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# Setting Goals in a Digital Transformation of Environmental Assessment: A Case Study

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**Abstract.** Since The Sustainable Development Goals (SDGs) emerged in 2015, they have become a guide for managing present sustainability challenges. However, we have limited knowledge about inter-organizational goal setting for digital transformations towards sustainable development. Recognizing this shortcoming, we report an in-depth case study of an inter-organizational digital transformation and the challenges of setting goals towards promoting progress on SDGs in environmental assessments. An environmental assessment is an obligatory procedure securing environmental concerns are considered before a decision is made, either for individual projects or public plans and programs. From analyzing the activities in environmental assessments, we outline their distinct digitalization goals and the stakeholders' associated experiences. These findings extend preliminary research on what drives digital transformation in environmental assessment and highlight environmentally responsible activities where information systems can make a difference. The paper discusses how these findings show a further need for research on the digital transformation of environmental assessment.

**Keywords:** Digital transformation, environmental assessment, inter-organization, case-study.

## 1 Introduction

Digital transformation and sustainability stand as leading trends shaping our society. The sustainable development goals (SDGs) have set a common agenda and have been accepted as shared sustainability goals since their adaptation in 2015. The SDGs contain longer-term and more diverse goals (e.g., climate action, economic growth, responsible consumption, and production) meant to encourage organizations towards sustainable development. Yet, there are unutilized opportunities for digitalization to aid a transformation towards sustainable development [19, 8, 3]. The call to tackle societal challenges in the IS domain often reiterates that solutions call for holistic,

transdisciplinary, and interdisciplinary attempts to which different disciplines, including Information Systems (IS), must contribute [39, 18]. However, too few studies on environmental sustainability include the IS perspective, despite evidence pointing towards a positive relationship between digitalization and sustainability [27, 11].

On its own, implementing or adopting a digital technology does not correspond to digital transformation [36]. Instead, digital transformation is the leverage of technology in a specific context that necessitates changes in the organizational and societal structure, which opens for innovative ways to create value in this emerging and ever-changing environment [1, 5]. While, digital transformation impacts value creation and value capture, it has also taken a stance as a pervasive influence, where digital products become more the rule than the exception [19]. As digital transformation changes most areas of society [33, 28, 35], the role of digital technologies in digital transformation encompasses paradoxes and uncalled-for burdens [39, 41]. Thus, the process of digital transformation within IS research is still not well understood [32, 37, 12]. More specifically research indicate that paradoxical externalities [14] may emerge from complex digital transformations, however, we still lack an understanding of how to navigate complex digital transformation, distinctly how to navigate different stakeholders digitalization goals in digital transformations towards sustainable development/advancing SDGs. Motivated by this observation, we report an attempt to coherently explain this shortcoming with an in-depth case study of setting digitalization goals in an inter-organizational digital transformation of environmental assessments (i.e., EAs) in Denmark towards the SDGs, by addressing the research question: How can we understand the digitalization goals of different stakeholders in a digital transformation of environmental assessment (EA)?

An environmental assessments (EA) is obligatory when building a new bridge or raising 150 meters high wind turbines according to two EU Directives known as 'Environmental Impact Assessment' and 'Strategic Environmental Assessment'. EA is a procedure securing those environmental concerns are considered before a decision is made, either for individual projects or public plans and programs. The EA procedure implies the process of identifying, predicting, evaluating, and mitigating the potential environmental effects of a proposed plan, program, or project, which is documented in a public EA report. The benefits of an EA process lie in supporting better decision-making by considering how a prospective activity can be optimized to minimize or simply avoid negative effects on the environment. Other benefits include actualizing public participation, increasing protections for human health, reducing risks of environmental harm and contributing to sustainable development, paving the way towards the SDGs [20]. Accordingly, the case is an opportunity to improve our understanding of digital transformation tackling the societal challenges of EA and sustainability.

## 2 Related Research

The research question opens for two types of related research: digital transformation and the sustainable development goals.

### 2.1 Digital Transformation

Digital transformation is understood to initiate a broad variety of changes in all areas of human society [35, 30, 37]. This understanding warrants three observations, which indicate that digital transformation is not only organization-centric but also social and technological [30]. The distinction between the three perspectives lies in the digital transformation goals. Goals from an organizational perspective may be to discover new business models or alter value creation paths through innovation [15]. Goals from a social perspective may be to improve individuals' quality of life through increased social welfare, collaboration, autonomy in users, and quality of service [15, 37]. Finally, from a technological perspective, digital technologies may become a goal in itself, representing value creation and survival in the new digital reality [30]. It is, however, difficult to draw a clear line between these perspectives because of their interdependence.

Digital technologies have become omnipresent and play a growing role in our lives, making digital transformation the main challenge confronting organizations [33]. Despite its complexity, the growing expectations from the promise of digital transformation motivates organizations to pursue digital transformations. Unsurprisingly, many organizations pursuing digital transformation do not reach their goal and consequently miss out on the expected benefits [42, 36, 28]. The inability to reach digitalization goals indicates that while we may have an advanced understanding of specific aspects of digital transformation, we still have a void in our understanding, and if not addressed, we will continue to build weak assumptions on how digital transformation can be managed and sustained [37].

Digital transformation increases the complexity of the environment in which organizations function and affords more information, communication, and connectivity, as digital technologies enable new collaboration among diversified actors. These affordances also create dependencies among actors whose interests may not always align [37, 2], which points towards how digital transformation may impact inter-organizational collaborations. Digital transformation drives increased collaboration among organizations. However, we need to know more about inter-organizational activities and experiences when embarking on collaborative digital transformation efforts in practice [25, 44]. Inter-organizational collaborations cross organizational borders, which means stakeholders are loosely coupled. Identifying these stakeholders and exploring their perspectives in terms of their interests and goals [4] can be essential steps in establishing a successful digital transformation. This highlights how organizations, which already are considered complex systems due to the multiplicity of groups within them, only become more complex with the addition of external groups. These groups refer to the stakeholders within and outside the

organization – those who have a ‘stake’ in its activities [40]. In our study, SDGs is a key societal stake in the digital transformation of EA.

## 2.2 Sustainable Development Goals

By the end of the 20th century, the concept of sustainable development became one of the most vital thoughts for society [27]. The concept of being “green” impacts all segments of society and drives us towards sustainable development. However, considering the sustainable development-related research, the exact role of digitalization toward sustainability is unclear, especially in Central Europe [16]. An encompassing definition of sustainability is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” [26, 20]. Related to this definition is the triple bottom line of economic, social and environmental dimensions, which points to the sustainability concept’s complexity and uncertain interdependencies [26].

A set of universal goals (i.e., The Sustainable Development Goals - SDGs) for sustainability emerged in 2015, to meet the urgent environmental, political and economic challenges facing our world. The SDGs became a reference point for global policy-making processes and represented a paradigm shift in which development is considered in every aspect of society [21]. In this regard, much aspiration has been assigned to the relations between the SDGs and EAs and the relevance of integrating SDGs in EAs is widely acknowledged [3]. EAs and their process for identifying, predicting, evaluating, and mitigating the potential environmental effects of a proposed plan, program, or project can play a key role in achieving SDGs. Integrating SDGs in EA means bringing SDGs into the core of formalized decision-making on policies, plans and projects. Further, EA can provide a systematic framework for understanding the effects of decisions on SDGs [3].

With the overall growing awareness of economic, political and environmental concerns, sustainability has become a necessity. As a result, Green has emerged as a new subfield in the IS discipline. Green IS has become an accomplished field with the responsibility and potential for IS scholars to contribute to reducing and mitigating the effects of many environmental problems. While notable achievements have been made in shaping Green IS as a subfield in the IS discipline, the emergence of Green IS, is still by far too slow, given the magnitude of the problem, indicating how Green IS can do more [39]. With digital technologies gaining a prominent position in our everyday lives, their vital role in enhancing and promoting a sustainable future has not gone unnoticed. Still, the IS perspective on sustainability is often at the margin of academic and public discussions [34, 3].

The strategic roles of IS (automation, information and transformation) can lead the society towards sustainability. However, the literature concerning sustainability shows that an IT-enabled transformation towards sustainability is just beginning and cannot happen too fast [27, 38]. Thus, current literature leads to an arising question, how do we integrate sustainability strategically during a digital transformation. As exhibited in this section, current research claims that sustainability has become part of the agenda and that digital transformation offers endless opportunities. Correspondingly digital

transformation has gone from being a technological opportunity to a pure necessity for managing the needs and expectations of the world's growing population [23]. However, the limited research focusing on the interrelations between digitalization and sustainability is a definite research gap.

### **3 Research Approach**

We address the research question on understanding the digitalization goals of different stakeholders in a digital transformation by investigating the unusual case of EA in Denmark. The case study approach is appropriate to address the nature and complexity of setting goals in its inter-organizational context – a contemporary phenomenon in its real-life setting [45, 2]. Additionally, the case study approach is especially suitable for inquiry in which research and theory are at their early and formative stages [2]. The unusual case [17], an on-going inter-organizational digital transformation of EA in Denmark, is one of the first initiatives towards digitally transforming the way society accesses and communicates information during environmental assessment processes. This case of digital transformation is an initiative that transcends organizational borders and societal interests, which affects both public- and private organizations. Consequently, our case differs from what we commonly know from digital transformation literature. Obtaining in-depth insights from this case can be important for similar inter-organizations and the IS community to advance knowledge of digitalization goals within the EA domain.

#### **3.1 The Case**

The digitalization of Danish EAs was initiated in October 2020 as a partnership between 15 public and private organizations creating an inter-organization of different stakeholders organized in an innovation project called DREAMS, [www.dreamsproject.dk](http://www.dreamsproject.dk). According to the project charter, the overall goal is: “to promote progress on SDGs by digitally transforming the way society accesses and communicates information about environmental impacts of projects and plans in order to enable the best decisions towards green transition in a transparent and inclusive democratic process”. To achieve this goal two solutions were proposed (i.e., CAUSA and baseline). CAUSA is the more novel tool, which is expected to provide the involved stakeholders with an overview of how similar activities in a specific geography were assessed, including impacts and mitigation measures. Additionally, CAUSA will include interlinkages to the SDGs. Whereas the open-access baseline tool is expected to provide an overview of environmental data. Prior to the DREAMS project, the involved stakeholders had access to different digitalized solutions (i.e., both internal and public solutions). Whilst the existing solutions affords the stakeholders in several ways, they also come with challenges. More specifically, the current practice has drawbacks as highly manual (e.g., sharing of word documents, XL-files and PDFs with

attachments between different actors), time-consuming (e.g., searching for heterogeneous data) causing inefficient EA processes.

Accordingly, the relevance of the digitalization of EA is supported and positively perceived across stakeholders invested in the DREAMS project (i.e., consultants, developers, authorities, and civil society). EAs occur on the basis of two EU Directives and known as ‘Environmental Impact Assessment’ and ‘Strategic Environmental Assessment’). The EA procedure implies the process of identifying, predicting, evaluating, and mitigating the potential environmental effects of a proposed plan, program or project, which is documented in a public EA-report.

EA reports must be produced before a decision that may significantly affect the environment [31]. An EA procedure occurs when a developer seeks to carry out a certain type of project or plan. Normally it is recommended that the EA process begin as soon as possible so the developer can consider the analysis of their proposed plans (e.g., incorporate mitigation measures into their plans, which will reduce, control or eliminate a project’s adverse effects). An EA process’s benefits lie in its potential for supporting better decision-making by considering how a prospective project or plan can be optimized to minimize or avoid negative effects on the environment. Other benefits include public participation, protections for human health, reducing risks of environmental harm and contributing to sustainable development, paving the way towards the SDGs. In realizing these benefits, the EA must consider cumulative environmental effects, their significance, public comments, mitigation measures, changes to a project caused by the environment, its purpose, and alternative means of carrying it out. These considerations include different actors (i.e., developers, consultants, governmental agencies, regional authorities and civil society). Accordingly, the different actors contribute to distinct activities. A developer is responsible for preparing a project description, a draft concerning scoping, ensuring that competent experts (e.g., consultants) develop environmental impact assessment (i.e., EIA). The developer is also responsible for modifying the EA project and EIA draft based on the citizens’ or governmental agencies’ input. Governmental agencies and regional authorities’ responsibilities include appointing affected authorities, conducting hearings with affected authorities and the public, processing the received EIA, and preparing a draft concerning verdict regarding approval. Once again, these agencies are responsible for having a hearing with affected authorities and the public to decide the verdict and make it publicly known. Thus, an EA is a comprehensive social effort to identify, predict and evaluate potential environmental effects of a proposed project or plan prior to undertaking the action. The digital transformation of EAs in Denmark is interesting because: 1) it is one of the first initiatives towards transforming the way society accesses and communicates information during EA processes, and 2) Denmark is one of the most digitalized countries, making Denmark a likely frontrunner.



### 3.2 Data Collection and Data Analysis

The research was conducted as part of the larger innovation project, DREAMS. We collected empirical data for this case study through qualitative interviews and participant observation [29]. The participant observations covered several workshops in which different stakeholders, each representing a different function during the EA procedure, discussed the problem area. The workshops were conducted and led by the DREAMS project, consequently resulting in secondary data obtained through observations. The stakeholders mainly discussed two questions: (1) which challenges and problems do you experience in relation to your current environmental assessments practice and (2) how do you see digitalization can best alleviate the challenges and problems and help to develop the good EA process and report.

The interviews were semi-structured and followed an interview guide with a point of departure in current work practices, visions for digitalization and perception of DREAMS project's objectives. The guide included questions such as: "What could be a good digitalization goal for the upcoming year" and "What challenges do you experience in your current work practice?" and "How do you see the DREAMS project impact your work practice?". Consequently, the interview guide was a means of encouragement for the participants to give a detailed description of goals, the problem area including experienced challenges. The intention was to interview key stakeholders, and these were selected in detail based on consultations with an expert from the DREAMS project and our observations during stakeholder workshops. Overall, the making of an EA report involves different actors, each contributing with different input (i.e., developers who builds e.g., highways, bridges, tubes, wind turbines, consultants who has the responsibility of writing an EA report, agencies and authorities who consults on prospective EA projects or plans and civil society who discusses prospective EA projects or plans). Accordingly, we interviewed two key stakeholders from each stakeholder group to ensure that the empirical data was inclusive. The qualitative interviews cover 10 encounters, each consisting of less or more than one-hour durations (see, Table 1). All encounters were documented through audio recordings, observation notes and interview summaries.

**Table 1.** Data collection

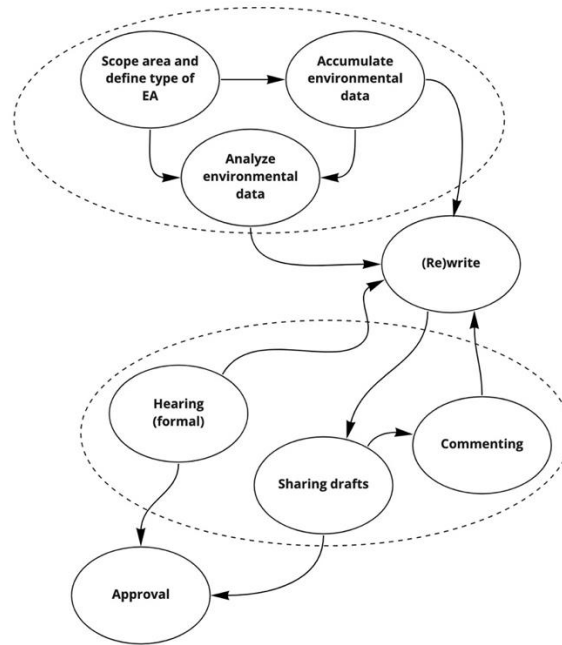
<b>Stakeholder type</b>	<b>Organization</b>	<b>Duration</b>
Consultant	NIRAS	46:47
Consultant	COWI	31:56
Governmental agencies	Danish Energy Agency	47:06
Governmental agencies	The Danish Environmental Protection Agency	35:66
Regional authorities	Municipality of Aarhus	1:19:18
Regional authorities	Municipality of Esbjerg	59:13
Developer	The Danish Road Directorate	44:40
Developer	BaneDK	42:57

Civil society	The Danish society for Nature Conservation	16:35
Civil society	DinGeo	14:25

Soft System Methodology was used to thematize and systematize the analysis of digitalization goals. The Soft System Methodology grounded analysis first led to a list of desired goals expressed by stakeholders, to create an overview of the diverse views and interest of change in the DREAMS project. From this, a brief list of relevant human activity systems was created, and for these root definitions were formulated [9-10]. The most central of these human activity systems and the by far most reemerged became the system to materialization of EAs illustrated in Figure 1. Thus, the activities documented in Figure 1 are elicited from the collected data. An EA operates as an administrative document, explaining why the making and the activities in the conceptual model layout a practice that is already settled on a legal basis. The activities in Figure 1 are thus expected to remain unchanged in the digital transformation. However, this constancy of activities does not prevent the actors in the problem situation from being supported differently.

#### **4 Findings**

This section reports the findings from our analyses. The conceptual model of activities for making an EA and the logical dependencies between these activities is shown in Figure 1. As Figure 1 emphasizes some activities more than others are highly dependent on each other and occur simultaneously. Figure 1 comprises the most necessary and most minimal set of activities during the making of EA projects and reports. Accordingly, the eight activities include tracing early activities in the EA process to the collaboration between actors to approve or reject an environmental assessment project.

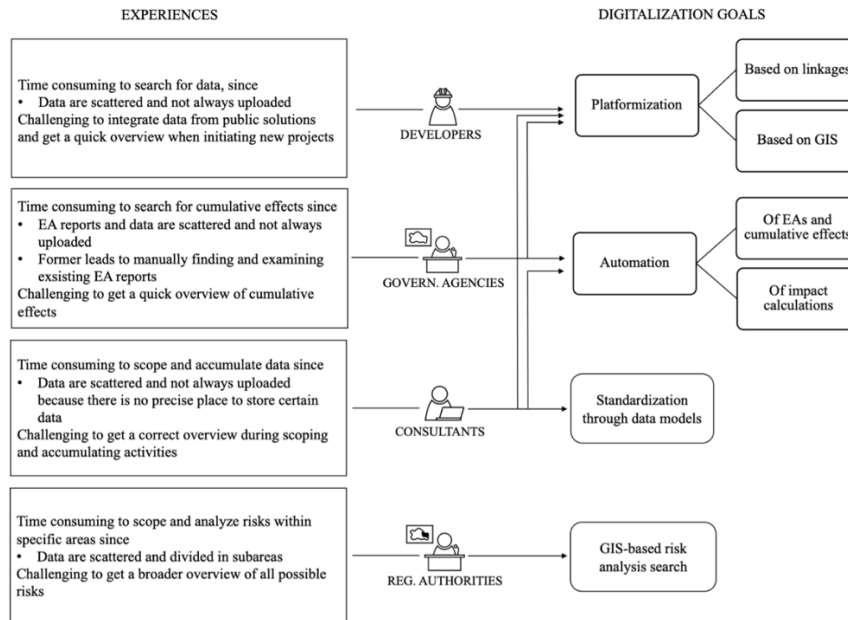


**Fig. 1.** Activities in making EA projects and plans documented in EA reports

In the following, we account for each activity as outlined in Figure 1 and each stakeholder's goals for digitalization. These goals for how the practice ought to be are explicitly formed in the specific activity and emphasize how goals for the digital transformation are embedded in said activity. The goals are formed by the experiences stakeholders have faced in each activity. Accordingly, our analysis accounts for the space where digitalization and experiences meet, while still acknowledging that goal setting also can involve other concerns (e.g., ownership, responsibility, and accountability for meeting digital transformation objectives).

#### 4.1 Scoping, Accumulating, and Analyzing

Scoping, accumulating, and analyzing is a pre-requisite when initiating a prospective EA project. These activities are highly influenced by developers, consultants, governmental agencies, and regional authorities. These stakeholders each influence the activities differently, consequently making them relevant in different ways during these activities. The developers are the first instance since they often present a prospective EA project. Accordingly, a developer will have to be part of scoping the project (e.g., what is being built, working methods, information regarding areas to be used, both permanently and temporary). However, scoping happens in close collaboration with consultants and is often not done by developers themselves in practice. But, as Figure 2 outlines, this is not easy and rather time consuming because data are scattered and not always uploaded, making it difficult to initiate a new EA project.



**Fig. 2.** Digitalization goals for scoping, accumulating, and analyzing activities

The prospective project provided by a developer is then put in supply and won by a consultant based on different factors (e.g., economics, time, and quality). The consultant's primary role is to ensure that the prospective EA project can be realized, which emphasizes iterative collaboration between developers and consultants. Whether or not an EA project can be realized is based on the scoping, accumulation, and analysis of data. If data uncover something that would hinder the realization of a prospective EA, the project will be adapted accordingly. However, scoping, and accumulating data is not a straightforward process and is time consuming, because data are scattered and not always uploaded making it difficult to get a correct overview.

The affected governmental agency's primary function when receiving an application (e.g., concerning a project or a plan from a developer) is to get an overview of the cumulative effects the prospective EA project or plan can have besides the ones already identified. The search for cumulative effects takes place through public platforms, internal GIS solutions and/or looking through existing EAs reports with similar scope to get an overview of already identified cumulative effects. However, getting a quick overview of possible cumulative effects is time consuming as data are scattered and not always uploaded. Like the governmental agencies, the regional authorities receive an application for a prospective EA project or plan. However, their role is primarily to scope and analyze the risks within specific areas, so that possible problems can be allocated as early as possible and a discussion of how these can be minimized. However, as an EA project or plan contain multiple subareas, getting a broader view can be difficult. What reoccurs in the experiences of the different stakeholders is how these activities are described as time consuming because data are scattered, which

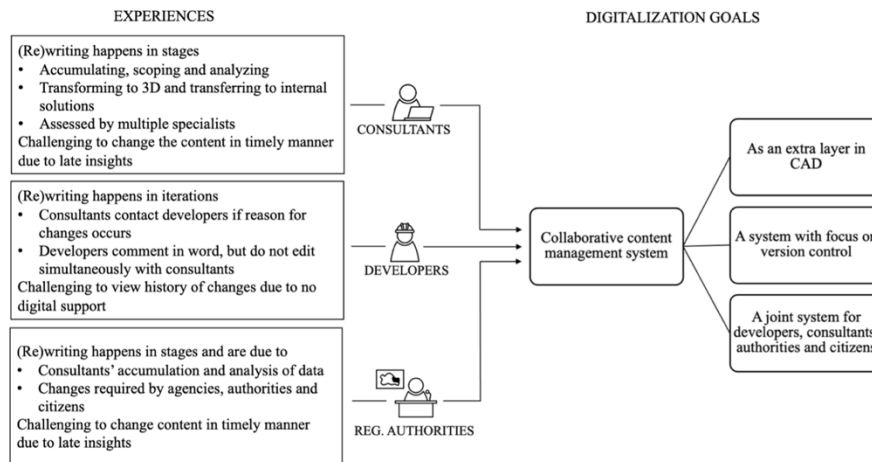
makes it difficult to get an overview. While the reoccurrence in experiences indicates a common problem (e.g., lack of overview of data), the digitalization goals point towards some consensus and different perceptions of how this problem can be sorted.

The digitalization goal with the most support is platformization. While developers, governmental agencies, and consultants share the same perception of the goal (e.g., platformization), there are some differences between their views. Developers and governmental agencies indicate the platformization should be based on GIS as this will ease the process of realizing what is relevant to assess. Consultants specify that platformization based on linkages will aid the access to data, which supports valid arguments and similar EAs reports who states the same, leading to a correct overview of existing data. In addition, there was a similar perception of digitalization goals between governmental agencies and consultants (e.g., automation). However, there is a difference in understanding what exactly should be automated. While these mentioned goals have backing from several stakeholders, other goals were only declared by one stakeholder. Consultants experience that not all data is uploaded, indicating doubt about where specific data should be uploaded. According to the consultants, the solution would be standardization through data models, emphasizing that all data should have a unique identifier used across organizations involved in EA reports. As a result of challenges when scoping and analyzing risks, regional authorities point towards a GIS-based risk analysis search. According to regional authorities, this digitalization goal should ease getting a broader overview of possible risks when assessing a prospective EA project.

#### **4.2 (Re)write**

(Re)writing an EA report is not a standardized practice, as no formal requirement is legally dictated, the law only states that an EA report must be written by a competent person (e.g., often consultants), stressing how consultants are extremely relevant for this activity. An EA report is a legal document that must be approved and stored in either regional or state archives. Consequently, an EA report is based on documentation (e.g., sums up seven out of eight activities in writing supplemented by visualizations), and the progression of outlining and writing an EA report occurs sequentially. Working sequentially might make the process of writing an EA report easier for the consultants. Still, it is problematic when confronted with adjustments from governmental agencies, civil society and regional authorities late in the process. As the initiators behind a prospective EA project, the developers do not directly write the EA report but oversee the consultants' work, which leads to continuous adjustments to decrease the number of adjustments in the final reporting phase. Besides writing the EA report, the responsibilities of consultants also include informing developers whenever a reason for changes to an EA project occurs (e.g., the project is hindered). Accordingly, there is a close collaboration between consultants and developers. However, it is difficult for developers to see the progression in an EA report. While the consultants' experiences indicate that the sequential approach hinders quicker correct decision making, developers express how the iterative process hinders a transparent view of changes. The regional authorities express the problem of being the last instance to view the EA report.

Both consultants, developers and regional authorities point towards the same problem and share the goal of minimizing these problems. Consultants, developers and regional authorities see the benefits of having a more iterative collaboration between actors and believe this can be supported through a collaborative content-management system.



**Fig. 3.** Digitalization goals for (re)write activity

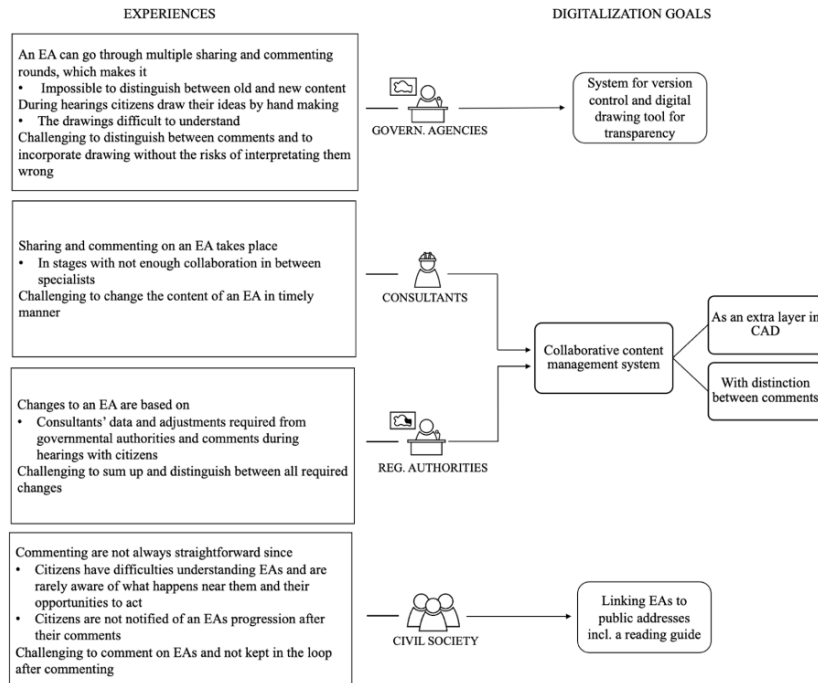
As outlined in Figure 3, a notable distinction between the digitalization goals expressed by developers, regional authorities and consultants is the focus on the content-management system in the more traditional sense as opposed to visualization. The developers and regional authorities describe their digitalization goals more traditionally. While developers see it as a tool for more collaboration, focusing on version control to increase transparency, the regional authorities perceive the digitalization to increase collaboration between developers, consultants, authorities, and citizens. Contrary, the consultants focus on a visual collaboration tool, which should add an extra layer in already utilized CAD programs. According to consultants having this extra layer in CAD might make it possible to monitor actions across organizations, consequently increasing the pace for decision making and even helping predict adjustments in a more timely manner. This digitalization goal is rather different from the current collaboration between consultants and other specialists, which happens much more sequentially, leading to impractical work.

### 4.3 Sharing, Commenting, and Hearing

Sharing, commenting, and hearing activities are essential for the quality of an EA report. These activities are highly influenced by governmental agencies, consultants, regional authorities, and the civil society. While the consultants are responsible for changing an EA report when required, governmental agencies, regional authorities and civil society share the responsibility of pointing towards adjustments. Accordingly, an EA report is often reviewed several times before the content is satisfactory. While

several rounds of reviews increase the quality of a prospective EA report, they also come with challenges for the stakeholders. During these rounds of reviews governmental agencies provide adjustments in a commenting sheet, which is divided in general and specific comments. This commenting sheet is shared amongst subspecialist so that the comments can be forwarded collectively to the responsible consultants and developers. Consequently, when receiving the modified EA report, it is a challenge for governmental agencies to distinguish between old and new content. In addition, governmental agencies addressed how citizens tend to draw their ideas for modifications by hand to supplement their comments. While the ideas are good, they are not always easy to interpret. This difficulty makes it challenging for consultants to incorporate them, consequently becoming a weak point during hearings addressing why and which ideas and adjustments were taken into account.

Meanwhile, consultants face another challenge connected to the process of sharing and commenting, which takes place sequentially. However, this challenge does not involve comments from governmental agencies and regional authorities but rather the sharing and commenting processes between internal and external collaborators writing the EA report. An EA report is roughly equivalent to a document based on data and different environmental knowledge. The issue of having a sequential approach is that subspecialists attached to an EA project do not have an early discussion on what can be realized based on their prospective knowledge. Like the consultants, regional authorities experience challenges in becoming aware of adjustments. Regional authorities additionally share how comments can be difficult to distinguish between since these originate from multiple places. While the governmental agencies, consultants, and regional authorities express their challenges in terms of the review round, civil society deals with challenges of a different character. Citizens tend to be faced with two challenges: 1) having difficulties understanding larger and more complex EA reports and knowing what opportunities they have to influence an EA project, making it difficult to comment and 2) if commenting on an EA report, citizens tend to be kept out of the process that follows, making them unable to get insight into how their comments are being addressed.



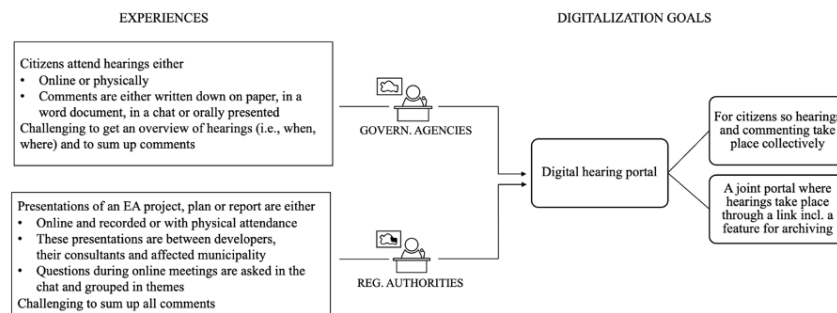
**Fig. 4.** Digitalization goals for sharing, commenting, and hearing activities

Since the consultants and regional authorities share similar challenges during specifically sharing and commenting activities, they also share similar views of digitalization goals (cf. Figure 4) being a collaborative content management system with some differences in between. Governmental agencies and civil society's dissimilar challenges are also reflected in their very different digitalization goals. What was especially surprising was that the governmental agencies even made a digitalization goal for citizens (e.g., digital drawing tool, which includes an overview of the area of concern) based on their observations during hearings. As a means for easier distinction in old and new content during the multiple commenting rounds, governmental agencies envisioned a system for version control and are already working towards this goal internally in the organization. Meanwhile, the civil society's digitalization goal is different. Their challenge lies in understanding the content of EA reports, their opportunities to influence an EA project and what is happening near them. The citizens' challenges are reflected in the expressed digitalization goals. However, what was surprising was that the consultants mentioned how the citizens' digitalization goal is partially realized as digitalized EA reports linked to public addresses exists. This can point towards a lack of transparency between stakeholders relevant for making EA reports and the civil society.



#### 4.4 Approval

The last activity of an EA process is deciding whether a prospective EA project is approved and can be initiated. Relevant for this activity is especially the affected governmental agencies and regional authorities, as they are the last instance assessing the prospective EA project, concluding its approval or rejection. The decision regarding an EA project's approval or rejection must be published. As mentioned, an EA report tends to go through multiple rounds of commenting and sharing. Regardless of an EA project's origin (i.e., initiated by the Danish parliament or from a private developer) the EA project follows these same procedures (e.g., the eight activities outlined in Figure 1). However, a difference is that while an EA project initiated by the Danish parliament has been adopted by legislation, EA projects initiated by private developers are dependent on several paragraph approvals (i.e., §20 in the Nature Conservation Act).



**Fig. 5.** Digitalization goals for approval activity

Usually, hearings are physical. However, due to the COVID-19 pandemic, hearings were virtual. Both governmental agencies and regional authorities agree that virtually performing hearings has advantages and disadvantages. The most emphasized advantages were the ease for citizens to participate in the hearings from the comfort of their homes and, consequently, the change in participant demographic for these hearings. The most emphasized disadvantages were that the alternation between physical and virtual hearings complicates summing up comments. Accordingly, the digitalization goals expressed by the governmental agencies and regional authorities share similarities as they stem from similar experiences and challenges and have a common wish for a digital hearing portal.

## 5 Discussion and Conclusion

This research aims to advance knowledge on how different stakeholders' digitalization goals can be understood in a digital transformation of environmental assessment. With an unusual case of digitally transforming Danish EAs, we analyzed the stakeholders' experiences using Soft System Methodology [9-10] to develop a conceptual model of

necessary activities for making EA projects and reports (see Figure 1). Next, we tied the stakeholders' different experiences from the eight identified activities to their digitalization goals. As a result, our findings (see Figures 2-5) uncovered more nuanced and specific digitalization goals for EAs, as these relate to the specific stakeholders' activities during an EA process. Our findings distinguish four overarching digitalization goals across these stakeholders (i.e., platformization, collaborative content management system, automatization, and digital hearing portal). We explain the stakeholder's different descriptions of the same digitalization goals with their different experiences from the EA activities.

Our findings expand current IS literature on digital transformation by explaining stakeholders' digitalization goals (i.e., through experiences and relating these to specific activities). To the best of our knowledge, existing research concerning digital transformation has not explicitly related digitalization goals to the stakeholder's experiences from a specific activity. Existing research divides digitalization goals into three perspectives (i.e., organizational, social and technology) and identifies goals as strategic roles of information technology (i.e., automate, informate-up, informate-down and transform) [30, 37]. We do not reject the relevance of dividing digital transformation goals into three perspectives (i.e., organizational, social and technological), nor the identified goals (i.e., automate, informate-up, informate-down and transform) [30, 37] as these goals relates to our identified goals (i.e., platformization, collaborative content management system, automatization and digital hearing portal). However, we critique how existing research focuses on abstract and broad sweeping digitalization goals with the risk of digital transformations detached from stakeholders' activities and experiences. The no-win situation being undergoing a digital transformation (i.e., utilizing resources, time, finances) only to realize that affected stakeholders do not see the purpose of the digital transformation and consequently will not contribute to the transformation nor use the implemented digital technologies.

IS literature widely recognizes that digital transformations should begin with a vision and then determine a coherent goal to be achieved [7, 13, 28, 22]. Still, an inability to reach digitalization goals is not uncommon [42, 36, 28]. Existing literature emphasizes that the chance of superior outcomes rises when stakeholders have a shared understanding of goals [6]. While literature unfolds challenges of setting goals during digital transformation [7], there is very little research on achieving shared goal setting in digital transformations [25].

The literature suggests that two variables should be considered: the company size and its activities [44]. Thus, we propose managing digitalization goals by attending to who the goals are for, what experiences they are grounded in, for key activities of EA, and other areas undergoing digital transformation. Setting goals in this way is particularly important for inter-organizations where stakeholders are more loosely coupled, making it more difficult to recognize a common drive for a prospective digital transformation. However, managing stakeholders' diverse but legitimate goals in an inter-organization should be recognized as a key challenge in inter-organizational digital transformation. Approaching goal setting by mapping them to different stakeholders, experiences and activities allows stakeholders to participate in and see the

goalsetting process. This participation can enhance goal commitment, help confirm that the goals are not irrational, improve stakeholders' understanding of the goals, and help them achieve the goal [24]. We stress that goals cannot simply be assigned effectively throughout an organization and much less in inter-organizational collaboration about digital transformation.

IS researchers concerned with digital transformation or Green IS have not previously investigated digitalization goals within EA processes, despite its importance for reducing and mitigating the effects of environmental problems. EAs should interest IS researchers wanting to address the calls for IS research on environmental sustainability [26, 11]. While digital transformation and sustainability receive growing attention from IS researchers, limited research has investigated digital transformation and sustainability together [8, 16]. The specification of nuanced digitalization goals for EAs furthers the current understanding of the interplay between sustainability and digitalization, which is currently addressed as a positive relationship [26, 11]. This study's findings thus nuance digitalization goals for EAs as an orientation towards the SDGs and thus further our understanding of digital technologies for the SDGs achievement. Correspondingly, these findings provide preliminary research on what goals drives digital transformation in EA and highlight environmentally responsible activities where IS can make a difference.

In conclusion, our research expands previous studies on the interplay between digital transformation and sustainability, deepening the discourse on initiating inter-organizational digital transformations in practice. Additionally, this study unfolds how establishing a fit between transformational objectives and the diverse digitalization goals of stakeholders should be recognized as one of the main challenges in digital transformations. We acknowledge that addressing an unusual case provides limitations in terms of transferability. However, to further this research we recommend two directions for future research. First, we recommend examining how the proposed goals and experiences can inform other domains, by studying related cases. Second, we suggest a specific focus on the *interplay* between digital transformation and SDGs.

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