INTERNATIONAL CONFERENCE ON ENGINEERING DESIGN
ICED 03 STOCKHOLM, AUGUST 19-21, 2003

BUSINESSPLAN APPROACH FOR NEW PRODUCTS

J. Hesselbach, K.-H. Broistedt, D. K. Lieu, M. Mateika

Abstract

New products are indispensable for lasting entrepreneurial success. Rising customer expectations force companies to increase the complexity of products while reducing the length of innovation cycles. This is only possible, when companies concentrate on the development and conversion of new product ideas that proved to be economically promising.

Although the significance of a company's ability and capability to generate innovations is widely acknowledged, the application of (marketing) methods in the early phases of the product development is poor. Many times, the product development starts without evaluating the market success of the new product.

This paper presents the approaches of the Business Plan for "start-up" companies and the phases models, that describe the phases of the innovation process. Both approaches are discussed and compared. Furthermore, a planing concept is proposed by combination of the two approaches. The concept was applied in a case study and the application was evaluated.

Keywords: customer demands, early phases of design, innovation methods

1 Introduction

Product innovation is indispensable for maintaining profitability and competitiveness. Despite the widespread recognition of this necessity, a methodical and systematic procedure in enterprises can hardly be observed. Several surveys have shown, that a continuous application of methods in enterprises takes place only rarely [1]. This applies especially to the planning of the early phases of an innovation project The reasons for insufficient application are various. Examples of reasons, which are described in literature, are lack of time in the product development process or a false understanding of methods, which leads to the non-fulfilment of the users expectations [2],[3].

Before realisation of a new business idea ("Start up") it is usual to provide a Business Plan. This is used in order to promote the idea to potential financial backers. All important points of the "start up"-idea are discussed in the Business Plan, such as customer needs, competitors, etc.

The comparison of a new business idea with an new product idea (with high level of novelty) shows that these are similar regarding risk, level of novelty, planning interval, uncertainty of the planning and complexity of the planning (table 1)

Tabel 1: characteristics innovation vs. “start up”-idea

	“start up”-idea	product idea
risk	high	middle/ high
level of novelty	middle/ high	high
planning interval	long-term	long-term
complexity of the planning	high	middle
uncertainty of the planning	high	middle/ high

On the other side, many phase models exist in the literature which describe the process of an innovation project. The approaches of the Business-Plan and of phase models can be combined according to opinion of the authors. In the following these two approaches are introduced briefly and their advantages and disadvantages are discussed. Afterwards the own approach is proposed.

2 State of the Art

2.1 Phase models of the innovation process

Different opinions about the ideal-typical process flow and extent of an innovation project can be find in the literature. Numerous phase models were developed in this context. These models differ each other significantly according to the number of used phases and the abstraction level. However, the most phase models have in common that they divide the innovation process into sequential subprocesses. The most phase models begin with a phase of the problem realisation. In this phase an innovation need is derived - on the basis of the general market and technology development or a chance in the enterprise. The phase models mostly end with the introduction on the market of the product innovations. Examples for such phase models are given by [4], [5], [6], [7], [8], [9], [10].

Critical appreciation

Phase models are a clear, but abstract representation of the innovation process. They offer a orientation, how an innovation process can be organised. On the other side, the phase models of the innovation process can be criticised because of the fact that the practical feasibility of the models is insufficient. In particular, the models can hardly serve small and medium-size enterprises as action manual. Furthermore, the success factor of customer orientation is not sufficiently considered in many phase models [11]. Besides, many phase models do not consider the necessity for a continuous evaluation and controlling of the innovation process. The literature gives many references, how (design) methods can be systematised, described and selected (e.g. [12], [13], [14]). But a description is missing, how the phases of the phase models can be supported by (marketing) methods. A further point of criticism is the sequential procedure. The innovation process is characterised by a high division of labor and multidisciplinarity. Therefore, many process steps pass parallel and not sequentially [8].

2.2 Business Plans for “Start up”-companies

Function and Task of Business Plans

A Business Plan serves primarily for documentation of a new business idea. The purpose is to find financial sources or buyers for an enterprise. Above all, the Business Plan is a communication instrument and should convince the reader of the gainful new business by a clear and comprehensible interpretation [16]. The necessity for preparation of a Business Plan can occur at different times. Thus, one does not require a plan by existence founders only, but also by enterprises, which develop a new business field or which aspire an IPO (initial public offering).

The preparation of a Business Plan pursues a certain purpose and addresses a certain person group. The business project - for which the Business Plan is written, and the purpose - for which it is meant - have therefore a crucial influence on its structuring. A Business Plan for a start up company looks different than one for an enterprise, which wants to develop a new business field. Since it is not read in presence of the author who could give further inquiries and explanations, a clear formulation is important.

Elements of Business Plans

In the literature gives different views, which elements a Business Plan should have and which extent is appropriate. The reason is the variability of enterprises and projects. There is no generally accepted plan. Despite all differences, Business Plans have certain main elements,

which should be present in each case. Table 2 shows an exemplary arrangement, how one finds it in the literature [15], [16].

Table 2: Elements of a Business Plan

Summery	A Businessplan always begins with a short summary of the business concept. The summary is should arouse the interest of the investor, in order to be more concerned about the details of the project
Product	It is to be argued, how the products of the enterprise differ from the current and future competitors. Therefore, the product performence and the benefit for the customer must be described in detail.
Responsible team	Investors have often the opinion that they invest in persons and not only in enterprises, products or markets. Hence, investors intensively dedicates itself to the section "team".
Market and competitors	The market potential has to be estimated in order to evaluate a business idea. Furthermore, information about customers, competitors and the most important boundary conditions should be given.
Marketing and distribution	Beside the discussion of market and the competitor, it must be represented in a Businessplan, how the desired sales potential can be achieved. The plan must contain a convincing concept for the strategy of the market entrance. Further data are necessary for the price strategy, distribution politics and sales promotion.
Business system and enterprise organisation	The business system covers the activities of an enterprise, which are necessary for the supply and distribution of a final product to a customer. The concept for the business system has to be described. The author should give also data about the selected organisational structure.
Chances and risks	This element of the Business Plan covers a realistic estimate of the chances and risks, which are present or are expected. The author should explain, which positive or negative consequences are expected and which counteractive measures are planed.
Financial plan	The financial plan has to explain the investors, how the financial situation of the enterprise develops and which capital requirement develops thereby.

Critical appreciation

In the following it is discussed to what extent the concept of the Businessplanes is suitable to support enterprises when they plan a new product development project. The emphasis of the discussion is the different purpose, planning contents, the methodical support and the consideration of existing resources.

A Business Plan has an enterprise-external purpose. It should convince a potential investor of the success of the planned business project. The enterprise-internal purpose - the methodical and systematic planning of a project - is not the centre of attention. Therefore, the relevant literature orients itself at the requirements of investor regarding the structure of Business Plans (and not at the requirements of a product development)

In addition, some planning contents of the classical Business Plan are not suitable for the planning of a new product. For example, the planning of the organisational structure is conditionally meaningful, since a firm's structure is usually already existent and it can hardly be changed. Furthermore, the financial considerations - accomplished in the financial plan- are of interest for an external investor. But they are not suitable for an internal investment planning.

A Business Plan should describe all relevant points comprehensively. The complexity and heterogeneity of planning contents increases. For this reason a description of the methodical support can be found only rare in the literature.

The preparation of a Business Plan requires high personnel and financial resources. Furthermore, the Business Plan requires knowledge over the different methods of the technical and economical disciplines. This knowledge is often missing enterprises, in particular in small and middle size enterprises.

Recapitulatory, it can be said that the systematic procedure of the Business Plan preparation is suitable for evaluating and planning a new product idea. Particulary, the market-focused view of new ideas increase the chances of success. The contents of a Business Plan must be adapted, however, so that the concept of the Business Plan can be used for the planning of a new product. Furthermore, a concept is necessary, which describes the methodical support of a Business Plan.

The Business Plan is to be developed further, if it is to be used for the planning of a new product.

3 Business plan for new products

3.1 Phases and methods of the Business Plan (overview)

The developed own planning represents a combination of German standard VDI 2220 [17] and the Business Plan concept. According to the VDI guideline 2220 the product planning begins with the strategic derivation of product ideas and ends with product death. The guideline is divided into a strategic phase, a phase of the product identification, the product realisation and the product care. This definition is too extensive for the purpose of the developed planning concept. Instead the starting point of planning concept is an already existing product idea. Neither strategic considerations nor the product realisation belong to the contents. The emphasis is on the planning and examination of the idea. Figure 1 shows the phases of the Business Plan for product developments as an overview. Due to the limited extent of this paper, the planning steps as well as sufficient methods and check lists are described only briefly.

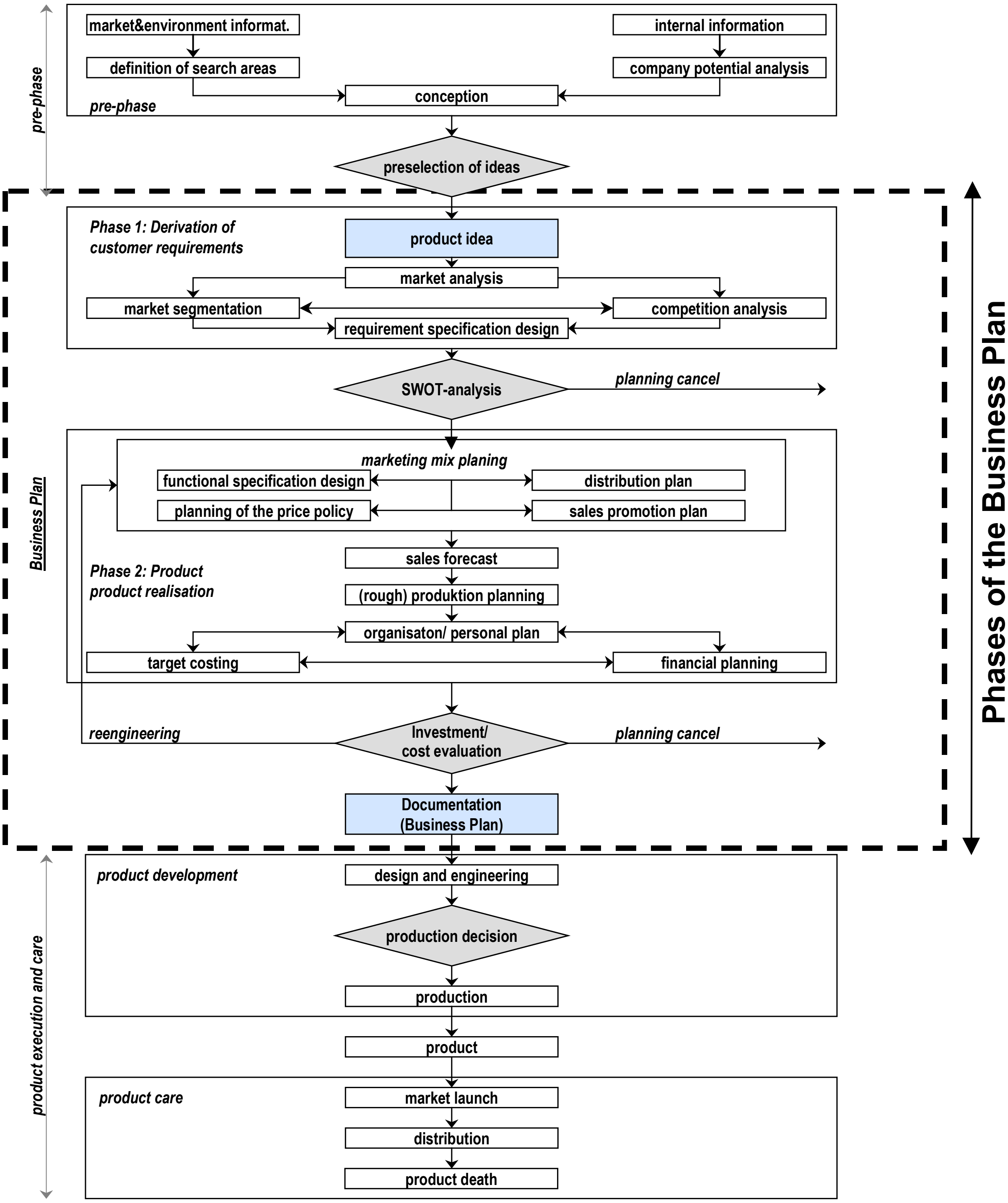

Figure 1: Phases of the Business Plan for Product Development (following VDI 2220 [17])

3.2 Phase 1: Derivation of the customer requirements

The steps of the first phase are the market analysis, segmenting of the market and the competition analysis.

The beginning of the market analysis are the systematic collection and evaluation of information about the relevant market circumstances, the industries and customers.

Figure 2 shows a check list for information that should be collected in a market analysis. The quality of the data determines the quality of the Business Plan. However, it is important that the expenditure for collecting the information is adapted to the resources of the enterprise.

<table>
<tr><th>market sizes</th><th>trade analysis</th><th>customer analysis</th><th>general market environment</th></tr>
<tr>
<td>▪ market potential
▪ market volume
▪ saturation of consumption
▪ growth of the market</td>
<td>▪ number of providers
▪ structure of traders (number, distribution, size...)
▪ competition structure (number, size, market share...)
▪ products (programm, quality, prices, service...)
▪ distribution (national/international, trade channels, logistic...)
▪ sales promotion
▪ entry / exit barriers
▪ organisation in associations</td>
<td>▪ customer structure
▪ customer requirements
▪ customer problems
▪ customer needs
▪ ...</td>
<td>▪ tax legislation
▪ structure- and investment grant
▪ environment regulations
▪ commodity prices
▪ energy costs
▪ legal security by legislation
▪ ...</td>
</tr>
</table>

Figure 2: Check list for the market analysis

An enterprise should not try to take up the competition in all fields - and often against competitors with better conditions. It should concentrate on the relevant market segment. The potential customers must be differentiated into definable categories. The customer requirements have to be determined for the relevant categories. There are no standardised segmenting rules. However, it is crucial to use geographical, demographic, psychographical and behaviour-oriented segmenting criteria [18].

Competition analyses have the task to point out the influence of the competition on the sales prospects. The extent and the depth of the competition analyses are determined by the availability of the desired information and by the costs of the provision of information. Relevant competition information are: sales quantity, market share, price strategy, growth, cost structures, customer service, marketing, chain of distribution, etc.

The results from competition and market analysis can be visualised in a strengths and a weakness diagram (figure 3) as well as in a chances and risk diagram.

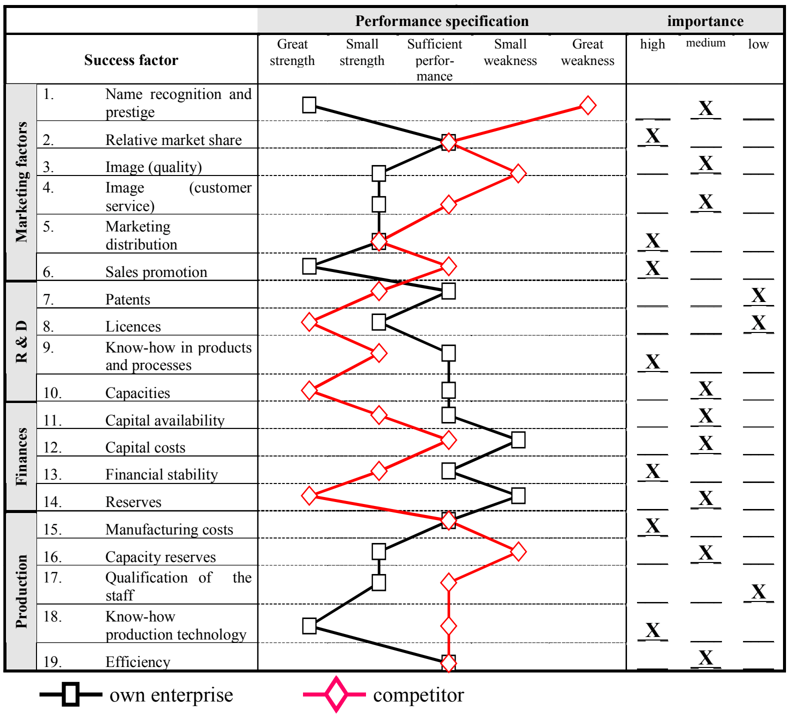

Figure 3: strengths and a weakness diagram (example)

3.3 Phase 2: Planning of the product realisation

Contents of the second planning phase are the concretising of the product idea and the planning of the realisation. The steps of the second phase are definition of the marketing mix: sales forecast, provisional production planning, organisation and personnel planning, financial planning and deriving targets for the Target Costing.

Starting point is the planning of the marketing instruments: Product, price, placement and promotion (Markting Mix). Figure 4 shows the instruments with their parameters.

product	price	placement	sales promotion
▪ quality ▪ extras ▪ design ▪ brand name ▪ wrapping ▪ packaging size ▪ customer service ▪ guarantee ▪ ...	▪ cataloque price ▪ sales discount / cash discount ▪ payment terms ▪ financing instruments ▪ ...	▪ channels of distribution ▪ supply places ▪ distributions partners ▪ market penetration	▪ advertising ▪ personal sale ▪ sales promotion ▪ public relations ▪ direct marketing ▪ sponsoring ▪ ...

Figure 4: marketing instruments

A sales forecast can be conducted place quantitatively and qualitatively. The quantitative prognosis is not suitable for small and medium-size enterprises due to the high expenditure. A possibility of the qualitative prognosis is the estimation by (external) experts. The prognosis should cover a positive, an optimistic and a pessimistic case.

The next two steps cover a rough production planning and an organisation planning, which are not be further discussed here.

Based on of the results of the past planning steps, it is now possible to derivate cost defaults for the following product design. A suitable method represents the Target Costing. The first step of the Target Costing is the determination of the total goal costs of the product. In the second step, the goal costs are distributed on the components of the product due to their contribution for the fulfilment of the customer benefit.

After all relevant cost blocks were identified and quantified, a financial plan can be provided. The financial plan has the purpose to judge the capital requirement resulting from the new product on short and long term view. Also an investment appraisal belongs to the financial plan. The purpose of the investment appraisal is the evaluation if the expected cash flow caused by the innovation project justifies the necessary investments.

After the last planning step, the enterprise can decide about the realisation of the product development.

4 Results

The presented planning concept was derived from the literature. The planning concept was applied for a innovation project of a small enterprise. The involved enterprise was a casting company, which planed to bring a product on the market for the first time. So far the enterprise had manufactured products only by order of other enterprises. The product idea was a cast-iron lamp with an innovative design and a new illuminating technique.

The results from the application of the Business Plan were:

- Strong market orientation in the early phases of a project
- Identification of the success factors of the market (e.g. image)
- identification of weaknesses in the enterprise organisation (e.g.. distribution and marketing)
- Reengineering of the product concept based on the planning results
- High quality of the planning results (due to opinion of the management)
- Relatively high expenditure. The Business plan is only suitable for larger projects

5 Conclusion

One approach of a planning process is the business plan concept as it is used for raising capital for newly founded companies or the extension of existing businesses. However, the different purpose of the common Business Plan restricts its applicability for supporting small and medium-sized companies during the planning process of a new product idea.. A new planning concept developed in this paper. The concept guides the company through two planning stages. In the first stage, the emphasis of the planning activities is on the identification of the factors influencing the success of the project and the comparison of these factors with the abilities and resources of the company. For this, the relevant market segment is identified and the demand of this segment for the product is determined.

1 Acknowledgement

This collaborative R&D project (BMBF-Projekt GINA: Ganzheitliche Innovationsprozesse in modularen Unternehmensnetzwerken, 07.2001 –06.2004; Förderkennzeichen: 02PD1020) [19] is funded by the German Federal Ministry for Education and Research (BMBF) as a part of the program "Research for Tomorrow's Production", and supported by the Production and Manufacturing Technologies Project Management Agency (PFT), Karlsruhe Research Centre.

References

[1] Grabowski H; Geiger K.: Neue Wege zur Produktentwicklung, Raabe, Stuttgart 1997

[2] Gausemeier J., et al.: Kooperatives Produktengineering, Band 79 der HNI-Verlagsschriftenreihe, Paderborn 2001

[3] Lindemann U.: Towards a flexible and adequate use of methods in the moduct Development, proceedings of the Design 2002, Dubrovnik 2002

[4] Thom N.: Grundlagen des betrieblichen Innovationsmanagements, Kölner Wirtschafts- und Sozialwissenschaftliche Abhandlungen, 1976

[5] Pleschak F. and Sabisch H.: Innovationsmanagement: Schäffel-Poeschel Verlag, Stuttgart, 1996

[6] Brockhoff K: Forschung und Entwicklung: Planung und Kontrolle, Oldenbourg, München/ Wien, 1999

[7] Schlicksupp H.: Innovation, Kreativität und Ideenfindung, Vogel Verlag, Würzburg, 1999

[8] Vahs D.: Innovationsmanagement: von der Produktidee zur erfolgreichen Vermarktung; Schäffel-Poeschel Verlag, Stuttgart, 1999

[9] Sabisch H.: Produktinnovation, Schäffel-Poeschel Verlag, Stuttgart, 1991

[10] Witt J.: Produktinnovation: Entwicklung und Vermarktung neuer Produkte, Vahlen Verlag, München, 1996

[11] Strippel N.: Innovationscontrolling: Managementunterstützung zue effektiven und effizienten Steuerung von Innovationsprozessen im Unternehmen, Vahlen Verlag, München 1999

[12] Birkhofer H., Kloberdanz H., Berger B., Sauer T., Cleaning up Design Methods Completely and Standardised, proceedings of the Design 2002, Dubrovnik 2002

[13] López-Mesa B., Thompson G. and Williander M.: Managing uncertainty in the design and development process by appropriate methods selection, proceedings of the Design 2002, Dubrovnik 2002

[14] Cross N., Engineering design methods. Startegies for product design, Wiley, Great Britain, 2000

[15] Struck U.: Geschäftspläne, Schäffel-Poeschel Verlag, Stuttgart, 2001

[16] Kussmaul H., Der Businessplan: Aufbau, Inhalt, Zweck, Bespiel, Lehrstuhl für Betriebswirtschaftslehre, insb. Betriebswirtschaftliche Steuerlehre, Inst. für Existenzgründung/Mittelstand, Univ. des Saarlandes, Saarbrücken, 2000

[17] VDI-Richtlinie 2220: Produktplanung: Ablauf, Begriffe und Organisation, VDI-Handbuch Konstruktion, 1980

[18] Meffert H., Marketing: Grundlagen marktorientierter Unternehmensführung, Gabler Verlag, Wiesbaden, 2000

[19] Franke H.-J., Hesselbach J., Huch B, et al.: Innovationsprozesse und F&E-Kooperation ganzheitlich gestalten,

Corresponding author:
Marc, Mateika, Technical University of Braunschweig, Institute of Machine Tools and Production Technology
Tel: +49 531 391-7608, Fax: +49 531 391-5842, E-mail: M.Mateika@tu-bs.de