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ON THE CONTENT OF A PRODUCT IDEA

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1 Introduction

In an industrial company developing consumer products for the global marketplace, it is the management's task to decide which product ideas shall be selected as a basis for developing new and innovative products. The company management has to allocate resources to a portfolio of product ideas for further development and to reject others. This is a risky task. If resources are allocated to wrong or wicket product ideas there will be no business for the company in the future. Allocating proper resources to the right product ideas is a first step towards a viable business, a task made difficult because many stakeholders, aspects and future events have to be predicted and taken into account.

From a research viewpoint we see at least three ways to support a company with its task to select product ideas for further development:

1. To develop systematic procedures for better collecting and recording product ideas.
2. To develop methods and tools for stronger management of product idea portfolios.
3. To develop a product idea description, which enhances the creation of ideas. Hopefully strong ideas, but at least ideas, which has a rich and sound description, in the sense that it contains characteristics and aspects, which shall be defined and understood for selecting product ideas for further development and for carrying over the vision.

In this paper we will focus on the third way, i.e. we will focus upon the product idea and its description. In our study of the design methodology literature, and the business and innovation oriented literature we have observed that many terms are used, e.g. need, problem, business opportunity, task, creative solution, innovation, the radical idea etc., but the terms have different meanings for different authors. We have for more than a decade organised a PhD summer school on design research methodology, and we have observed that the PhD students participating do not have a coherent and consistent terminology to describe and discuss these matters. When we see this situation in the research community we have reason to believe that the situation is not better in industrial practice. Thus, a proper support of company's management and design team is to contribute to a coherent and subtle understanding of the nature and content of a product idea and creation of a productive mindset and skills. We see such a contribution not only as important, but also as of actual interest since much current debate within European industry is concerned with a highly prioritised enhancement of the development of innovative products in order to survive at the global marketplace.

The aim of this paper is to identify the nature and content of a product idea, i.e. we will focus upon the questions: what is a rich and sound product idea description? What is the content of

a product idea description? And seen from a method viewpoint: Which concepts are ideal for the early, fragile and abstract thoughts, and which concepts shall be used for elaborated, robust and rich proposals for product development? The method applied to answer our research questions is a study of the literature consisting of an analysis of the terminology used and an analysis of examples. For each piece of literature we identify its understanding of a product idea by analysing the key-terms and establish the relations between these terms. The result of our research is a contribution to a productive mindset for the company management, e.g. product manager and product development manager, and design team, i.e. project leader and design team members. The mindset consists of a terminology, i.e. a set of key-terms and the relations between these terms, a set of design principles, and a model of the elements of a product idea. Thus, the result of our research work shall not be seen as a trial to develop new theory regarding the product idea as such, but must be seen as a step towards consolidation and clarification of terminology and knowledge within the research area of product development and design methodology.

The paper is structured as follows. In the section 2 we give an overview of literature that we identify essentially related to our topic. In sections 3 and 4 we go into a detailed study of our core references. In section 3 we focus upon the nature of designing and a design as it is described in the core references. In section 4 we focus upon the activity from product idea to product concept. In section 5 we propose a mindset for the development of a product idea. Finally, in section 6 we conclude.

2 Related work

We have identified roughly speaking three different perspectives on the product idea in the literature:

1. Authors within the field of design methodology focus upon the engineering designer's synthesis activities from an identification of a perceived need to the determination of a product concept.
2. Authors within the business and innovation oriented literature focus on the integration of technological, market and organisational innovation as a means to create future business for the company.
3. Authors within marketing and consumer research focus upon acceptance and consumer behaviour related to the introduction of a new product on the market.

We will study these perspectives or approaches closer based upon selected references. We will confront our findings based on the assumption that these perspectives may all be relevant initiators of idea search in new product development.

2.1 The design synthesis perspective

Pahl & Beitz [1] prescribes a design process consisting of four phases: clarification of the task, conceptual design, embodiment design, and detail design. Each phase comprises a set of activities, and the phases are carried out in a fixed sequence. However, before a design process can begin there has to be a product idea, i.e. an idea that promises to lead to technically and economically viable applications. Pahl & Beitz see the crux of product planning as a systematic search for new product ideas. On the content of a product idea Pahl & Beitz write, "*The last step in product planning, namely 'product definition', involves the specification of the most important features and requirements of the final product. Such*

definitions are usually submitted to the company board before they are acted upon. They are best presented in the form of a simplified specification or requirements list which must later be completed and elaborated by the design department."

Pahl & Beitz describe in this way the product development in a sort of pre-development phase, where the "why" and the "what" questions are asked and answered, but only the detailing statements on the "what" are transformed to the design team. A critical question is, whether the design concept, being synthesised later, will be in accordance with the answers to the "why" and "what" questions.

Ulrich & Eppinger [2] prescribes a product development process consisting of five phases. The input to the process is a mission statement, which according to Ulrich & Eppinger identifies the target market for the product, provides a basic functional description of the product, and specifies the business goals of the effort. Based on the mission statement the concept development phase begins, in which the first activity is to identify customer needs. Ulrich & Eppinger makes a distinction between customer needs and product specifications, "Needs *are largely independent of any particular product we might develop; they are not specific to the concept we eventually choose to pursue*." And, "*Also note that we choose to use the word need to label any attribute of a potential product that is desired by the customer; we do not distinguish here between a want and a need*." Ulrich & Eppinger use the term 'product concept' for the first product design alternatives, which are generated. Ulrich & Eppinger write, "*A product concept is an approximate description of the technology, working principles, and form of the product. It is a concise description of how the product will satisfy the customer needs. A concept is usually expressed as a sketch or as a rough three-dimensional model and is often accompanied by a brief textual description*."

We observe that Ulrich & Eppinger transfer a more rich description to the development process, articulating the mission statement, target market, and business goals as "why" answers, and searching a functional identification of the product as an answer to the "what" question. In this search a deeper understanding of the need emerges.

2.2 The business perspective

Cooper [3] has set up a state-gate model of the product development process, where focus is on the broad business oriented evaluation aspect. Cooper describes in details how to get more and better new product ideas. With respect to the content of a product idea Cooper writes, "*The trigger for the process is a new product idea. An idea occurs when technological possibilities are matched with market needs and expected market demand. Ideas may be generated by the marketplace – a recognition of unsatisfied customer needs, direct requests from customers, or a competitive product. Such market-pull ideas represent the source for the majority of new product projects. But technology-push ideas – which are generated by research, from science or technology, or the result of a serendipitous discovery – also play an important role, particularly in radical innovations or breakthrough products*." Cooper describes twenty-five action items for generating new product ideas, and Cooper proposes the companies to use a suggestion scheme to solicit new product ideas. The format or content of such a company internal suggestion scheme is not described, but Cooper proposes that the company management should provide guidance for the submitters by listing what kinds of ideas are wanted and by which the criteria the ideas will be judged.

We observe here how Cooper brings in both engineering and business and how he sees diverse starting points or origins of ideas. We also see how he asks for a compound

description of an idea: technology, user need, market demand, and (not mentioned explicitly) product concept.

Leifer et al. [4] focus upon the managerial issues large and mature companies face in creating radical innovation. Leifer et al. define: "*a radical innovation project is one with the potential to produce one or more of the following:*

- an entirely new set of performance features;
- improvements in known performance features of five times or greater; or
- a significant (30 percent or greater) reduction in cost."

According to Leifer et al. the managerial issues of radical innovation encompass: dealing with capturing radical ideas, managing projects, learning about markets, resolving uncertainty in the business model, bridging the resource and competency gaps, accelerating the transition from project to operation, and engaging individual initiatives.

With respect to the origin of radical ideas Leifer et al. write, "*In some cases, radical innovation starts with a technical idea or set of technical ideas. The idea may be born out of the natural curiosity of a scientist or engineer, or stimulated by a challenging problem. The technical idea can take the form of a discovery of a novel technology, a new insight into an old problem, or a new way of linking existing technologies. In other cases, radical innovation has its roots in a market need, an industry "Holy Grail" (a great and unsolved challenge in the company's industry), or the strategic vision of the firm's leadership. Each of these can catalyze the development of technical ideas with the potential to be breakthroughs. Because ideas can come from so many sources, noticing them is difficult. Many are missed for lack of an alert listener*." However, it is not enough to generate an idea, someone must recognise its potential. Leifer et al. write, "*For a radical idea to move forward, someone must recognize its business potential – in other words, make a connection between a novel technical solution and a compelling market need*."

From our study of the literature we have seen that the business perspective focuses on the challenge to match the technical ideas with a market need, and on the organisational and managerial aspects to ensure that a project based on a radical idea becomes tractable and results in corporate success.

2.3 The consumer perspective

Tidd et al. [5] discuss buying behaviour of consumers. Two types of theories to describe consumer behaviour are described: utilitarian theories and behavioural approaches. Utilitarian theories assume that a consumer is rational and make purchase decisions based on a comparison of the product utility with the consumer's requirements. However, such a rational process is seldom seen in practice. Tidd et al. state that behavioural approaches that emphasise the consumers' changing attitude towards the product have greater explanatory power. The behavioural approaches describe the consumers' changing attitude from an awareness of the product, via interest and desire, to finally buying the product.

Creusen [6] focuses upon the consumers' responses to product appearance. In many purchase situations product appearance determines the consumers' impression, and based on this impression consumers reason about other product attributes, e.g. performance and quality. Creusen distinguishes six roles of product appearance: attention drawing, categorisation, communication of practical, ergonomic, hedonic, and symbolic product information. The

roles are not independent, and consumers evaluate product appearance in a holistic way taking into account a global product appearance rather than the way specific functions are designed.

We observe that a new product introduced on a market might result in new play rules and a new understanding among consumers of what to expect. Since consumers infer about product attributes such as performance and quality based on the product appearance, the company introducing a new product on the market has to expect that in some situations these inferences might be wrong. And further, that a new and different technical solution in a product might have almost no appeal to the consumers unless certain features, marginal to the company's engineering and technical efforts, appeal to consumers.

2.4 What makes a product idea?

Our study of the literature has shown three different perspectives on the product idea, its origin and development into a new and innovative product. We observe that many terms are used, e.g. need, market need, business opportunity, creativity, innovation and radical idea. However, the terms have different meanings for different authors, which is not beneficial for a debate between researchers and not productive for industrial practitioners. The many concepts brought in here may be put into a framework articulating the origins of ideas, see figure 1.

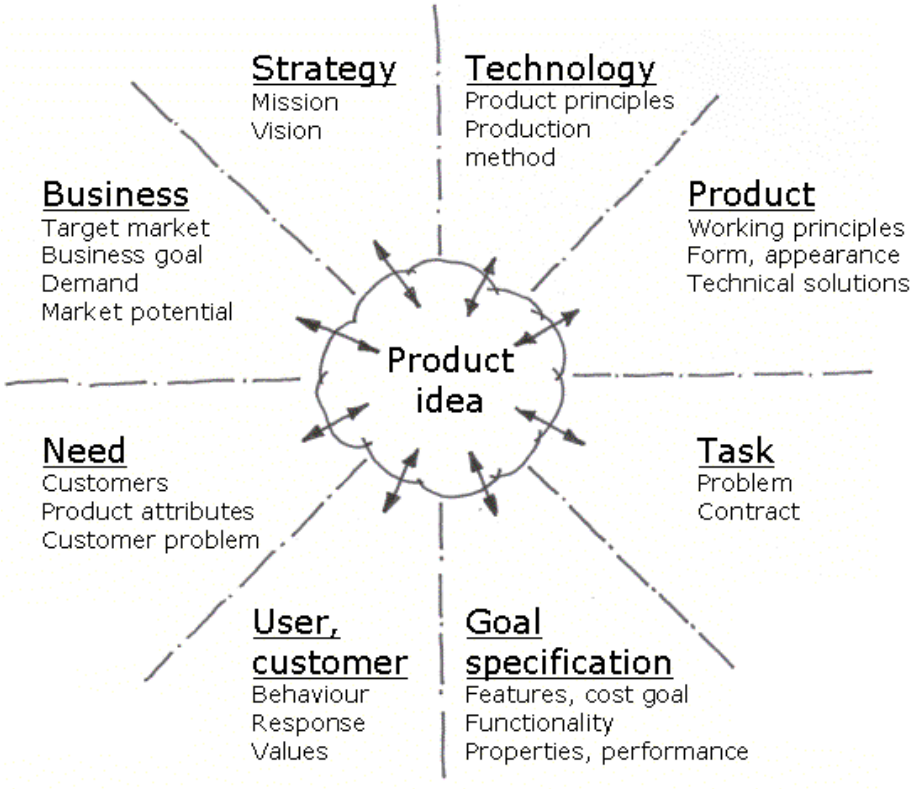

Figure 1. The origins of a product idea: A framework summing up the dimensions of a product idea as found in the literature.

In order to contribute to a consolidation and clarification of terminology and knowledge we have carried out a detailed analysis of three core references. Our result of this analysis is described in the following sections.

3 The nature of designing and a design

The purpose of this section is to clarify the key-terms related to the product idea. As a basis for our clarification we have chosen three references: Asimow [7], Alger & Hays [8], and Harrisberger [9] as our core references. These books were written and published in the early period of engineering design research, and therefore the authors had to carefully develop and describe their terminology. Thus, we have carried out a detailed analysis focusing upon the authors' usage of language, i.e. how do they write about and describe their key-terms, and the relations between these terms.

3.1 What is need and design?

The first sentence of chapter 1 in Asimow [7] sounds, "*Engineering design is a purposeful activity directed toward the goal of fulfilling human needs, particularly those which can be met by the technological factors of our culture*." Asimow concludes his first chapter with a listing of 14 principles on which his subsequent discussions rest. Some of these principles express Asimow's understanding of a need:

- "*(1)* Need. *Design must be a response to individual or social needs which can be satisfied by the technological factors of our culture*."
- "*(2)* Physical Realizability. *The object of a design is material good or service which must be physically realizable*."
- "*(3)* Economic Worthwhileness. *The good or service, described by a design, must have a utility to the consumer that equals or exceeds the sum of proper costs of making it available to him*."
- "*(4)* Financial Feasibility. *The operations of designing, producing, and distributing the good must be financial supportable*."
- "*(6)* Design Criterion. *Optimality must be established relative to a design criterion which represents the designer's compromise among possibly conflicting value judgements that include those of the consumer, the producer, the distributor, and his own*."

From Asimow [7] we observe that a need is linked to individuals or the society. Thus, needs are subjective, and they do not have an objective and isolated existence. Therefore, we cannot talk about or describe a need isolated from consumers, users, or society.

From principles (2), (3), and (4) we observe three types stakeholders involved in the relation need-design-business. Physical realizability is the concern of the design team, because the team has to synthesise the design within the allocated resources and time. Economic worthwhileness is the concern of the potential consumers or users. Financial feasibility is the concern of the company, i.e. will the development of the design and the production of the product result in a viable business for the company.

According to Alger & Hays [8] a need belongs to humans. Alger & Hays write, "*The engineer is concerned with creating material objects to serve human needs*." And "*Mankind recognizes a problem of human existence (often prosaic – such as how to dispose of garbage!). An engineer (or a person doing engineering work) then attempts to solve the problem*." Humans can be seen as an individual, or a group of persons, or as the society as a hole. Alger & Hays write, "*The role of engineering is to point the way, to exert pressure on society to recognize that change is needed because significant benefits to society will result*" However, several stakeholders are involved and must be taken into account, "*Once a problem is recognized*

clearly and all parties concerned have agreed on its nature, the development of detailed specifications becomes vital." Thus, we observe a nice agreement between Asimow and Alger & Hays in their understanding of the concept of a need.

3.2 What is problem and solution?

When a need has been recognised or identified and a company management has committed resources to the development of a design, the design task is born. Asimow describes the design process as an iterative problem-solving process, and principle (9) of Asimow is:

- "*(9)* Subproblems*. In attending to the solution of a design problem, there is uncovered a substratum of subproblems; the solution of the original problem is dependent on the solution of the subproblem*."

Dym & Little [10] identify "*three 'roles' being played as the design of a product unfolds. Obviously there is the* designer*, and it seems equally clear that there will be a* client*, the person or group or company that wants a design conceived. For the working engineer, the client could be internal … or external … And while there may be some differences in how the designer relates to internal and external clients, in both cases it is the client who presents a project statement from which all else begins to flow. Design project statements are often verbal, and sometimes they are quite short."* The third role of design belongs to the user, and Dym & Little write, "*There's another player or stakeholder in the design effort and that's the* user*, the person or set of people who will actually use the device or artifact being designed. …The users hold a stake in the design process because a product 'wont sell' if its design doesn't meet their needs. Thus, the designer, the client, and the user form an interesting triangle… It is clear that the designer has to understand what the client wants, but the client also has to understand what his users need and help communicate that to the designer.*"

Based on our analysis we can identify two types of relations:

1. There are relations between humans in three different roles. The consumer or user having a need, the client who has recognised the need and sees a potential business opportunity in introducing a product on the market satisfying the need, and the designer or design team who has the task to synthesise a design, and therefore to articulate the core problem.
2. There is a logical or time relation between the key constructs: a need is recognised, a problem is formulated, a design is synthesised, and a product is produced and introduced on the market.

3.3 What is the relation between need and problem?

When a need has been recognised the design problem has to be formulated. As a first step in the formulation of the problem Asimow sees the design to be synthesised as a black box system, where "*The desired outputs of the system are derived from the effective needs of the consumers. The language of the outputs should be more precise than that of the needs, and should reflect what the system does or provides in response to the eliciting needs*." Thus, a soft, non-technical formulation of a need is translated into a set of hard, technical requirements. We find the same idea in Pahl & Beitz [1] who write that the most important features and requirements of the final product "*are best presented in the form of a simplified specification or requirements list which must later be completed and elaborated by the design department*."

It is not a simple and straightforward task for engineering designers to formulate a problem. Asimow writes as a warning to the engineering designer, "*In the first place we must avoid the hazard of assigning to consumers the needs we feel they ought to have, for we are likely to be biased by what we think is possible in the technology*." Some engineering designers seem to think that it is not worthwhile to ask the consumers or users what they want, because they do not know what they can get, i.e. they do not know the technological possibilities. But engineering designers have to respect the fact that the users are the experts in using the product.

Based upon the quotations in sections 3.1 and 3.2 we identify a relation between constructs and actors:

1. The design team is belonging to a company and work for this company or/and a client, who has identified a need and a business opportunity.
2. The design team generates design concepts based upon a task specification (or contract) from the company/client, which specifies how the need should be seen, satisfied and the business opportunity created.
3. The design project has as a core a problem to be solved by the design team. The problem is identified, as an interpretation of the task and need satisfaction, by the team and the company/client. A goal specification may be formulated as a supplement to the task and articulating what is seen as the ideal solution's functionality and properties.

3.4 What is the content of a product idea?

Now we are ready to make our first step towards identifying the content of a product idea based on the core references. Again we will use Asimow's book as a starting point. In his description of the pattern of design projects he writes, "*We wish to examine this pattern, and to bring into sight the methodology of design by which ideas about needs are projected creatively into ideas about things; and which in turn are translated into engineering prescriptions for transforming suitable resources into useful, physical objects*." For our purpose this statement is very important. Asimow is saying that many ideas are involved in the process from recognising a need to introducing a product on the market:

- Ideas about needs,
- Ideas about things, i.e. designs which can be of type good or service,
- Ideas about production,
- Ideas about useful, physical objects, i.e. products introduced on the market, sold to consumers and resulting in a viable business.

Thus, we observe that the content of a product idea encompasses at least these four dimensions.

Harrisberger [9] writes, "*The crux of the design process is successfully matching needs with ability-to-do. The motive may come from either direction – from having a problem of need for which a technological system is to be designed – or from having a new discovery and devising a useful product from it*." We observe that this line of thinking is articulated in the newer literature, e.g. [3] and [4], as bridging the gap between need and technology.

We observe here, that the excursion into the core references supports the framework shown in figure 1. The product idea may originate from many views upon the constructs and aspects

involved in identifying, articulating, synthesising the product/service and satisfying the need, namely: technology, product, task, goal specification, user or customer, need, business or company strategy.

Many authors, as seen above, propose a sequence of determining the content or articulation of the product idea in these dimensions. However, since different authors propose different sequences it seems sensible to us to state that any starting point and sequence is feasible and relevant in determining a product idea.

4 From idea to concept

In order to understand the dynamics in the development of the product idea we will focus upon the descriptions of the design process in our core references.

According to Harrisberger [9] the initial phases of the design process are Advanced Planning and Feasibility Studies. For each phase of the design process Harrisberger formulates a number of questions to be answered:

"*Advanced Planning:*

- *What changes can we expect and what will they do to our products?*
- *What does the consumer need that he doesn't get now?*
- *What's new that we can adapt to a new product?*
- *What problems still need solving?*
- *How can we create an entirely new product?*

Feasibility Studies:

- *Will the idea work? Can it be done?*
- *What will current technology allow us to do?*
- *Can we possibly make it?*
- *Could we make it practical?*
- *Could we sell it and make money?*"

According to Harrisberger the purpose of the feasibility study is to gain sufficient confidence in an idea to warrant time, money, and effort required to make a detailed design. Harriberger writes, "*A feasibility study is an iterative process – check and revise, then check again – until all possible alternative ideas for achieving the requirements of the design, are explored*." And "*The ultimate goal is a product idea that has enough merit to be worth extensive design, development, and testing. However, it is also likely that a feasibility study will verify that the idea would not be practical in terms of cost or utility; that is, 'Sure we can do it – but is it worth the effort?'*" Harrisberger sees the result of a feasibility study as a promising design concept.

Asimow [7] sees the Feasibility Study as the first phase of the design project. The purpose of the phase is to synthesise a set of useful solutions to the design problem. Asimow writes, "*The first step in the study is to demonstrate whether the original need, which was presumed to be*

valid, does indeed have current existence, or strong evidence of latent existence." Asimow makes a distinction between a primitive statement of needs and effective needs. Asimow writes, "*We assume that we have been given a primitive statement of needs. By primitive we mean that the statement represents opinion based mainly on casual observations, but unsupported by organized evidence. Such opinions are valuable as starting points when they come from people who have had the opportunity and have the ability to make observations and to temper them with considered judgment*." And "*Effective needs we will define as those which have an existence in the market place, by virtue of consumers' willingness and ability to acquire the means for their satisfaction.*" Thus, an important step in the feasibility study is to demonstrate whether a proposed primitive need actually is an effective need.

Both Harrisberger's and Asimow's approaches are in accordance with the aim of this paper: to enhance the creation of product ideas, hopefully strong ideas. Harrisberger focuses, in his many checkpoints, upon building up *enough merit*. The merit may be seen as establishing robustness of the product idea in all of the 8 dimensions in figure 1, independent of in which of the dimensions the idea originates.

In Cooper [3] we find Preliminary Investigation as the first stage of the process, and Cooper writes, "*The spirit of Stage 1 is to 'spend a little money, gather some information, so that the project can be reevaluated at Gate 2 in the light of better information.' Therefore, this first stage is a quick and inexpensive assessment of the technical merits of the project and its market prospects. Preliminary market, technical and financial assessments make up Stage 1*."

Cooper also points out the multi-dimensional merit of a product idea, here called the project (proposal). And Cooper mentions a ninth dimension of the merit, besides the 8 dimensions of the product idea, namely the project's tractability, i.e. is the idea of such a kind that the company management and the design team has sufficient confidence with respect to carrying through the design process within allocated resources and time and with respect to the business potential.

The product idea's merit and the project's tractability do not ensure innovative solutions. The authors of this paper see an innovative solution as a solution or concept "with a difference that matters", i.e. a difference which is setting a new reference for the customers or the market, Hansen & Andreasen [11]. A design concept may be seen as a proposal for a product or service, which is brought to such a level of concretisation, that one can identify "the difference that matters".

In the discussion how about giving an idea enough merit one may say, that all efforts for creating innovation are superfluous if the idea is not based upon an innovative concept. Therefore, an innovation strategy would be to go directly to the market/competition dimension and ask: are we able to create an innovative concept? The answer will maybe require excursions into several of the 8 dimensions, but the focus should be on "the difference that matters".

5 A mindset for innovative ideation

Our aim is to reach to a practical and productive mindset; it means a thinking pattern introduced for industrialists and students. The foundation for the mindset is a model based theory. Thus, we allow ourselves to see the aggregated knowledge above as a trustworthy prescriptive and descriptive model of the formal side of ideation, and the concepts useful here for.

The model is a framework of concepts, which may be illustrated in figure 1: the principal dimensions for initiating and meriting product ideas, and illustrated in figure 2: the constructs and agents in need satisfaction and product development.

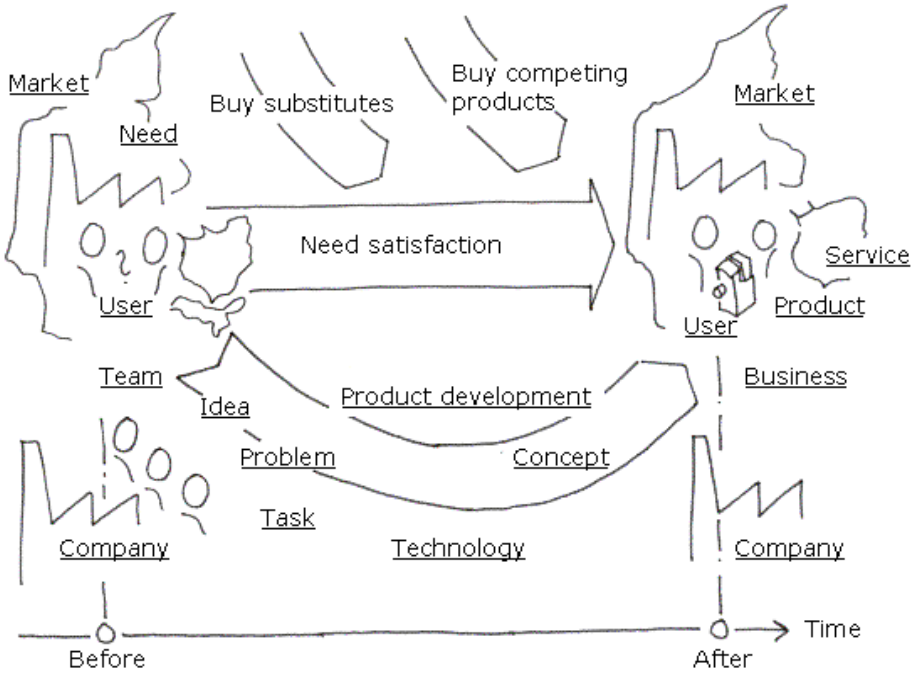

Figure 2. The constructs and agents in the satisfaction of human needs by product development.

The definition of the relations between the entities shown in figure 2 is an important step in creating a model-based theory:

- The need belongs to or relates to a group of users on the market. The need may be satisfied by a product or service. The need recognition is a mental perception or construct, which together with intensions of a company or client initiates a product development project.
- The task (-specification) is a construct created by the company/client and the team, identifying and articulating the activities, i.e. the project, and the results to be synthesised by the team, mainly the product or service and the new business opportunity. The task becomes an activity when executed.
- The problem (-statement) is a construct created mainly by the team, as a statement of what is seen as the core obstacle or missing mechanism for reaching to a full execution of the task and reaching at a design solution (product or service), which satisfies the need. When the problem is solved, the designing is successful, but the need may not yet be satisfied, and the product not yet determined in details and produced.

The idea of a problem statement seems to be an engineering design approach, where the core of the task may for instance be found by abstraction, Pahl & Beitz [1]. The same task may lead to different articulations of the problem depending on the designers' background, so the role of a problem statement could be dubious in the sense that formulating and solving a complex problem may have no effect upon the resulting design's need satisfaction.

- The idea (or product idea) is a mental construct, articulating both a design and the project for reaching the design. The design is believed to satisfy the need, cover the market demand, being better saleable, or in other ways taking away obstacles. The product idea

may be a partial idea and successively developed into an idea with completeness and enough merit, see figure 3.

- The concept (or design concept) is a conceptual (i.e. only focusing upon important, characteristics aspects "the difference that matters") description of a design (product/service). A concept may be partial or a set of interrelated concepts like business concept, sales concept, production concept, assembly concept, use concept, disposal concept, etc.

It is evident that idea and concept are nearly synonyms. Both idea and concept may be seen as the carrier of innovation, and being a combination of user and use considerations, and realisation and production considerations. And both are the subject to a gradual concretisation and making complete. The distinction between product idea and design concept is found in their focus. The design concept is a description of a design (product/service), i.e. it is an answer to the "what" question. The product idea encompasses not only the design but also considerations on the task, the project, and the fit of the product in relation to the company strategy, i.e. the product idea is an answer to the "what" and "why" questions.

A mindset for understanding the nature of ideation may consist of the following:

- An understanding of the words explained above, their interrelations, and their role in designing.
- An understanding of basic principles of ideation independent of discrete approaches, methods, tools etc.

We propose the following three basic principles of ideation:

1. The human need is the fix point or identity of ideation: concepts/solutions/products and services serve the satisfaction of the need.
2. The embryo of a product idea or concept may come from many perspectives or aspects of what may be seen as a complete elaboration of a need. (Figure 1)
3. The product idea should be gradually developed by the design team over time for creation appropriate confidence (with respect to merit and tractability) in the idea. (Figure 3)

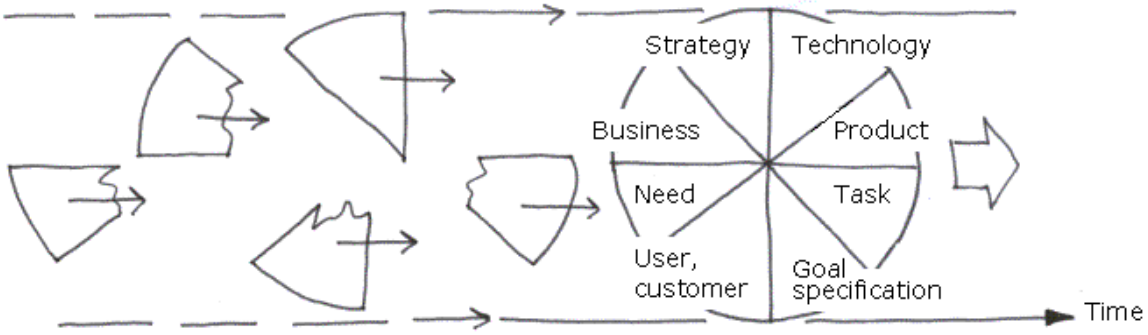

Figure 3. The product idea should be gradually developed in the different dimensions. The clarifications in the different dimensions have to be added up into a product idea having enough merit. In the figure the embryo of the product idea is found in the need dimension, followed by a clarification with respect to business.

We see this proposal as the core of a mindset of innovative ideation. In design practice the mindset of ideation will be supplemented with the designers' use of creative methods, e.g.

brainstorming and synectics, staging of creative sessions, philosophies etc. applied to creating ideas.

6 Conclusion

The research work documented in this paper is a reaction to an observed confused situation in literature and between designers and design students: an imprecise use of words and confusing mix of understanding of terminology in the area of ideation. Creating innovative ideas is the core of innovation. Thus, we cannot accept confusion and unnecessary weak product ideas and design concepts as the starting point for portfolio management and new product development.

Our proposal for a mindset of ideation consisting of a set of defined and interrelated concepts, three basic principles for formal handling of ideation, and a model illustrating the origins and content of a product idea may be seen as a first step in the direction of a methodics and basic theory for ideation. It is our belief, that our mindset will be a step in the direction of enhancing ideation and creating stronger product ideas. The mindset offers the company management and the design team a way to noticing product ideas. Thus, they have a change to become alert listeners when the very first embryo of a product idea is conceived.

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