

Basic Design Cycle

The Basic Design Cycle is a model that represents the fundamental reasoning steps in the process of designing. It consists of a sequence of conscious reasoning steps that are repeated in empirical cycles. The knowledge of both the problem and the solution increases with each cycle.

WHAT & WHY? The model describes the different basic reasoning steps a designer goes through when solving a design problem purposefully and consciously. Theoretically, you can go through only a single cycle, but you usually perform many cycles across the various phases of any design process. The basic design cycle consists of five reasoning steps that are logically connected. Novice or naïve designers often tend to 'jump' over some of the steps, which might harm the quality of the design outcome. For example, one might immediately 'jump to solutions' when presented with a design brief, without thoroughly analysing the problem. This reasoning might result in a design that does not address the actual problem. Ideally, you spiral from problem to solution, from abstract to concrete, and from function to product geometry. This process is usually iterative, in which you sometimes have to take a few steps back – 'back to the drawing board!' – to go a step forward later on. You might also enter into the cycle at different steps, as long as you complete the cycle each time. Being aware of the basic cycle that you are going through on different resolution levels – from a cycle within the time span of a minute to cycles that span several weeks – helps you to organise your thoughts and design activities.

MINDSET: The Basic Design Cycle represents a fundamental cycle of reasoning that is inherent in conscious, purposeful design problem solving. This means that a designer who desires to do so needs to critically reflect on how his or her own thinking corresponds to basic reasoning logic.

HOW? The model describes five reasoning steps, each with its own purpose. As mentioned, these steps can happen, for example, in a span of a few seconds or over a period of weeks depending on the resolution level you take.

Analyse: In this step, you examine the aspects related to your design goal or a design problem. Overall, analytical reasoning yields information that informs your design criteria and eventually the requirements.

Synthesise: In this step, you generate possible solutions. Synthesis yields (elements of) design proposals that potentially offer valuable (parts of) solutions to the problem.

Simulate: In this step, you create imagined, digital, or physical representations of

(elements of) design proposals. Simulation yields representations either in your mind or externalised with which you can evaluate their potential value.

Evaluate: In this step, you reason about the potential value of design proposals through their simulated representation. This happens in relation to design criteria. Evaluation produces an understanding of the current value of (an element of) your design proposal and informs design making.

Decide: In this step, you reason about the relative value of (an element of) your design proposal and you decide on how to proceed. Decision making informs the next cycles of design: whether to repeat a cycle, proceed to (an element of) your design proposal, or focus on other elements instead.

REFERENCES & FURTHER READING: Roozenburg, N.F.M. & Eekels, J., 1995. *Product Design: Fundamentals and Methods*. Chichester: John Wiley & Sons. / Roozenburg, N.F.M. & Eekels, J., 1998. *Product Ontwerpen: Structuur en Methoden*. 2nd ed. Utrecht: Lemma.

TIPS & CONCERNS

Do not confuse the five reasoning steps with the phases of a design process. The Basic Design Cycle is a model describing the fundamental reasoning steps and their relative logical order, which happen throughout any conscious, goal-directed design process.

This means that there is not one phase in which you synthesise, but that you must engage in synthesis throughout the design process.

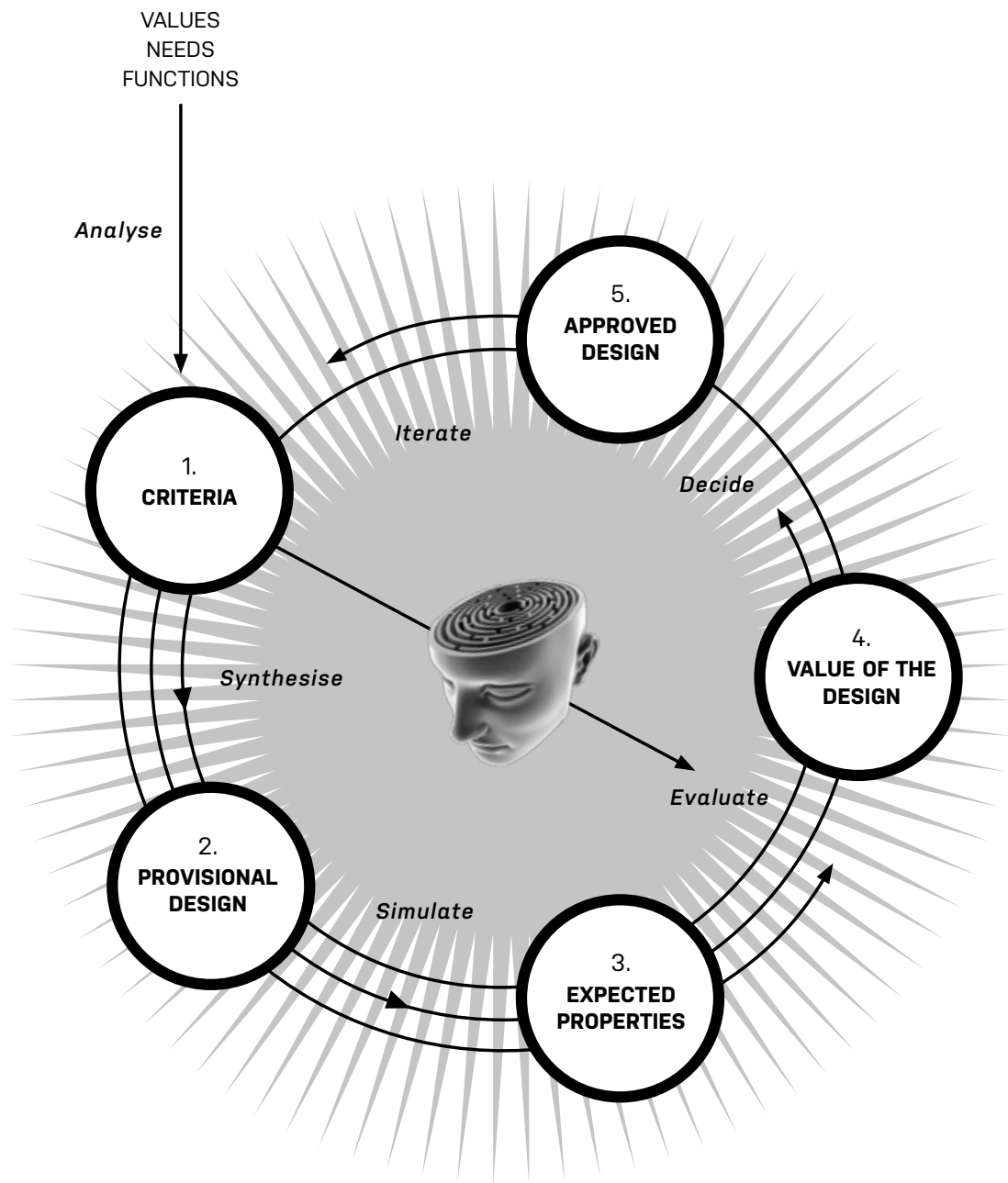
When you 'get lost' in your ideas and thoughts, you might find it helpful to consider which step of the basic cycle you are in and identify which reasoning steps you might have missed that might get you back on track.

Discussion with others often helps in effectively doing these reflections.

LIMITATIONS

'Analyse' is the first step in this model, and this might suggest that it should also be your point of departure. However, that step is not necessarily your preferred point for starting your design cycle.

Depending on your preference, you can enter into the cycle at different points.



The basic building block of the design process is this circle of thought, action and decision. Designing is like a fractal: zooming in or out results in a similar image. Designing is an iterative process where you sometimes have to take a few steps back – 'back to the drawing board!' – in order to go a step forward later on. Being aware of the basic cycle that you are going through, up to a few times per minute, helps you as a designer to organise your thoughts and design activities. (After Roozenburg and Eekels, 1995)

Product Innovation Process

The Product Innovation Process model describes the overall process of product innovation, along with an emphasis on the fuzzy front end. The model can help designers plan for and manage innovation as well as to keep an overview of the process while innovating.

WHAT & WHY? A company often responds to changes inside and outside its organisation by developing new products. This kind of development can be seen with the Product Innovation Process, which is a model that describes innovation as a process of experiential learning in a continuous loop. Several stages are seen in this loop: the development can begin from people using an existing product, to the company forming its strategic product position, to the project undergoing stages of product development, and finally to the product launch where people are using the new product. The model can help you to organise and align all activities in this loop.

The Product Innovation Process model advances a stepwise approach to product design and development, and it is intended for active use by designers to set agendas and collaborate with others in innovation.

MINDSET: Broaden in your mind the position of design in innovation and make a departure from the tradition that describes design as a function to bridge a world of production with a world of consumption.

HOW? The process consists of five stages that are visually similar in terms of building blocks, shape, and size. Each stage ensures creativity in innovation by requiring divergent thinking and by forcing innovators to consider the company's internal and external environment. For each step in the model, various methods are developed to support research and development, as well as other activities in the design process. For example, for the strategy formulation stage (Step 5), you can use methods such as Strategy Wheel and SWOT & Search Areas. In the development stage (Step 4), you can try several different approaches for creativity.

Step 1 - Product use: The use of the company's existing products is seen as the starting point for the next innovation round. This stage involves connecting product use with the next step – which is referred to as a strategy formulation for the company – thereby initiating the next innovation cycle.

Step 2 - Strategy formulation: This stage starts with determining the current strategic situation of the company using an internal and external analysis of the company. By combining these two analyses, you can formulate search areas, which are strategic ideas for innovation and are potential new business opportunities. When evaluating these search areas you can check their validity in a number of ways such as expert interviews, looking at patents, or observing potential customers and users.

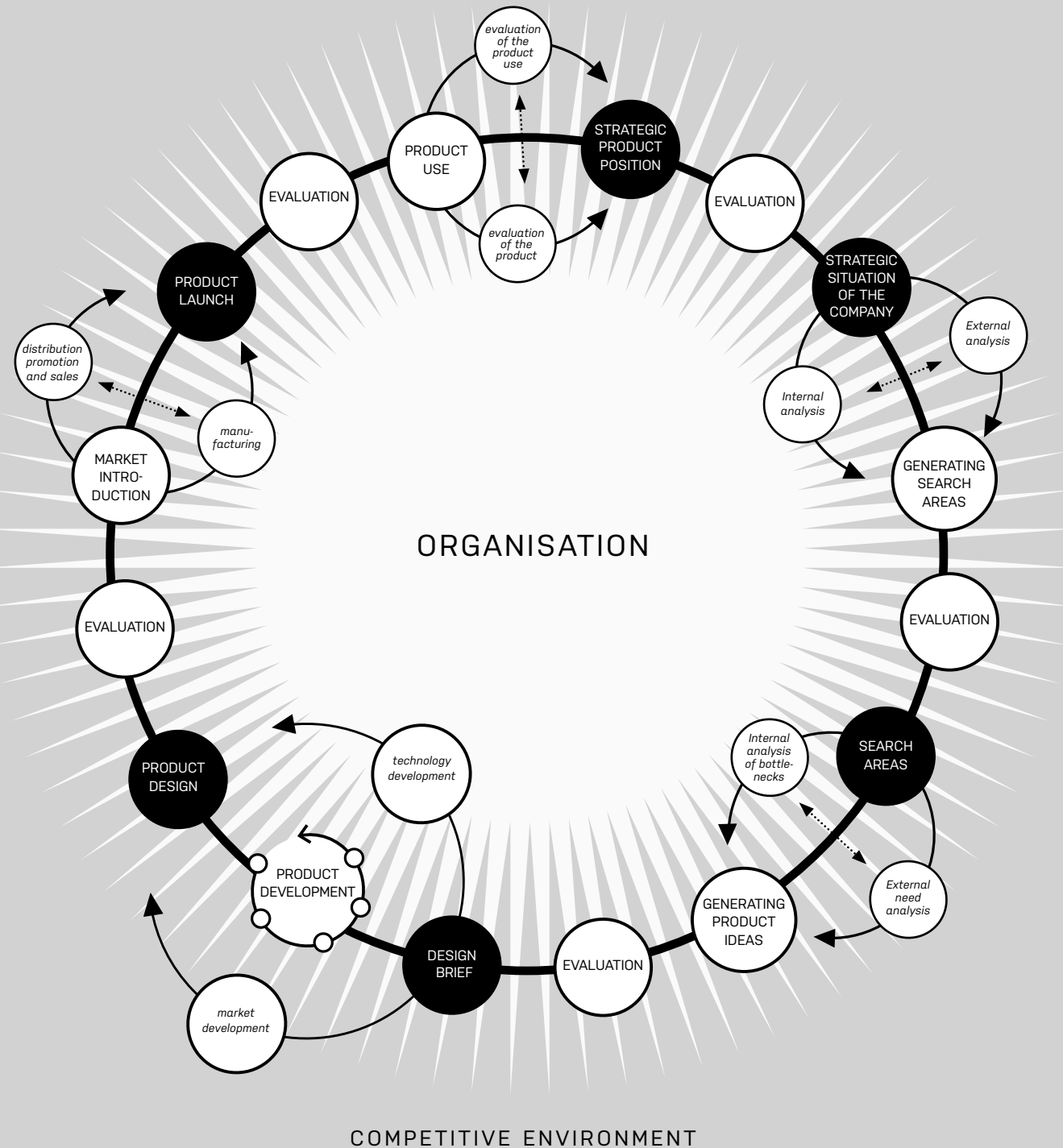
Step 3 - Design brief formulation: In this stage, the selected search areas are transformed into product ideas, which

are then formulated in a design brief. This brief describes the ideas in a way that an internal or external design team can start developing the product or service. The brief can include a vision statement, a program of requirements, and other guidelines to steer the design direction.

Step 4 - Development: This stage involves traditional design activities that are related to product design, and such activities include creating a marketing plan and assessing the required technology for the product and its production. A number of essential components will result from this stage, such as working prototypes, technical documents and assembly schemes.

Step 5 - Market introduction: This stage entails the further development of a full-scale manufacturing process as well as marketing, encompassing sales, promotion, and distribution. The final result is the product launch.

REFERENCES & FURTHER READING Buijs, J. A., 2012. *The Delft Innovation Method; a design thinker's guide to innovation*. The Hague: Eleven International Publishing. / Buijs, J. & Valkenburg, R., 2005. *Integrale Productontwikkeling*. 3rd ed. Utrecht: Lemma. / Buijs, J., 2003. *Modelling Product Innovation Processes: from Linear Logic to Circular Chaos*. *Creativity and Innovation Management*, June, 12(2), pp. 76-93.



It never ends: the Product Innovation Process is a continuous circular process. An organisation moves through the cycle all the time, developing new products and redeveloping existing products, sometimes simultaneously. (After Buijs, 2012)

TIPS & CONCERNS

The visualised innovation process, a circular model, suggests that there is neither a beginning nor an end. This is true because a new product on the market will lead to reactions from competitors. These reactions will eventually eat away the competitive advantage of the new product, and this would necessitate the start of a new Product Innovation Process.

LIMITATIONS

In theory, the model could also be applied to the innovation of digital services in highly networked ecosystems. However, in those cases, you need to be aware that it is hard to make a distinction between the analyses (internal and external) and between the human factors (users and providers).

The model was not conceived for more agile forms of innovation, where ideas are quickly prototyped and marketed for faster learning cycles. In agile innovation, certain stages in the model can be skipped in order to speed up the innovation process.