

How to use the degree of novelty of product ideas in idea management

Mathias Messerle, Hansgeorg Binz, Daniel Roth

Institute for Engineering Design and Industrial Design (IKTD), University of Stuttgart
mathias.messerle@iktd.uni-stuttgart.de

Abstract

This paper aims for the development of a concept that shows how the degree of novelty of product ideas can be used for idea management. Therefore, a definition of the degree of novelty of product ideas is developed at first. The degree of novelty is divided in different dimensions regarding what aspect of an idea is new, how new this aspect is and to whom this aspect is new. Based on that, it is shown how the degree of novelty can be implemented in the stages of idea description and evaluation.

Keywords: *Idea management, Product idea, Degree of novelty, Idea description, Idea evaluation.*

Introduction

In general terms, the degree of novelty provides information about the newness of product ideas. It is obvious, that it is important to know how new a product is compared to existing ones and which aspect of a product is new. Relevant literature confirms that this is an important aspect in the context of idea management and product development [1, 2]. Also, during the evaluation of patent applications a focus is put on the question which aspect of the idea is new [3].

In addition, the connection between the success of a product and its degree of novelty is often examined [4, 5, 6]. However, the results of these studies do not lead to clear conclusions and offer different or even contradictory statements. In order to come to more useful results, many studies divide the degree of novelty into different dimensions [5, 7, 8, 9, 10, 11, 12]. This paper builds on these studies in order to come to a meaningful and useful definition and classification of the different dimensions of the degree of novelty in a first step. Afterwards, a concept is developed that shows how the degree of novelty can be used for idea description and evaluation.

Problem statement and goals

Based on the different or even contradictory results of numerous studies dealing with the degree of novelty that have been mentioned in the previous section, the question arises what the degree of novelty exactly is and in which way it can be used. In literature, different terms are used as a synonym for the degree of novelty like “degree of innovation” or “innovativeness” [11]. Also, different definitions of the degree of novelty of product ideas can be found. Often, the different dimensions of the degree of novelty are mixed up [8]. Schlaak [11] summarises these problems by means of the “problem circle” of the degree of novelty (see Figure 1).

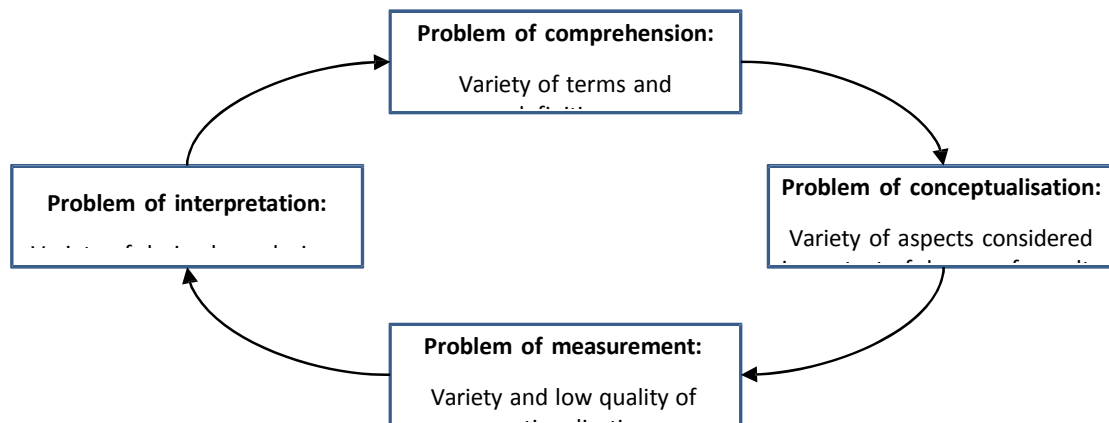


Figure 1 Problem circle of the degree of novelty according to Schlaak [11]

The *problem of comprehension* (see Figure 1) cannot be solved extensively. To avoid misunderstandings the term “degree of novelty” is used continuously within this paper.

One aim of this paper is to overcome the *problem of conceptualisation* for being able to evaluate product ideas in a first step. Therefore, the first subgoal of this paper is to answer the research question (RQ) in which dimensions the degree of novelty has to be subdivided in order to be able to use it for idea management (RQ 1, see Figure 2).

The *problem of measurement* is not going to be solved comprehensively due to the limited extent of this paper.

In spite of the fact that the degree of novelty is seen as an important aspect in connection with product ideas, there is no generally accepted approach that shows how it can be implemented in idea management. Based on that, the main goal in this paper is to answer the question how the degree of novelty can be used in a process of idea description and evaluation (RQ 2, see Figure 2). Therefore, the *problem of interpretation* has to be focused.

Method

The research for preparing the paper as well as the paper itself is structured according to the following main stages of the Design Research Methodology established by Blessing and Chakrabarti [13]: Research Clarification, Descriptive Study 1, Prescriptive Study, Descriptive Study 2.

The first stage of the Design Research Methodology is called Research Clarification. At this stage problems and research questions are described in order to clarify the research approach. In the second stage, which is called Descriptive Study 1, literature and results of empirical research are analysed so that understanding of examined phenomena can be increased. Afterwards, different approaches are developed in order to improve the current situation (Prescriptive Study). During the fourth stage (Descriptive Study 2) the developed support is evaluated and implications for improvement are developed [13].

The research questions described in the previous section form the basis of the Research Clarification for this paper. In the following section, research question 1 is answered, so that understanding of the examined phenomena can be increased (RQ 1, Descriptive Study 1, see Figure 2). In concrete terms, English and German literature that deals with the degree of novelty in different dimensions has been analysed.

Afterwards, a concept is developed based on the findings out of the literature research in order to implement the degree of novelty in idea management and to improve the current situation (RQ 2, Prescriptive Study, see Figure 2).

The evaluation of the developed concept is not part of this paper. According to this, the Descriptive Study 2 has to be done in future work.

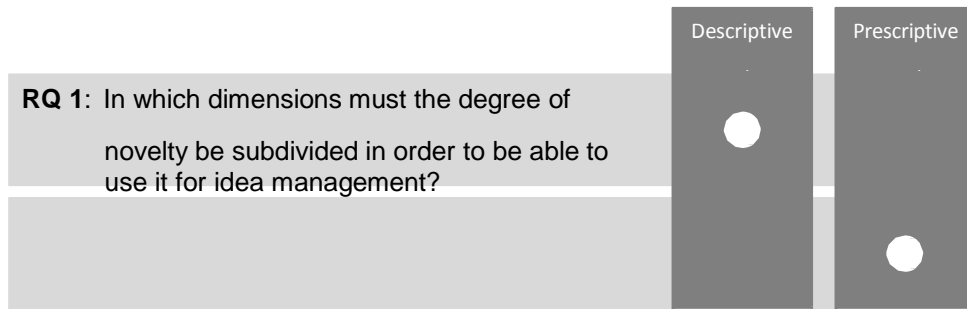


Figure 2 Research questions (RQ) and the according stages of DRM

Definition of the degree of novelty

Several studies have dealt with the degree of novelty and have developed different definitions [5, 7, 8, 9, 10, 11, 12]. Within this paper, mainly these studies are used as a basis that subdivided it in different dimensions by asking the questions “what is new, how new, and new to whom?” [14]. In this context, the studies of Danneels and Kleinschmidt [7], Garcia and Calantone [8], Billing [12], Salomo [10], Krieger [9] and Steinhoff [5] have to be mentioned. The results of these studies are partially very similar due to the fact that they all follow the same questions (“what is new, how new, and new to whom?”) and because several of these studies build upon another. They all have in common that the degree of novelty is divided in three or more dimensions like the degree of novelty for the customer, the degree of novelty for the market, the degree of novelty for the industry or the degree of novelty for the company. Several of these studies expand these dimensions by the degree of novelty for the environment [5, 9, 10, 12]. All these dimensions answer the question to whom a product idea is new. In order to be able to use the dimensions for idea management, they are adapted and further developed. Figure 3 shows a conceptualisation of these dimensions.

The studies also answer the question what aspect of an idea can be new. The findings of the studies are adapted so that they are better suited for the use in idea management and also summarised in Figure 3.

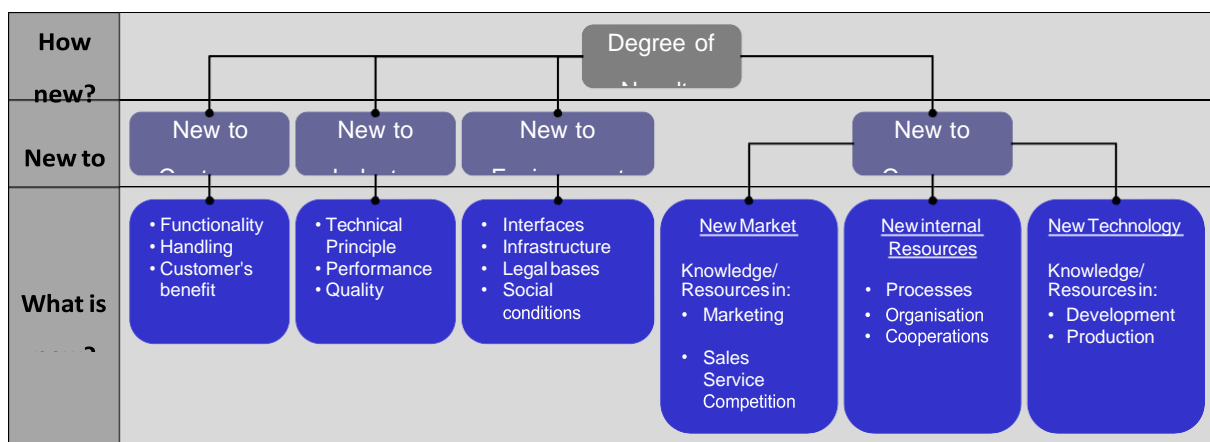


Figure 3 Conceptualisation of the degree of novelty in different dimensions

Approach to implement the degree of novelty in idea management

Based on the conceptualisation of the degree of novelty, the question arises how the dimensions of the degree of novelty can be implemented in idea management.

Suitability of different dimensions of the degree of novelty for idea evaluation

In a first step, possibilities to integrate the dimensions in an idea evaluation are examined. Therefore, it is analysed if correlations between them and the later success of products can be found. Afterwards, the dimensions that are correlated to later product success have to be implemented in idea evaluation. For the dimensions without correlations to product success, other possibilities of integration in idea management have to be regarded.

No direct correlation between the degree of novelty in general and the product success could be found [1, 15]. However, some dimensions have proven to be important for the product success. In order to identify these dimensions that are important for the idea management and to overcome the problem of interpretation (see Figure 1) a study that examines the connections between single dimensions of the degree of novelty and later product success [1] is analysed on the one hand. On the other hand, studies dealing with factors of products that are related to new product success or evaluation criteria for product ideas are regarded [15, 16].

Kock et al. [1] conclude that a high degree of novelty for the company has a negative impact on the product success. Furthermore, Messerle et al. [15] demonstrate that synergy is a factor related to new product success. In this context, synergy means that the resources and the knowledge of an enterprise fit to the needs of a conducted development project. Thus, it can be summarised that the more things are new to the company the less probable it is that a product idea becomes a success for the company. Therefore, the degree of novelty for the company can be used in idea evaluation as a basis for the evaluation of the risks that have to be taken during the evaluation of a new product idea (see also Figure 5).

Additionally, Kock et al. [1] state that the more things are new to the environment, like the infrastructure required by a new product (for example required fuel, data formats or consumable supplies), the less the probability of a product success becomes. This aspect is confirmed by Messerle et al. [16] who consider the existence of the necessary infrastructure to be an important evaluation criterion for product ideas. This conclusion is mainly based on the statements of Dueck [17] who describes the existence or the development of the infrastructure, that is necessary for a new product as a very important part of innovation. Thus, also the aspects of the new product that are new to the environment (see Figure 3) can serve as a basis for the risk evaluation of a new product idea (see also Figure 5).

The dimensions of the degree of novelty that are described above can be used for the evaluation of the risks connected to a new product idea as mentioned in the previous paragraphs. For the degree of novelty for customers and the industry, no possibility to integrate them in the idea evaluation could be found. Therefore, it has to be examined if they can support other stages of idea management.

The test-results of an evaluation method for product ideas and products have shown that it is very useful for developers to think about the question what aspect of a product is new to the customer or the industry compared with comparable products [18]. Therefore, this aspect cannot be neglected. On the other hand, it is not sufficient for a product to be only new to the customer or the industry to be successful. Because of that, these two dimensions can only serve as a step before the real evaluation.

Definition of an idea process for the integration of the degree of novelty

In literature, the idea generation and the idea evaluation are normally seen as two of the main stages of the idea process [19]. Often, the idea evaluation is seen as a step directly after idea

generation. However, an idea has to be put across to the evaluators so that they are able to get the core of an idea before they do the evaluation. In this stage, information about different aspects of the idea has to be generated so that the evaluators are able to get a deeper understanding [19]. Figure 4 shows an exemplary idea process which forms the basis for the implementation of the degree of novelty in idea management. The further an idea passes the idea process the more information about the idea should be available. In this process the stage between idea generation and idea evaluation is called idea description.

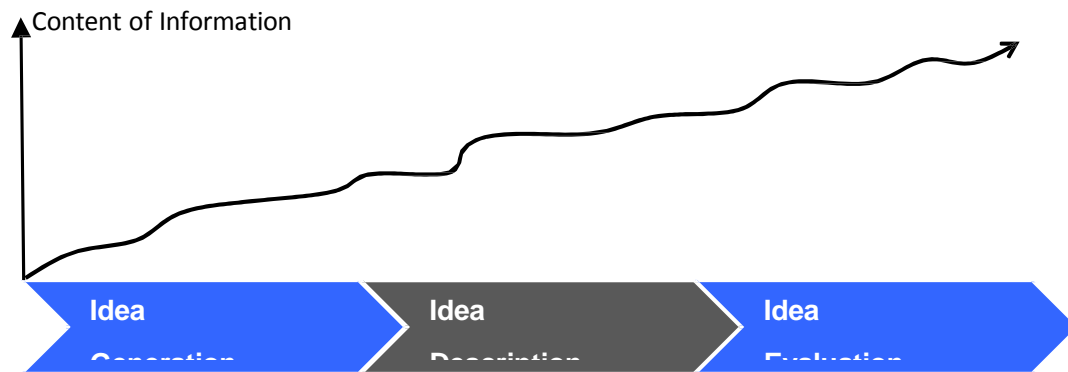


Figure 4 Exemplary idea process

Approach to implement the degree of novelty in the idea process

Based on the analysis of the suitability of different dimensions of the degree of novelty for idea evaluation and the exemplary idea process showed in the sections before, the degree of novelty is implemented in the idea process in this section.

As described above, the aspects of a product that are new to the company (see Figure 3) can serve as a basis for the risk evaluation of a new product idea. But they do not only pose a risk for the company. The more aspects are new to the company the more additional effort has to be taken. Therefore, this dimension of the degree of novelty serves as a basis for risk and effort evaluation of a new product idea. In Figure 5 these aspects of the evaluation are summarised by means of the term “idea familiarity”.

Also the aspects of the new product that are new to the environment (see Figure 3), like the required infrastructure, can serve as a basis for the risk evaluation. Therefore, this dimension is also integrated in the step of the evaluation of the idea familiarity.

As a result, these different aspects of the described dimensions of the degree of novelty (“What is new and how new?”) should be analysed and determined in detail.

The degree of novelty for customers and the industry cannot be integrated in the idea evaluation because of reasons that have been described in the previous sections. Instead, they can be integrated in the stage of idea description so that developers and evaluators are able to deal with the question what aspect of an idea is really new in an early stage. Furthermore, this step can be a means of preparing the evaluation of the idea potential, see Figure 5. In this part of the evaluation, it is for example discussed to which degree the new product will offer useful advantages to the customer. Because this aspect is not the same like the degree of novelty for the customer but is closely related to it, the idea description by means of the questions what is new to the customer and the industry can be a helpful step. In this case, an exact determination of the degree of novelty (“How new?”) does not seem to be useful for idea management. Furthermore, it could be difficult to do that in such an early stage because of missing information.

Figure 5 summarises these findings and shows the described approach of implementing the degree of novelty in the idea process.

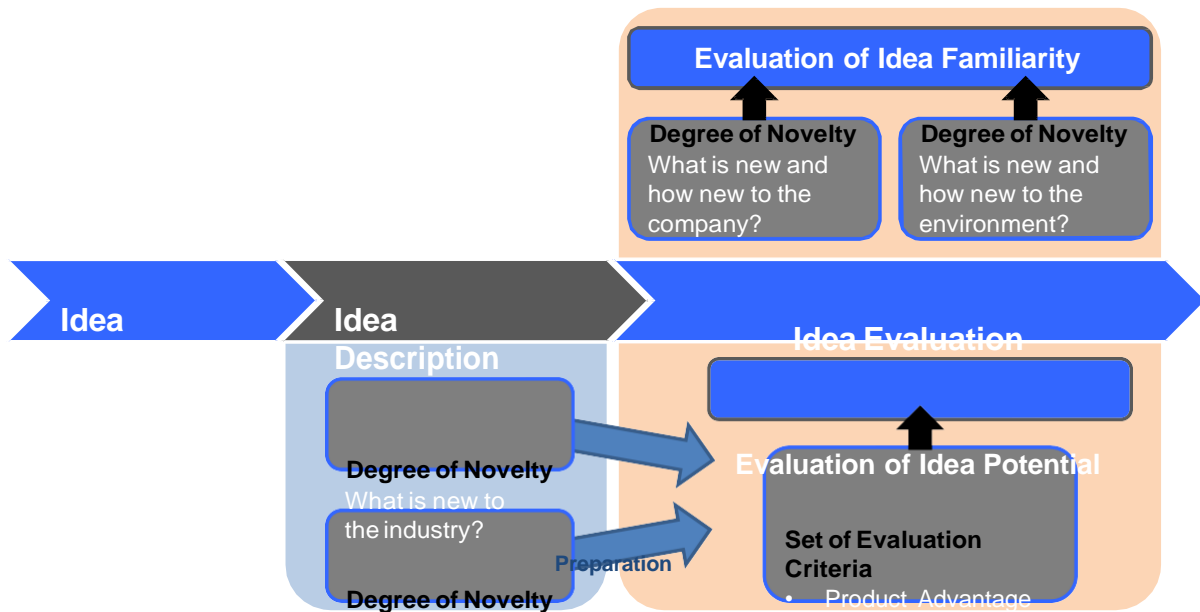


Figure 5 Use of the degree of novelty in idea management

Often, an idea process includes additional stages that are not part of the exemplary idea process shown in Figure 4 and 5, for example the preselection of product ideas. In such a case, the question arises where this stage could be implemented in the exemplary idea process. Of course it has to be done before the detailed evaluation in order to reduce the number of ideas that have to be evaluated. Regarding typical knock-out criteria of a preselection like

- does the idea fit to the company's strategy and image,
- do there exist insurmountable obstacles,
- are the necessary resources available or can they be procured,

it seems to be useful to do some kind of idea description before the preselection so that the evaluator is able to come to a substantiated decision. However, the detailed design of the idea process depends on the circumstances in the company like the number of new ideas, the available time for the preselection and evaluation of product ideas or the procedure of producing new ideas.

Discussion

Within this paper, the degree of novelty has been implemented in the idea management. The aim was to overcome some of the problems out of the "problem circle" of the degree of novelty according to Schlaak [11].

It was not the aim of the paper to overcome the problem of comprehension because this cannot be done by one paper. Instead, all researchers dealing with this topic have to be careful in using different terms and definitions in connection with the degree of novelty. Within this paper, the term "degree of novelty" has been used because it meets the content that is dealt with in this paper better than other terms like "degree of innovation" or "innovativeness". It seems questionable to the authors that these two terms can be used in connection with the consideration of the newness of different aspects of a product idea due to the fact that the term "innovation" comprises more than the newness. It also comprises an aspect of success. Therefore, the "degree of novelty" has been considered to be the most suitable term.

The problem of conceptualisation has been addressed by developing a conceptualisation based on studies that have done comprehensive examinations of this topic [5, 7, 8, 9, 10, 11,

12]. It has to be evaluated in future work if all relevant aspects and dimensions have been considered and if the developed dimensions are useful.

The problem of measurement could not be addressed within this paper because of the limited extent of the paper. It has to be done in future work.

The problem of interpretation has been addressed based on studies that examined the connection between single dimensions of the degree of novelty and the success and risks in product development. Additionally, conclusions have been drawn by comparing different dimensions of the degree of novelty to criteria that are used for the evaluation of product ideas or to factors of products that are related to new product success. In a further step, the conclusions have been used to develop an approach that shows how the dimensions of the degree of novelty can be implemented in the process of idea description and evaluation. After the operationalisation of the dimensions of the degree of novelty, this approach has to be evaluated in business practice so that strengths, weaknesses and problems can be identified. In this context, it has to be emphasised that such an approach can only serve as a framework that has to be adapted to the particular situation of idea description and evaluation in the respective company.

Conclusion

In this paper, the degree of novelty has been classified in several dimensions by asking the questions “What is new and new to whom?”. Therefore, it has been built on several studies that have dealt with this topic comprehensively [5, 7, 8, 9, 10, 11, 12]. Afterwards, it has been shown that the degree of novelty for the company and the environment can be a means of evaluating the familiarity with the development, production and distribution of a new product idea. Other dimensions like the degree of novelty for the customer and the industry cannot be a part of the idea evaluation but can serve as a basis for idea description before an evaluation. In order to come to a useful method for the evaluation of product ideas that respects the degree of novelty of new product ideas, the approach must be put in more concrete terms. The development of such an evaluation method does not finish with the end of the operationalisation of every dimension of the degree of novelty or other evaluation criteria. Instead, it must be implemented in different companies and applied to several product cases in order to be able to see whether a meaningful evaluation can be done.

References

- [1] Kock, A., Gemünden, H. G., Salomo, S. & Schultz, C., “*The Mixed Blessings of Technological Innovativeness for the Commercial Success of New Products*”, Journal of Product Innovation Management, Vol. 28, No. 1, pp. 28-43, 2011
- [2] Pahl, G., Beitz, W., Feldhusen, J., Grote, K. H., Wallace, K. (ed.) & Blessing, L. (ed.), “*Engineering Design*”, Springer, 2007
- [3] Burr, W., Stephan, M., Soppe, B. & Weisheit, S., “*Patentmanagement*”, Schäffer-Poeschel, 2007
- [4] Balachandra, R. & Friar, J. H., “*Factors for Success in R&D Projects and New Product Innovation: A Contextual Framework*”, IEEE Transactions on Engineering Management, Vol. 44, August, pp. 276-287, 1997
- [5] Steinhoff, F., „*Kundenorientierung bei hochgradigen Innovationen: Konzeptualisierung, empirische Bestandsaufnahme und Erfolgsbetrachtung*“. In: Alber, S., Brockhoff, K., Ernst, H., Gemünden, G., Hauschildt, J. & Teichert T (eds.), „*Betriebswirtschaftslehre für Technologie und Innovation*“, Deutscher Universitäts-Verlag, 2006

- [6] van der Panne, G., van Beers, C. & Kleinknecht, A., "Success and Failure of Innovation: A Literature Review", International Journal of Innovation Management, Vol. 7, September, pp. 309-338, 2003
- [7] Danneels, E. & Kleinschmidt, E. J., "Product innovativeness from the firm's perspective: Its dimensions and their relation with project selection and performance", Journal of Product Innovation Management, Vol. 18, No. 6, S. 357- 373, 2001
- [8] Garcia, R. & Calantone, R., "A critical look at technological innovation typology and innovativeness terminology: a literature review", Journal of Product Innovation Management, Vol. 19, No. 2, S. 110-132, 2002
- [9] Krieger, A., „Erfolgreiches Management radikaler Innovationen“, Deutscher Universitäts-Verlag, 2005
- [10] Salomo, S., „Konzept und Messung des Innovationsgrades - Ergebnisse einer empirischen Studie zu innovativen Entwicklungsvorhaben“. In: Schwaiger, M. & Harhoff, D. (eds.), „Empirie und Betriebswirtschaft“, Schäffer-Poeschel Verlag, 2003
- [11] Schlaak, T., „Der Innovationsgrad als Schlüsselvariable“, Deutscher Universitäts-Verlag, 1999
- [12] Billing, F., „Koordination in radikalen Innovationsvorhaben“, Deutscher Universitäts-Verlag, 2003
- [13] Blessing, L. & Chakrabarti, A., "DRM, a Design Research Methodology", Springer, 2009
- [14] Johannessen, J.-A., Olsen, B. & Lumpkin, G. T., "Innovation as newness: what is new, how new and new to whom?", European Journal of Innovation Management, Vol. 4, No. 1, 2001
- [15] Messerle, M., Binz, H. & Roth, D., "Optimisation of an evaluation method for innovative product ideas". In: Legardeur, J. & North, K. (eds.), "Selected papers from ERIMA 2010 proceedings: International Symposium on Innovative Management Practices", pp. 14-22, 2010
- [16] Messerle, M., Binz, H. & Roth, D., „Relevant Criteria for the Evaluation of Product Ideas“. In: Spath, D., Ilg, R. & Krause, T. (eds.), „Innovation in Product and Production, Conference Proceedings, 21. International Conference on Production Reserach ICPR 21“, 2011
- [17] Dueck, G., „Die Idee allein ist fast nichts“, Innovationsmanager, Vol. 1, No. 9, pp. 34- 35, 2010
- [18] Reichle, M., „Bewertungsverfahren zur Bestimmung des Erfolgspotenzials und des Innovationsgrades von Produktideen und Produkten“, University of Stuttgart, Dissertation, 2006
- [19] Brandenburg, F., "Methodik zur Planung technologischer Produktinnovationen", Shaker, 2002