

## **561b Entrepreneurial Decision Making for Investments in Sustainable Technologies**

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### Background

During recent years there has been a very active debate on how to realize steps towards sustainability. One focal element in this debate has been the role that companies can play to contribute to the quest for sustainability. While the importance that society attributes to corporate sustainability has increased, the exact role of companies has remained unclear; neither a comprehensive theory of corporate sustainability nor clear and detailed operational guidelines for companies exist. Additionally, the concept of sustainability is perceived to be vague and its impact on the company value is difficult to quantify. This might have made companies reluctant towards sustainability measures and it is unclear to which extent they embrace the details of the concept. Yet, the design and implementation of appropriate technologies that promote sustainability are of critical importance. However, many companies rely on economic evaluations alone when making investment decisions as it is often unclear what characterizes a 'sustainable' technology. Hence, the tools for technology evaluation from an entrepreneurial perspective should be extended to include a technology's contribution to sustainability. This offers a broader perspective about the characteristics of a technology and guides investment decisions among competing technologies towards sustainability.

### Research objective

In the light of this discussion, our research tries to elucidate the approaches companies from the producing sector – with a focus on the process industries - take towards sustainability and aims to propose a decision making framework that explicitly takes account of sustainability. Specifically, our research includes the following two parts: 1. Empirical review of sustainability in business decisions 2. Proposition of a decision making framework for investments in sustainable process technologies

#### Empirical review of sustainability in business decisions (part 1)

Methodologically, we investigate Swiss companies in different focus groups (those associated in sustainability organizations versus randomly selected ones). We target each of the groups with an explorative survey (in total about 500 invitations to participate) and additionally conduct interviews with selected industry players (about 20 interviews with sustainability pioneers as well as in mainstream companies). The composition of our data sample allows us to differentiate our results by industry, company size, and ownership structure while we focus on process industries. Results are offered in three steps. First, we give an overview of general perceptions in industry regarding sustainability (meaning of sustainability; definitions applied; importance of economic, ecologic, and social aspects; expectations towards government, industry associations, academia etc.). Second, we illustrate some business approaches towards sustainability that have been taken (reasons for sustainability commitment; identification of entrepreneurial opportunities and risks; key success factors and barriers etc.). Third, we comment on the relation between sustainability and innovation as observed in participating companies (advantages due to integrating sustainability in innovation processes, key success factors and barriers etc.).

#### Proposition of a decision making framework for investments in sustainable process technologies (part 2)

In the second part of our research, we transfer our findings from the first part to process design decisions. To respond to the perceived need to integrate sustainability issues in investment decisions, a novel decision making framework is proposed. The framework combines traditional tools such as

financial valuation techniques with sustainability ideas such as life-cycle thinking, environmental evaluation, and stakeholder analysis. Special emphasis is put on the role of uncertainty. To illustrate the decision making framework, examples from the chemical industry are discussed from a sustainability perspective. To conclude, directions for future research are suggested.