

Empowering intermediaries to train agro-food companies in tackling organizational, cultural and behavioural barriers for energy efficiency measures.

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1. Introduction

To reach countries' CO₂ emission reduction targets, the adoption of emission reduction measures in industry needs to accelerate rapidly [1]. Because of their substantial impact on countries' CO₂ emissions, decarbonization options of energy-intensive industries receive substantial attention in research and policy [1][2][3]. Smaller emitters, such as the agro-food industry, receive relatively little attention, although they face many challenges. Cost-effective energy efficiency innovations for these companies are available, but are often not adopted because middle managers lack the resources for identifying innovation opportunities or for persuading higher management of their merits (or both).

The literature on drivers and barriers for the adoption of energy efficiency measures tends to focus on technical and economic barriers for innovation adoption [5]. Similarly, most interventions (i.e., tools, methods, guidelines) to help companies improve energy efficiency, focus on removing these barriers by providing knowledge and insight on technical and

economic aspects [6]. While it is acknowledged that organizational, cultural and behavioural factors impact eventual implementation of energy efficiency measures, it is apparently difficult to address drivers and barriers of this nature, both in research and in practice.

Whether interventions sort a lasting behavioural impact in companies strongly depends on the ability of intermediaries (i.e., training companies or energy managers in large firms). Intermediaries are typically very knowledgeable about technical opportunities for energy efficiency and how to identify and implement them, but often lack the skills to make companies actually want to adopt these measures [7]. Expanding their knowledge to non-technical drivers and barriers that impact implementation of energy efficiency measures may increase their impact on the company's energy efficiency. Thus, approaches aimed at improving current practice by incorporating insights on organizational, cultural and behavioural change, also need to take the role of these intermediaries into account. The interventions should preferably be developed in close cooperation with these intermediaries, and should pay attention to knowledge transfer to these intermediaries.

Therefore, in this study, we posed the following research questions:

RQ1: What organizational, cultural and behavioural drivers and barriers hamper or stimulate the adoption of energy efficiency measures in companies in the agro-food industry?

RQ2: How can training programs address organizational, cultural and behavioural drivers and tackle barriers for adoption, in addition to technical and economic drivers and barriers?

RQ3: How can intermediaries be empowered to use insights about their client's organization, culture and behaviour to help them realize technical energy efficiency improvements?

2. Background and Methodology

The study described here was performed as part of a capacity building project for energy efficiency in the European agro-food sector (INDUCE, 2018-2020). Core of this project was the development and implementation of a training program through co-creation between fifteen pilot companies in four different countries (the Netherlands, Germany, Spain, and France), four training companies, four trade associations, and a team of social scientists.

The training program was based on studies into barriers to organizational energy efficiency [8][9], strategic decision making [7][10], cognitive social psychology [11], group decision making [12] and organizational culture [13].

After conducting a concise review of drivers and barriers to organizational energy efficiency, we conducted three empirical studies for each of the fifteen pilot companies: (1) a structured interview with the energy manager about implemented energy efficiency measures and organizational routines, (2) semi-structured interviews with four to five employees about

drivers and barriers for implementing energy efficiency measures, and (3) a survey on organizational culture. Based on the individual pilot outcomes, proposals for training programs were developed and discussed with each pilot company in co-creation sessions. Development of the training program followed the publicly available Human-Centered Design methodⁱ. This resulted in programs that took into account what companies considered useful and achievable at the specific time the trainings would be conducted.

The co-creation process provided an opportunity for the training companies to learn how to develop training programs focusing on technical, financial, cultural, organizational and behavioural barriers to effective energy management. The training programs were delivered to the companies by the trainers, with support of the behavioural scientists. A 20-hour train-the-trainer course was developed and implemented in each of the four countries, educating approximately 60 other trainers in the method. Training results were monitored and evaluated for effects on drivers and barriers. Trainers also took a questionnaire to report their experiences with the training formats.

3. Results and Findings

In addition to identifying known barriers and drivers related to organization structure and resources, this study extended insight in barriers and drivers related to organization processes, communication, culture, and individual behaviour on all organizational levels. In subsequent training proposals, however, it proved difficult to have companies opt for trainings addressing these barriers and drivers. To the extent that trainings addressing these “soft” aspects were implemented, they addressed the workplace; not the middle management or the boardroom.

The organizational culture at the pilot companies generally focuses on cooperation rather than competition. This finding is interesting because many employee training programs contain competitive elements. Findings of the present study indicate that such elements may backfire in interventions targeting employees in agro-food companies. Monitoring and evaluation results of the trainings are being produced at time of writing this abstract, and will be available by the end of June, 2020.

4. Discussions and Conclusions

RQ1: Drivers and barriers hampering or stimulating adoption of energy-efficiency measures in the agro-food industry are not only related to organization structure and resources, but also to organizational communication, processes, culture, and individual (exemplary) behaviour.

RQ2: Co-creation sessions appear to work well for generating ideas for training the workplace, but the setting was not suitable for making tempting offers to the middle management. Stronger commitment of the boardroom would possibly have made a difference.

ⁱ <https://www.designkit.org/human-centered-design>

RQ3: The project marked the start of a learning process for training companies. However, since training companies, like every company, suffer from resource constraints, it is tempting for them to stick to business-as-usual trainings. Repetitive use and evaluation of the developed training formats will be important to consolidate the learning effect.

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