

Renewable energies in Senegal:

Significance and challenges of local small and medium-sized enterprises (SMEs)

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Context and motivation

Role of SMEs

- SMEs play a crucial role in the development of national economies
- In Senegal 95% of all enterprises are SMEs
- SMEs in Africa face several challenges: access to stable energy supply is of particular importance
- Evidence from a 2012 survey (Cissokho & Seck, 2013):
 - 57% of Senegalese SMEs identified electricity as major concern for their firm
 - 55% said that power outages affect their investment decisions

Potentials of decentralized RE

- provide enterprises with a stable source of energy
- create opportunities for new business models
- shift to RE can mitigate climate change and meet rapidly growing energy demands in developing economies

Context and motivation

➔ What considerations motivate Senegalese entrepreneurs to adopt RE in the operation of their SMEs?

RQ 1: What are the challenges for SMEs regarding the use of RE?

RQ 2: How can SMEs be supported in using RE, based on their existing knowledge, skills and competences?



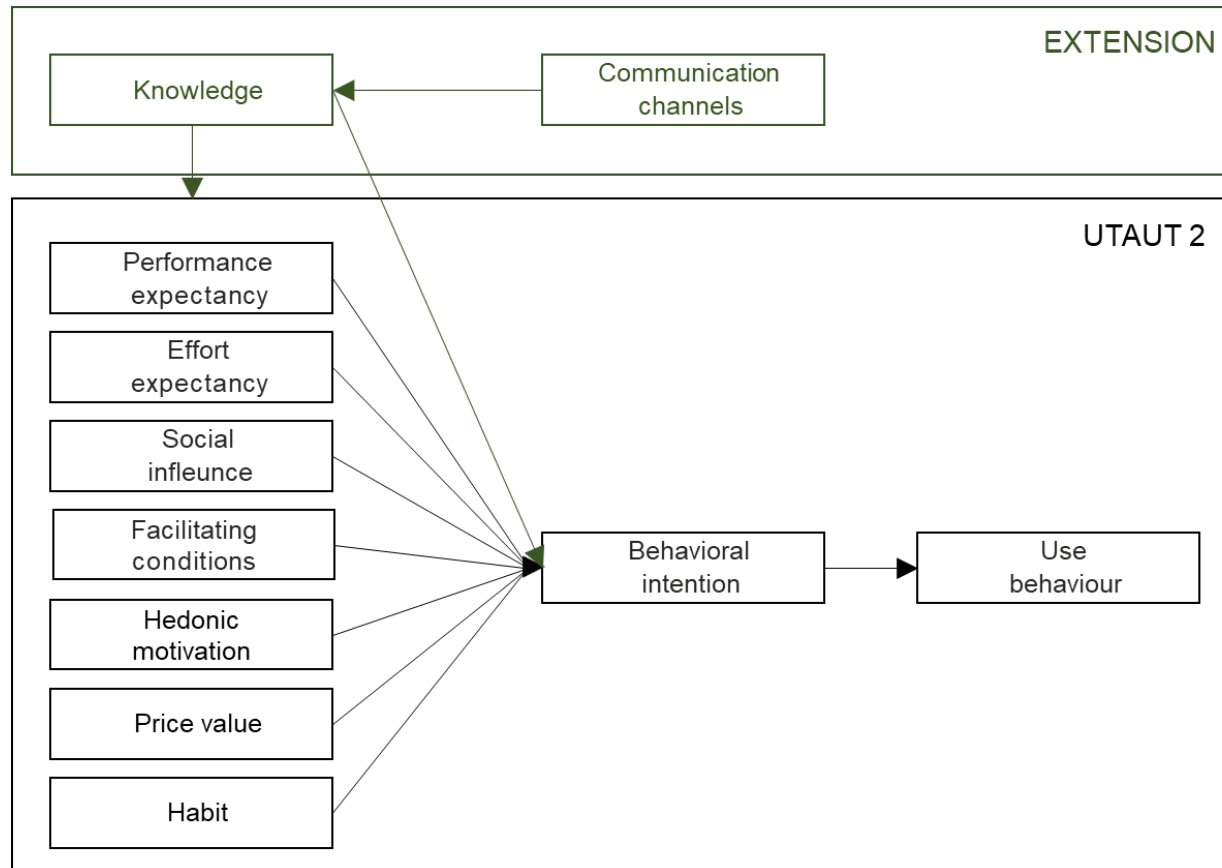
Research methods

- Qualitative interview study in 2019/2020 in Senegal, focus on two different target groups
 - Senegalese SMEs: 23 interviews
 - Experts in the Senegalese Energy sector: 13 interviews

Sector	Interviewee
Accommodation and Food Service Activities	SME 1, SME 2, SME 5, SME 7, SME 16, SME 17, SME 18, SME 20
Information and Communication	SME 6, SME 14, SME 15; SME 23
Agriculture, Livestock and Fishing	SME 3, SME 8, SME 12, SME 21
Wholesale and Retail Trade	SME 9, SME 10, SME 13, SME 22
Construction	SME 11
Other Services	SME 19
Intl. Development Cooperation	Expert 1, Expert 13
Environmental Consultant	Expert 2
Public Institutions	Expert 3, Expert 5, Expert 6, Expert 8, Expert 9
Senegalese RE Industry	Expert 4, Expert 7
Academia	Expert 10
Finance	Expert 11, Expert 12

Analytical framework

- Unified Theory of acceptance and Use of Technology 2 (UTAUT2)
- Need to adapt the theory to the Senegalese context: extended UTAUT2 model



(Rogers, 2003)

(Venkatesh et al., 2003; Venkatesh et al., 2012)

Results

Knowledge

Information seeking and processing activities, which enable individuals to form an attitude towards an innovation. (Rogers, 2003)

- The majority of the SMEs (20/23) stated that they had sufficient knowledge of RE technologies
- Overall positive self-estimation needs to be questioned
- SMEs have little knowledge about energy in general
- Experts see general problems in the lack of skills in business management and entrepreneurship

“Of course, we try little things. For example for biogas, we watch videos on YouTube and try to see how it goes.” (SME 21)

“The people watch TV and that's how they know. But from a practical point of view, they don't know anything. What it takes to get it, how it's going to last. There's all this information out there, that people don't have a clue about.” (SME 6)

Results

Communication channels

Communication might range from interpersonal to mass media channels; it can be passive or active; and it can be disseminated by different sources. (Rogers, 2003)

- Information distribution through mass media plays a minor role
- SMEs do not know about existing support for RE deployment
- Networking organizations are no crucial part of the entrepreneurial activities
- Only two SMEs are strategic network actors: links to national governance level
- The experts have doubts about the ability of networks to influence national policy-making

Results

Performance expectancy

“[...] degree to which an individual believes that using the system will help him or her to attain gains in job performance.” (Venkatesh et al., 2003, p. 447)

- The interviewees see benefits in the use of RE technologies, in three categories
 1. Cost reduction
 2. Re-investment into other business activities
 3. Back-up during low-tension/power outages
- The experts see another advantage: SMEs could become energy suppliers and develop new ventures, only one SME also sees this opportunity

“So it's something that could work if, I wouldn't say copy, but take the model of France with EDF so that the population, if they want, can invest for their own consumption and inject in case of surplus production.” (SME 10)

Results

Effort expectancy

“[...] degree of ease associated with the use of the system.” (Venkatesh et al., 2003, p. 450)

- Photovoltaics are considered as simple plug-and-play systems, no thoughts are given to what the use means to a firm
- The efforts needed to adopt RE technologies are overlooked
- It is likely that this belongs to the prevailing knowledge deficit about RE

“If it were me, I would take the solar. It's very reliable now and you pay less. Once you buy the equipment, it's over.” (SME 16)

Results

Social influence

“[...] degree to which an individual perceives that important others believe he or she should use the new system.” (Venkatesh et al., 2003, p. 451)

- Does not play a role in our sample
- Three SMEs express awareness of climate change, but as individual value

Results

Facilitating conditions

“[...] degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system.” (Venkatesh et al., 2003, p. 453)

- Identification of three mechanism of state support, which is needed
 1. Financial support
 2. Feed-In tariff mechanism
 3. Liberalization of the energy market

→ SMEs call for state support that experts believe do already exist (knowledge and communication deficits)
- Various initiatives and agencies already operate in the field of RE, providing SMEs with support
- Experts express fundamental concerns about the transparency of political goals, regulations and coordination

Results

Hedonic motivation

“ [...] the fun or pleasure derived from using a technology [...] ”. Venkatesh et al., 2012, p. 161)

- Pleasure derived from the new technology was not motioned

Results

Price value

“[...] consumers’ cognitive tradeoff between the perceived benefits of the applications and the monetary cost for using them [...].” Venkatesh et al., 2012, p. 161)

- The question of price dominates all other considerations
- Also the quality of the products is seen critically

“A large solar panel to operate, for example, or an electric dryer where you can dry mangoes or bananas, it is very expensive and a company can't afford it.”
(Expert 3)

“You can buy a solar thing that costs nothing at all, it comes from China, you install it and after three months it is defective. Sometimes even after a week. We need people who can guarantee that when you put that [PV panel] on, you have quite some time without needing to do anything.” (SME 16)

Results

Habits

“[...] the extent to which people tend to perform behaviors automatically because of learning [...]”.
Venkatesh et al., 2012, p. 161)

- SMEs have only little experience with RE technologies
- Few experts point to cultural constraints

Conclusions

Internal factors

- Importance of attitudes and skills that allow entrepreneurs to engage with new technologies:
 - Networking capabilities and vehicles for knowledge diffusion
 - External support by knowledge brokers: Senegalese universities and RE technology suppliers
- Improvement of communication channels
 - Information and support mechanism should reach out to their intended recipients, they should be accessibly via simple structures

Policy perspectives

- Measures are needed to target SMEs and especially the informal sector firms, as they depend on a stable and affordable energy supply
- The role of SMEs as energy prosumers should receive more support from the Senegalese government

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Thank you for your attention