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A Conceptual Framework and Research Agenda for Harnessing Institutional Work in Green Information Systems

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A CONCEPTUAL FRAMEWORK AND RESEARCH AGENDA FOR HARNESSING INSTITUTIONAL WORK IN GREEN INFORMATION SYSTEMS

Short Paper

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Abstract

This study advances the field of Green Information Systems (IS) by conceptualizing the role of institutions (humanly devised rules, norms, and beliefs) in sustainability transitions with IS. We propose a framework for understanding how institutional work can support the maintenance, creation, and disruption of institutions, driving individual user-level transitions toward more sustainable behaviors. In addition, we establish a research agenda to guide future academic inquiry in harnessing the promising lens of institutional work in driving the transformative possibilities of Green IS.

Keywords: green information systems, sustainability transitions, institutional work, conceptual framework, research agenda.

1 Introduction

In a world where climate change and its related humanitarian crises are escalating, it is increasingly evident that addressing these global challenges requires climate action beyond mere technological innovation and advancements (Davies, 2014). What is needed is a behavioral shift toward sustainability at the individual, organizational, and societal levels. To this end, Green Information Systems (IS) has emerged as a potent catalyst for harnessing the transformative potential of IS within organizational practices and processes, thereby contributing to the establishment of a more sustainable society (Melville, 2010; vom Brocke et al., 2013). Under the umbrella of Green IS, a diverse range of IS initiatives have been explored, aligning with the “triple bottom line” approach (i.e., economic, environmental, and social dimensions of sustainability) (Kleindorfer et al., 2005). Accordingly, Green IS studies have strong links to organizational environments, addressing challenges, for instance, through initiatives such as virtualizing meetings for environmentally sustainable work practices (Bose and Luo, 2011) and improving organizational compliance with emerging legislation and norms (Butler, 2011).

However, the journey toward sustainability is filled with complexities, particularly at the intersection of individual beliefs, motivations, and engagement in sustainable practices using Green IS (Sedera et al., 2017). For example, a significant challenge lies in the misalignment between the sustainability objectives of organizations and the deeply held beliefs, values, and goals of their members, which critically shape the adoption and effectiveness of sustainable practices (Melville, 2010). Drawing from institutional theory (Scott, 2014), we see this misalignment underscores a broader conflict within the institutional structures—comprising enduring rules, norms, and beliefs—that guide the actions of individuals and organizations alike (Vargo and Lusch, 2016). These institutional forces simultaneously enable and constrain individuals’ behavior, affecting their perceptions and actions toward sustainability. Consequently, understanding these structures is critical for driving individual user-level transitions toward more sustainable behaviors with Green IS, enabling the creation of sustainable practices and

disrupting unsustainable ones. However, existing research has not adequately captured the interplay between institutions and sustainability transitions.

To address this important gap, we explore the potential of institutional work—the purposive efforts of individuals and organizations to create, maintain, and disrupt institutions (Lawrence and Suddaby, 2006)—as a strategic approach to support sustainability transitions with IS. This perspective is promising yet underexplored in the context of Green IS and offers a novel viewpoint on how existing institutional structures can be reformed to drive sustainability transitions. We investigate the role of institutional work in aligning Green IS initiatives with their institutional contexts, addressing the following research question: *How can institutional work be harnessed to drive sustainability transitions with IS?* Accordingly, we seek to set the stage for an enriched theoretical understanding of institutional dynamics in sustainability transitions and provide practical insights into leveraging institutional work to enhance the efficacy of Green IS initiatives in achieving organizational and societal sustainability goals (Melville, 2010).

Guided by Jaakkola's (2020) methodological principles for designing conceptual articles and MacInnis' (2011) framework for conceptual contributions, we searched and synthesized theories (institutional theory) and the interconnections among the concepts of Green IS, sustainability transitions, institutions, and institutional work to explore and explain previously unexplored connections. Following a careful evaluation and analysis of the relationships between the key concepts, we outlined the process of institutional work driving sustainability transitions with IS in a conceptual framework. Accordingly, we argue that to achieve sustainability transitions, it is imperative to understand the role of institutions and to consider how institutional work can be harnessed to reform the surrounding institutions in conjunction with Green IS initiatives. Our conceptual framework delineates the relationship between Green IS and sustainability transition with the concepts of institutions and institutional work. These previously unexplored connections promise to bring novel insights to the field of Green IS about how actors (e.g., individuals and organizations) can intentionally drive change in institutionalized practices and behaviors, thereby enabling the transition to more sustainable behaviors with Green IS.

2 Conceptual Background

2.1 Enabling sustainability transitions with IS

As governments and organizations increasingly strive toward sustainability transitions, among other essential fields, IS is at the forefront of this endeavor. Due to the regulative and normative impacts of the pursuit of planetary well-being, the integration of sustainability into IS research can be considered not only a moral imperative but a strategic necessity. Whereas social, environmental, and economic aspects are all focal to Green IS, the domain is primarily dedicated to leveraging the transformative power of IS in organizational practices and processes for an environmentally sustainable society (Melville, 2010; vom Brocke et al., 2013). The literature discusses Green IS initiatives' adoption and impacts on business, government, organizations, and society, with a particular focus on developing sustainable practices (e.g., Singh and Sahu, 2020). For instance, the adoption of a truck drivers' bypassing system was found to be impacted by individually perceived benefits, following peers' behavior, and perceived normative pressure (Marett et al., 2013). The existing studies have tended to focus on the organization's point of view (e.g., Debnath, 2020) or supply chain management (e.g., Khan and Qianli, 2017). For example, supporting a company's supply chain in adopting environmentally sustainable practices and management systems has been found to create an overall competitive advantage (Chiou et al., 2011).

While Green IS encompasses interactions among technology, individuals, and organizations, and supports goals at the level of individuals, organizations, and societies (Kranz et al., 2015), the role of individual users in sustainability transitions remains understudied. As personal beliefs, values, and goals drive individual users' behavior with Green IS, the purposive alignment of values and goals becomes essential for the success of sustainability initiatives (Melville, 2010). More specifically, individual users' belief formation presents an underlying force in implementing sustainable practices and processes at the

individual level, potentially leading to targeted, sustainable outcomes at the aggregated level. Conflicts between proposed sustainability values and individuals' personal values may result in negative impacts (Melville, 2010). Therefore, an emphasis on the individual user's role in sustainability transitions aligns with the broader goal of mitigating global climate change and fostering a sustainable future.

Given that sustainability is, per se, a value-laden concept, more attention is needed to how sustainability, its challenges, and proposed solutions are represented by the targeted users (Stirling, 2006). With this perspective, designing Green IS to support and impact individual users' beliefs of sustainable behavior becomes integral in conflict prevention and efficiently promoting sustainable practices and processes. Thus, understanding individual users' behaviors and how to affect them through IS emerges as an essential academic interest, as well as a crucial step in realizing the full potential of Green IS in driving forward the global agenda of sustainable development.

2.2 Toward the institutional work perspective in Green IS

Institutional theory (Scott, 2014) offers an established lens for understanding the dynamics of organizational behavior and change, particularly fruitful within the domain of Green IS. Extant research has leveraged institutional theory, for example, to elucidate the mechanisms by which institutional pressures and the pursuit of legitimacy influence organizations to embark on sustainable initiatives (Butler, 2011; Orlikowski and Barley, 2001). Institutions, consisting of formal codified laws, informal social norms and embedded symbolic meanings (Koskela-Huotari et al., 2020), play a focal role in shaping individuals' behaviors by instilling and enforcing shared rules, norms, and beliefs within a social system (Edvardsson et al., 2014; Vargo and Lusch, 2016). Institutions manifest as three principal elements: regulative (laws and formal rules), normative (norms and values), and cultural-cognitive (perceptions of reality and shared understandings), collectively coordinating individual and collective actions through enforcing compliance, social obligations, and shared cognition (Scott, 2014).

The concept of institutional work (Lawrence and Suddaby, 2006) refers to the deliberate actions undertaken by individuals and organizations to create, maintain, and disrupt institutions, thereby underscoring the agency of individuals and organizations in shaping their surrounding institutional structures. This notion can be harnessed to derive pathways for reforming the regulative, normative, and cultural-cognitive elements of institutions (Scott, 2014) within various social contexts (e.g., organizations) to facilitate sustainability transitions. Institutional work encompasses various activities, from establishing new regulative frameworks and normative guidelines to strategically disrupting and reconstructing existing institutional boundaries and meanings (Lawrence et al., 2011).

Within the Green IS domain, the application of institutional work translates to a purposeful effort to engage with and reform the institutional structures (regulative, normative, cognitive elements) to promote and embed IS-supported sustainable practices. More specifically, the regulative components transform behavior through legal compliance; normative components influence actions via societal expectations and obligations; and cultural-cognitive components drive behavior based on shared beliefs and perceptions of reality. These elements, distinct in their mechanisms of influence, collectively provide a framework for advancing sustainability transitions through IS, from the enactment of immediate regulatory compliance to the deep-seated internalization and institutionalization of sustainability norms and values (Edvardsson et al., 2014; Koskela-Huotari, 2020).

3 Institutional Work for Sustainability Transitions with IS: A Conceptual Framework

For IS-driven sustainability transitions to be meaningful and enduring, organizations must extend their focus beyond introducing IS initiatives to include a nuanced understanding and engagement with the existing institutional structures. Drawing from institutional theory (Scott, 2014) and the concept of institutional work (Lawrence and Suddaby, 2006), we propose a novel approach that supports actively considering and purposively (re)forming institutional structures to enable individual user-level sustainability transitions with IS. More specifically, we propose a conceptual framework comprising

two main components: (1) institutional work and (2) institutions (Figure 1). We argue that effective sustainability transitions with IS necessitate institutional work—purposeful actions undertaken by individuals and organizations within social systems to purposefully maintain, create, and disrupt institutions (Lawrence and Suddaby, 2006). This work supports introducing and integrating new sustainable practices and the challenging of unsustainable ones, which is essential for driving sustainability transitions.

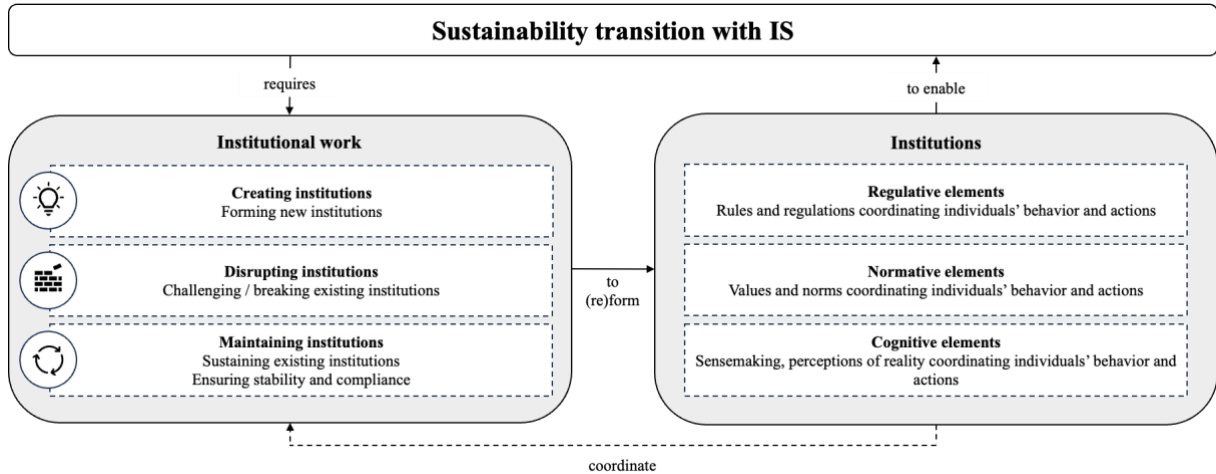


Figure 1. *Institutional work in driving sustainability transitions with IS.*

In the context of Green IS, creating institutions may involve, for instance, creating policies and regulations that provide external pressure toward sustainability transitions, a phenomenon that calls for further research in the Green IS literature (Singh and Sahu, 2020). Disrupting institutions, in turn, may entail public campaigns to disrupt existing norms and practices in the social system, advocating for a shift towards more sustainable alternatives. For instance, introducing an IS to reduce energy consumption may require institutional disruption of individual users’ beliefs of social norms when they inhibit adoption decisions (Loock et al., 2011). Achieving a balance between creating, disrupting, and maintaining institutions is essential to ensure that individuals feel comfortable while embracing new, sustainable practices and behaviors. For institutions to be created and disrupted, most existing structures need to be maintained to make the transition smoother and the new institutions to be accepted by the individuals (Koskela-Huotari et al., 2016). For instance, when attempting to transform behaviors, such as routinized printing of paper, into more sustainable practices with eco-efficient goals, maintenance of institutions could be manifested by attempting to introduce only minor changes in the routines by new requirements and demands.

As a focal underpinning of the proposed conceptualization, the interplay between institutional work and institutional elements is central, and each institutional element plays a unique role in shaping behaviors and actions at both the individual and organizational levels. *Regulative elements*, from the organizational standpoint, may comprise laws aimed at reducing carbon footprints and enhancing digital workflows. For example, privacy regulations partially dictate how individual users’ data may be collected and used to create more sustainable practices in collaboration systems in healthcare (e.g., Zahid et al., 2022). For individuals, regulative influences can manifest, for example, through workplace IT policies eliminating unsustainable practices, such as default on-site meetings (i.e., disrupting institutions) while nudging users to adopt new virtual meeting practices for decreasing climate impact and simultaneously implementing safety distances during the COVID-19 pandemic (i.e., creating institutions) (e.g., Sundermeiaer, 2022).

Normatively, organizations can harness Green IS, for example, in their corporate social responsibility initiatives. Normative frameworks such as the ISO 14001 for environmental management may steer and coordinate the institutional work organizations engage in and can be enforced, for instance, by implementing online courses on specific sustainability topics (e.g., Hsu and Chen, 2021). At the individual level, the influence of peers in prioritizing sustainable practices, such as using carbon

footprint tracking apps (e.g., Lumivalo et al., 2024) or IT-enabled real-time feedback on energy consumption (e.g., Tiefenbeck et al., 2018), exemplify such normative push toward behavior change with Green IS.

From a *cultural-cognitive perspective*, an individual's belief in the importance of sustainable practices may encourage the adoption of Green IS. For example, an organizational system can distribute motivational messages to support individuals' awareness and beliefs of environmental or social sustainability issues, reflecting a cognitive alignment with the users' actions and goals (i.e., maintaining institutions). Institutions, often perceived as implicit "taken-for-granted" structures within society (Edvardsson et al., 2014), mirror an individual's understanding of their social environment based on inner reflections (Vink & Koskela-Huotari, 2022). Supporting individual and collective awareness of the surrounding institutions is critical, as unawareness can lead to conflicts and obstacles in the Green IS implementation, impeding sustainability transitions. To foster a collective awareness and commitment to sustainability goals, organizations can leverage storytelling and narratives, enhancing both individual and group understanding (Wieland et al., 2017). For instance, implementing Green IS initiatives may help maintain and create employees' beliefs of organizational practices such as paper printing and its impacts versus digital copies by democratization of information on printing behavior and encouraging open discourse on related topics (Degirmenci and Recker, 2023).

Accordingly, our conceptualization, as depicted in Figure 1, highlights that sustainability transitions with IS are to be considered dynamic, iterative processes where actors engage in ongoing institutional work, (re)forming institutions to align with the evolving sustainability norms, rules, and beliefs of the users and their social system (e.g., Koskela-Huotari et al., 2016). Institutional work supports integrating new sustainable practices and the challenging of unsustainable ones, which is essential for driving sustainability transitions. Furthermore, as new, more sustainable practices are established, continuously maintaining them is vital to ensure their ongoing effectiveness. As the dynamic process of (re)forming institutions is often accompanied by conflicts and tensions, impacted by the changing objectives for sustainability and sustainable behavior over time (Koskela-Huotari et al., 2020), it is important to view sustainability transitions as a process rather than a fixed aim. The proposed conceptual framework represents a first attempt at integrating Green IS-driven sustainability transitions with the lens of institutional work and the elements of institutions, driving impactful and enduring transitions embedded within and responsive to their institutional structures.

4 Research Agenda for Institutional Work in Green IS

Our proposed framework posits that the success of sustainability transitions with IS is dependent on the institutions that frame the context in which they are introduced. This implies the need for a better understanding of institutions to navigate such transitions' complexities effectively. By harnessing institutional understanding, organizations may purposefully align with and engage in the (re)formation of individual users' beliefs, values, and goals toward sustainability with Green IS (Melville, 2010). To this end, we propose that institutional work presents a promising approach to foster lasting sustainability transitions aligned with prevalent institutional structures. We outline a threefold research agenda to guide further exploration and knowledge development on institutional work in the domain of Green IS.

First, we call for an in-depth exploration of *the antecedents of institutional work in Green IS*. The novelty of the institutional approach in Green IS emphasizes the need for qualitative research designs, such as observations and in-depth interviews, to delve into the elements influencing institutional work. Key areas of inquiry include actor characteristics, such as their agency, structural positions, and social competencies (Suddaby et al., 2016), alongside individual users' cognitive frameworks and mental models, and the effects of existing institutional structures (e.g., Vargo and Lusch, 2016). Furthermore, studies should explore the role of IS in institutional work and delineate the different forms of institutional work—creation, disruption, and maintenance—as they relate to the institutionalizations of sustainable practices by (re)forming institutions within various Green IS context. This exploration is vital for understanding how different forms of institutions and institutional work affect sustainability transitions with IS, considering the distinct challenges and opportunities that arise from specific actor

characteristics, technologies, and Green IS contexts. In pursuit of these objectives, empirical studies are invited to address the following problems:

- How do the characteristics of actors (such as their agency, structural roles, and cognitive frameworks) influence their ability to engage in institutional work for sustainability transitions with IS?
- What are the enabling and constraining effects of existing institutional structures on the implementation of Green IS initiatives and the engagement of actors in institutional work?
- Which types and combinations of institutional work (creating, disrupting, maintaining) are most effective in driving sustainability transitions for particular sustainability goals in different Green IS contexts, and why?
- Which elements (regulative, normative, cognitive) and combinations of institutions are most effective in driving sustainability transitions for particular sustainability goals in different Green IS contexts, and why?
- What is the role of IS in facilitating or hindering institutional work for sustainability transitions?

Second, we call for a deeper understanding of *the process of institutional work in Green IS*. Acknowledging that the process of (re)forming institutions is often fraught with changing conflicts and tensions, it is important to view sustainability transitions as an ongoing process rather than a fixed objective. This perspective underscores the necessity of longitudinal and experimental studies to examine how institutional work evolves over time and impacts sustainability transitions within the context of Green IS. Empirical studies in this domain should trace the implementation, adoption and evolution of Green IS initiatives, from their inception to successful integration within organizations and other social systems, to uncover the interplay between institutional work and Green IS over time (Singh and Sahu, 2020). This research direction aims to showcase examples of successfully implemented institutional work and create guidelines for future endeavors in this area. Such research would provide invaluable insights into the sustained impact of institutional work and develop strategies that accommodate the evolving objectives of sustainability and sustainable behavior over time (Koskela-Huotari et al., 2020). Accordingly, we suggest future studies to address the following problems:

- How do the needs and forms of institutional work evolve throughout a Green IS initiative's lifecycle, and how can these changes be accounted for?
- Which types and combinations of institutional work (creating, disrupting, maintaining) are most effective in driving sustainability transitions at particular temporal points in different Green IS contexts, and why?
- Which elements (regulative, normative, cognitive) and combinations of institutions are most effective in driving sustainability transitions at particular temporal points in different Green IS contexts, and why?
- What role do conflicts and tensions play in institutional work over time, and how can they be managed to establish and maintain sustainability transitions with IS?

Finally, we emphasize the importance of *embedding institutional work principles into the design of Green IS* to foster more effective sustainability transitions. Drawing on the transformative potential of Green IS to contribute to a more sustainable society, design science research (DSR) emerges as a suitable methodology for developing and evaluating Green IS initiatives aligned with institutional work principles (Melville, 2010; vom Brocke et al., 2013). Leveraging user-centric design and institutional work insights, DSR studies can effectively support the development of design principles for creating, disrupting, and maintaining institutions, facilitating the incorporation of sustainable practices with Green IS into organizational and societal contexts. Accordingly, we advocate for including institutional work considerations building on our conceptual framework in the design, development, and empirical testing of Green IS initiatives and invite studies to address the following problems:

- What are the fundamental institutional work principles that should be integrated into the design of Green IS to foster sustainability transitions?

- How do users' perceptions of institutions (regulative, normative, cognitive elements) influence their engagement with Green IS designed to support sustainability transitions?
- How can institutional work in the design, development, and evaluation of Green IS initiatives provide practical frameworks for leveraging IS in sustainability transitions?

5 Conclusion

This study contributes to the Green IS field by bridging previously unexplored connections between Green IS, sustainability transitions, institutions, and institutional work, contributing cross-disciplinary insights to the field (Sedera et al., 2017). We introduce institutional work as a promising lens for contributing novel insights to the field of Green IS about how actors (e.g., individuals and organizations) can purposely drive institutional change in their social contexts, thereby enabling sustainability transitions with IS. We propose a research agenda to guide further investigation and applications in Green IS. While our work continues, we invite others to join in driving the transformative possibilities of Green IS with institutional work.

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