem solving. Firstly, the findings describe the activity of sensemaking where the project team gathered resources and knowledge to make sense of the situation. Secondly, through working cross-functionally the project team was able to get a shared understanding, where project members could exchange their expert knowledge and establish ways of communicating around solutions. Additionally, establishing a shared understanding with the supplier laid the ground for future solutions. Lastly, during the activity of iterative problem solving, the project team utilised ways of working to effectively evaluate different solutions that would solve the Schrems II problem. The themes of ways of working, knowledge and resources are more or less apparent in each activity.

## 5.1 Sensemaking

Sensemaking refers to how individuals and constellations within project teams interpret and understand external knowledge about legal requirements, and its implications for IS development. This activity served as the groundwork for subsequent decision making, as the project team sought to define the scope of the problem, understand its legal implications, and identify possible avenues for action. Through acquiring and utilising particularly legal resources, the team was able to effectively gather knowledge.

“The timeline document” (2020) details how, particularly in the beginning, the project team gathered information and resources to begin making sense of the situation. Individuals within the project team would frequently share external information such as articles and informative videos among the project team in an effort to understand the Schrems II judgement and potential solutions to the problem. They would also engage in external dialogue with the purpose of understanding the Schrems II ruling and its consequences, as well as holding internal meetings and sharing information within Skolverket. As an example, the project team engaged with Integritetsskyddsmyndigheten, IMY (the Swedish authority for privacy protection) who provided support through seminars and forum discussions. Another example of external engagement was with eSam, a collaborative effort between 41 Swedish agencies to support digitalisation (eSam, N.D). ESam had provided additional information about how other actors had interpreted the judgement and its consequences, and the project team contacted a legal expert representative about the Schrems II judgement. Further collaboration is noted in “The Course of Action Following Schrems II” (2021), which highlights outreach to countries like Norway and where Skolverket recommends involving more stakeholders such as Nordic partners, platform customers, and strategic collaborators. A notable effort to collaborate by Skolverket was mentioned in “The timeline document” (2020), but which was discouraged. Skolverket had reached out to the Ministry of Education and proposed a meeting with other ministries to discuss the Schrems II ruling, but where Skolverket got the answer that they were expected to independently ensure legal compliance in digitalising national tests.

Additionally, “The timeline document” (2020) details how an independent external law firm was hired early on using previously signed agreements with Skolverket. The project team requested that the resources from the law firm would, amongst other things, have extensive knowledge regarding contract negotiations, legal frameworks used by agencies for compliance with GDPR, the Schrems II judgement and its consequences, guidance when making an action plan from a legal strategic perspective and Swedish-English legal translation.

These findings show how resources were particularly important during the sense-making activity. The resources include other agencies and actors, informational material, and the external law firm. The theme of resources relates closely to that of knowledge, as the resources served the purpose of bringing, particularly legal

knowledge, to the project team. The external law firm provided legal knowledge in the form of expert personnel resources to work with the project team, whereas sharing informational material was useful for gathering knowledge about the new legal environment and the ruling itself. Many respondents reflected on the legal resources Skolverket had access to, including lawyers available within the organisation and project team, and stressed the importance of them during these kinds of missions. R5 expressed this by saying:

*I'm thinking about the Schools, I have at Skolverket good access to lawyers, but you don't have that in the same way throughout the rest of the education system. They need to get into things that are complex.*

Of particular importance was the knowledge provided through Skolverket externally collaborating with other actors, as it aided them in ensuring compliance as a public sector agency. Because of this, several respondents expressed a desire for greater involvement and clearer guidance from state-level actors and other public agencies during the handling of the Schrems II ruling. R3 and R8 reflected on what they perceived as insufficient support and coordination externally. R8 thinks that:

*There is a lack of governance from the state and governmental support such as guidelines. Each agency had to work with this on their own.*

R3 shared a similar perspective, suggesting that other government bodies could have played a more active role in providing support. When asked directly about whether they felt state support had been lacking, R3 elaborated:

*This becomes personal, but I think that Sweden is too decentralised and that there is a lack of support. My personal view is that it is a waste of resources that so many municipalities and agencies need to do this type of legal analysis on their own. It would have been better if we had received clearer guidelines about how to handle this. That is my personal opinion.*

Throughout the two respondents' interviews, they shared the opinion that collaboration between state authorities and other agencies help in these kinds of situations. R8 took this further by suggesting even more external collaboration between other countries and private organisations would have benefitted the project team. R6 also addressed the need for broader collaboration, though their response was not focused on specific institutional actors. Instead, they pointed to the collective responsibility of all involved parties in supporting high-stake projects.

This strengthens the perceived importance of external collaboration as a resource since it supplies knowledge from similarly affected actors and is a way of making sense of what possibilities are available when solving the problem. It is possible that deeper engagement with external collaboration might introduce agile practices to collaborate effectively and thereby relate to the theme of ways of working. However, the way Skolverket engaged with external collaboration was not shown to relate to their ways of working as the theme rather captures the practices within the project team. In summary, the themes resources and knowledge are present within the

sensemaking activity as they together help the project team create the foundation of the environment where solutions can be found.

## 5.2 Shared Understanding

Following the sensemaking activity, the project team began to work toward a shared understanding across legal, technical, and other roles which was crucial for addressing the Schrems II ruling. Respondents emphasised that this understanding was fostered through cross-functionality, clear communication, and mutual learning, aligning closely with agile practices.

When the sensemaking activity had provided the necessary foundation to begin finding a solution, creating a shared understanding became important as it contributed to establishing a common ground where all team members had the same problem picture. This was done through sharing the knowledge that had been gathered during the sensemaking activity as well as sharing expert knowledge among team members, an important but sometimes challenging task reported by the respondents. The theme knowledge was therefore prevalent during the activity of shared understanding, as it described difficulties of and solutions to sharing knowledge. A major challenge was that of the contrasting focuses of legal and technical roles which lead to a divergence in problem interest. R3 explained this by saying:

*The lawyers wanted information about 'what information is being handled, where? By whom? How? For what purpose? For how long? What does the information flow look like?' While from a technical perspective, I was asking questions like 'What file formats are we using? Which APIs are in use? How should the files be sent? What technical validations should we build in?' and so on.*

The respondents explained that ways they could bridge this gap between domains was through sharing fundamental knowledge. For example, lawyers needed to communicate legal terms relating to personal data, and technicians needed to communicate terms regarding cloud computing. It was also explained that knowledge was communicated using simple terms and in a generally understandable way, like using layman's terms or referring to everyday situations as analogies. The purpose of this was to provide enough knowledge to begin working cross-functionally between roles. Since the nature of the problem required attention to both technical and legal concepts, one could not be addressed without the other. When knowledge was not communicated this way, the respondents said that collaboration became difficult and different roles had trouble contributing as they did not understand how to apply their knowledge in a context that was either too technical or legal. R7 explained their experience as:

*The difficult part is when you receive material that is too technical. It must be communicated in a clear language what I, as a lawyer, need to do. Therefore, simplified information flows are needed. When everything is too technical, it becomes difficult for me.*

The theme of ways of working and knowledge become closely intertwined, as ways of working provided a solution to bridging domain gaps. As the respondents explained, they needed to be able to communicate fundamental knowledge and simple terms to each other which was best done through working cross-functionally. R4 explained that they as a technician needed to develop a shared working method when collaborating with a lawyer:

*For quite a while, I had contact with a lawyer who was part of our subproject, with whom I had good collaboration. It was an initial process of establishing the right level (of communication) to ensure mutual understanding of the conditions, a handshake where we discussed which communication methods would work for both of us.*

Similarly, R3 mentioned how the cross-functional way of working made it possible to learn together as it allowed team members to provide short lectures about their domain knowledge to each other. To create a shared understanding among project members, ways of working like working cross-functionally and learning together made it possible to establish ways of bridging knowledge gaps. This resulted in the creation of simple terms and sharing of fundamental knowledge, relating to the theme of knowledge.

Beyond the project team, the shared understanding activity involved in Skolverket's case to have the supplier not only understand the legal implications but also recognise the seriousness of the issue from the perspective of the project team. Skolverket had early on contacted the supplier, SoNET/RM on September 23, 2020, and continued with a total of 16 meetings and frequent email contact as detailed in "The Timeline Document" (2020). Most of the participants mentioned in their interviews that a challenging part of solving the Schrems II problem was creating a shared understanding with the supplier. R2 described this as a particularly challenging problem-solving process:

*The hardest part was to make the supplier, SoNET/RM, understand the consequences of the Schrems II ruling. According to them, we were the only ones out of their customers that really emphasised the importance of complying with the new regulatory framework.*

This initial lack of shared understanding reportedly delayed progress. Respondents noted that considerable time and effort were required to align perspectives between the project team and the supplier. Over time, the supplier came to acknowledge the issue more fully. R2 recalled that the supplier eventually expressed regret over their initial response and that the external law firm were particularly helpful when engag-

ing with the supplier. “The Timeline Document” (2020) shows frequent collaboration between resources from the external law firm, project team members and the supplier. The theme of resources therefore played an important part in establishing a shared understanding, as utilising legal resources would become crucial for the eventual solution. This also shows how the Schrems II ruling presented challenges beyond finding technical solutions, creating a conflict of interest and where the legal standpoint of Skolverket was in focus.

In conclusion, creating a shared understanding was highlighted as a crucial element of collaboration by most of the respondents when addressing the Schrems II problem. As technical and legal expertise were essential, it became clear that bridging the gap between different domain knowledge required time and mutual effort. Respondents emphasised the importance of communication, simplifying information flows, and continuous collaboration in finding effective solutions. Through this process, participants learned how to work together and navigate the challenges of translating technical and legal perspectives into a shared understanding. Additionally, the legal capabilities of Skolverket were important in creating a shared understanding between the project team and the supplier.

### 5.3 Iterative Problem Solving

Building on the shared understanding developed on the previous activity, the project team began to iteratively explore and evaluate design solutions that would align with legal requirements while remaining technically feasible and organisationally supported. Unlike previous activities, which were about shared understanding and alignment, iterative problem-solving focuses on producing a concrete solution. This process involved utilising legal resources, integrating knowledge across domains, and working agile.

When iteratively problem solving, the respondents had explained that collaborating with expert roles was preferred over having dual competence. They explained that the competence within each role is extensive and requires years of practice to be made, and so they did not see a way of transferring this knowledge easily to other roles or where it would yield any major benefits. There was therefore an emphasis on the theme of resources, as lawyers were needed to assess the legality of possible solutions. R1 explained that they, as a lawyer, help interpret the law as well as contribute with useful knowledge:

*The idea is not for others to become lawyers. If you don't have the education and background, you can't start interpreting judgments and legal texts. However, depending on what you're working on, you might need a basic understanding of the legal framework, and that's something a lawyer tries to contribute with.*

The theme of resources and need for lawyers relate closely to that of knowledge, as they together contribute to the problem solving. As domain-specific expertise was not transferable in depth, knowledge sharing practices helped establish a sufficient level of common ground for collaborative decision-making. R6 explained that a needed form of knowledge was rather how to work collaboratively:

*When it comes to my own knowledge – Yes, of course – the more you know, the better you get at your job. At the same time, you can't be an expert in everything – I believe you need to have knowledge at a level where you know when to ask and who to ask, so to speak. That way, there's a greater chance of not missing any perspective.*

As R6 describes, working collaboratively becomes important as a way of working. The team worked iteratively and agile when problem solving, which resulted in effective collaboration and the possibility to return to the other activities when needed, making ways of working a strong theme for this activity. The respondents saw agile practices as not only structured workflows but also as a mindset that facilitated responsiveness and cross-functional engagement. R2, when asked about collaboration in the project, emphasised both structured processes and flexibility through agile methods:

*Yes, frameworks and clear collaboration within the organisation are important. It is also essential to continuously check in with each other. I believe in the agile way of working and the Scrum methodology. I know it is sometimes questioned in the IT industry nowadays, which is fair, but for us, it has worked well.*

R3 explained that the iterative process in agile ways of working is effective for gathering feedback and further emphasised the importance of having the flexibility to form their own teams, as it allowed the project team to bring in the right people and competence. R3 explained that:

*[...] What I think we did well was recognising that when issues arise, a kind of 'SWAT' team with regular meetings is needed. This also applies to when the exams are about to start—we then have ongoing meetings that are almost like daily stand-ups to check in. I am in favour of short and frequent meetings when there is an incident to resolve.*

In “The Timeline Document” (2020) it can be seen how the project team embraced this way of working after making sense of the new legal environment and creating a common problem picture. In December 2020, two important groups were formed within the project with the first one being the “test service group” which was a cross-functional, operative group involving key people within the DNT project. The group would formulate supporting documentation for the upcoming decision to continue, change, or cancel the project. The second group, the “Schrems II group”, was responsible for creating the basis for this decision and also involved key people with different roles within the DNT project. During the frequent meetings and workshops

as well as daily follow-up meetings for the “Schrems II group”, the project team could either evaluate different solutions or spend the time needed to bridge knowledge gaps before continuing the activity. Therefore, the cross-functional way of working allowed the project team to go back and forth between iterative problem solving and building a shared understanding when needed. This work continued until February 17, 2021, when it was concluded that no technical solutions could be found to provide an essentially equivalent level of protection to that of GDPR when transferring data that would also be supported by all stakeholders involved in the Test service.

The team then returned to the activity of sensemaking, as a way to reevaluate the legal environment and find a possible solution. They had continued to pay close attention to the EU Commission's upcoming adoption of the adequacy decision for the UK and made an in-depth analysis of Australian law regarding Swedish customers of Australian suppliers. Additionally, the team evaluated different options such as following through with a new procurement resulting in a change of supplier. However, as “The Course of Action Following The Schrems II Document” (2021) explains, they recommend the solution that their supplier SoNET/RM migrate the servers and make amendment agreements as this was deemed to be the fastest and most cost-efficient solution to the problem. As previously explained, establishing a shared understanding took a lot of effort but eventually resulted in SoNET/RM migrating the Test Service to a cloud service based in the EU/EEA and third-line support for the Test Service in the UK.

Through having an agile way of working and working iteratively, the project team was able to adapt to the new legal environment and utilise a solution long after the initial Schrems II ruling. R6 reflected on this and described agility as a foundation for long-term adaptability, especially when navigating legal uncertainty:

*It's about the fact that there are always changes. It is a long project and there will always be new circumstances. Then it might be about the agile way of working maybe, having an agile way of working as a foundation. It doesn't have to necessarily mean that you are following a specific methodology like Scrum. Instead, there can be different levels of agile work, but the key is being adaptable.*

The respondents did also mention ways in which the project could be more proactive toward legal uncertainties. They highlighted the importance of keeping an eye on relevant legal areas, involving lawyers through the whole development process such as during the procurement process and writing of the requirements specification. In this way, lawyers can address and prepare for legal challenges early on and lay the grounds for a broader legal leeway by for example creating exit clauses that can be used to solve future problems. The respondents showed that they viewed agile practices, such as collaboration, flexibility and iterative working as ways of being both reactive and proactive to the law. R3 explained this by saying:

*One thing is to keep track of your information and areas that could be affected by changes in the law, with an information model that is updated and clear. Have established collaborations and involve legal experts continuously in the project so they can quickly catch any legal issues as they arise. Previously, lawyers have been brought in when something happens, but I believe that lawyers should rather be involved all the time, not just when something goes wrong.*

In summary, most respondents described agile ways of working as critical tools for staying proactive, reactive, and adaptable, particularly when legal landscapes shift unexpectedly, as they did with the Schrems II ruling. Agile was framed as more than a set of practices; it represented a flexible approach that enabled iterative collaboration and role-based responsiveness.

## 6 Discussion

In this study, we aim at answering the question of how project teams can ensure compliant IS development in uncertain legal contexts. As understanding how to design compliant IS systems can be difficult, especially for developers, recent research has created frameworks to aid in turning legal requirements into software requirements. However, due to the nature of legal uncertainties, these frameworks may not be applicable to potential new requirements and undermine the socio-technical aspects of compliance that involve the project team at large, not just the developers. Therefore, to understand this aspect of compliance better, we examined how Skolverket's project team handled the challenges brought by Schrems II.

Project teams that aim to ensure compliant IS development under conditions of legal uncertainty do so by engaging in a recursive process of sensemaking, building a shared understanding, and iterative problem solving, enabled through knowledge sharing, organisational resources, collaboration, and agile ways of working.

This study shows that compliance is not achieved through technical solutions alone, but through an integrated, socio-technical process of knowledge sharing and interdisciplinary collaboration. In contrast to previous approaches that focus on design patterns or static strategies, Skolverket's response illustrates a continuous process of contextualising the problem, where the legal solution emerged through collaborative efforts within the project team. The three activities enabling this are discussed below.

## 6.1 The Activities

As literature has noted, developers designing complaint IS will need to understand and make sense of the legal frameworks they are aiming to comply with (Ataei et al., 2018; Barbosa et al., 2020; Dickhaut et al., 2024). This creates a struggle as developers often lack legal expertise and need to translate complex legal requirements into software specifications (Alshammari & Simpson, 2018). Through sensemaking, individuals and various constellations within the project team were able to acquire a clearer interpretation of the otherwise unclear legal framework. With our findings, we see that through contact with other actors like agencies, ministries and countries, gathering informational material, and acquiring resources from an external law firm, Skolverket's project team gained an understanding of the best practices and common approaches to the Schrems II problem. Therefore, sensemaking represents how the project team overcome the challenge of interpreting the legal requirements through acquiring the right resources and externally collaborating (Ullagaddi, 2024) and engage in a social and cultural risk assessment (Gürses et al., 2011). This finding emphasises that in the face of legal uncertainty, compliance cannot be seen as merely a technical translation of law into software. Instead, it must begin with collective sensemaking across organisations. In the case of Skolverket's project team, the sensemaking involved external collaboration between other public sector actors which the respondents want to enhance further. As they point out, the legal resources within Skolverket were essential for solving the problem and where challenges can arise for public sector actors lacking these resources. Therefore, the findings show how project teams within organisations, particularly the public sector, benefit from external collaboration in the face of legal uncertainty. After this activity of sensemaking, the acquired knowledge will have to be shared and understood across team members and roles (Ullagaddi, 2024; Knackstedt et al., 2014) – which leads directly to the need for a shared understanding.

During the shared understanding activity, individual team members and collectives share their acquired knowledge and understandings to create a common problem picture. Working together and mutual understanding were identified as foundational to the project's success. However, challenges arose as project members with different roles, particularly legal and technical, encountered communication problems that took time and effort to solve, a challenge previously highlighted in literature (Dickhaut et al., 2024; Barbala et al., 2023; Ullagaddi, 2024). The knowledge they would share constituted of knowledge about applying the new legal framework to the specific context, evaluating solutions from a technical and legal standpoint, arguing with the supplier for the proposed solution and knowing what relevant and fundamental knowledge needs to be communicated within the team. This shows how primarily tacit knowledge needed to be shared to find a solution to the problem, as it is highly personal, context-specific, and includes skills and experiences (Collins, 2010). A way in which tacit knowledge was understood better was through expressing fundamental domain knowledge using relatable and simple terms, creating a form of shared language. As Majchrzak et al., (2012) suggests, effective knowledge

sharing in cross-functional teams does not require full comprehension of each other's specialised knowledge, which the findings confirm. Rather, a collaborative approach allows team members to contribute their own perspectives and gradually co-construct a shared understanding. The findings show that by performing agile practices like social interaction and holding dialogues across domains through working cross-functionally, tacit knowledge was shared more easily (Ghobadi & Mathiasen, 2015; Olszewski, 2023; Khalil & Khalil, 2020; López et al., 2016). The activity of shared understanding therefore reflects the cross-functional way of working that brings the legal and technical domain to the problem, an important factor in PbD (Gürses et al. 2011; Barbala et al. 2023; Ullagaddi, 2024; Chukwurah, 2024). Notably, the respondents highlighted that an important part of creating a shared understanding was arguing and working together with the supplier to find a solution. Therefore, the case of Skolverket shows how facing legal uncertainties can result in problem solving involving competing interest with stakeholders. This aspect of the legal problem goes beyond PbD strategies and patterns, using business strategy to achieve compliance. Acquiring a shared understanding acts as the bridge between sensemaking and problem solving. Without a shared understanding, the legal and technical domain remain separate whereas the eventual solution requires them to be integrated, and where any stakeholders agree to the solution.

During the activity of iterative problem solving, the respondents had recognised the need for agile practices, such as small interdisciplinary teams, frequent meetings and working iteratively across domains which is in line with Argote (2024), Ghobadi & Mathiasen (2015) and Olszewski (2023). By using these practices, a knowledge-intensive culture emerged where team members learn through experimentation, reflection and where they adapt together (Annosi et al., 2020; Olszewski, 2023; Khalil & Khalil, 2020). Additionally, since agile practices embrace change at any stage of software development, they are suitable for evolving environments such as within uncertain legal contexts (Popoola et al 2024; Chukwurah, 2024; Olszewski 2023; Jørgensen 2018). This was seen in the case of Skolverket when the project team found no suitable technical solutions and they swiftly returned to sensemaking of the environment and responded to yet another change in the legal environment by utilising the new adequacy decision. Through iterative problem solving, compliance work becomes recursive which allows this type of flexibility to the legal environment. This activity focuses on the necessary task to contextualise and evaluate potential solutions to privacy problems (Dickhaut et al., 2024; Aljeraisy et al., 2021; Alshammari & Simpson, 2018). However, iterative problem solving goes beyond the uses of patterns and PbD methodologies by focusing on cross-functional ways of working between legal and technical roles to find and evaluate potential solutions to achieve compliance (Chukwurah, 2024; Ullagaddi, 2024; Barbala et al., 2023). The agile practices enable experimentation and creative solutions to emerge (Olszewski, 2023; Khalil & Khalil, 2020) while also allowing for adaptation to legal change (Chukwurah, 2024). Aside from the agile way of working, a major finding from this activity was how the respondents valued having expert competence and working cross-functionally rather than acquiring dual competence in roles. This suggests that expert competence, such as lawyers, and the ability to collaborate with other

roles effectively addresses legal uncertainty. Thus, working with a technical-legal problem requires a diverse project team where especially lawyers can actively contribute to the solution.

## 6.2 A Broader Approach to Compliance

Our findings have shown that through sensemaking, shared understanding and iterative problem solving, a project team is able to ensure complaint IS development while facing legal uncertainty. Important for these activities are ways of working, knowledge, and resources as they are what leads the team to design a complaint IS.

This approach to complaint IS development differs from that which has previously been focused on in literature. Guidelines, methodologies, and strategies that have been developed still leave developers and project teams needing to interpret the law and apply it within their given context (Ataei et al., 2018; Barbosa et al., 2020; Saltarella et al., 2024), creating a major problem that goes unsolved. Design patterns, being more specific and concrete, may provide more help but at the expense of being less adaptable and still requires the matching of the pattern to the law and IS (Aljearisy et al., 2021; Dickhaut et al., 2024; Alshammari & Simpson, 2018). The focus in any PbD framework is therefore on two broader efforts within the context of the IS, the project team making sense of the law they need to comply with and the evaluation of possible solutions from a legal and technical standpoint. This case study has shown that ensuring compliant IS development while facing legal uncertainty can be performed without the explicit use of PbD strategies, guidelines, methodologies and patterns by the project team. The project team can achieve compliance by interpreting the law and evaluating possible solutions when using agile practices, knowledge sharing and utilising organisational capabilities. This enables the project team to approach compliance through a socio-technical process rather than just as a technical task, and where the project team accounts for its own context and proactively finds a solution.

Furthermore, previous literature focusing on PbD has also underscored the need to adopt an approach to ensure privacy early on during system development (Dickhaut et al., 2024; Ataei et al., 2018; Alshammari & Simpson, 2018). However, the non-linear nature of IS development and transforming environments requires that projects respond effectively to legal uncertainties using agile approaches (Thomas, 2024). By embracing change using agile approaches, privacy can be ensured throughout the IS lifecycle, a fundamental principle of PbD (Cavukian, 2010). An IS can become non-compliant during any stage of development due to legal uncertainties, which suggests more than early-stage approaches to ensure compliance.

The case study shows how the challenges Skolverket encountered while facing legal uncertainties require a significant attention to the technicality of the IS as well as the law. The problem posed by the Schrems II ruling required a technical and legal evaluation to lastly result in the use of the law as a solution rather than engineering

practices. Therefore, the case of Skolverket demonstrates a collaborative process between members of the project team as well as with stakeholders where the full aspect of the problem is contextualised. Much like with existing frameworks, the technical side of the problem was considered by the project team but seen at large this becomes a minor part of what was required to solve the problem. A social understanding of the problem was required, leading to the emergence of a process involving this understanding. This could be seen through how the project team externally collaborated, worked with the supplier and relied on collaboration between expert competence within the team. The findings from this case study show that facing legal uncertainty poses a challenge which is not the solution in and of itself but rather the process of contextualising it which greatly involves a social aspect, going beyond existing PbD frameworks.

The Schrems II problem in the case of Skolverket posed challenges for the underlying architecture of their IS, requiring extensive technical and legal knowledge. Therefore, the conceptual framework in this study is a lens to view legal uncertainty that threatens to reengineer the IS to a high degree making the legal problem a highly technical one. By making use of cross-functionality and knowledge sharing between different roles, the project team was able to account for their own context and strengthen their organisational capabilities when ensuring compliance. The three activities consider the broader social context embedded in compliance. They describe how the team members and stakeholders effectively collaborate to find a solution. The activities can be performed while a project team considers applying a pattern or deciding what PbD strategies to use to provide a great contextual understanding. Our framework is a less suitable lens to future legal uncertainties that pose major challenges requiring urgent compliance in IS but that lack this technical complexity. Additionally, performing all activities becomes necessary. Focusing exclusively on sensemaking will only acquire knowledge without it being applied into the context of the IS and integrated between team members. A sole focus on iterative problem solving may produce a solution that does not account for the full technical, legal and organisational aspects of the problem. Lastly, only developing a shared understanding does not integrate external knowledge and does not produce a solution. Through performing all activities, necessary knowledge is gathered, shared, and applied to a solution that effectively ensures compliance during legal uncertainty.

## **6.3 Implications and Limitations**

This study makes a theoretical contribution to the field of complaint IS development by showing a social process-oriented focus when faced with legal uncertainty. Prior research has largely focused on technical solutions such as privacy patterns, design strategies, and methodologies grounded in PbD principles. These approaches often assume stable legal environments and place the burden of compliance primarily on developers. In contrast, our findings highlight how compliance can be achieved through organisational capabilities involving a diverse project team that adapts to

their environment. By emphasising the role of organisational capabilities such as knowledge sharing, cross-functional collaboration, and agile practices, we offer a broader and more dynamic perspective on compliance that describes how a project team faced legal uncertainty. These findings will support researchers seeking to understand compliance in uncertain legal contexts.

Our findings also offer several practical insights. First, the study highlights the importance of fostering organisational readiness for legal change. This includes building internal legal capabilities, enabling knowledge sharing between legal and technical roles, using agile practices to remain responsive throughout the development lifecycle and using external collaboration to better understand compliance. A focus on organisational capabilities that support the project team can enhance adaptability in the face of evolving legal requirements. Second, the study indicates that legal uncertainty may call for engagement with stakeholders, requiring extensive collaboration. These practical insights can be applicable to a broader spectrum of uncertain legal contexts. For example, the new EU AI act that is currently under implementation and introduces new regulatory demands, has created an uncertain legal context where our insights can improve compliance efforts.

As this is, to our knowledge, the first case study examining how a public sector organisation in Sweden faced legal uncertainty during IS development, we call for further research within other contexts. Findings from a private sector organisation or an organisation that has different levels of access to legal expertise may yield other results as these variables affect the project team. Therefore, we encourage future research to examine these variables as to broaden the understanding of organisational capabilities that support complaint IS development in uncertain legal contexts, particularly those that integrate the legal and technical domain. In doing so, future studies can help bridge the gap between technical compliance solutions and the social processes that sustain them. Furthermore, our study is based on a smaller sample size of eight respondents and document analysis. To get a more comprehensive understanding and enhance the generalisability of the findings, a broader sample size could be studied.

## 7 Conclusion

With a rising need for privacy of personal data and compliance to regulations like the GDPR, many project teams face challenges when trying to integrate these principles into IS. These challenges are amplified when a project team finds themselves within an uncertain legal context which poses the question of how project teams ensure compliant IS development while facing legal uncertainty. This study sought out to answer that question by looking at the case of Skolverket handling the Schrems II ruling mid development of digitalising the Swedish national tests. Through interviews with eight key people involved in the project and analysing internal documentation, our findings reveal that project teams ensure compliance

when facing legal uncertainty by a continuous social process of contextualising the problem. This is enabled through knowledge sharing, agile ways of working, and access to legal and organisational resources.

The case study showed how three major activities ensured the design of compliant IS while facing legal uncertainty. Firstly, sensemaking ensured the project team gathered the necessary legal information of the new environment where external collaboration was found to be a major benefit as it addressed internal knowledge gaps and can help other actors. Secondly, shared understanding focuses on project members finding ways to communicate and begin collaboratively working, learning how to bridge knowledge gaps together. Lastly, iterative problem solving provides the project team the ability to evaluate and find the best solution to the problem. The findings show a socio-technical focus to achieve compliance, where external collaboration, engagement with the stakeholder and collaboration between expert roles resulted in a compliant solution. This goes beyond existing PbD frameworks by showing how organisational capabilities can ensure compliance, and where enhancements in these capabilities can help project teams face legal uncertainty. These findings have relevant implications for facing current and future uncertain legal contexts, like the new EU AI act.

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# 9 Appendices

## 9.1 Appendix 1- Interview questions

This guide has been adjusted according to each person we have interviewed, meaning that not all questions were asked in every interview. We have also added the follow up questions that we have asked the interviewees in this guide.

Introduction:

- Introduce yourself! What is your name? What is your background? What role have you had in this project?
- When did you start working on the project?
- Have you worked in a team on the project? If so, please describe how.
- What previous experience do you have in developing large IT systems?

Main Questions:

- It is mentioned in the reports we have read that Schrems II entering into force in July 2020 was a challenge for the project. How do you think it affected the project?
- Can you describe your initial reaction to the ruling and how your understanding evolved over time?
- What challenges did you face in interpreting the ruling, and how did you navigate them? What was it like to, according to your role, receive legal information?
- How did the project team interpret the ruling?
- How was information about the ruling communicated, both internally and externally to the project team? What information was helpful and could the information have been presented differently?
- What roles did you have a close collaboration with within the project? What was it like to work together?

- (If they mention collaboration as being important) Why would you describe collaboration as being important within the project team to solve the Schrems II problem? Is something else more important?
- (Follow up question) What do you think contributes to better collaboration? What are the challenges?
- How does Skolverket usually handle privacy regulations?
- What resources, discussions, or support systems were used by the project team? What worked well and what could be improved?
- According to your role, what knowledge did you have to communicate within the project team? Was there any certain knowledge needed to solve the Schrems II problem? Can you give examples?
- (Follow up question) How do you think knowledge can be exchanged in an effective way?
- Do you think that developers would benefit from increasing their legal knowledge? Do you think that lawyers would benefit from increasing their technical knowledge? Or are there other roles that would benefit from acquiring this knowledge?
- What was the most important trait among the project team members that helped solve the Schrems II problem?
- How do you think you can improve within your role?

Reflection:

- Does your way of handling the Schrems II ruling reflect your overall work toward GDPR compliance?
- What improvements or changes would you like to see in future projects to handle similar legal challenges better?
- What makes a project team and project adaptable to legal change? What resources, methods or ways of working do you think makes a project team adaptable to legal change?
- What do you think went well when working with the project team and with finding a solution? What could have gone better?
- What do you think mattered the most when solving the Schrems II problem?

- Is there anything else you would like to add?

## 9.2 Appendix 2- Data Collection

Example quote	Initial codes	Second order codes and sub-themes	Main theme
<p>"When it comes to my own knowledge – Yes, of course – the more you know, the better you get at your job. At the same time, you can't be an expert in everything – I believe you need to have knowledge at a level where you know when to ask and who to ask, so to speak. That way, there's a greater chance of not missing any perspective." R6</p>	<p>Knowledge, competence level, technical knowledge, judicial knowledge, expert knowledge, perspective/angles, collaboration, communication</p>	<p>Legal knowledge  Technical knowledge</p>	<p>Knowledge</p>
<p>"[...] What I think we did well was recognising that when issues arise, a kind of 'SWAT' team with regular meetings is needed. This also applies to when the exams are about to start—we then have ongoing meetings that are almost like daily stand-ups to check in. I am in favor of short and frequent meetings when there</p>	<p>Meetings, agile, communication, updating progress, teamwork, collaboration, communication, handling the problem</p>	<p>Cross-functional  Working together</p>	<p>Ways of working</p>

<p>is an incident to resolve.” R3</p>			
<p>“I’m thinking about the Schools, I have at Skolverket good access to lawyers but you don’t have that in the same way throughout the rest of the education system. They need to get into things that are complex.” R5</p>	<p>Knowledge, lawyer, schools, GDPR compliance, GDPR knowledge, resources</p>	<p>Absence of legal resources</p>	<p>Resources</p>

