

Product optimization by using an audiovisual VR-system

Introduction to the problem

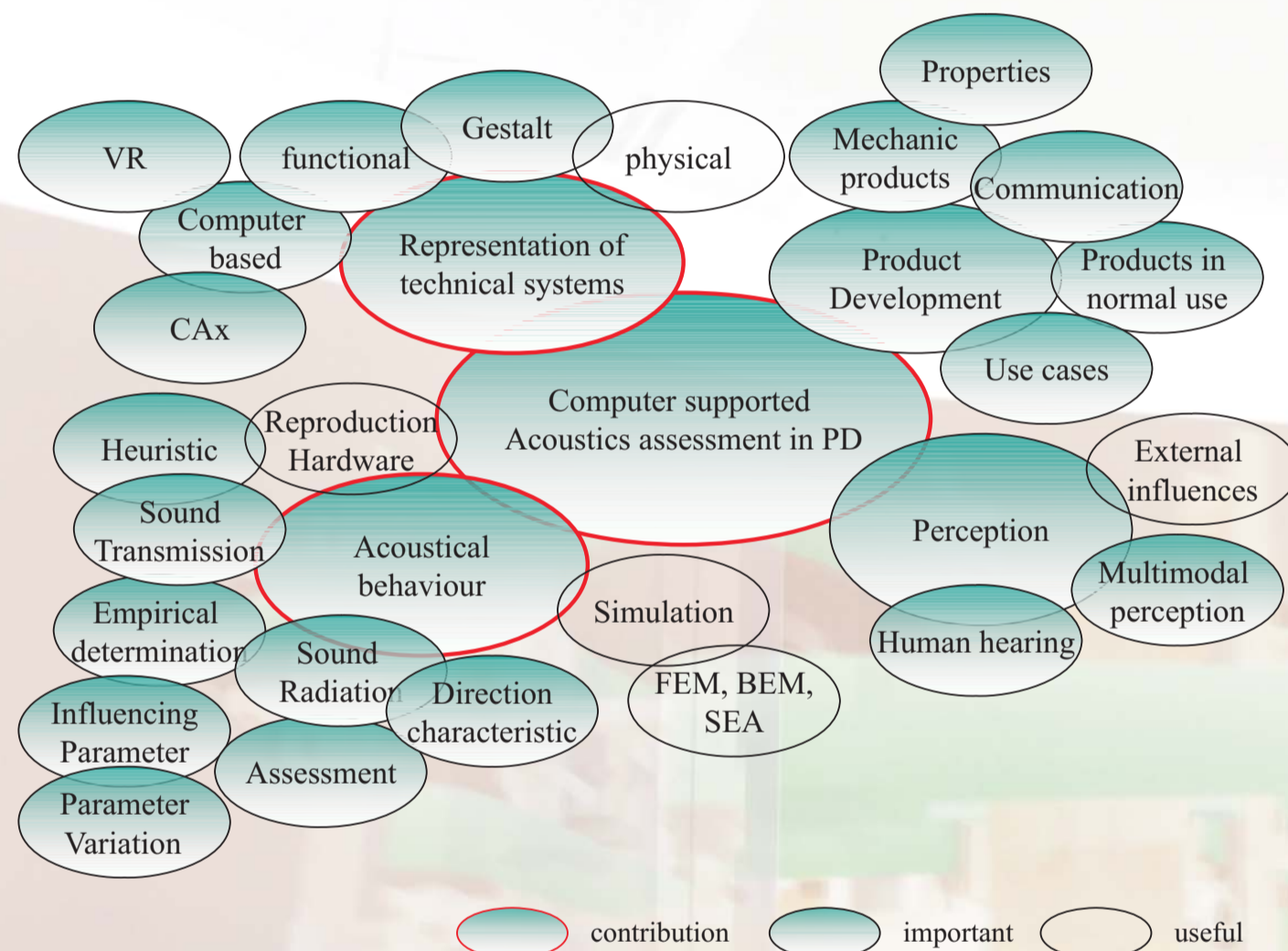
Today product development dominates manufacturing time and costs, which could be contradictory to high standards of quality. The use of computer based tools enables the representation of product properties and their optimization before first physical prototypes have to be build. One of the goals for the representation of product properties is the use of the *Virtual Reality* technology - a multimodal human-computer-interface with stereoscopic projection for spatial visualisation of 3D-object. Therewith an immersion in the virtual scene becomes possible. Furthermore this enables an easy comprehension and understanding of complex contexts and relations.

Present systems in the VR are often limited by only using stereoscopic projection as visual interface of information. Therefore the transferable amount of perception information is limited.

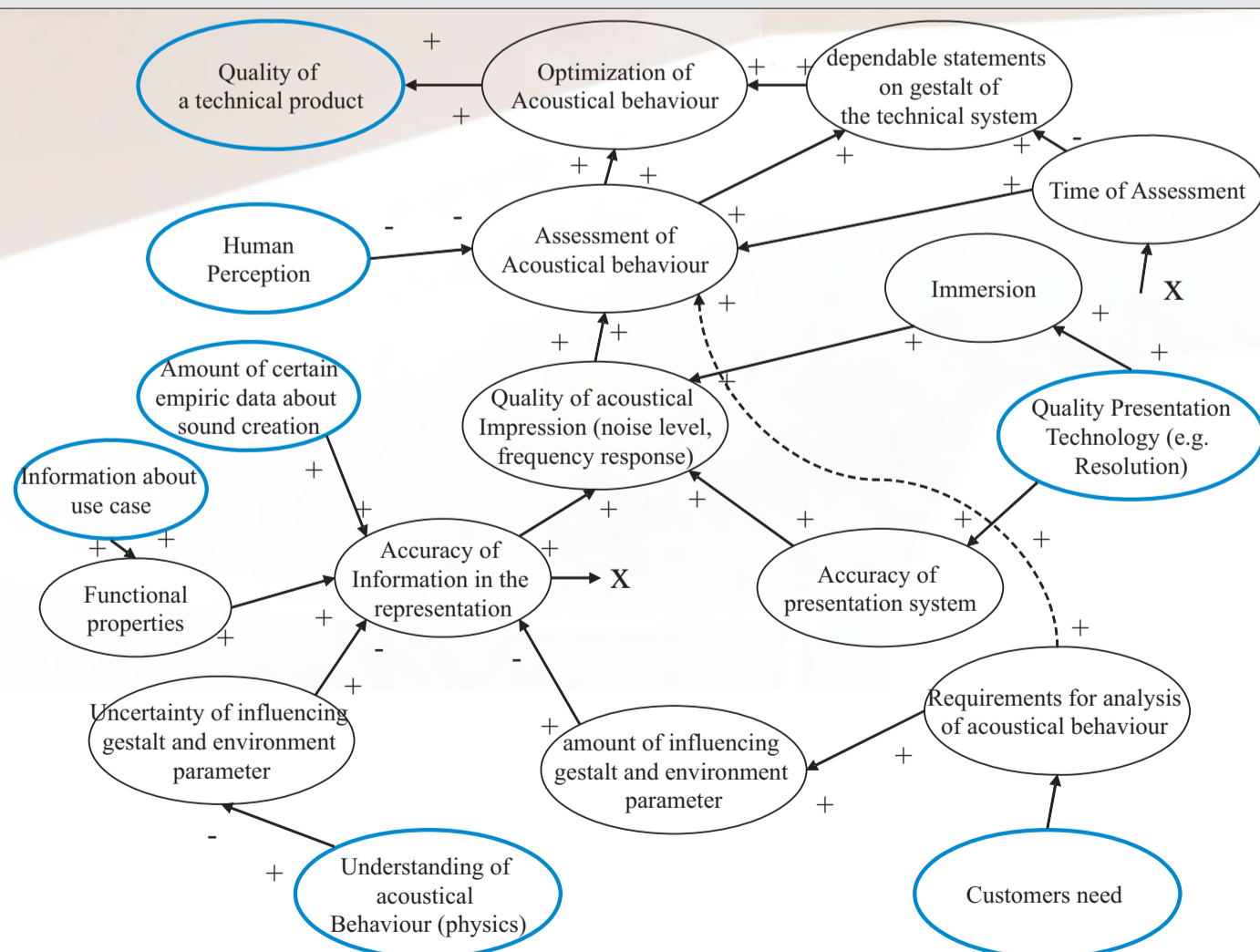
Product development takes the acoustic behaviour of technical systems into account. Thus the allowed noise level of a machine is already legally prescribed from ergonomic point of view. Beside the noise level an efficient analysis of the frequency response must be considered for acoustic product evaluation.

In the area of the consumer goods industry the so-called *sound design* is used to optimize the acoustic behaviour of products. This is done mostly empirically and dependable statements are only possible after the manufacturing of first prototypes. Therefore the goal is to include acoustics analysis and synthesis in the early phases of engineering design by means of virtual prototyping.

Areas of Relevance and Contribution

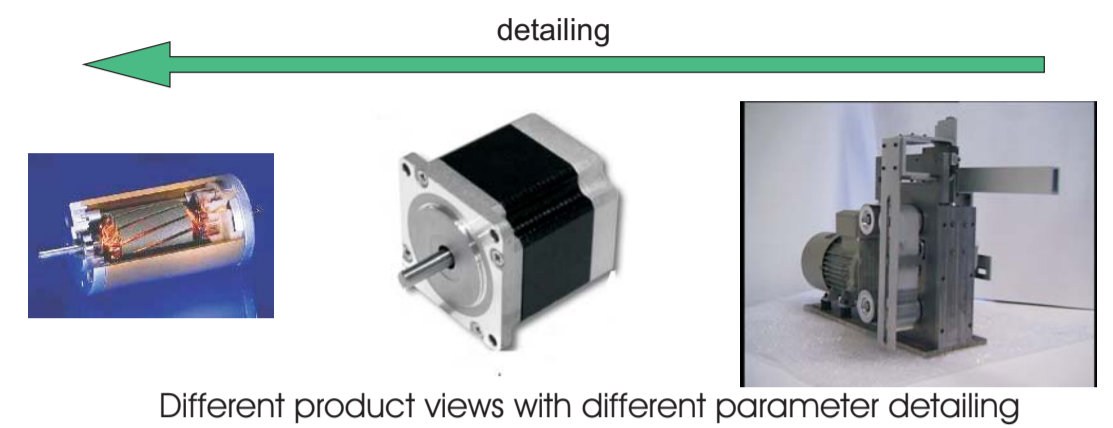


Reference Model



Hypotheses

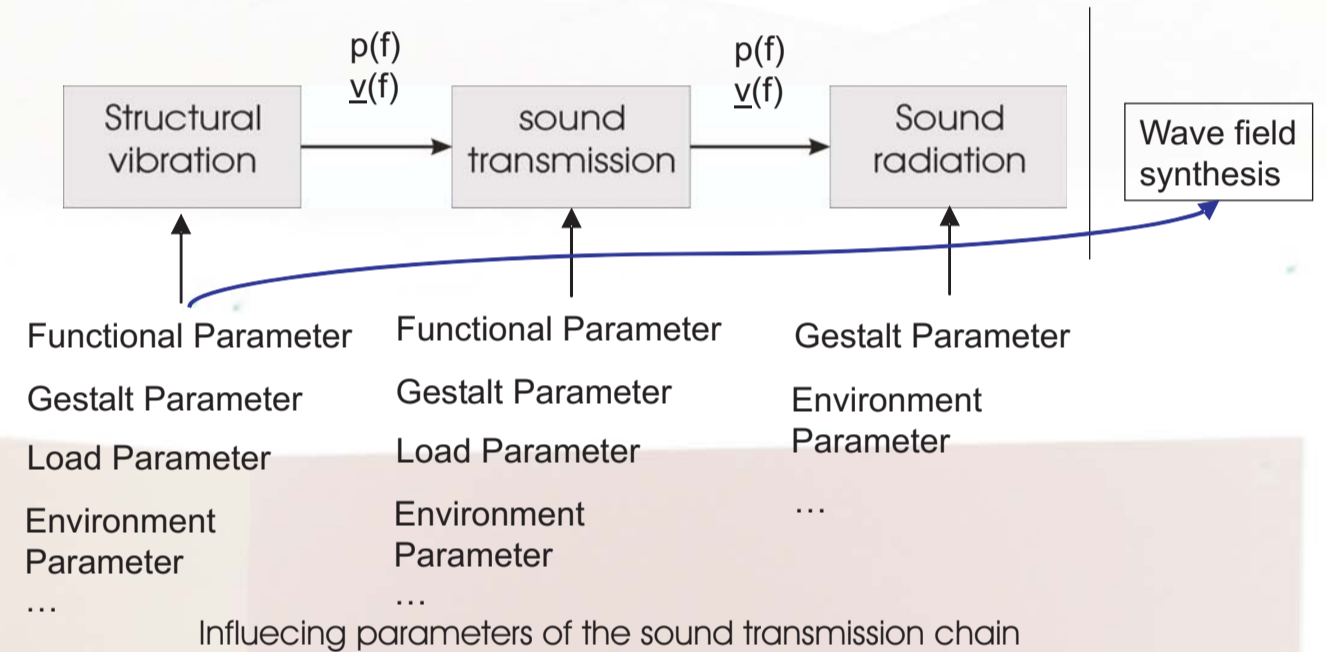
The assessment of the acoustical product properties by using virtual prototypes becomes more and more important. The variation of acoustical relevant parameters and the adaptation of the sound field help the designer.



Different product views with different parameter detailing

Aims

The complete description of the acoustical behaviour of new product only based on geometrical as well as material information and input parameters is currently impossible. It often helps the engineer if he has methods and tools which support the variation of parameters of an existing technical system or the integration of further components for the reproduction as well as the auralisation of the modified acoustical behaviour with these information.



Research Questions

- What are the influencing parameters of the products acoustical behaviour depending on the product view and what influence do they have?
- How to structure the product and measure the effect of the variable parameters (geometrical, functional ...)?
- How to model the known acoustical behaviour (transmission and radiation) of an existing technical system?
- Which information are necessary to modify the acoustical behaviour?
- What is the necessary accuracy for the reproduction of the acoustical behaviour in virtual environments?

Expected deliverables

- method to determine acoustical parameters of an existing machine for a parametric information storage
- method and model to describe parametrically the acoustical behaviour of a technical system in virtual environments
- method to modify the acoustical behaviour and auralise it in relation to the geometrical and functional properties



Kontakt

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