

ZukunftBAU Research Project

„Life cycle oriented product information“ - Abridged version 2014

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Initial situation and strategic approach of research

The research project “Life cycle oriented product information“ has many intersecting aspects, discourses and functional assignments to previous and partly simultaneous coordinated ZukunftBAU research projects under the direction of the author, in particular the ZukunftBAU project “Life cycle oriented tendering and procurement” (published in 2012) and “Life cycle benchmarking” (published in 2013). The starting point of these research projects, was the question, which parts of a building are in particular decisive for follow-up costs and in addition for qualities of sustainability. An empirically proven result is the pareto-ratio between investment costs and follow-up costs: ca. 20 % of all investments affect components, which cause due to their functions and operating conditions ca. 80 % of all follow-up costs in the first two decades of the period of use.

Product information serves "Performance Competition"

Product information has within the communication of the actors in the construction industry a strategic value. They may serve to transfer the previously dominant price competition into a “Performance Competition” – which is focused on the comparison of life cycle costs, service and operating qualities. Otherwise product information cause – if they serve as basis for decision making without giving indications of qualities of sustainability – that product prices displace aspects of qualities inappropriately. In this case, buyers choose the “cheaper” version – risking that they at the end act opposite to their real interest.

An important result of our research is the differentiation of product life cycles, as they were observed in “Life cycle assessment”, and the corresponding depiction of objects, whose origin lies in the phases of planning. They were given the term “Life cycle objects” by the author. These are parts of buildings, in particular “strategic components”. Their end of life coincides with the expiration of “useful life“. By distinguishing strictly between “product status” and “object status” of building parts and building components value-added chains and service chains can be demarcated more precisely.

"Signaling" and "Screening" – ways of dealing with product information on the sustainability approach

In the new institutional economics the information mechanisms "signaling" and "screening" were described to avoid adverse selection. They served in our research project in the development of product-utility analyses as a scientific basis. By "signaling" the product providers (agents) can make the potential utility foundation transparent to the user and also bring business success.

Signaling by product suppliers using product-benefit analyses

The neutrality of the developed methods and tools in the research project and their applicability for any construction products were binding scientific conditions for all participating industry partners. Our system for displaying life-cycle-related product information and application-related benefits for decision makers is suited as a common principle for product-utility analyses. With the here presented three-step structure according to main criteria, sub-criteria and indicators product qualities to third parties can be signaled. The implied information categories are oriented across the markets on the DGNB- / BNB-

rating system. For very different products, this tool of information proved to be suitable for the display of any product characteristics.

Screening by owners, planners and operators

The product-based system of product-benefit analysis here developed is not only for manufacturing companies a suitable instrument for signaling of qualities of sustainability in the context of marketing and sales. It is also for buyers a suitable medium in construction projects to identify the best alternatives in the great diversity of product markets. In this way market partners facilitate their communication in concrete investment processes by reducing the market-typical "advertising" by higher transparency.

Broaden the information spectrum

Based on the already in parts extensively available technical and environmental information in manufacturing processes, it is a future aim to broaden the information supply within the overall spectrum of information sustainability and sustainability criteria. It is essential for the evaluation of product alternatives in product procurement processes to supplement the 5 main criteria of the DGNB- / BNB- system to 2 additional criteria: "synergies between building parts / building components" and aspects of the "long-term responsibility." These criteria are not included in the DGNB- and BNB-system because they are not needed on the building as a whole, but only for products and building parts developed from them (subsystems and building components).

Extend the information chains

Life cycle oriented product information will not only support all project phases to the beginnings of the operation phases in the future – they have to go far beyond that. In contrast to the restriction on the manufacturing and project phases, which is until today the usual manner, for each BNB-category the subsequent life cycle phases and processes "use and operation" as well as "disposal and recycling" or "end of life" are included.

Methodological consequences are higher requirements to products and in the end further long-term criteria of decisions with the indication of product related advantages / disadvantages during disposal and recycling processes.

At the beginning of a development of an evaluation system emerges the question: Which products within the phases of planning and procurement are "success factors" regarding follow-up costs, respectively environmental and health factors. To clarify this research question three perspectives were pursued and combined with each other:

Certification systems change planning and procurement within building processes – Life cycle information is needed for building parts and building components

For the development of an overall systematic regarding requirements to product information the "Evaluation system of sustainable building"¹ (BNB) for Federal Buildings has proven to be a suitable methodological basis². The result is a "matrix of information" for product

¹ In German: „Bewertungssystem Nachhaltiges Bauen“ (BNB).

² The evaluation system (BNB) is recommended here as an universal platform for the her-presented

information as a combination from the BNB-criteria system and the environmental phase models for products (product life cycles). The BNB-system (with parallels in the DGNB-system) as well as the life cycle oriented process terminology have become nationally recognized standards in the German construction industry. The most important reason for the applicability of the “matrix of information” is the implicit fundamental “integrative function” of the BNB-system for every interested user, and its usability in the pursuit of sustainability in all life cycle phases of objects (buildings and their building components) and products useable.

The need of product information is the prove of sustainability for buildings

The main result of the research project is an evaluation system that is oriented on the criterias and indicators of building evaluation, as they were used in the German Building Certification systems DGNB and BNB. In this project they were named “Product-benefit-analysis”. To demonstrate suitabilities of products along the list of BNB-criteria adaptation is needed in perspective of demanders (buyers) as well as in perspective of producers (sellers). Thus, together with research partners the 5-partite BNB-classification was transferred into another classification system and extended with two new criteria, specifically needed to compare products within procurement- process. The following list of criteria has seven positions; five of them are coincident with the five main criteria of the BNB. This new criteria system was entitled “5 + 2 system” by the author.

The 5 main criterias of BNB System

- 1 Features of usage / functionality
- 2 Features of products within processes of planning and construction
- 3 Features of systems and components in operating processes
- 4 Synergy with other building components
- 5 Environmental qualities of systems and components

Additional criterias for product-evaluation

- 6 Economic evaluation
- 7 Product-oriented long-term responsibility

Alignment on business potential

If product information, product features and product characteristics in combination with exposed advantages are described, it is oftentimes cryptic, which potential business companies possess to provide builders and planners within the planning phases with appropriate product possibilities and to point out the product advantages in information

evaluation system for products, for it is an open source in the internet, for there is regular data maintenance, for there is an advancement for the “Federal Office for Building and Regional Planning” (BBR) and for it has a role model effect for public works. In addition the German “DGNB” certification system is an equivalent basis for the private sector.

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processes. In the course of the research project the insight in the importance of business potential has become a point of growing significance. Especially during the “triangle-communications” in sequential workshops with experts of markets, product developers and consultants of technical applications (customer advice in case of malfunction) it was manifested which potentials within the company’s organization play a role for the success of a product. Actually quite individual perspectives became recognizable in the exchange with these different actors; even with products with outstanding qualities and efficiency qualities the successful sale, respectively the successful purchase by users, is nearly in the same dimension depending on the extent of the quality and efficiency of the corresponding business potential.