

Customer-Orientation Using Integration and Individualization Aspects Enabling the Transition from Manufacturer to Solution Provider

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Abstract¹

The paper addresses the increasing importance of solution providers due to fundamental changes within global economic constraints. The challenges emerging during the transition process in becoming a solution provider will be highlighted as well as the lack of scientific approaches dealing with these challenges. Based upon the integration and individualization aspects of solutions, fields of action for future approaches will be depicted. In this context, the importance of continuous and individual customer integration will be accented, followed by a methodology facilitating a customer-individual value provision as well as the alignment of solution portfolios according to changing customer needs. The paper will conclude with the benefits of the methodology as well as with the emphasis of future need for action regarding customer integration in the field of solution provision.

1. Introduction

For some time past, industrial enterprises from different industries are confronted with a fundamental change of global economic constraints. This change is due to an aggravated international competition especially from low-wage countries and results in a homogenization of

the offered products regarding technical and qualitative aspects [1, 2]. In consequence of the missing possibility to differentiate from competitors by means of the available product range, the market players engage in an intense price competition, which affects the providers' profit margins negatively. Empirical studies show that industrial enterprises understand the increasing pricing pressure due to a missing possibility of differentiation from competitors as a main problem area, which has to be faced necessarily [3].

Customers, especially within the business consumer sector, recognize the opportunity to increase their market power since providers of homogeneous products can easily be interchanged without the risk of establishing dependences. In doing so, the customers not only enforce decreasing market prices but also make growing demands concerning the services of the providers [4]. Those growing demands become manifest in the fact that customers claim offerings which are tailored to their very special needs [5]. The origin of those claims is in an increasing need of individualization and is thus embedded into a global development as individualization is considered as one of the main actual global trends.

Many manufacturers meet those challenges by extending their product-driven core business with services going along with the products. The aim of this strategy is to set up key differentiators from the competition as well as to generate an individual added value for the customer by additional services. This step

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is accompanied by a changing self-conception of the companies - from a manufacturer to a solution provider. Hereby, a solution provider is defined as a provider of customized and customer-specific problem solutions whereas manufacturers are only and solely providers of produced goods [6]. Besides the opportunities to set up differentiation potentials and therefore increase the enterprise's market power as well as to meet customer requirements in an individual way, the entrance into the solution business allows an increase of the enterprise's profit margin. Thus, the attainable EBIT-margin of solutions comes up to 11.0% and therefore exceeds the margin of business with new machines, which is 2.3% exemplarily regarding plant construction, by far [7, 8].

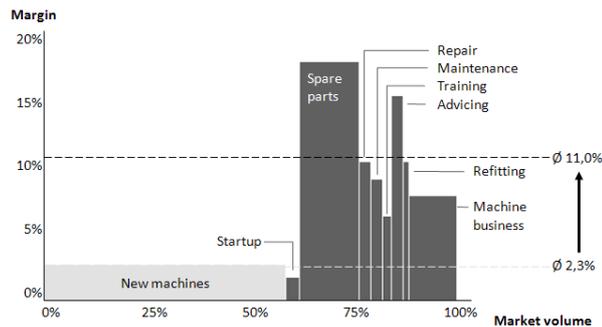


Figure 1 EBIT-margins and market volumes of solution components [8]

Empirical studies show that industrial enterprises understand the installation of such a solution business as a main challenge of the future [9]. Providers such as IBM, General Electric, or Rolls-Royce have already made the step towards a solution provider and successfully offer comprehensive customer solutions instead of isolated products and services [10].

2. Deficiencies in the transformation process becoming a solution provider

Since the entrance to the solution business happens in an intuitional and hardly structured way in many enterprises, the expected potentials are hardly exploited or even not at all. Therefore, the anticipated differentiation from competition fails to succeed in many cases [11, 12]. In certain cases, this development even leads to the quitting of the solution business. The reasons arise from a missing understanding of the idea of a comprehensive solution, but also from a lack of scientific methods, which accompany the transition to a solution provider. In the following, the main reasons for the failure occurring during the transition to a solution provider will be summarized.

2.1 Inadequate methods supporting the development of services

Regarding manufacturers, the planning and development of the product business as a historical core competence is based on methodically established foundations and follows a structured way. In contrast, deficits can be found regarding the range of services since methods and tools for a structured planning and

development of services are only provided to an inadequate degree. Therefore, the development of services in the industry happens in an unstructured way and ad hoc in response to specific customer requests. In doing so, the fact that the economic success of a service is significantly dependent on its conception and design is considered only in an inadequate way. Hence, in analogy to the development of products, services are to be regarded as development objects which allow a continuous and lifecycle-supporting handling and management based on information-technological reference models. The academic field of Service Engineering is build upon the mentioned basic ideas but is limited to the domain of services without taking the integration between products and services into consideration. Due to the short history of the discipline Service Engineering, in comparison to Product Engineering there are no standardized procedure models which can be applied by enterprises. Furthermore, the service sector is characterized by a lack of scientific approaches dealing with reference models [13].

2.2 Deficiencies within the integration of product and service domain

In the referred context of customer solutions, the limitation of focusing only to the domain of services as covered within Service Engineering is not sufficient. Instead, the lifecycles of the product and service domains have to be integrated as well as aligned into each other in order to meet the concerns of the solution aspect in a sufficient way. However, scientific research has considered theoretical insights and practical experiences about how enterprises can effectively apply their development resources so as to develop integrated solutions only for a short time and therefore only exist to a minor degree. Exemplarily, the approaches introduced by Zhang, et al. [14] as well as from Spath and Demuß [15] shall be named. However, up to now the focus of research is on the economic marketing of hybrid products, on business models as well as pricing theory and only to a lesser extent on the provision of consistent approaches for integrated development processes. According to Becker et al. [16], only three reference models dealing with integrated products and services exist, whereas only specific topics such as facility management are considered in these approaches.

In consequence of the lack of adequate methods, product and service processes in enterprises are mostly interconnected only to a minor degree. The resulting product-service-systems are characterized by a low degree of harmonization and contribute to the satisfaction of customer-specific requirements as well as to the differentiation from other market participants only in an insufficient way. Simple but often offered services such as installation or maintenance are only partly sufficient within the present context. Many of the offered services only aim at the subsequent disposal of products and therefore the customers expect those

services to be as a matter of course and for free. Instead, services which are appropriate to the problem and which individually target and permanently optimize the value-added processes of customers have to be developed and finally offered. Such services are characterized by their difficult substitutability and therefore allow an escape from the easy replaceability of the product range when the services are intimately involved into the product business. In contrast, the entrepreneurial reality appears as follows:

- The single parts of the solution are only cursorily integrated with each other and therefore easily substitutable.
- The customer solutions do not offer an added value compared to the separate purchase of product and service components.

2.3 Deficiencies in degree of individualization of the solution offering

The degree of individualization is a critical factor when deciding to what extent customer-specific but still enough standardized solution portfolios can be offered. The problem follows from the fact that in spite of the important role, which the provision of a customer-individual solution statement plays, an approach, which is effective and efficient for the service provider, is demanded. Due to these two restrictions, providers find themselves in the area of conflict between complete standardization and individual customization.

Standardized solutions are easily reproducible and can be sold in large amounts on one hand. However, they do not match the understanding of customer solutions since the individual customer requirements are not considered. Due to their simple reproducibility, the anticipated differentiation from the market is not possible. On the contrary, a complete customized individualization decreases the efficiency on the side of the service provider and contributes to the fact that the provisioning costs exceed the expected benefits many times over. Whereas the benefits for the customer as well as the possibility of differentiation amplify, profit margins and efficiency as well as reproducibility decrease due to higher provisioning costs.

Enterprises face this problem by providing a pre-defined solution portfolio with the possibility of customized specification. Thereby, the customer-specific adjustment is gained by configuration or mass customization, as the whole portfolio is subdivided into individual, partially freely selectable sub-components. However, the main challenge how to define the right granularity of the individual components still remains. Hereby, the definition of larger solution components tends to standardization since smaller but more individual components mean a continuously high maintenance effort as the range of solutions has to be adjusted to changing market requirements continuously.

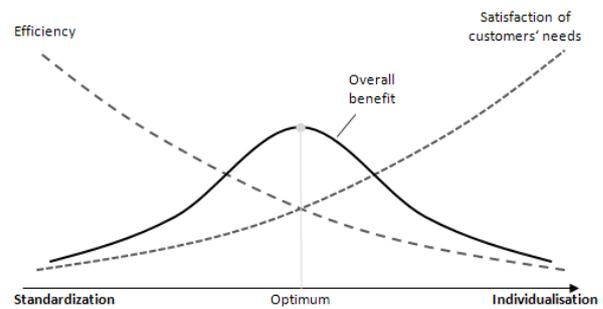


Figure 2 - Vendors in the area of conflict between standardization and individualization

2.4 Insufficient integration of individual customer requirements

Due to a lack of methodical support, solution providers do not integrate customers into the processes of solution creation and solution provision in a sufficient way, affected in particular are the design and development phases.

In the classical sense, the customer was faded out inside the processes of the service provider and was only considered as a passive recipient [17]. For solution providers with the deep-seated aspiration to solve customer-individual problems, the integration of single customers becomes compulsory inevitable. The necessity results in the heterogeneity of customer-individual problems which can only be solved by means of customer-specific solution alternatives.

Already existing methods from Product Engineering as well as from Service Engineering provide only insufficient support since the customer only partially needs to be integrated into the production process, especially regarding Product Engineering. Thus, Berkovich in her state-of-the-art analysis also emphasizes the necessity to integrate customers into the whole development process and points out that no existing approach of customer integration covers the whole innovation process [18]. Usually, the customer integration on the level of Product Engineering is limited to the general requirements management as well as to the sales process. In the following, existing methods of customer integration are outlined.

In the quality management standard DIN EN ISO 9000:2005, a requirement is defined as „a need or expectation which is determined, usually preconditioned, or compulsory.“ Within the context of product development, the requirements management enables the customers and also internal development departments to communicate their expectations on products which are to be developed in the future. For this purpose, Product Engineering offers several process models such as the iterative approach of Ehrlenspiel [19] or the sequential process model of Pahl [20]. The available approaches integrate the prospective customer into the production processes only by explicit questionnaires or checklists but do not show possibilities how requirements can be passed to

the provider in an intuitive manner using the natural process integration of the customer.

Within Service Engineering, methods, processes, and tools of the requirements management are only covered superficially. In the process model of Ramaswamy, the requirements of some exclusive key users are understood as crucial. However, it is not mentioned how the process of requirement collection should happen [21]. Schneider et al. also mention the importance of customer requirements but do not offer appropriate methods [22].

In contrast to the requirements management which defines expectations on new or more customized products and services, Feedback Management applies itself to the return of experiential knowledge about existing services to the development processes. Feedback from customers can be converted into requirements subsequently to its acquisition. Referring to Ovtcharova [23], Feedback Management is defined as methodology which aggregates all specialized activities of an enterprise concerning the return of experiential knowledge into the development processes of products and services which become more adjusted to customer requirements. The process contains the acquisition, aggregation as well as the integration of the conditioned knowledge into the operational processes of product and service planning and development.

Both presented methods have in common that they do not consider the continuous integration of customers but instead focus on selected aspects concerning customer integration. The allocation of the specific requirements of individual customers is only of secondary interest. Instead, an anonymous aggregation of customer requirements is the basis of prospective development processes. Thus, a tailored provision of customized solution alternatives is not possible with any of the available methods due to the lack of a customer-specific problem analysis as well as the lack of customer-specific requirements concerning products or services.

3. Objectives and associated work plan

In the preliminary chapters it was illustrated that companies changing from sole manufacturers to solution providers are confronted with manifold challenges, which shall be analyzed systematically in the following. As a basis for the analysis, the definition of the term “solution” will be referred, in order to better demonstrate the causes for the uprising problems and subsequently identify adequate possibilities for the avoidance of those problems based on methodical approaches.

The relevant literature distinguishes solutions from simple product-service-bundles using three central characteristics. According to the derived definition, a solution is (1) a combination of products and services, which (2) may be adapted to special customers’ wishes (3) and are closely linked with each other [11, 24, 25, 26]. By means of the presented definition, the two main

aspects of the term solution can be clarified. These main aspects are integration and individualization.

3.1 Integration aspect of solutions

Concerning solution offers, the relevant literature distinguishes between two fundamental kinds of integration: marketing-based integration on one hand and technical integration on the other hand. The marketing-based integration enables customers to obtain the solution, which is appropriate to their problem, directly from a single source. Thus, instead of multiple vendors, the solution provider emerges as a general contractor, whereby consumers obtain an added value throughout the entire decision and acquisition cycle [25]. In this context, literature mentions cooperative arrangements of solution providers with suppliers as well as competitors, enabling them to offer a wide range of services most suitable for the customers’ specific problem statement [10, 27].

Technical integration on the other hand describes to what extent product and service components within a solution offering are inter-coordinated and harmonized. Hereby, it is not sufficient to offer services which are largely detached from products. Instead, the development of the individual components of the product and service domain has to be carried out in such a way, that an added value for the customers arises. Thus, as objective of the integration of single components, the value of a solution perceived by the customer has to exceed the sum of its single elements. [28]

In combination, both kinds of integration illustrated in the previous sections ensure that a solution provider is able to differentiate from other market participants by the provision of more integrated and thus less substitutable solution offerings. The general rule is, that the higher the degree of integration in technical and marketing-based kinds are pronounced, the higher the potential to differentiate compared to the competitive environment is recognized [29].

The general objective arising from the integration aspect of the solution term is to offer customers a solution value, which exceeds the sum of the values of the single solution components, by the combination of product and service components. For this purpose, the product and service domain have to be integrated into each other. Beyond, it has to be assured that all solutions or solution components required for the fulfillment of the customer’s necessities are offered from one single source. The knowledge, which solutions have to be provided for the fulfillment of the problem-specific necessities, may be acquired by the individualization aspect of solutions (see chapter 3.2).

3.2 Individualization aspect of solutions

The individualization aspect of solutions addresses the ability of solution providers to satisfy customer-specific necessities on the basis of a pre-defined solution portfolio as comprehensive as possible. Thereby, the integration of individual customers is not limited to the

integration of the customer within the scope of the solution specification. Instead, the customer as an equal partner within the value chain has to be integrated at an early stage and continuously involved into the processes of the solution provider. Therefore, customers have to be integrated into all stages of an ideal process of solution provision, which are namely analysis, solution specification, solution provision and solution result [30].

- Analysis of the customer's necessities: On the part of the provider there is the need of understanding each customer's specific problems and necessities. For many customers, the mutual analysis of the specific customer problem already belongs to the problem-solving, for what reason the customer's early and continuous integration is once again emphasized to be mandatory.
- Solution specification: Subsequently, a problem-adequate definition of the solution based on the mutual analysis of the requirements becomes essential. The definition likewise takes place with the customer's interaction and has to be carried out in a transparent and comprehensible way. The provision of a solution portfolio adequate to the customer's needs has to be assured.
- Solution provision and solution result: In a manufacturer's product business, the lifecycle for the producer mostly ends with sales activities. In contrast, solutions are characterized by the fact that the provision of the solution is also carried out by the solution provider. Thereby, the solution provider becomes directly responsible for the incidence of the desired impact, namely the solution of the customer's problem. The solution provision is accompanied by a constant alignment with the solution result and therefore also by the involvement of the customer. This approach facilitates the solution provider to counteract by adjusting the solution specification if necessary.

As objective arising from the individualization aspect of the solution term, the demand for an individually customizable, pre-defined solution portfolio arises. This solution portfolio has to be aligned to the satisfaction of customer-individual needs while taking into account the shifting nature of the customers' challenges. The provision of such a solution portfolio is based on methods and tools for the continuous integration of individual customers into the processes of the solution provider.

4. Solution approach

Resulting from the objectives of the solution's integration aspect, the demand for an integrated planning, development, and provision of solution arises. Hence, processes of product and service domain

have to be harmonized pursuing the main goal to provide a coherent solution portfolio which is value-adding for the customer. A reference model which includes the product domain as well as the service domain serves as a basis for the integration and therefore links both domains with each other. Such a reference model has to be developed as a component-based, hierarchically structured model with the possibility of customer-individual specification which allows the development and provision of a pre-defined solution portfolio. Exemplarily, such a model was developed and adopted in collaboration with a manufacturing company within the scope of an industrial cooperation. The reference model for services originated in this context is subdivided into the three partial models of the result dimension, the process dimension and the potential dimension analogous to the three dimensions of constructivist service definitions. The integration into the product domain occurs via the process modules, which are interlinked with assemblies and maintenance positions. Figure 3 exemplarily illustrates the partial model of the result dimension.

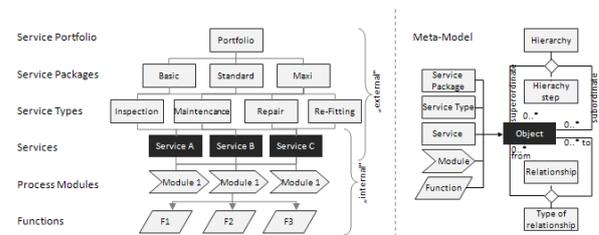


Figure 3 - Result dimension of the service reference model

The individual turnout of solution alternatives requested in the final objectives of the individualization aspect is solved on the basis of configuration management using mass customization. Following the approach of the 'product instance PLM' described by Abramovici et al., [31] a concept for the customer-specific instantiation of the general reference model is suggested, building the foundation for the customer integration method described in the following. Dependent on customer specific projects, instances of the general model are created allowing the deposition of relevant field information. The relationship between instances and the general model are persistent in order to ensure the possibility of bi-directional information exchange.

A three-level methodology for customer integration permits the continuous integration of individual customers into the processes of the solution provider based on customer requirements as well as on customer feedback. The methodology assumes that customers continuously emit implicit and explicit information referring to the solution definition of the provider. Based on this information, the solution provider is enabled to (1) determine the exact customer-specific solution configuration on one hand and on the other

hand to (2) continuously align the solution portfolio to the necessities of the customers.

- Within the first level of the methodology, the information emitted by the customer is collected and connected with the customer instance of the general reference model. The assignment to individual components of the instantiated model offers the possibility of a solution configuration characterized by transparency and adjustment to the customers' needs by the analysis of the customer's requirements interconnected with the instantiated model.
- In a second step, the aggregation of the customer-specific information and the subsequent assignment to certain components of the general reference model in the context of requirements management allow the adjustment of existing solution portfolios to shifting market needs. Therefore, customers' requirements on a solution configuration as well as requirements extracted by practical knowledge (customer feedback) lead to the enhancement of existing solutions.
- Beyond, the aggregation of customer information without the possibility of assignment to existing solution components allows the planning of new product and service components in the context of innovation management. Frequently mentioned, but due to the lack of corresponding components not grantable customer requirements thereby are included into the planning processes of new solution components.

Such a customer-centric approach both increases the innovation capabilities of an enterprise as well as the customer retention, as always those solutions can be offered which assure the highest potential benefit for the customer. Figure 4 illustrates the methodology explained above.

5. Conclusion and outlook

Within this paper it was shown that the change from manufacturer to solution provider entails manifold challenges. Based upon the definition of the solution term, operational fields and solution alternatives supporting companies in their transformation process were identified. Particularly, the necessity of integration between product and service domain was highlighted and a reference model for the provision of pre-defined solution portfolios was introduced. Beyond that, the paper emphasized the importance of continuous customer integration and pointed out the lack of existing approaches. It was stated that the deficiencies in this field especially are affecting innovation processes of solution providers. As a solution approach covering this problem, a three-layer methodology for customer integration was illustrated, facilitating a customer-individual value provision as

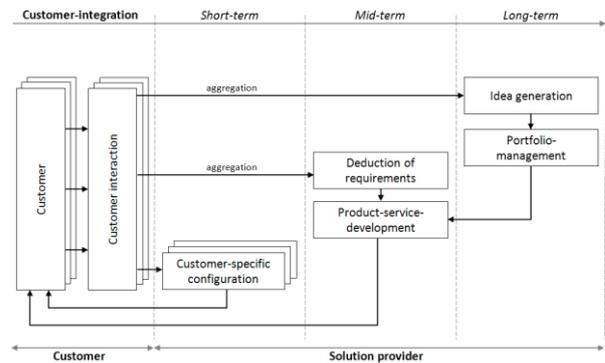


Figure 4 - Proposed methodology for continuous customer integration

well as the alignment of solution portfolios according to changing customer needs. Future research will have to pursue integrating the customer into the processes of the solution providers enabling them to serve clients in a more individual and customer-oriented way. Therefore, standardized integrated reference models are needed which are, above all, dealing with individualized customer information. Models enriched with semantic information show great promise for this problem as the interconnection between the different domains becomes obvious and interdependencies can be depicted [32].

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References

1. Homburg, C.; Faßnacht, M.; Günther, C. Erfolgreiche Umsetzung dienstleistungsorientierter Strategien von Industriegüterunternehmen. *Zeitschrift für betriebswirtschaftliche Forschung*. 2002, Bd. 54, 6
2. Günther, C. *Das Management industrieller Dienstleistungen: Determinanten, Gestaltung und Erfolgsauswirkungen*. Wiesbaden : Gabler, 2001
3. McKinsey Corporation. *The McKinsey Global Survey of Business Executives*. *The McKinsey Quarterly*. 2005, Bd. 42, 1
4. Stremersch, S.; Weiss, A.; Dellaert, B.; Frambach, R. Buying Modular Systems in Technology-Intensive Markets. *Journal of Marketing Research*. 2003, Bd. 40, 3
5. Reichwald, R.; Bonnemeier, S. *Kommunikation in der Wertschöpfung*. [Buchverf.] M. Bruhn, F.-R. Esch und T. Langner. *Handbuch Kommunikation. Grundlagen, innovative Ansätze, praktische Umsetzungen*. Wiesbaden : Gabler, 2009
6. Schuh, G.; Friedli, Th.; Gebauer, Th. *Fit for Service: Industrie als Dienstleister*. München, Wien : Hanser, 2004

7. Gebauer, H.; Hildenbrand, K.; Fleisch, E. Servicestrategien für die Industrie. Harvard Business Manager. 2006, Bd. 27, 5
8. Roland Berger Strategy Consultants. Maschinen- und Anlagenbau im Abschwung. September 2008
9. Sturm, F.; Bading, A. Investitionsgüterhersteller als Anbieter industrieller Lösungen – Bestandsaufnahme des Wandels anhand einer Umfrage. Wirtschaftsinformatik. 2008, Bd. 50, 3,
10. Davies, A.; Brady, T.; Hobday, M. Charting an Path Toward Integrated Solutions. In: MIT Sloan Management Review. 2006, Bd. 47, Nr. 3, S.39-48
11. Johansson, J.; Krishnamurthy, C.; Schlissberg, H. Solving the Solutions Problem. The McKinsey Quarterly. 2003, Bd. 40, Nr. 3, S. 116-125
12. Neu, W.A.; Brown, S.W.: Forming Successful Business-to-Business Services in Goods-Dominant Firms. In: Journal of Service Research. 2005, Vol. 8, No. 1, S. 3-17
13. Fähnrich, K.-P., van Husen, C.: Entwicklung IT-basierter Dienstleistungen: Co-Design von Software und Services mit ServCASE, Physica-Verlag, 2008
14. Zhang, Y.; Srari, J; Gregory, M.; Iakovaki, A. Engineering Network Configuration: Transition from products to services. In: Proceedings of the 1st CIRP Industrial Product-Service Systems (IPS2) Conference, Carnfield, Carnfield University Press, 2009
15. Spath, D.; Demuß, L. Entwicklung hybrider Produkte – Gestaltung materieller und immaterieller Leistungsbündel. Bullinger, H.-J.;Scheer, A.-W. Service Engineering – Entwicklung und Gestaltung innovativer Dienstleistungen. 2006S.463-502
16. Becker, J.; Beverungen, D.; Knackstedt, R. Reference Models and Modeling Languages for Product-Service-Systems Status Quo and Perspectives for Further Research. In: HICSS '08: Proceedings of the 41th Annual Hawaii International Conference on Systems Sciences, Washington. IEEE Computer Society. 2008, S.105-115
17. Prahalad, Coimbatore K.; Ramaswamy, Venkat: The Future of Competition: Co-Creating Unique Value with Customers. Boston, MA: Harvard Business School Press. 2004, S.2
18. Berkovich, M.; Esch, S.; Leimeister, J.M.; Krcmar, H. Requirements engineering for hybrid products as bundles of hardware, software and service elements – a literature review. 9. Internationale Tagung der Wirtschaftsinformatik. Wien, Österreich, 2009
19. Ramaswamy, R. Design and Management of Service Processes, Addison-Wesley, Massachusetts, 1996
20. Ehrlenspiel, K. Integrierte Produktentwicklung, Hanser, München, 2003
21. Pahl, G.; Beitz, W.; Feldhusen, J.; Grote, K.H. Konstruktionslehre, Berlin: Springer, 2003.
22. Schmitz, G. Die Ermittlung der Kundenanforderungen an industrielle Dienstleistungen, in: Zeitschrift für Planung. 2000, Nr. 2, S. 195-215
23. Ovtcharova, J.; Krahtov, K.; Rogalski, S. eHomeostasis Methodology in the Automotive Industry - Integration of Emotion-based Customer Feedback into Product Lifecycle Management, in: Proceedings of the MCPC 2007 World Conference on Mass Customization & Personalization (MCP), Innovation and Research Conference, MIT Cambridge/Boston, 2007
24. Davies, A.; Brady, T. Organisational Capabilities and Learning in Complex Product Systems: Towards Repeatable Solutions. Research Policy. 2000, Bd. 29, 7-8
25. Sawhney, M. Going Beyond the Product: Defining, Designing and Delivering Customer Solutions. [Buchverf.] R. Lusch und Stephen L. Vargo. Toward a Service-Dominant Logic of Marketing: Dialogue, Debate, and Directions. Armonk, New York, 2006, S. 365-380
26. Tuli, K.; Kohli, A.; Bharadwaj, S. Rethinking Customer Solutions: From Product Bundles to Relational Processes. Journal of Marketing. 2007, Bd. 71, 3
27. Windahl, C.; Andersson, P.; Berggren, C.; Nehler, C. Manufacturing Firms and Integrated Solutions: Characteristics and Implications, in: European Journal of Innovation Management. 2004, 7 (3), S. 218-228
28. Böhmann, T.; Krcmar, H. Hybride Produkte: Merkmale und Herausforderungen. [Buchverf.] M. Bruhn und B. Stauss. Wertschöpfungsprozesse bei Dienstleistungen. Wiesbaden : Gabler Verlag, 2007
29. Krishnamurthy, C.; Johansson, J.; Schlissberg, H. Solutions Selling. Is the Pain Worth the Gain? McKinsey Marketing Solutions. McKinsey Marketing & Sales Practice. 2003, S. 3
30. Scheer, A.-W.; Griebel, O.; Klein, R. Modellbasiertes Dienstleistungsmanagement in: Bullinger, H.-J.; Scheer, A.-W. Service Engineering – Entwicklung und Gestaltung innovativer Dienstleistungen 2006, S.22-24
31. Abramovici, M.; Fathi, M.; Holland, A.; Neubach, M. Integration von Feedbackdaten aus der Produktnutzungsphase im Rahmen des PLM-Konzepts In: Proceedings zur Multikonferenz Wirtschaftsinformatik (MKWI 2008), München, Germany, 2008
32. Bittel, V.; Awad, R.; Ovtcharova, J. Analysis and semantic structuring of product information with the example – distribution, Proceedings of the Russian-German Workshop “Innovation in Information Technologies”. Ufa, Russia, July 25-31, 2009