

# Creating sustainable solutions with the application of natural phenomena in product design: organic and fractal theories

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As an evolutionary machine, the human body and mind has since its inception evolved in tandem with nature, responding to and collaborating with it. Product Design, like many other man-made technologies, on the other hand, has traditionally focused on humankind's self-perceived needs, with little regard to its relationship with nature. By diverging from a continuously evolutionary approach in partnership with nature, opportunities have been missed to create products that would perfectly fit human beings in their natural environment. Man-made technology although very positive in many aspects such as providing shelter, food, transport, hygiene and so forth, has removed man from his natural habitat. If the artificial living conditions created by humans have solved many of their basic problems, it has also created new challenges that did not exist before. Another consequence of human alienation from nature has been the damage that they have inflicted upon their natural environment and as a result of which they are now also victims.

This paper will investigate how an evolutionary approach to the design of specific products could be possible in the context of sustainable manufactured goods. At the same time, it is hoped to make a valuable, practical and theoretical contribution to the use of organic and fractal techniques in product design.

Further investigation and refining of organic and fractal design concepts and its insertion into mainstream design theory will contribute to the development of better products, promoting smarter usage of materials and energy, creating innovative and more efficient, sustainable solutions (mimicking nature) and enabling large scale production of goods that yet although mass-produced will be able to fulfill individual requirements of each of its users. I'm very interested in following the work of visionary designers such as Ross Lovegrove and James King, who are closely inspired by nature and its evolutionary intelligence to create solutions made of sensible and sustainable structures. As well as that, it is also important to investigate how computing technology is enabling the precise mimicking of nature through the use of powerful software.

The original contribution of this research is twofold. Firstly, it will investigate and analyse the circumstances by which (how, when, why, where) Natural Phenomena (NP), organic design and fractals, are deployed during product design conceptual and development phases. Through the use of qualitative research methods, this study will attempt to qualify designers' different approaches to the incorporation of NP as part of product development. At same time desk research on existing design methodology will identify to what extent, if any, NP is considered as an investigative, creativity and solution enabling tool. Particular attention will be given to methodologies commonly deployed by product designers. The combination of both investigations, a qualitative designer survey and the desk research on existing methodology, will provide invaluable insight into what extent and how successfully existing design methodology instigates the consideration of NP as part of product design development.

Secondly, this research will attempt to create a more systematic approach to the use of NP as part of design methodology. It aims to propose methods to facilitate the exploration of NP not only at more traditional stages of core design such as product design specification, conceptual and detailed design, but also when exploring its inclusion in defining market/user need, manufacturing and sales.