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Changing behavior towards sustainable practices using Information Technology

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ABSTRACT

This article addresses the question of how to change individuals' behavior towards more sustainable practices using Information Technology (IT). By following a multidisciplinary and socio-technical perspective, this inquiry is answered by applying a new framework—The Commonality Framework for IT-enabled Change—on a case study of sustainable behavioral change. The framework is grounded in practice theory and is used to analyze the implementation of an IT-system aimed at changing citizens' behavior towards more sustainable transport logistics and procurement in Uppsala, Sweden. The article applies case study research design and the empirical data consists of surveys, in-depth and semi-structured interviews, observations and archival documents. The results show how the change towards sustainable practices is an entanglement of both social and technical-structural elements across time. In this process, structures such as IT are the enablers, and the actors and their social activities are the tipping-point factors that ultimately determine the success of changing individuals' behavior towards a more sustainable direction. This article provides a more balanced view of how both actor and structure related properties interact during the on-going work with change towards greater sustainability practices than earlier research has offered. More specifically, the article offers both a lower-level theory and a method from which we can analyze change processes where technology is seen in its context, and where *both* technology and the human actor is brought forth to center stage.

1. Introduction

This paper addresses the question of how to change individuals' behavior towards more sustainable practices using Information Technology (IT). This inquiry is connected to the notion that sustainable development is deeply connected to people's actions, decisions and practices that are enabled by technology and that they perform in their everyday lives: recycling, using public transport, upgrading to energy efficient domestic appliances, conserving water, switching of lights, choice of energy supplier, buying eco-friendly products, and so forth (Melville, 2010; Santos et al., 2009; Shove and Walker, 2010; Spaargaren, 2011; Strengers, 2012). The extent to which individuals are able to change and adopt such new practices is a fundamental question for a more sustainable society and therefore a key-issue for policy makers across the globe (Sonnenfeld and Mol, 2011; WCED, 1987).

Earlier research suggests two different paradigms to approach the problem of behavioral change: the techno-economic model that favors a top–down rationalistic approach, and the individualistic model that gives service to bottom–up approaches from the autonomous individual (Jackson, 2005; Kollmuss and Agyeman, 2002). However, both approaches are problematic (Spaargaren, 2011; Strengers, 2012) and have been extensively criticized since they have "given rise, on the one hand, to a range of technological solutions which have not sufficiently or explicitly taken account of social practices and social contexts, and therefore have not resulted in the expected energy efficiency gains (e.g. pricing signals and energy efficient appliances) and, on the other hand, to the emergence of a plethora of behavior change programs designed to assist individuals, households and businesses identify the steps they can take to reduce their energy, water and resource consumption" (Moloney et al., 2010, p. 7622). As a result, there are a number of researchers that are calling for studies that are informed by a social–technical perspective (Guy, 2006; Moloney et al., 2010; Strijbos, 2006; Verbeek, 2006) and social practice theory (Shove and Walker, 2010; Spaargaren, 2011; Strengers, 2012). The

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aspiration is that this approach can offer a steppingstone for bridging the divide between the techno-economic and individualistic model.

Such an attempt is provided by this article that, through a multidisciplinary approach (Young and Middlemiss, 2011), applies the Commonality Framework for IT-enabled Change (CFITC) on a case study of sustainable behavioral change. More specifically, the CFITC is used to analyze the implementation of an IT-system aimed at changing towards more sustainable transport logistics and procurement behavior among the citizens in a municipality in Sweden. The results show how change towards sustainable practices is an entanglement of both social and technical-structural elements across time. In this process, structures like IT are only the enablers, and the actors and their social activities are the tipping-point factors that ultimately determine the success of changing individuals' behavior towards a more sustainable direction.

The contribution includes showing how the techno-economic and individualistic models can be bridged by using a framework that is grounded in sociotechnical perspective and practice theory (Guy, 2006; Moloney et al., 2010; Spaargaren, 2011; Strijbos, 2006). This article provides both a lower-level theory and a method that answers the recent calls for a more human and social oriented perspective and framework from which we can enrich our understanding of global environmental change (Hoffman, 2003; Sonnenfeld and Mol, 2011, p. 773; Strengers, 2012).

2. Theoretical background

2.1. Earlier research on behavioral change

There are a number of different models and approaches on how to change individual behavior (Dwyer et al., 1993; Jackson, 2005; Kollmuss and Agyeman, 2002). Among these, there are two dominant paradigms: the techno-economic model and the individualistic model. The first-mentioned perspective has been the most dominant and it holds a deterministic and top–down approach, where structure and materiality are seen to have an impact on individuals' sustainable behavior (Guy, 2006; Guy and Shove, 2000). Such a perspective contends that behavioral change can be attained through e.g. the implementation of innovative technological solutions, infrastructure, market-based measures, and regulations (Spaargaren, 2011). From this vantage point, technology, such as IT, is viewed only as a physical object with deterministic properties and where IT is considered the independent variable and the driver of change (Orlikowski and Scott, 2008). However, the techno-economic model downplays the role of humans and instead treats them as pawns who are passive to the external and deterministic forces of the wider context of society. In such an over-fatalistic perspective, the human agent is given limited possibilities to shape, influence and participate in change processes towards sustainability (Heiskanen et al., 2005; Jørgensen et al., 2009; Leach and Mearns, 1996).

The individualist perspective takes a contradictory stance and argues for the strong role of human agency, where the individuals autonomously choose their intended conduct. Here, behavioral change towards sustainability is primarily achieved through policies that include soft and social instruments and a bottom–up approach (Southerton et al., 2011; Spaargaren, 2011). With this perspective, individuals can determine their own fate and intervene and directly influence change that will either promote or destabilize sustainability. In other words, it is a perspective where human agents are the driver of change – downplaying casual agency of structure, materiality and technology. Here, IT is a product of the social spectrum that has voluntaristic properties (Orlikowski and Scott, 2008). However, critics contend that too much focus is put on the individuals, as they are over-socialized. In this sense, the agents work in isolation and determines the fate of the environmental change, with limited structural and technological influences on their actions (Jackson, 2004; Lutzenhiser, 1993; Middlemiss, 2010; Sanne, 2002).

The techno-economic and individualistic paradigms can be seen as a reaction against each other, either attributing the casual agency of environmental change to structure and technology or to the individual. This is problematic because, on the one hand, too much agency gives a voluntaristic stance to change that purports that change is caused by the free will of independent individuals with limited constraints. On the other hand, too much structure yields a deterministic standpoint alleging that environmental change is merely a result of exogenous and social structures that determine the actions of individuals.

2.2. The sociotechnical perspective

Missing from the picture is a more dynamic, contextual and balanced view of how the properties of actors and structures interact (Shove and Walker, 2010; Spaargaren, 2011). Such an approach is the sociotechnical perspective (Guy, 2006; Verbeek, 2006) that renounces the classical dichotomy of agency vs. structure and instead brings them together in an interconnected perspective. Here, the causal structure is neither deterministic nor voluntaristic but rather both, as the arrow of causality points two ways instead of one. Studies of sustainability with a sociotechnical perspective underline "the importance of understanding the role of context and technology in shaping behavior relating to energy use and, vice versa, the role of behavior and routine in shaping the use of energy-related technologies" (Moloney et al., 2010, p. 7616). Therefore, the attention is on the relationship *between* technology and practice and the relationship *between* consumption and convention (Moloney et al., 2010; Shove, 2003). With this theoretical lens, IT is in part incorporated into the social structure and it emerges through the reciprocal process between agency and structure where it is produced and reproduced over time during the on-going practice (Orlikowski and Scott, 2008).

Studies based on the sociotechnical perspective demand attentiveness to the contextual embeddedness of both technological–structural properties and individual–social properties and how they temporally interact. For instance, Shove (2003) argues that green consumption is not necessarily a direct product of individual environmental commitment (i.e. individualistic paradigm) or the outcome of an innovative technological solution (i.e. techno-economic paradigm). Instead, green consumption is part of inconspicuous routines and habits of humans that are situated in a particular context in which they are performed across time. Shove and Walker (2010) have recently illustrated this point by showing how the transition into the sustainable practices of showering routines and London's congestion charging scheme comes into existence. The work of Shove is illustrative because it shows how the social–technical perspective takes practices as central units of analyses (Schatzki et al., 2001; Southerton et al., 2004; Spaargaren, 2011; Strengers, 2012). The attention is not on the change of individual behavior but instead on the social context where the practices are performed.

However, there are few frameworks that can be used to analyze sustainability with a socio-technical perspective (Geels, 2010), and more specifically there is a call for "interpretive" socio-technical frameworks and models with a "human dimension" (Cohen-Rosenthal, 2000; Hoffman, 2003; Sonnenfeld and Mol, 2011, p. 773). Such problems have recently been addressed by Iveroth who has developed a framework that illustrates the entanglement of the technical and social properties across time: "The Commonality