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# A Study on the Application of Business Plans in New Product Development Processes

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**Abstract.** The present work presents a study on the application of business plans (BP) (a widely used document for investment decisions of new enterprises), with standard new product development processes (PDPs). The main objective was to find out whether it may be applied and, if so, at which moments it should be used in the PDP. The main source of information in this exploratory research was the existing literature concerning product and business development processes, business plans models and similar documentation, and project selection and evaluation methods. Then, these contents have been compared using the PDP stages as references. As a result, the study points out that a business plan is a document that models business, and it can gather enough information for investment decision analyses. It can also be elaborated concurrently with the PDP stages and used at the PDP decision gates. However, business dynamics has favored other forms of documentation for early decisions, such as synopses, presentations and even web-pages (for external resources). Business plan contents are still relevant and useful for new enterprises investment decisions.

**Keywords.** Business plan, new product development processes, project selection and evaluation methods

## 1 Introduction

Economic sustainability of existing and startup companies strongly depends on their ability to take advantage of market opportunities. However, to identify them and to decide upon which one of them will mostly be feasible in an uncertain future, is a subject that still attracts attention.

The central point of this problem is the fact that one cannot foresee the future [19]. Therefore the success of a given company in the long term cannot be guaranteed [5]. In this scenario of uncertainty in several industrial sectors and of imperfect companies, the best alternative in order to invest is to search for elements that contribute to reduce failure risk [5].

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Business planning has emerged as a way to improve chances of a new venture to succeed, yet with no warranty. The first step in this process is to perceive a given opportunity and then transform it into a business effort. The way to convey such transformation is through a business plan. A company may be created or used to explore this opportunity by operating, manufacturing or developing a new product [17]. There is always an idea of a product or service behind a given opportunity. However, only a feasibility study, which can be built upon a business plan, will indicate its potential to be converted into a profitable business. Hence, not only must one focus on an idea for the best product and never lose sight of it, but one must also pursue the business as a whole [5].

Although the literature on business plans and topics related to product development process is vast, they are rarely studied together. And when that happens, operational details are seldom presented. Also, the so called “business project” approach [3] does not bring out a reference model capable of guiding a given product development project in a way that is fully integrated with the corresponding business. Not even suggested models of product development processes [4, 15] include all necessary details to create a new company, as they assume it already exists.

In the present study, no trace has been found of a product development process reference model that supports the creation of the enterprise that will be delivering the given product. Although businesses and products are usually developed altogether in practice, an integrated framework to support both the product development team and the entrepreneur is missing.

The present work aims to bridge the gap between these themes, so that decisions concerning new product development can be made based upon a broader vision: one that considers both technical and business aspects presented in a business plan.

## 2 New Enterprises and Investment Decisions

### 2.1 The New Product Development Process

A recent research conducted by Hustad [7], that involved PDMA (*Product Development and Management Association*) affiliated companies, has pointed out that there are several models of product development processes (PDP) put in place. Also, there are significant differences among them.

In addition to these models, there are also PDP models found in the literature, which serve as a basis for activity planning in product development projects [15]. Among these, the ones based upon decision portals or gates between their main phases are noticeable, as proposed by Cooper [4] and Rozenfeld et al [15]. In these models, due to uncertainty, investment decisions are fractioned into several moments, and bets increase in the same proportion as risk decreases. This approach avoids risky “all-or-nothing” decisions. At the gates a company evaluates how development projects are doing in such a way that its resources are more

efficiently allocated. There are basically four kinds of decisions: approve, disapprove, freeze or recycle the project [4, 15].

Decision making is a collective task and, therefore, it happens by means of meetings with development team members and higher management [*ibidem*]. As a result, revision points are credited on account of proper participation of higher management, when it is ultimately useful: at points where high risk and/or costs are involved [14]

On the other hand, PDP is a process of “information assembling”. However, decision makers do not always take part in this assemblage. Then, how is it possible to establish a common and yet collective vision of what the project is? Furthermore, what kind of analysis is made to decide whether a given alternative deserves investment or even more resources to be allocated?

Whatever the form of documentation is to represent a given project, it should be such that it is adequate to the kind of analysis to be performed at every gate. This could be presented in the form of one or more of the approaches that follow.

## 2.2 Project Selection Approaches – What Occurs in a Decision Gate

The decision to invest in a given project involves the analysis of both qualitative and quantitative factors. There are several approaches to project selection, which can be grouped into three main categories [4]:

- Benefit measuring techniques;
- Economic models;
- Portfolio management methods.

In the benefit measuring techniques approach, one gathers criteria to be used when a given project is analyzed. Grades can be used, as well as binary logic (yes/no) when one compares data from each given project against reference values. This approach is mostly qualitative, as it involves a subjective evaluation sense, which can incorporate an evaluator's personal criteria.

In the economic models, a timeliness study on the economic behavior of each project is performed and financial indexes are used in order to allow for a detailed comparison from different projects. This approach has a quantitative nature [4, 8, 13].

On the other hand, portfolio management methods aim at maximizing return of investment (ROI), selecting projects that are aligned with the company's strategy and balancing the project portfolio. It allows holistic decisions as it mixes both qualitative and quantitative factors. To do that, one applies a group of techniques that come from the two previous approaches, among others [4, 15].

Despite the fact that either economic models and benefit measuring techniques are not ideal when used exclusively, ROI metrics that derive from them are fundamental to support decisions in each one of the approaches presented [4]. Nonetheless, the main element that justifies the existence of a given company is profit making. Positive results are not enough; it is necessary that the generated profits are better than those expected from other investment alternatives. Hence, the essence of an economic-financial evaluation is to measure a given project's return such that comparisons can be made against other investments [15].

However, in order to test a given project's feasibility, no matter what approach is used, a model is necessary – something that represents its technical, economic and commercial performance. In the literature about PDP, there are some planning tools, such as the business case. It is very similar to business plans in its content and partially similar to project planning. In the business literature, though, business plans have become the main piece of documentation for business modeling [1, 2, 5, 17].

### 2.3 The Business Plan

Business plans are usually associated to the entrepreneur and his dream to foster a new company [1, 5]. But a business plan can be used both by new companies and established ones, large or small [1, 2, 12, 16].

Companies can be perceived as systems that, in turn, need several internal subsystems. Systems have their performance evaluated by means of models that represent them. Model conception and development cause people who conduct experiments to become self-conscious of concepts and values that influence understanding, planning, action and reaction of a system's elements. Hence, initially one has a tacit/mental model of the system [2].

A business plan is used to formalize and make the model of a given system explicit. To do that, it has qualitative and quantitative aspects. The qualitative part is discoursed and refers to the description of a functioning system and of the model projection inserted in the system. The quantitative part reveals the economic model of the project and is targeted towards measuring the economic return of the model [*ibidem*], yet allowing for trade-offs – sensitivity tests of controllable and uncontrollable variables of the system [18]. Since the qualitative part is the one that carries the description of the technical and commercial model, it is essential for the development of the economic model [2].

On the other hand, a business plan is a document that contains description and characterization of a given business, the way to operate it, its strategy, its plan to conquer market-share and its projections of revenue, expenses and financial results [17].

However, a business plan concerns company or product? Egg or chicken? Indeed, a company does not exist without a product. It is seen as the outcome, or the result of work or of a process, and as something that adds value to the one who uses it or consumes it. But the product does not exist either, without the process that originates it and that makes it available to the market. Therefore, they are interdependent and each one's feasibility influences the other's.

In other words, the product (good or service) is an offer of value to the market and can be used in an exchange process to generate revenue [10]. As a result, there is no offer without the process that bring it into existence. Decision towards investment in a company cannot treat product and business separately. In order to compare projects and decide, understanding of the whole is necessary. Hence, the model must represent the performances of both product and business.

### 3 Methodology

The present work has been carried out through an exploratory research on international and national literature about product development processes and businesses, business plan models and similar documentation, and project selection/evaluation methods. To accomplish that, a list of fundamental questions and key-words has been placed, which has been constantly revisited due to new coming pieces of information.

Significant results have been registered and analyzed using mind maps and block diagrams. In the light of commonly cited phase-gate PDP models, it has been possible to figure out relationships between terms and topics.

### 4 The Application of BPs in PDPs

According to the information gathered in the present work, product and business feasibility are interdependent; product feasibility studies must consider business feasibility and vice-versa. However, such studies demand models that represent the system performance of dimensions comparable to other investments.

Both the PDP and project selection approaches used in it point out to the need of a model that makes a product's technical, economic and commercial performance explicit. This is because the decision making process within the PDP demands meaningful ways to present data for extensive approach-dependent analysis.

Since a new product will have economic and commercial performance only if there is a company that makes it available to the market, it is believed that flexible business plans may be the missing model to support investment decisions in the PDP.

Therefore, in an existing company, a business plan can be built concurrently with the PDP, analyzed at each gate and updated at each phase. This would allow an overall view for everyone, including possible external investors. After all, companies should not be limited by their own resources.

In a newborn company, where “egg and chicken come out at the same time” there would be significant gains if the new business development process is integrated to the PDP. Although no reference model to develop new businesses has been found, business plans have supported the process to build new companies.

However, there is a need for reference models to support both new products and new businesses. The demand for a “guide to unexplored lands” is evident. Innovation hides in scenarios where new companies offer new products to new markets. These products are sometimes discarded in investment rounds because there are no known ways to explore them, even when they represent remarkable opportunities.

Nonetheless, the development of a new product, carried out by an existing company or a startup, consumes resources, not always available. In both cases, external sources will be needed to leverage the business.

In order to search for investors, loans, partners and strategic alliances, an adequate tools is needed [2]. No investor can evaluate an opportunity without a clear demonstration of what the company is [12] and this is nor far from the reality of PDPs. At gates an idea is “sold” in order to obtain more resources (money and/or human) for the next development phases, no matter they come from internal or external sources.

As external investments are obtained in exchange for business participation [1, 5, 6, 12], the larger the value perceived by the investor is, the less the cost to participate will be. Value perception is, in turn, directly proportional to the existence of concrete success evidence (like patents, prototypes, preliminary contracts, among others) capable of minimizing failure risk.

On the other hand, in a creative process like the PDP, or a new business development process (NBDP), such evidences only come later on. Thus one arrives again in the origin of this problem: the future and uncertainty. To risk or not to risk valuable resources in search of success evidences?

But the ability to create or obtain them in the beginning of the PDP, or of the NBDP, has a substantial leverage effect on the company's value, which can, in turn, reduce investment cost dramatically. Recent studies [6, 12], point out that maybe there are no other elements that allow such efficient business leverage.

Therefore, product and business success are linked. Business plans formalize an integrated model for investment analysis in the PDP. Companies that need to raise external resources to develop new products will mostly benefit from them.

## 5 Discussions

Although the advantages presented previously are evident, there has been no strong relationship between performance and the use of a formal business plan [6, 11]. Also, there are doubts concerning the effectiveness of the enterprise planning activity as a whole [11].

Most of the criticism on Bps is related to startup evaluations by venture capitalists. One of them is that investors typically focus first and foremost on the quality of a venture personnel; they invest in people not in paper [6]. As there is no way to foresee the future, a team's capacity to becoming reality rather than a fantasy is desired. Therefore, team experience with the proposed business and its formation is crucial.

Another criticism is that not always investors base their decisions on business plans. The dynamics of venture capital investments has demanded faster and practical alternatives to be analyzed than a document that can have as many as 100 pages (with appendices and annexes). Some approaches could be used before the presentation of a complete BP, as electronic presentations, web-sites, two or three pages summaries or synopses, among others [6, 12].

About the BP application in the PDP, research is demanded on how to integrate it operationally. After all, the necessary time for BP writing and analysis can be extensive, therefore they precede all the system synthesis. Thus, in the development of initial phases, when there are many alternatives to choose from, a

more simplified form of model, such as an electronic presentation, or synopsis, could be more adequate to the decision process.

Once the decision of initiating a project is taken, the BP can be of use in decisions such as to approve, to disapprove, to congeal or to recycle the project.

## 6 Conclusions

It was verified that NPD and BP literature are seldom presented in a correlated way. The subjects are generally treated separately, even though they are known to be interdependent.

To capitalize a market opportunity implies in a product and a business existence. A model that represents a system's feasibility and its performance is needed. The BP is a document that has been used to make this model explicit.

The BP is a document that can be adapted for diverse goals. It must incorporate business and product related questions. It can be simultaneously developed with the PDP and be used at the process decision gates, after the initial idea selection. It may be useful, over all, for companies who need to raise external resources for its development projects, as it is meant for the evaluation and capturing of potential investors.

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