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Potentials and Trends in Biomimetics

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Foreword

There is a wide consensus about the necessity of sustainable development. There is also a consensus that wide areas of our economy, industry, and technology and the life styles in industrialized countries are not sustainable. Science and technology are widely regarded as (main) causes for this situation. Issues in this context comprise the generally low resource efficiency, an increased and mostly undebated technological power, an increased invasiveness of modern technologies, increasing amounts and diversity of pollutants, and high technological risks.

On the other hand science and technology are also regarded as (main) solution providers towards more sustainability. Thus the question is which type of science and technology is rather a part of the problem, and which type is rather a part of the solution?

‘Learning from nature’ may give some orientation in this context. Biomimetics and bionics are widely regarded as being a part of the solution. Organisms and ecosystems have learned to solve (technological) problems since the beginning of evolution. In many technological fields they outperform manmade solutions by far. Ecological systems have learned to sustain themselves in dynamic environments. Their achievements are results of an evolutionary optimisation process lasting over millions of years. This is the main reason why biomimetic solutions are widely regarded as not only being ingenious, but also as being ecologically sound, resilient (stable in dynamic environments), and low-risk. These expectations are shared not only by the public and the media, but also by most of the actors in the field itself (Richey 2008). We refer to these sentiments as the ‘biomimetic promise’ (or the ‘biomimetic expectation’).

The aim of this study is, to evaluate the potentials and trends in biomimetics and to compare the performance of actors in this field in leading countries. On a more general level, however, this study inspects the evidence for and against the statement that biomimetic solutions can live up to their promise. A promise which, if kept, implies that biomimetics is rather part of the solution than of the problem of unsustainability.

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