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Renewable energy partnerships in development cooperation: Towards a relational understanding of technical assistance

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HIGHLIGHTS

- Study of renewable energy partnerships in development cooperation.
- Relational framework for analysis of inter-organisational technology diffusion.
- Empirical cases of renewable energy partnerships in Central America.
- Different types of network relationships enable/inhibit sustainable adoption.
- Three policy recommendations for programme development.

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ABSTRACT

Recent decades have witnessed a surge in international programmes established to assist the adoption of renewable energy technologies (RETs) in low and lower-middle income countries. So far, such programmes have yielded mixed success. While partnerships between international, national and local organisations have become the pre-eminent model for RET programmes, we know relatively little about their contribution. This article traces the role of renewable energy partnerships in development cooperation, shifting the analytical emphasis from barriers and drivers to key actors and their relationships. It presents a relational approach for the analysis of development assistance for renewable energy, drawing on theories concerning the role of strong and weak ties in inter-organisational networks. Through an analysis of seven empirical cases from Central America, the article provides insights into how different forms of inter-organisational relationships can facilitate implementation of RET programmes but do not necessarily enhance the capacities of local organisations in a way to support a more sustainable adoption of RETs. On the basis of this analysis, theoretical and policy implications are given concerning the potential of relational approaches for researching technology diffusion processes, and the role of strong and weak ties for the success – or failure – of renewable energy partnerships.

1. Introduction

Renewable energy technologies (RETs) could play a central role in enabling sustainable development in low and lower-middle income countries. They bear the promise of enabling economic growth and enhancing energy access for rural populations while reducing the environmental impact of energy generation, in this way contributing to poverty alleviation and improved standards of living (UNDP, 2009). As a result, RETs have become prominent in the field of international development cooperation (Chaurey et al., 2012; Pinkse and Kolk, 2012). A plethora of development programmes aim at the adoption of RETs in the Global South, often with a special emphasis on off-grid rural electrification and small-scale applications for populations with limited access to modern energy services[1]. Some of these programmes are run by development banks, multilateral organisations and development agencies; others by nongovernmental organisations (NGOs) or national governments. So far, RET programmes have yielded a mixed record of success. Common problems arise from the fragmented implementation of RET interventions, their limited sustainability and restricted potential for replication (Acker and Kammen, 1996; Chaurey

[1] The terms 'Global South' and 'Global North' refer to the continuing inequalities between the Southern and the Northern hemisphere. Although not strictly accurate, the term 'Global South' is used as an umbrella term for low and lower-middle income countries with a relatively lower Human Development Index.

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et al., 2012; Foley, 1992). In the last decade, partnerships between international, national and local organisations have become the pre-eminent model for RET programmes in development cooperation (Pinkse and Kolk, 2012). While the number of 'sustainable energy partnerships' seems to grow by the day, relatively little is known about the actual practices of such partnerships (Doranova et al., 2011; Forsyth, 2010). A growing body of case studies has informed the progressive development of RET programme designs, but it has fallen short of providing deeper insights into the micro-processes of inter-organisational learning that underlie international technical assistance (Grammig, 2012; Sovacool and Drupady, 2012). This makes it difficult to appreciate the ways in which renewable energy partnerships can contribute to a more sustainable uptake of RETs in the Global South.

The first part of this article traces the history of RET programmes in development cooperation and shows how renewable energy partnerships emerged as a 'silver bullet' approach to development assistance for renewable energy. It is argued that in order to better understand how partnerships can contribute to a more sustainable technology uptake of RETs, we need to shift our attention from static factors influencing programme outcomes to the actors involved and their dynamic relationships. The exploratory study presented in the second part of the article demonstrates the potential of such a relational approach. Drawing on theories concerning the role of strong and weak ties in inter-organisational networks, seven empirical cases of renewable energy partnerships in Central America are analysed. The analysis shows how the adoption of small-scale renewable energy technologies is affected by the project-centred dynamics of development cooperation, and how different forms of inter-organisational relationships can facilitate but also inhibit a more sustainable adoption of RETs. On the basis of this analysis, theoretical and policy implications are given concerning the potential value of relational approaches to research on technology diffusion, and the role of strong and weak ties for the success – or failure – of renewable energy partnerships in development cooperation.

1.1. Renewable energy technologies in development contexts: Lessons learnt

Since the late 1990s, a growing body of literature has identified 'best practices' and 'lessons learnt' from past and current RET programmes (Brass et al., 2012; Sovacool and Drupady, 2012). While the variety of case studies on this topic is remarkable, a closer look at this literature reveals shortcomings. Widely reported indicators – such as number of installed RET systems – lack information about the sustainability of the technologies (Brass et al., 2012). Often it seems to be assumed, rather than proven, that the expected benefits of RETs will materialise (van Alphen et al., 2008; van Huijstee et al., 2007). Notwithstanding these weaknesses, studies of RET programmes have identified important economic, social, and political 'gaps' that affect the outcomes of RET programmes in terms of their resources, capacitation, implementation and policy (Forsyth, 2010; Pinkse and Kolk, 2012). The following paragraphs summarise the latent theoretical and empirical understanding of these gaps.

About 80% of the 1.2 billion people without access to electricity live in rural areas where poor market infrastructure inhibits the development of appropriate market-delivery solutions for RETs (Gradl and Knobloch, 2011; Mills, 2005; World Bank, 2014). The (transaction) costs involved in acquiring and maintaining small-scale RETs in remote rural areas represent "an established market barrier to natural adoption" (Mills and Jacobson, 2011, 536) notwithstanding the fact that many rural low-income households pay disproportionate prices for low-quality fuel-based energy services (Byrnes et al., 2013; Mills and Jacobson, 2011). International development cooperation can reduce some of the *resource gaps* inhibiting the diffusion of RETs, but financial assistance tends to be limited in scope and duration (Byrne, 2011). As a result, many local RET organisations operate multiple business models, some of them based on direct sales for cash and (micro-) loans in emerging commercial markets, others involving donations and mixed finance models in various RET projects (Karakosta et al., 2010; Sovacool, 2012). RET programmes may boost the turnover of local organisations but also add to the volatility of rural RET markets, as do changing currency rates (Balint, 2006; Martinot et al., 2002; Karakosta et al., 2010). Insufficient funds for follow-up, maintenance and repair limit the sustainability of many donor-initiated RET interventions (Kaminski, 2010). A growing number of initiatives now aim at the productive use of RETs in small enterprises in order to create demand and enhance financial sustainability (Cabraal et al., 2005; Romijn et al., 2010). However, a lack of local resources, poor market access and political instability often makes it difficult to translate energy access (e.g. in the form of a solar household system) into opportunities for income generation (Kapadia, 2004)[2].

The sustainable adoption of RETs also requires the removal of *capacity gaps* at the local, national and international level (Acker and Kammen, 1996). Most low and lower-middle income countries depend on imported technologies (Chaurey et al., 2012). RET systems have to be imported, installed and repaired by trained technicians. The investments needed to develop appropriate technical capacities were previously underestimated (Chaurey et al., 2012; ESMAP, 2000). Market-based initiatives have given evidence to the importance of advancing business know-how along with technological expertise (Martinot et al., 2002). Donors face learning gaps due to a lack of long-term programme evaluations (Newell et al., 2009; Vincent and Byrne, 2006). Rural populations tend to have limited access to education and little experience with modern technologies which can make it difficult for them to adopt RETs (Sovacool and Drupady, 2012). Unsuccessful demonstration projects have reduced the attractiveness of RETs in places. However, some pilot projects engendered important learning opportunities (Romijn et al., 2010). Today, most programmes involve capacity building measures for local technicians and end-users (Chaurey et al., 2012).

Implementation gaps persist at multiple levels. Global RET initiatives produce diverse outcomes as they are inconsistently implemented by different national and local organisations. The plurality of actors involved makes it difficult to identify governance issues and evaluate impacts (Newell et al., 2009). NGOs and small and medium enterprises (SMEs) working in emerging RET sectors face the triple challenge of establishing appropriate supply chains and developing rural market infrastructure whilst simultaneously creating demand through the promotion of RETs (Byrne, 2011; Martinot et al., 2002; Mills, Jacobson, 2011). They also have to balance the requirements of emerging demand-oriented markets for the more affluent with donor-driven markets focusing on lowest-income areas. Recent RET programmes have put a larger emphasis on the active involvement of end-users and local technicians in the selection and adaptation of RETs after it became apparent that many projects had failed due to unforeseen practical problems and cultural barriers (Acker and Kammen, 1996; Drinkwaard et al., 2010; Romijn et al., 2010; Sovacool and Drupadym, 2012).

Regulatory gaps can be difficult to address (Newell et al., 2009). As donor agencies generate their own aid-related markets, they contribute to interacting levels of political economy (Byrne et al., 2011). The successful adoption of RETs requires consistent levels of

[2] Others pointed out that local demand for solar home systems may not derive from income generation. For example, Jacobson (2007) found that Kenya's rural middle class acquired solar home systems not so much for productive uses but rather for 'connective' applications, such as mobile phones, radios and televisions.