When is the right time to switch toward a green business model? An early warning system for small and medium enterprises

Keywords: *green business model, early warning system, environmental scanning, small and medium enterprise, design science*.

This paper is addressed to small and medium enterprises (SMEs) that assess the opportunity to redefine their business models towards sustainability. In their taxonomy of green information systems (IS), Hasan et al. (2012) list “demonstrating the business values of a green reputation” among the items to promote the business case for green IS through information systems. Nonetheless, such business value needs to be captured by a firm, if the enterprise wants to combine sustainability with sustainable economic growth.

Previous studies have already addressed the topic of **green business model**. To cite recent examples in IS, Watson et al (2011) have used the business model canvas of Osterwalder and Pigneur (2010) to develop a set of relevant questions for energy informatics, whereas Dustdar et al. (2013) developed a set of patterns for green software services. Thus, the question left to answer for SMEs is to decide what to do next and when.

Therefore, we define **environmental scanning** an activity that consists in acquiring and using “information about events, trends and relationships in an organization’s external environment, the knowledge of which would assist management in planning the organization’s future course of action.”(Choo 2001). Along external elements related to green business model implementation, we identify three core dimensions (Howard and Lubbe 2012): (1) environment, (2) research, and (3) motivating forces. Nonetheless, environmental scanning meets implementation difficulties in SMEs, because its results depend on the managers’ ability to define their objectives and their strategy.

Henceforth, we look for a device that (a) allows SMEs to associate indicators to their hypothetical green business models and (b) to detect changes in their environment associated to those indicators. Existing literature describes applications of **Early Warning Systems** (EWS) in different contexts and it defines *strategic early warning systems* as systems capable of detecting changes in the environment at an early stage, investigating what the consequences of those changes will be and predicting their long-term development a part of the initial phases of strategic planning (Reinhardt, 1984).
An EWS scans the environment to detect weak signals, which are factors of change hardly perceptible at present, but which will constitute a strong trend in the future. To select such weak signals, we intend to use the business models canvas to create different scenarios, which are a series of hypothetical events describing what could happen within our environment.

Therefore, our research question is: *how to design a strategic early warning system, which performs environmental scanning to collect evidences supporting different types of green business models for a small or medium enterprise?*

Melville (2010) listed a set of research questions relevant to IS for environmental sustainability, one of which is try to understand which design approaches are effective for developing IS that influence managerial decisions about the natural environment.
Nonetheless, a preliminary search on ScienceDirect, Taylor & Francis, JSTOR, Ingentaconnect and Google Scholar using “green business”, “early warning system” and “small and medium enterprise” as keywords returned no result.

To fill the research gap, we follow the design research process proposed by Peffers et al. (2007).
Our research is *objective-centered*, since (a) separate literature on two relevant topics for our study, which are green business model and EWS, already exist and (b) we try to understand what a better artefact (EWS for green business models assessment) would accomplish.

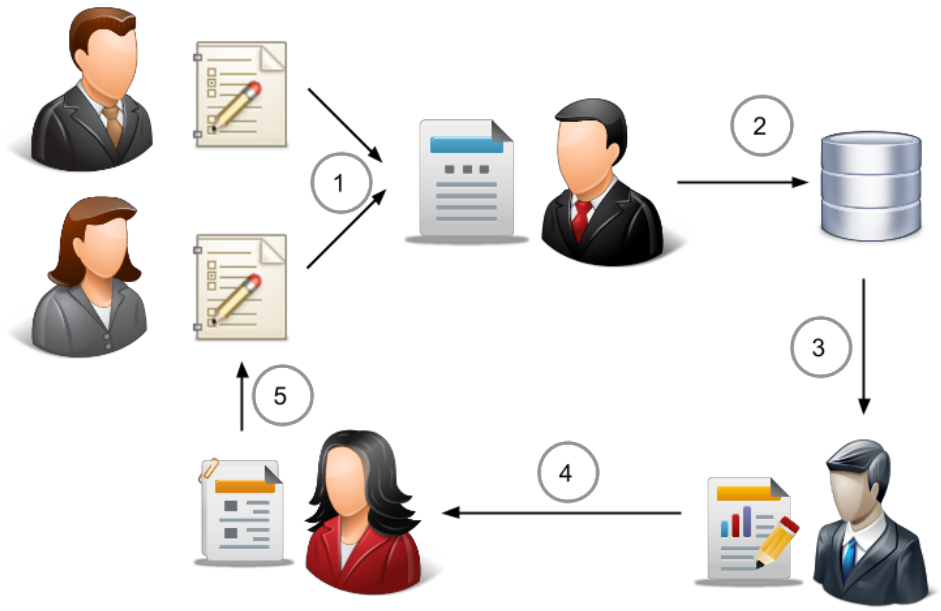

Figure 1: The use case of our EWS

Our system can be used in five steps, as illustrated in figure 1.

1. experts in business model innovation answer a set of questions. The chosen pattern among those available (Dustdar et al. 2013; Henriksen et al. 2012; Allé 2012), is the one with the smallest euclidean distance (Doty and Glick 1994).
2. the strategy makers of the firm are expected to validate the obtained scenario, by assessing if it is appropriate to the company.

3. the system associates relates environmental variables (Howard and Lubbe 2012) to a set of open databases, and it performs data mining to collect trends, which are presented to the decision makers of the firm.
4. the scenario experts collect the information about the trends and design new scenarios
5. new scenarios are tested

In the extended version we shall describe technical implementation details and discuss the preliminary results from interviews with experts in energy management.

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