

Colophon

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Executive summary

Construction Management and Urban Development 2009-2010

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Graduation program:

Construction Management and Urban Development 2009-2010

Business Engineering

Graduation committee:

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26-08-2010

ABSTRACT

Many high tech start-ups fail in their first years of start-up, which is why the reasons for their failing were identified and reduced by a format business plan design. The start-ups failure rate was 42% within three and a half years after start-up, and 33% for high tech start-ups after five years. The results gathered in this project were directly implemented in a high tech start-up, which the authors set up simultaneously to the graduation project. The project resulted in a format, designed to reduce external risks for high tech start-ups. The high tech start-up of the authors, based on this format, successfully joined several stimulating programs and started with the first pilot within six months.

Keywords: Assets management, Business Flow Model (BFM), Business Plan, Value Disciplines, Business Model.

INTRODUCTION

During the development of a business plan for the entrepreneurship course, an idea grew to start a company for which the business plan, further named as BP, was written. Two things were wished for to become successful entrepreneurs in this field; to create a financially feasible company, and it shouldn't have a big burden on the environment. The BP was written for innovative solar panels and matched with our aspirations. Important to consider when starting up a company in a high tech sector is that many of the companies entering a new market with a new product have a high chance of failing according to the EIM reports Timmermans (2010) and *Monitor nieuw ondernemingschap 2006* (Anon., 2007). Therefore BK Solar wants to investigate the reasons why new ventures fail. By identifying the problems and solutions, BK Solar can increase its own chances of succeeding and surviving.

PROBLEM

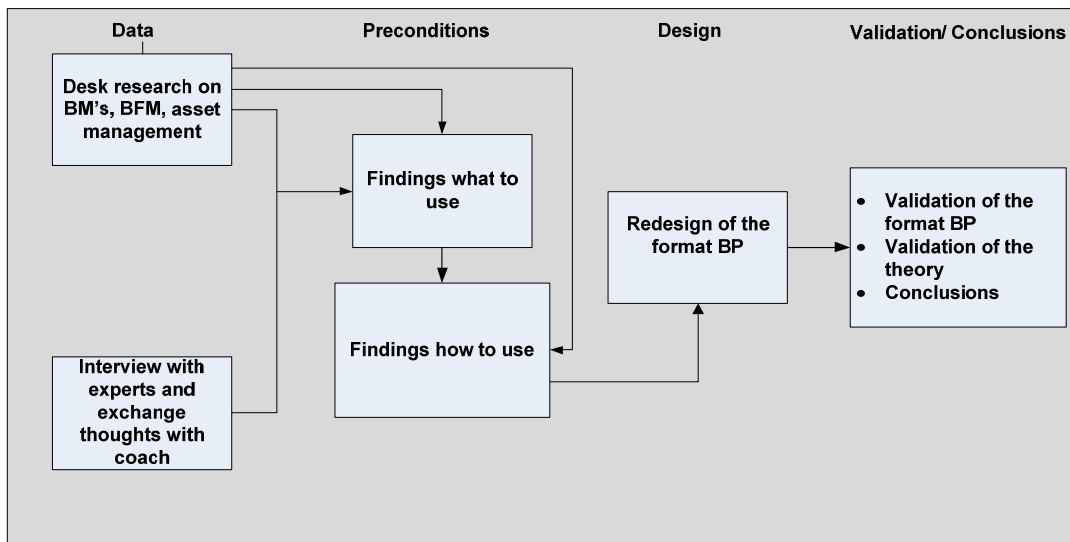
Entering a new market with a new product is proven to be a challenging task since 42% of start-up companies fail in their first three and half years due to various reasons, according to the EIM report *Monitor nieuw ondernemingschap 2006* (Anon., 2007). In the first explorations, it was identified that a company fails due to various Internal and external factors. Important elements for a company success/ failure were identified to be: strategy, assets combined with strategy, product, material assets (money), management, degree of competition, economic factors, political and legal factors.

In order to give a solution for this problem the above mentioned key elements should be managed. A member of the graduation committee suggested that the Business Flow Model, further named as BFM, would be a comprehensive tool to configure the assets and therefore the core of a business. By controlling the core of the business and thus the above mentioned key elements, failures rates might be reduced.

METHOD

The main research question for this research is:

“Can we make a format business plan, by identifying and analyzing the factors responsible for the high failure rates of high-tech start-up in the Netherlands to increase the success chances of the start-ups?”.



In the first phase of the research a literature study was performed. In order to get an answer on the main research question, the sub questions were set up. These bounded the literature research to the necessary topics. In the data phase the reasons for high tech start-ups failures were given. Furthermore, the definitions of business models, value disciplines (strategies), assets and risks were given. The assets definition was elaborated to explain the use of the BFM for the business plan design.

After having performed the extensive desk research, a well-founded theory approach was constructed with all the gathered data. The preconditions were set up based upon this

extensive desk research to show what aspects should be considered for the BP design. The desk research clearly showed that the failures of new high tech start-up companies are heavily influenced by three core elements namely assets, the business model and value discipline/strategy. External factors also have effect on the company's future, but almost none of these external factors can be managed or controlled by the company (competition, economical factors etc.).

The design phase was based upon the pre-conditions. The detailed literature study showed the key elements involved in the company's success, which were also the elements of a BFM and a BP. With the pre-conditions results of this study a design was made. Included in the BP design were the risks involved for start-ups. The new improved BP design was then validated by a panel of experts.

CONCLUSION

The graduation research made clear that reasons of failure of high tech start-ups can be categorized internally and externally. Even though there are several reasons for the failure of high-tech start-ups, it showed that having a high-quality internal foundation will reduce the influence of external factors and increase the success chances. It's identified that the most important internal factors are: assets configurations, stakeholder management, selection of value discipline and strategy based on value discipline, and having a proper business model. The internal factors are the key elements for any start-up venture to be successful. Nonetheless, as it was also discussed that external factors can be partially controlled by the company, but most of them are not under the control of the company. The hypothesis was proved by making a BP design and validating it. The validation suggested that the role of a BFM is vital and that it's a key component in a BP. This means that having a good BFM will make sure that all the necessary key elements are identified on forehand. This knowledge will show whether it's required to take steps to improve the company's BP before starting up. An increase of the success chances of the company is predicted, since external risk factors are reduced with this BP design.

DISCUSSION

The discussion may rise that this is not the most educational BP design that exists. We understand this statement, since our goal was not to educate but to be successful. In the graduation project it was the goal to highlight all important key elements of a BP, in order to have the most successful business as possible for entrepreneurs with an idea. In our research we didn't contact any failed high tech start-up, but based our project on other research documents and advice from business experts. The best possible case study for us was implementing the design in our own company. Whether or not the BP design will have influence on our company survival is difficult to measure for such a short period of time. In order to make an accurate judgment on the BP design, it should be used by several companies followed by a longitudinal study of their success.

Ing. G. (Giel-Jan) Bogaert



The work experience of G. Bogaert started from 1999, starting at steel laser cutting company Bormstaal B.V. From his thirteen he worked for several companies and from 2003 managing several people. In 2009 he worked at P.R.C. on the WoOn2009 project ordered by the ministry of VROM.

In his Bachelors and Masters he also had several board roles: Board members student association Aqua ad Vinum, president for the Hogeschool Zeeland Prom, Competition Secretary for the Rugby Club ESRC, president for the VDCM Symposia "Towards An Energy Supplying Built Environment", and finally treasurer for the study association of CoUrsE!.

C.V.

- 2003 – 2007 Hogeschool Zeeland, Bachelor Built Environment
- 2007 – Now Eindhoven University of Technology, Master Construction Management and Engineering
- 2010 – Now Founder of company Bogaert – Kalyanapu V.O.F.

C. (Chanakya) Kalyanapu



Chanakya Kalyanapu completed his bachelor's in Civil engineering in 2008. During his bachelors program he did various internships at IIT Roorkee and Eindhoven University of Technology. He also was the design head of the MINI BAJA ATV team and was successful in leading the team in USA.

During his Master's program he, along with his colleague, founded the company Bogaert – Kalyanapu V.O.F. The current state of the venture is the completion of the Business Plan and the first pilot.

C.V.

- 2004 – 2008 Bachelor in Civil Engineering Vellore University of Technology Technische Universiteit Eindhoven
- 2007 – 2008 Traineeship at IIT Roorkee
- 2007 – 2008 Internship on Construction Waste Management at Eindhoven University of Technology
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Acknowledgements

During the graduation project and the start-up phase of Bogaert – Kalyanapu V.O.F. by Mr. Bogaert and Mr. Kalyanapu several parties and persons were of great help. On this page we acknowledge their help and elaborate where they helped us with.

The TU/e was of course the main supporter for the company start-up, through lectures and advice the students were motivated to set up their own company. Prof. W.F. Schaefer, Prof. L.H.J. Verhoef and Dr. E.G.J. Blokhuis of the graduation committee, checked and adjusted the path/ progresses that BK Solar followed where they deemed necessary. In the obstacles we encountered they showed to be good mentors.

Furthermore they were supported by the several programs such as Innovation Lab and Brabant's Centre of Entrepreneurship (BCE). Innovation Lab helped to reveal possible obstacles such as the freedom to operate on IP's. The BCE provides the starting entrepreneurs with skills trainings, financial support and coaches.

The coaches J.H. van den Berg and M. Dierselhuis were of great help to introduce the colossal world of entrepreneurship and how to behave in that environment. J.H. van den Berg was the coach that supported BK Solar in the first semester of study year 2009-2010. In this phase he helped with the transformation of the idea to an enterprise. In the second semester the coach M. Dierselhuis supported in the research and further development of the product, which showed to be a bigger deal than expected.

In the first semester the first contact was made with Red Cross Asia who could be a possible customer in the future, since they showed interest in the product. This gave BK demands to work with and an impression of what other customers would like to see.

During the research and development of the product the Energy Centre of the Netherlands, further named ECN, was of great help. They supported the research and development with advice and materials. With the support of ECN the first demos were produced. By this collaboration BK avoided making a big financial investment (though for students still relatively big).

Other support came from the Kenniscluster Energy Neutraal Wonen in Eindhoven (KENWIB) program, which was more than stimulating for company start-up. We would like to thank all the persons who are working in this program and contributed to this support.

Last but not least the family and friends of Mr. Bogaert and Mr. Kalyanapu were of great help. The support was shown in a variety of skills. C. van Langelaan supported the financial side of the company, J. Korf supported the commercial designs of documents, and C.J.M. de Hoon supported the research approach.

To all who helped, thank you very much.

1. RESEARCH LAYOUT

1.1. Introduction

In this Chapter, the introduction of the graduation project and start-up of Bogaert - Kalyanapu V.O.F. further named as BK Solar, is given. The idea to combine the company start-up with the graduation emerged when the KENWIB atelier was introduced. During the introduction it was stated that this atelier would stimulate new ventures which could make their contribution to make the Brainport region energy neutral by 2020. The two founders of BK Solar had the ambition to valorise an invention of the TU/e which could contribute to this challenge. With the support of the graduation committee the graduation project emerged and so was the company BK Solar of the founders. In the research layout the general problem of our graduation project (and start-up of our company) is introduced along with the hypothesis. These will be answered by conducting this graduation project according to the given research model in *chapter 1.4*. The research model contains the steps to be followed in the graduation project in order to have a systematic planning to improve the company's chance of success.

1.2. Context

During the development of a business plan for the entrepreneurship course, an idea grew to start a company for which the business plan, further named as BP, was written. Two things were wished for by the entrepreneurs; a financially feasible company and it shouldn't have a big burden on the environment. The best choice would be to enter a new market having great potential with a unique new sustainable product. The product Solar Flex, see business plan *appendix D*, is such a product. Important to consider when starting up a company in a high tech sector is that many entering a new market with a new product have high chances of failing. Failing is considered to be stopping the company due to negative factors (bankruptcies, product fail, etc.). It's clear from *figure 1* that there is a high percentage of failure for start-ups, therefore BK Solar wants to investigate the reasons why new ventures fail. By identifying the problems and solutions BK Solar can increase its own chances of succeeding and surviving.

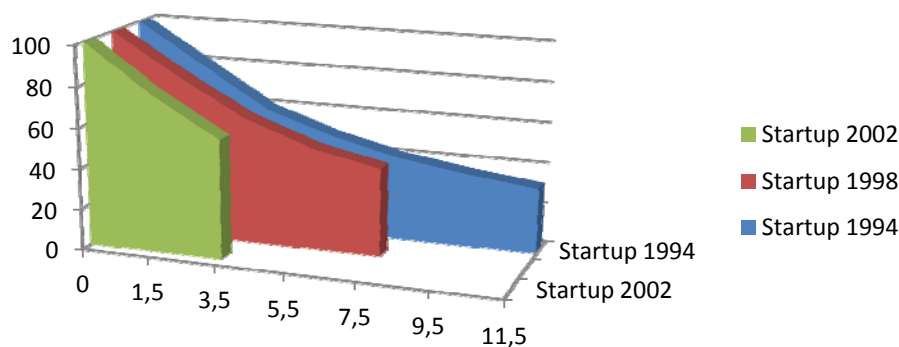


Figure 1 - Failure of start-ups in the Netherlands

1.3. Research approach

1.3.1. Problem

Entering a new market with a new product is proven to be a challenging task. The problem is that there is a high percentage namely 42%, according to EIM report *Monitor nieuw ondernemingschap 2006* (Anon., 2007). These companies stop due to various reasons in the first three and a half year. In the high tech sector 33% of the companies stopped after five years according to the EIM report Timmermans (2010), which is in our eyes still high. In the rough first explorations, it was identified that a company fails due to various internal and external factors. Based on this we conclude that there is a problem, which needs to be explored and preferably solved before BK Solar is set up. We therefore set up the main question and sub questions, which are based on the problem i.e.:

Problem: “There is a high failure rate amongst the high tech start-ups”

Phrasing of the Question

Main Question: “Can we make a format business plan, by identifying and analyzing the factors responsible for the high failure rates of high-tech start-up in the Netherlands to increase the success chances of the start-ups?”

In order to answer the main question the following sub questions need to be answered. The questions are categorized according to the themes. Answering the questions will be done in the shown paragraphs chapters of this document.

Failure of High-tech start-up

- § 2.1 *What are the reasons involved with failures of high tech start-ups?*
- § 2.1 *What are the internal and external factors responsible for the failure of high-tech start-ups?*
- § 2.6 *What are the risks involved for high tech start-ups?*

Business flow model

- § 2.3 *What are the various company assets?*
- § 2.3 *What is the relation between assets and firm capabilities?*
- § 2.4 *What is a strategy and is it important in company development?*
- § 2.4 *What are the value disciplines?*
- § 2.5 *What are the business models and why are they important?*
- § 2.5 *What are the most commonly used business models?*

1.3.2. Hypothesis

The graduation project will contribute to the stimulation of new ventures. For us this means stimulating our own new venture and therefore the postulate H1 will be validated. We think that answering this postulate will increase the success percentage of BK Solar.

H1 – Making a sound foundation, which includes a business plan design for high tech start-ups can reduce the external risks, increasing the success chances of the start-up.

One of the graduation committee members suggested the Business Flow Model, further named as BFM, to be a solid tool to configure the assets and therefore the core of a business. This model is shown in *figure 2*, and used in *chapter 4* for the design. We also believe that the BFM is a proper tool to control the assets configuration of high tech start-ups and thus can reduce the failure rate. This claim is made, because assets form the core of a company, which was revealed in the literature study for the graduation proposal. In this graduation report we will design a BP approach, which also includes a BFM allowing the user to identify and configure the critical assets of the high tech start-ups. We believe that further studies are necessary to input the design as successful as possible, which is why in the chapter seven several recommendations are done.

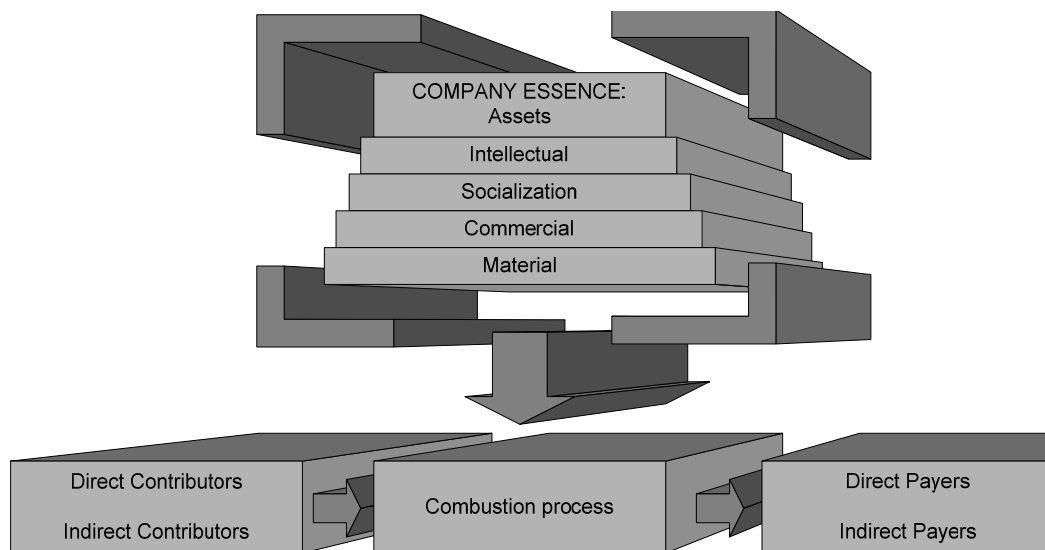


Figure 2 - Business Flow Model

Figure 2 above shows the BFM and a overview of the relationships between each entity of the model. The management of assets and process is critical since they contribute to the increase in assets and efficient combustion process respectively.

As shown in *figure 2*, the direct and indirect contributors play an important role, because they are the ingredients for the combustion process. In this process the actual productions/ services

takes place. The combusting process leads to the revenue of the company, which is a cycling process.

The payers are the clients, which pay for the product/service. Indirect payers can be organizations that stimulate the product by advertisement or subsidies, such as the government is currently doing for innovations.

1.4. Research model

The research model set up for this graduation project is shown in *figure 3*. The model gives an overview of the necessary steps in order to test our hypothesis and achieve the results.

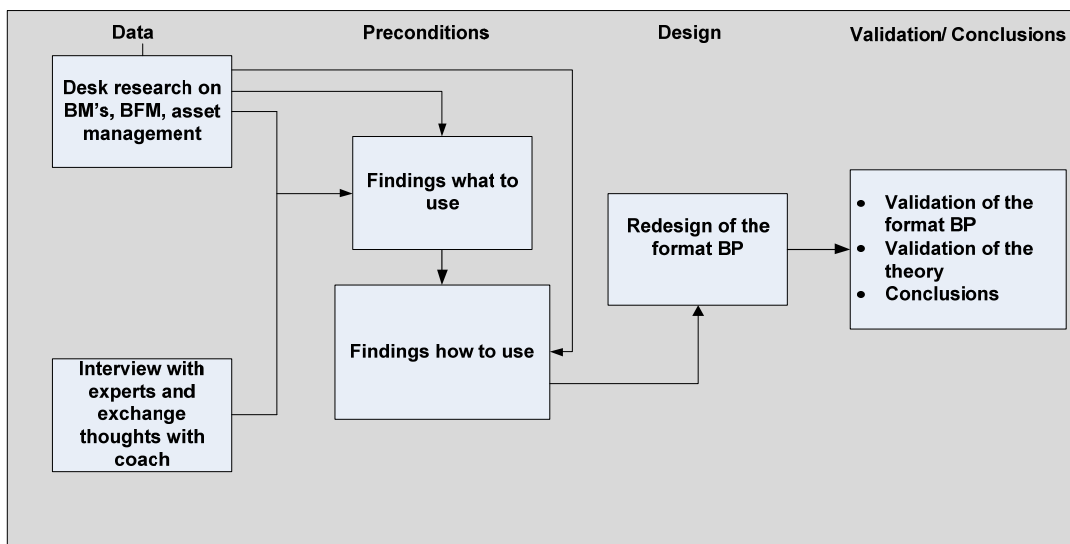


Figure 3 - Research Model

1.4.1. Research method

The research method is an explorative desk research. This method is aimed to gather information that will be used for checking and, if needed, improving of the BP produced at the end of this graduation project.

1) Data

In the literature study done for the research proposal, it was found that many start-ups fail. The company fails due to various reasons, but all can either be categorized to internal or external factors. As stated in the hypothesis we believe that a solid foundation for the internal factors will exclude and/ or could cover the external risk factors. It is therefore important to explore the three main subjects of internal factors which are assets management, business models, and BFM's.

Assets management

The configuration of assets is very important for the growth possibilities of the company and the goals on the longer term. These goals often imply bigger events/ milestones such as expanding from a two man company to a 100 man company. These goals often can't be reached within the short-term and can mean a change of company's direction. The company will fail if there is mismanagement in the asset configuration and growth, because it will cause a wrong strategy focus.

Besides the previous mentioned topics, discussions with professionals, such as coaches, will be done simultaneously. These discussions will support the choice of "what to use" and "how to use" the findings.

Business models

Business models are the core of every company and can be seen as a translation of the chosen strategy. In order to understand the linkage between value discipline and BM's, desk research should be done on this topic. Several BM's will be explained.

Business Flow Model

The BFM is a tool for managing short term goals. The first step is confirming whether the BFM is sufficient as a tool for managing the short term goals. This confirmation will be done by performing a desk research. Related journals will be used for the following topics; strategy, assets, and an exploration of valuable contributors. Any important aspects which can improve the BFM will be processed to form an improved BFM.

It's important to elaborate the BFM in order to give an impression on how the model works and how we categorized it. In short the combustion process contains all the activities of the company. These activities are driven by the contributors (stakeholders) and the payers (customers). In order to be successful, a company relies on its assets, which is why they are the focus of this document and are discussed during the graduation process.

2) Preconditions

After having performed the extensive desk research, a well-founded theory approach can be constructed with all the gathered data. This includes forming the theory for the improved BP design, checking the strategy of BK Solar and configuring the assets. It's Important to first describe what findings were relevant as implementation, and secondly how they are going to be implemented.

3) Design

One of the practical implementations will be the processing of the findings into the BP design and improving it. No format is used for setting up the BP, but the preconditions and theory will be the guiding tool for this. Later the implementation is done by processing all the findings into the company.

4) Validation/ Recommendations

The BP and the theory behind it is validated in this phase. It will be done by discussing it with a panel of experts. These experts will be carefully chosen in order to reveal the weaknesses and strengths of the design and theory. Important to mention here is that this validation will not be done to claim whether the BFM is wrong or right.

1.4.2. Framework

By using the business model, BFM and asset management a frame can be set up to cover the external risks that high tech start-ups face in their first years. The Framework, shown in *figure 4*, will be used to improve the success percentage of BK.

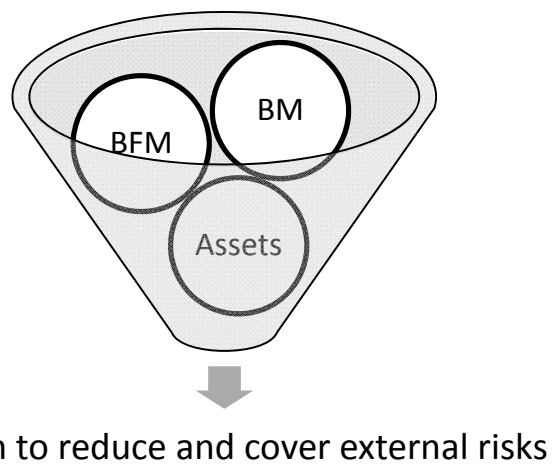


Figure 4 - Research Framework

1.5. Chapters: Guideline for the graduation report

This report consists of eight chapters, which describe the graduation project and its conclusion. In the first chapter the research approach and method will be explained, followed by the desk research. An important part of the second chapter is the identification of risks. With the findings of the desk research the preconditions (chapter three) and design (chapter four) can be formed. These will form the basics and theory for the implementation in BK Solar.

In order to check whether our findings are correct, a validation will be done in chapter five. This is done through presenting our BP design to a panel of experts and explaining how and why we think this method/ path is comprehensive.

Chapter six is the simulation/ progress part, where the practical effects of the graduation research are shown. In this chapter the entire process of BK Solar will be explained and the underlying reasoning to take certain decisions will be given. The developments of the assets are shown to reflect the company progress to mature state. This is also to show whether the developments that BK Solar made are sufficient to continue with the company.

Chapter seven will contain the conclusions of the graduation project. In this chapter conclusions will be made on whether or not the BP design is a proper tool to increase the chance of success for high tech start-ups, whether it is a better way of setting up a BP than through the traditional BP formats, and whether or not BK Solar can be seen as an example for starting up a company for students. The final chapter will contain the references of the diverse sources used during the graduation project.

2. DESK RESEARCH

2.1. Introduction

In this chapter, the failures rates of start-ups and reasons for those rates are explored. The critical reasons or factors on why there is a high percentage of failure are identified and discussed below.

Before narrowing down on the problem, the failure rates of the USA are explored in *chapter 2.2*. Parallel to identifying these numbers will also be the identification of the reasons for their disappearing. The second important subtopic for the desk research is the elaboration on the assets followed by business disciplines and strategies, business models, and finally risks.

In order to give a solution for the research problem the key elements mentioned in *chapter 2.2.2* should be managed. We think that by controlling the core of the business and thus the above mentioned key elements, failures rates could be reduced. This is why the BP design has a substantial size in this report along with assets, business strategies/value discipline and business model which are the key elements of a BFM.

2.2. New venture Failure Rates

It was always known that start-ups have high closure rate which are believed to be failures. It was also said by Philips and Kirchhoff (1989) that out of ten new businesses nine close down in the first year. But the recent studies done by Duns and Bradstreet in the USA indicated that 76 percentages of new firms were open in the first year and 38% after six years. In the Netherlands 77% still exists after one and a half year and 50% after five and half year. For high tech start-ups the numbers are different i.e. 33% fails after five years according to EIM report *Monitor nieuw ondernemingschap 2006* (Anon., 2007). This shows that there has been a significant improvement in success ratio of the start-ups from 1989 until now. However still many close down and in this chapter we'll find out what causes these closedowns.

In this chapter we answer the following questions:

- *What are the reasons involved with failures of high tech start-ups?*
- *What are the internal and external factors responsible for the failure of high-tech start-ups?*

2.2.1. Developments in new high tech start-ups

Figure 5 on the next page shows the percentage of success of start-ups in the U.S. According to the Bureau of the Census produced for the Office of Advocacy of the U.S. Small Business Administration six out of ten companies close down after six years, i.e. the failure rate is 60% for the USA. In the Netherlands this number is 50% so five out of ten start-ups survives the first five and a half year. (Scott Shane, April 2008).

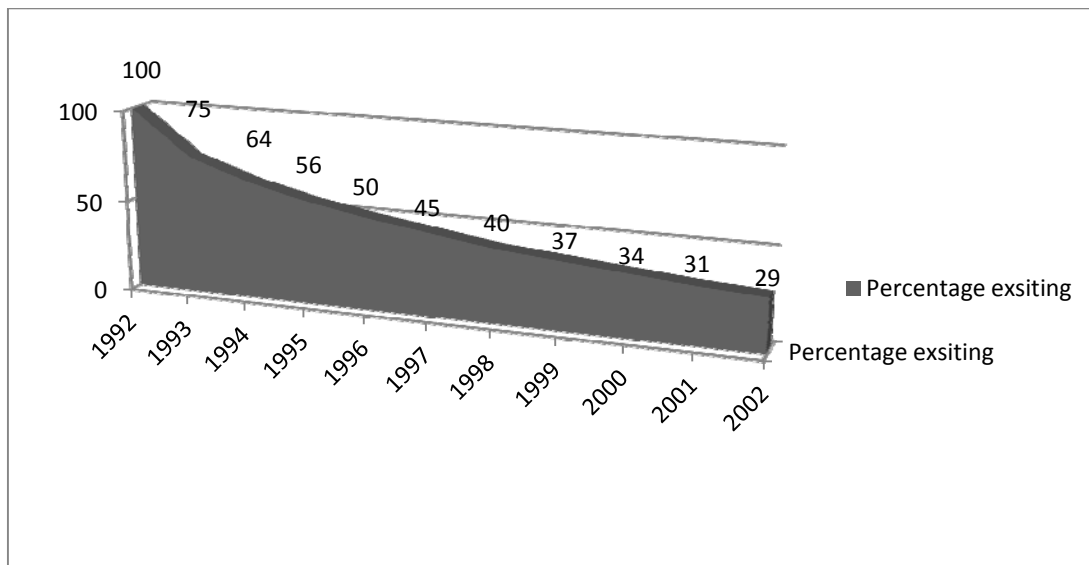


Figure 5 - Failure start-ups in USA (Scott Shane, April 2008)

Don Creswell (2008) says that for any new product launch there are high chances for the product to fail. Interestingly it also said that out of four new projects that enter development phase only one makes it to the market. And similar only one product is launched after successful research and development.

We can conclude from the interesting facts mentioned by Don Creswell (2008) that, a new product launched by a new start-up company has a high chance of failing in the today's market. This is also confirmed by the high failure rates, which means that they are not good propositioned in businesses today. This also indicates that new high tech start-ups need to be cautious and must have well planned business models, strategies etc.

Figure 6 was taken from the journal written by Stevens, G.A and Barley, J. (1997) which clearly illustrates how the actual scenarios are i.e. only out of 3000 raw ideas only one product is successful after its final launch.

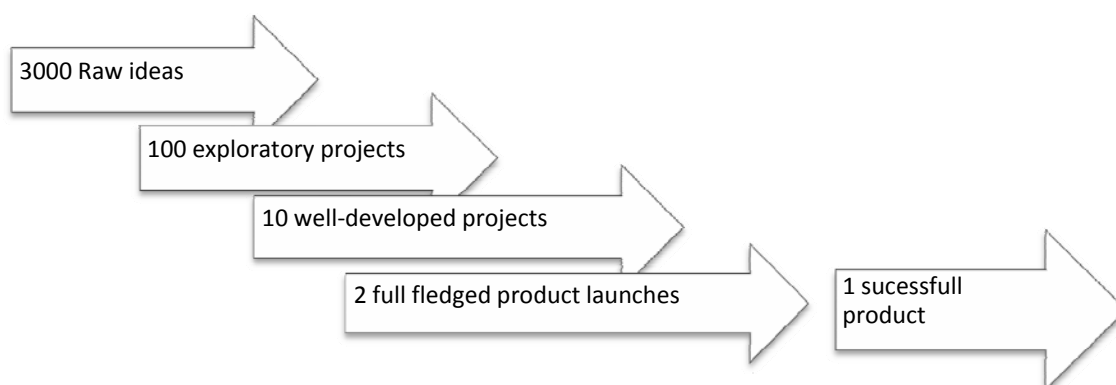


Figure 6 - From idea to successful product

2.2.2. Key elements involved with New Ventures failure

So far we've seen that nearly six out of ten businesses are gone within the first four years of operation as shown in *figure 1 and 5*. This research was done by U.S. bureau of labour statistics and EIM. Still the myth of 90% failure rate is considered valid by many companies. For BK Solar this means that it's vital to find out what the reasons are for new ventures to have big failure rates. Failure of the firms can be categorized into internal and external factors. Internal factors are mainly related factors which are within the business organization for example management, strategy etc. It's also known that business cannot only function within a vacuum of closed space internally, naturally the events that occur outside the business boundaries are also responsible for the success or failure of a firm. These external events will have effects on the internal functions of the firm and might affect the strategies and objectives.

It was identified that in new firms the absence of given resources (assets) could limit the growth of that firm while the presence of given resources could stimulate growth in such firms (Penrose 1959). A company or firm can be seen as composites of various resources (assets). This stress on resources is supported in the entrepreneurship literature, which records that a principal cause of high-technology firm failure is a lack of resources (assets). (Brutona, Rubanikb, 2001). We can name these resources in a company as assets. There are four main assets for a company which are; the intellectual assets, commercial assets, socializations asset and finally the material assets. The four assets also form the core of the BFM in *figure 2*, and should be configured accordingly. It's identified that assets are also critical in a sociological point of view. These assets will be explained in *chapter 2.3*.

However, it is also argued that liability of newness of start-ups could be eased by the nature of the firm's founding characteristics (Eisenhardt, Schoonhoven 1990). The founders of the firm, the innovativeness of product(s), and the firm's position as a first mover in the market can mitigate the liability of newness since these characteristics impact the accessibility of resources. The selection of the right strategy plays a major role to factor the firm success. These strategies have an influence on the company. At the same time the combination of many different factors have effects on new venture performance (Vesper 1990).

Garry D. Brutona and Yuri Rubanikb (2001) also mentioned that if the responsibilities to the stakeholders of the organization, including employees, suppliers, the community as a whole, and customers, as well as the owners are not met or satisfied, this contributes to the failure of company. Start-ups often don't establish relationships, roles and routines, such as external and internal interconnections which are vital. Start-ups have higher chances of failure than mature firms principally, because they have not established relationships with suppliers and customers or established roles and routines within the firm. This absence increases the pressure on material assets due to the fact that start-ups have limited availability of resources. (Eisenhardt, Schoonhoven, 1990).

Bruno et al. (1986) argued that the lack of financial resources is also a principal cause for start-ups to fail. Here we can assume that from now on financial resources can also be considered as

material asset of the company. For any start-ups the role played by material assets is vital for company's success. Martin and Justis (1993) also pointed out that access to capital was one of the most critical resources for the success of new firms. Resource theory also claims the fact that assets configuration has an important role to play in a company's success.

In the previous paragraphs only internal factors have been discussed, but as explained earlier external factors also contribute towards the failure of the business. Some of these external factors can be controlled by the company, but most of them are completely uncontrollable. External factors can be categorized into two type's namely external micro and external macro environment. External micro environment includes factors which can be partially controlled by the organization like suppliers, warehouses, wholesalers, distributors etc. while the external macro environmental factors are those which are completely out of company's control. These factors are not only implied for that particular organization, but for all the companies i.e. country as whole. Some of the important external macro environmental factors are degree of competition, economic factors, political and legal factors, technology, social and cultural factors etc.

It's now clearly understandable that internal factors are controllable within the company, but that the external factors are out of the company's control. It can be concluded that if a good solid and structured internal foundation is made, irrespective of the external reasons, a company can survive and it increases success ratio.

2.2.3. General new product development

In *figure 7*, which was taken from book written by Charles M. Mayo (2007) , 2nd edition published by encyclopaedia. The title of the book is "New product development process, factors and strategies". It shows the phases that a new product development process includes are shown. A high tech company start-up will go through all these phases and as shown in *figure 6* many of them fail in the process. The road to commercialization is with many pitfalls as indicated by the failure rates, therefore this overview is considered in the risk analysis described in *chapter 2.6*.

New Product Development Process, Factors and Strategies

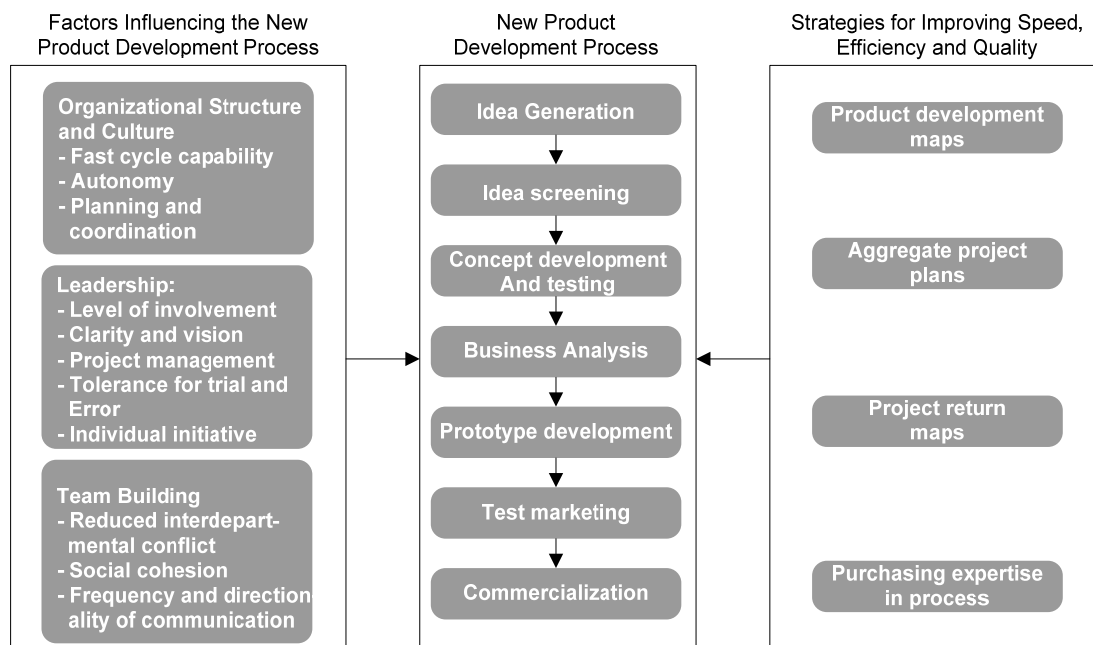


Figure 7 - New product development process

According to Bell Mason Groups, innovations responding to global changes are due to the aging population, rapid urbanization & globalization, climatic and sustainable changes. It was also mentioned that ventures introducing a new product or solutions in a new market requires a new business model with higher than average risks. New ventures should focus on developing new capabilities and it is said that it's a voyage of discovering the business with a time scale. Another important factor is that new ventures have a low asset base and high risk tolerance. Maintaining the external network is also a key for success.

Bell Mason explicitly describes that it's because of conflict of interests (especially in the early stages) between venture and business units regarding business model. Market strategy & channels, communication and value network are key control points and are some reasons for failure of new ventures. Bell Mason Frame work says that for any successful venture it is necessary to define the stage processes.

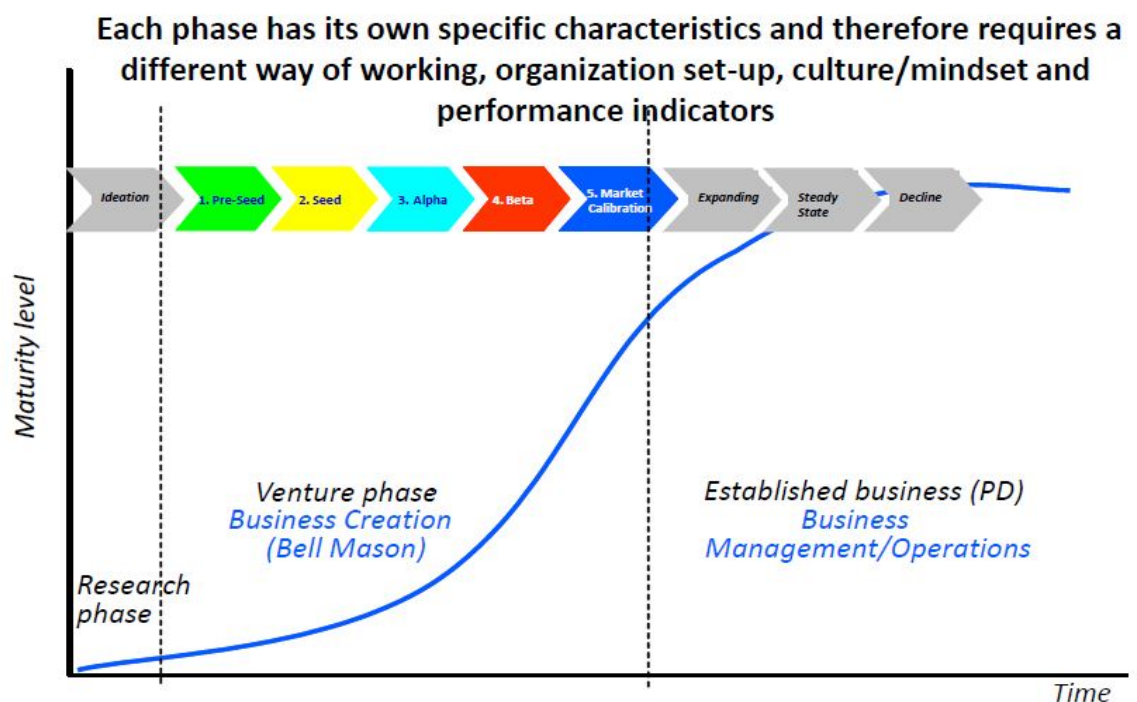


Figure 8: Phases during the development of the company

Figure 8 was produced by Bell Mason (2009), which clearly identifies the life cycle stages involved for new venture development and which phase is related to which stage. Bell Mason model says that the venture phase (involving PRE SEED, SEED, ALPFA, BETA and MARKET CALLIBRATION stages) is the critical phase of business development of start-ups.

The critical dimensions of the venture development mentioned in the Bell Mason Framework are shown in figure 9 below:

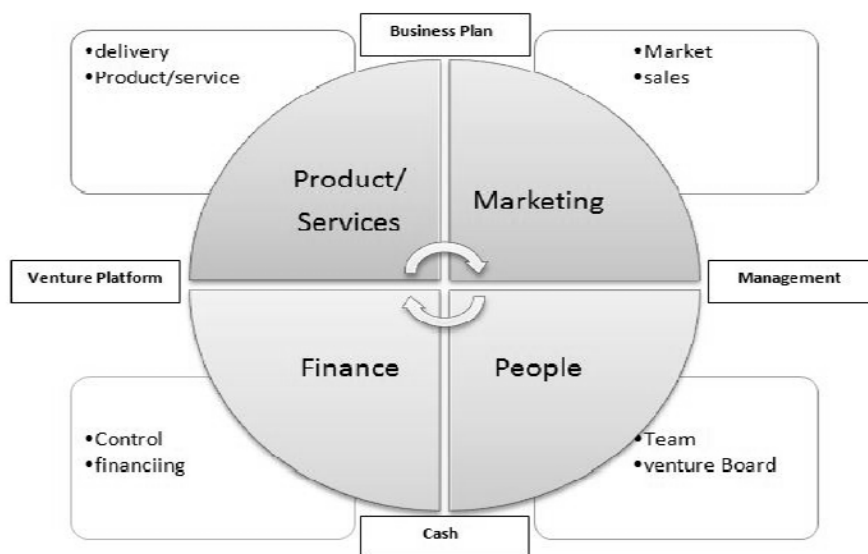


Figure 9: Critical dimension

Some of the critical dimensions involved in the development of new venture are found to be internal and external factors which are responsible for the success or failure of the company. For example one of the critical dimensions *People* (management, team, venture board) fall under internal factors and *Marketing* (market) fall as the external factors. They can also be partially categorized into various assets. This fact assures that it's vital to consider all these factors during the start-ups of the business.

According to Bell Mason a concept business plan including a business model should be defined at the PRE-SEED stage itself. The business plan will then be formalized or approved at the SEED stage. ALFA and BETA stages are most critical stages of the new venture according to Bell Mason framework. ALFA stage deals with the situations like testing the prototype with a pilot customer, identifying and prioritizing the next customers, having a defined road map etc. which are vital information to be gathered and processed and are required for smooth transition into the BETA stage. In the BETA stage it's mostly confirmation of results (product/service testing) and the test results are factored in the business model.

2.2.4. Conclusion

It's clear from the above literature study that failure rate of new start-ups are still high. Through the recent advancements and development in entrepreneurial literature the failure rate for new start-ups after four years is around 60% (USA) and 50% (Netherlands). Two types of factors namely internal and external factors are responsible for the success or failure.

The below stated sub questions are now answered:

What are the internal and external factors responsible for the failure of high-tech start-ups?

It's identified that the most important internal factors are: assets configurations, stakeholder management, selection of value discipline and strategy based on value discipline, and having a proper business model. The internal factors are the key elements for any start-up venture to be successful. External factors can be categorized into factors which can be partially controlled by the organization like suppliers, warehouses, wholesalers, distributors etc. while others are completely out of company's control.

Nonetheless, as it was also discussed that external factors can be partially controlled by the company, but most of them are not under the control of the company. This further strengthens the claims made in the H1 postulate, because if a strong internal foundation is made on the internal factors there is a possibility of reducing the effects of external risks.

As described in the Bell Mason Model there are three phases during the growth of the company. When it comes to ventures phase there are various stages involved. And it's during the maturity phase where most of the development takes places, shown as a steep rise as in figure 8. This means there should be a strong focus on this phase since this vital for the development of the company.

In chapter 1.4.1., the important elements identified are in line with these findings. Furthermore it can be noticed that all the key elements are the attributes of a BFM as shown in the figure 2 and constitute a bulk of the business plan.

What are the reasons involved with failures of high tech start-ups?

Important reasons for a company failure were identified to be:

- *Lack of Strategy*
- *Assets not matched with strategy*
- *Bad product*
- *No attention on material assets (money)*
- *Inefficient management*
- *Degree of competition*
- *Changes in economic factors*
- *Political and legal factors*

There are also other reasons like financial resources, but we assume that this is a part of material assets. Therefore it's important to understand what these mean and necessary to investigate more which will be done in the following sections.

2.3. Assets

Depending on the chosen value discipline, the importance of assets and their role in the business model changes, which show the inter-relations between the value discipline and the assets. This means that for any start-up it's quite important to choose the right value discipline to form the right assets configuration, which plays a vital role on a longer period of time.

The following sub questions are answered in this section:

What are the various company assets?

What is the relation between assets and firm capabilities?

2.3.1. Intellectual assets

Definition: New innovation-oriented activities which rely largely on research and development, patents, software, human resources and new organizational structures – collectively referred to as intellectual assets.

Intellectual assets have been proposed by Edvinsson and Malone as a technique for quantifying a company's intangible assets Harper (1997). We know that "A good idea is worth gold", which can also said that the idea will significantly increase the value of the company if it's protected, exploited and utilized properly. For many years, strategy theorists have been paying great attention to the idea that organizations comprise a body of knowledge. Now in the age of Information technology knowledge has become a vital entity for the competitive success of a company. It's also mentioned that knowledge must be managed effectively in people and

organizations, to ensure that wealth-creating capacity is maintained and also the capacity to manage knowledge attends to be a critical skill (Martinez-Torres, 2006).

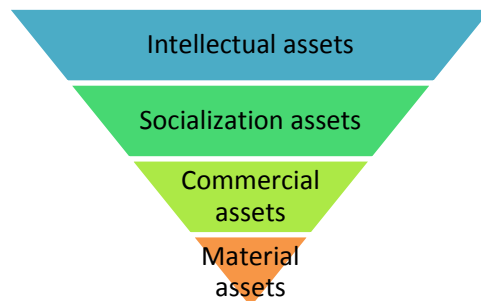


Figure 10 - Assets configuration

Figure 10 above represents the hierarchy of the assets for any start-ups. Intellectual assets are at the top. This is due to the fact that new start-ups companies have an idea which they need to protect and make use of it so that the company can progress.

In all the firms there is something valuable beyond the physical asset. This valuable asset was identified to be the intellectual property which the firm possesses and this creates value to the firm (Tobin & Brainard, 1977). These intangible assets are mostly recognized as the possession of knowledge. In combination with innovation this knowledge will have a vital role in the company development. According to Penrose (1959) any firm can be characterized as a Knowledge storehouse.

Winter (1997) suggested that knowledge, if possessed from the beginning of the start-up of the company will lead to competitive advantage. By this we can note that a new start-up can only gain support and strength if the intellectual asset is present from the start.

2.3.2. Socialization assets

Definition: The social resources upon which a company draws in pursuit of their objectives. It is about the quality of relationships among people and the extent to which one can count on support by the family, stakeholders or mutual assistance.

An emerging definition of socialization is the level of interaction between, and communication of, various actors within and between the firms. This interaction and communication leads to the building of personal familiarity, improved communication, and problem solving (Gupta & Govindarajan, 2000). Another definition is that socialization is the process by which an individual acquires the social knowledge and skills necessary to assume an organizational role (e.g. the process of “learning the ropes”) (Van Maanen and Schein, 1979).

The socialization asset can be related to customer intimacy strategy, because according to the customer intimacy value discipline a company provides its services or products according to the

requirements of the customer. The company will always try to improve or enhance the products for the current and/ or future clients.

It is also a known fact that without establishing social ties between buyers and suppliers in the supply chain the performance of the company is affected. Socialization is often considered to be of less importance, but it plays a larger role within the organization itself establishing and maintaining the relations.

According to Paul d cousins (2005), there are two forms of socialization namely formal and informal socialization. This paper also says that partners try to learn about the other's culture, establish whether there is the potential for alignment, and in some cases, adjust their behaviour accordingly to establish successful outcomes. Socialization acts to connect individuals across both parties, with the resulting pattern of close interaction creating a network of interdependent social exchanges, and increasing the level of mutual trust and respect present in the relationship.

There are a number of ways a company can look for improving the socialization assets to improve the inter-firm relationships, such as:

- Buyers- suppliers conferences
- Making suppliers as a stakeholders
- On-site visits
- Having a good contract
- Benefits through profits sharing etc. (2% of profit will go to suppliers, in order to stimulate the delivery the best possible component, since if we sell more they earn more.)

2.3.3. Commercial Assets

Definition: According to Hardjono W. (1995) the commercial competence is defined as the ability to have access to and to act on markets and the skill to execute commercial transactions of an organization. An increase of this competence will make it more interesting for customers. This is due to the fact that this will lead to a growth of market share and also the growth of experience.

If a new product is developed, the marketing strategy is very important. This marketing strategy should be based upon the market itself and be linked with the company assets. This strategy gives an indication about which assets are important and how they should be improved. On the other hand the assets are the base to choose a strategy from, so it is quite interrelated.

According to Kwaku et al. (2006) the marketing strategy innovativeness, further named as MSI, can be positively influenced by the team's extra industry relationships and market dynamism. It is important to remember that product innovation doesn't mean much without the proper successful commercialization. Kwaku et al. (2006) claims that *"Examples of MSI practices include*

the use of new packaging, new distribution methods and channels, new advertising media and content, ingenious pricing and payment methods”.

2.3.4. Material Assets

Definition: Tangible resources possessed by a company refer to material assets of the company and are the easiest to evaluate since they are visible and quant-sizable. This asset can be shown in the balance sheets since its mostly constitute of physical and financial asset. It also constitute of organizational resources. According to Hardjono, material asset may be defined as the tangible resources possessed by a company and its growth (or decline) is reflected by the changes in cash-flow or profit on the balance sheet.

2.3.5. Relationship between Assets and Firms Capabilities

There is also a relation between the firm’s capabilities and assets which can be called as resources as a whole. K. Hafeeza, N. Malakb and Y.B. Zhangc (March 2006) quoted that resources are inputs into the production process, and the firm capability is the capacity for a team, to perform tasks or activities.

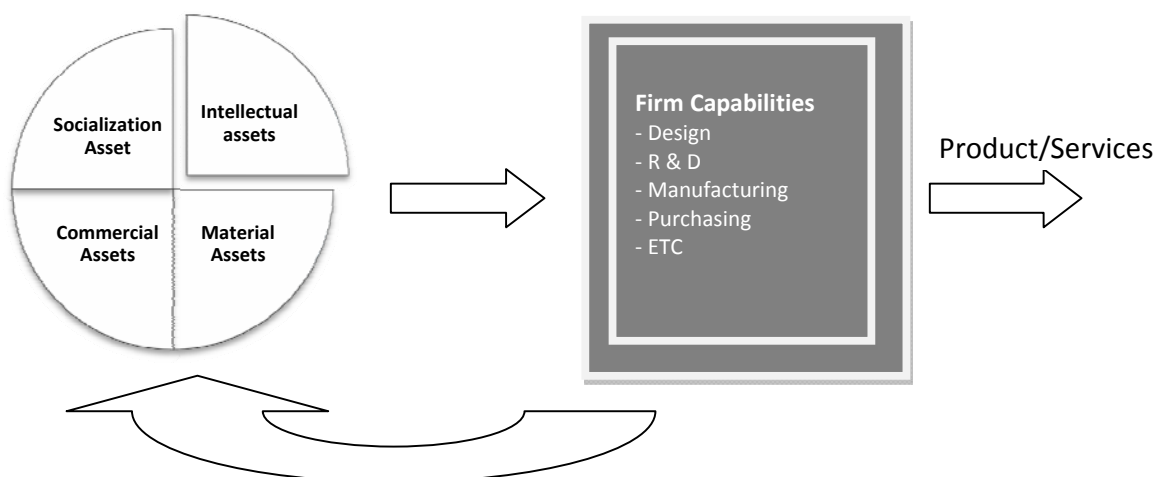


Figure 11 – Interrelation Assets and Firm Capabilities

The above picture shows the relationships between the firm’s capabilities and resources. As it can be noticed it’s a cyclic process between resources as a whole (assets individually) and capabilities of the firm, i.e. if any assets’ strength increase or decreases it reflects the firms capabilities and in turn effects the final product.

2.3.6. Conclusion

The below stated sub questions can now be answered:

What are the various company assets?

The review on literature concerning assets makes clear that assets are vital and have a important role to play in either the company's success or failure. Having a solid Intellectual asset

is necessary during the start of the company and should be higher compared to the other three assets. Possessing extensive Socialization assets are also necessary, which makes sure the company maintains a good working relation with the involved parties (internally and externally). Having sound Commercial assets makes sure that the company is able to understand and act according to the market needs. Finally Material assets have a huge role to play when the company matures, because they reflect the company's growths which in turn depend on cash flow or profit on the balance sheet.

What is the relation between assets and firm capabilities?

It was identified that there is a relation between resources and a firm's capabilities which highlights the importance of the assets. It can be understood from figure 11 that assets contribute toward the firm capabilities and lead to generation of a product or service. Also any increase or decrease in firm capabilities also has an effect on assets and resources as a whole. From the desk research it can be concluded that the configuration of assets towards the chosen value disciplines plays a vital role.

2.4. Business Disciplines/Strategies

The stated sub questions below are answered in this chapter part 2.4:

What is a strategy and is it important in company development?

What are the value disciplines?

To answer the sub questions, different types of strategies will be explained. In order to do so the definition of strategies according to Johnson and Scholes (Exploring Corporate Strategy) is given:

"A strategy is the direction and scope of an organization over the long-term: which achieves advantage for the organization through its configuration of resources within a challenging environment, to meet the needs of markets and to fulfil stakeholder expectations."

This means that if these questions below are answered, a firm's strategy is known or defined:

- Which direction is the business heading to in the long term?
- Market scope and activities involved in such markets?
- What competitive advantage does the firm have over others?
- What resources (skills, assets, finance, relationships, technical competence, and facilities) are required in order to be able to compete?
- What are stakeholder requirements, demands and expectations?
- Who are involved in the business?

It's been said that high-performance organizations know that resources must be allocated to develop a sound and matching strategy (Carter et al., 2000). There are three main types of "value discipline" identified in the book written by Treacy and Wiersema (1997), which are

Operational Excellence, Product Leadership, and Customer Intimacy. Furthermore the publication "The Discipline of Market Leaders" by Michael Treacy recommends that companies need to choose their value discipline based on the needs and vision. Depending on value discipline the strategy should be developed and evolved.

2.4.1. Operational Excellence

Firms following this value discipline and entering the market are dedicated to provide the lowest cost goods and services, while at the same time minimizing problems for the customer i.e. reducing inconvenience. The basic theme is to sell or offer services as cheap as possible without any difficult installation procedures. Few examples of companies following this value discipline could be Wal-Mart and McDonalds.

It virtually means "Best price with least inconvenience".

Firms following operational excellence as their value discipline have to follow some certain discipline, like managing people efficiently (i.e. training the employees thoroughly and effectively) is a must and at the same time it has to be done at low costs. This way of training the employees will improve the overall capacity and increase the productivity of firm. All the transitions between the suppliers and firms should also be managed and organized efficiently. The firm also needs to have a dedicated measuring system to reduce the costs and quality of the product or services offered regularly. This is done by measuring and at the same time identifying ways to reduce the costs. Managing the expectations of customers is another important key discipline which a firm needs to follow.

2.4.2. Product Leadership

Firms who choose product leadership as their value discipline provide the best possible products / services in terms of uniqueness, features etc. to the customers. The firm's basic ideology is to be the leaders in the markets in terms of products offered (Be the best at what they deliver) and at the same time push performance boundaries. The examples could be Nike, Apple and Intel.

"Innovation that delivers the best products" or "Offer products that push boundaries"

The company must be able to encourage new innovative ideas by encouraging small working groups, with an 'experimentation is good' mind-set and at the same time must understand the risks involved. They must plan accordingly to make sure that the new ventures pay off. The company must also recognize that the success and future prospects are in the hands of intellectual design people and should support and encourage them.

2.4.3. Customer Intimacy

Companies following customer intimacy as their value discipline select and concentrate one or very few high value clients. So basically they concentrate on a niche market. The company continuously tailors the product or services to fit the increasing demands or requirements of the

customers followed by an obsessive effort at getting to know these customers in detail. The basic philosophy is about delivering what specific customers want.

“Deep customer relationships for customized results”

Companies following customer intimacy need to make sure that they serve the clients demands by providing full range of services. Anticipation of customers’ requirements by the company is a must because the company has to be a step ahead in making sure they materially improve their products or services offered.

2.4.4. Resource Enrichment

Firms following this value discipline mainly focus to customer growth and realization of higher values (Gerstberger, 2007). Quinn & Rohrbaugh suggested it relates to human relation model. Here there is more emphasis on internal situation and focus on the needs of individuals. Products and services are based on the needs of individual customers which reduces the market scope. The idea is that the firm tries to realize its potential by raising the human spirit which once again constitutes towards internal situation of the company (Gerstberger, 2007). The most effective firms are those where leadership is aligned with their strategic focus. In this case the leader should be charismatic because he has to build up trust and commitment.

2.4.5. Conclusion

The below stated sub questions can now be answered:

What is a strategy and is it important in company development?

“A strategy is the direction and scope of an organization over the long-term: which achieves advantage for the organization by configuration of its resources within a challenging environment, to meet the needs of markets and to fulfil stakeholder expectations.”

What are the value disciplines?

In total there are four main value disciplines, which are Operational Excellence, Customer Intimacy, Resource Enrichment and Product Leadership. These disciplines cover all the focuses that a company in general can have.

2.5. Business models

In this chapter we will answer the sub questions:

What are the business models and why are they important?

What are the most commonly used business models?

Business models play a vital role in innovation processes and are used as a marketing device focusing on the use of materiality and dynamics (Liliana, Renault, 2009). More and more emphasis was given to business models of the companies after the dotcom explosion in which

most of the start-ups failed. (Liliana, Renault, 2009). A new venture must have a good business model, which guides them in obtaining the final goals as well as attracting new investors. A business model allows entrepreneurs to explore the market and at the same time promotes the existence of a new product venture (Liliana, Renault, 2009). New ventures use a business model to plan on how to make money in the long term (Afuah and Tucci, 2001) and this is done by articulating the value proposition, identifying the market, estimating the cost structure and profits potential which all together become the key attributes of a business model. (Liliana, Renault, 2009).

2.5.1. Purpose and problems in a Business model

Liliana & Renault (2009) pointed out that a business plan is considered as an internal management tool or an instrument for finding partners. Firm's founders use a Business plan to anticipate problems and information needs, and at the same time it helps to prepare specific milestones Liliana & Renault (2009). It is quoted by Liliana & Renault, (2009) that *"The business model calculates two entities: the new ventures and its products"* i.e. a business model is a simplified description of the company.

Morris (2003) proposed the following definition *"A Business model is a concise representation of an interrelated set of decision variable in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets"*. So as we can understand from the definition a business model is a model which a company designs for their understanding of the business and also defines the company's goals and economic interests. In other words we can also say that a model is a representation of realities by which value is created and captured. Shafr et al. (2004) claim that a business model facilitates strategic choices, testing and validation of firm's strategic choices but it's not a strategy itself.

After finalizing a business model, it's not wise to do any additional changes on it. For example Sun Microsystems did some modification on the Business model to launch a new line of cheaper servers based on Intel chips. This decision didn't help the company and the company revenue for the quarter endings were down by 13%. So we can understand that if once the business model is broken or modified its hard to for the company to communicate with the business model again. The Business model of Sun Microsystems was based on the Product leadership but it was not applicable when they used it to launch a cheap server. The strategic choice to offer less expensive servers had a significant impact on Sun's ability to maintain its current R&D funding levels, which in turn had implications regarding its ability to compete on the basis of higher performing solutions.

General problems of a business model

According to (Shafr, Smith, Linders, 2004) there are four important problems of a business model:

1. *Assumptions while trying to create firms value.* It's essential for a firm not to start developing and using a business model based untested core logic i.e. (product or

services). The business of the firm will fail. It's really important that the business model is checked and the cause-and-effect relations are well grounded as well as logical.

2. A firm must not limit too few strategic choices. It must define all its strategic choices to address the core logic for creating and capturing value.
3. *Lack of clear distinction or misunderstanding about the difference between value creation and capture.* Most of the entrepreneurs heavily focus on value creation but not much on value capturing. And in such cases the business model fails since the economic model is not complete.
4. Value network in a business model evolves throughout the growth of the company depending in the market situation and if the firms are still relying on the same value network the model fails.

2.5.2. Different kinds of models

Morris Model

Interestingly (Morris 2003) has proposed three levels of decision making called as Foundation, Proprietary and Rules levels for a business model and these levels reflect the different managerial purpose of a model.

At the Foundation level a definition is given what the business is about and is mainly related to the internal part of the organization. For all the levels there are six questions that are related in creation of the business model:

1. *How is value created?*

This question is basically the core and most important one to be answered. It's basically says that there is no business if there is no value created i.e. the value proposition of a firm. So in other words we can say that what the firm is offering (product, service or mix) is the value created. Here a firm must also define, based on the value discipline, if they are offering a standardized product or customized according to the need to customer or if they are manufacturing or outsourcing.

2. *Who do we create value for?*

This question is to identify with whom the firm want to do business with and what's their market. A firm must also consider what their place is in the value chain, on which locations, what type of market etc. If this question is not defined and answered properly the company fails and this is the most common reason why start-ups fail.

3. *What is the source of competence?*

Here a firm must explain their internal capabilities. These competences also form the heart of the business model and if the company has strong internal competences, then a firm can build a strong foundation which will lead in also having good external competences.

4. *How do we position our self competitively?*

Here the company must select a particular value discipline (operation excellence, customer intimacy, product leadership and supply enrichment) and depending on the chosen discipline and core competence the firm must define on how they differ from others and how to gain competitive advantage.

5. *How do we make money?*

Here the firm must explain how they generate profits. Here a firm must talk about their economic model which is approached in different way, i.e competitive pricing, volumes, margins or operating leverages.

6. *What are the time, scope and size ambition?*

The answer on this question is dependent on the answer of the previous question. Depending on the personal interests of the founders and investors a company must decide what investment model they should choose. There are four types of models; the subsistence model (to survive and meet the financial obligations), the growth model (initial investments and reinvestments till the firm grows and attract investors), the income model (initial investment by entrepreneur till the business is stable) and the speculative model (to shows the possibility of successful venture before selling).

Next to the foundation level there are the other two levels which are the proprietary level (creating a unique combination) and the rules level (creating rules or guidelines). When the company manages to determine and to create these two levels it can be concluded that the business level is complete. The Morris Business model is for example used at the TU/e as a standard business model.

Henry Chesbrough Model

Henry Chesbrough and Richard S. Rosebloom defined that there are six different components in a business model

1. *Market*- identifying the users based on the what the company has to offer
2. *Value proposition*- describing what value is created by the firm to the users
3. *Value chain*- defining the structure and position of the firm in the value chain
4. *Cost and profit*-assumptions and estimations of costs and profits i.e. defining the economic model
5. *Value network*- identifying and describing the position of the firm in network of suppliers and clients and where they fall. Here the firm must also identify and describe the competitor and potential complementing firms.
6. *Competitive strategy*-choosing a right strategy to survive in the market against competitors.



Figure 12 - Chesbrough Model

Figure 12 above shows how a business model mediates between technical and economical domains. It was also identified by Chesbrough that the information flow as shown in the above diagram must be designed and linked properly between the physical and economic domain.

Shafr, Smith, Linders Model

The important components of the business model of Shafr et al. (2004) are shown below. These components were narrowed down by Shafr et al. (2004) after looking into twelve different models and these were the common component repeating in most of the definition. In fact there were 42 different model components but the components shown below are considered the most important.

1. *Strategic choice*
 - a. Customer (Target market, scope)
 - b. Value proposition
 - c. Capabilities/competencies
 - d. Revenue/pricing
 - e. Competitors
 - f. Output (offering)
 - g. Strategy
 - h. Branding
 - i. Differentiation
 - j. Mission
2. *Value Network*
 - a. Suppliers
 - b. Customer information
 - c. Customer Relationship
 - d. Information flows
 - e. Product/service flow
3. *Create Value*
 - a. Resource/assets
 - b. Processes/activities
4. *Capture value*
 - a. Cost
 - b. Financial aspects
 - c. Profits

Osterwalder model

According to Alexander Osterwalder (1997) there are 9 building blocks for a business model which are necessary to make a business model look complete. The nine building blocks are namely

- Customer segments: An organization that serves one or more customers.
- Value proposition: It seeks to solve customer problems and satisfy customer needs with value proposition.
- Channels: Value propositions are delivered to customers through communication, distribution and sales channel.
- Customer relations: Maintaining customer relations with clients and steadily building them up.
- Revenue streams: Revenue streams result from value proposition successful offered to customers.
- Key resources: Key resources are assets required to offer and deliver the previously described elements.
- Key activities: By performing a number of activities.
- Key partners: Activities which are outsourced and resources acquired outside the enterprise.
- Cost structure: The business model elements result in cost structure.

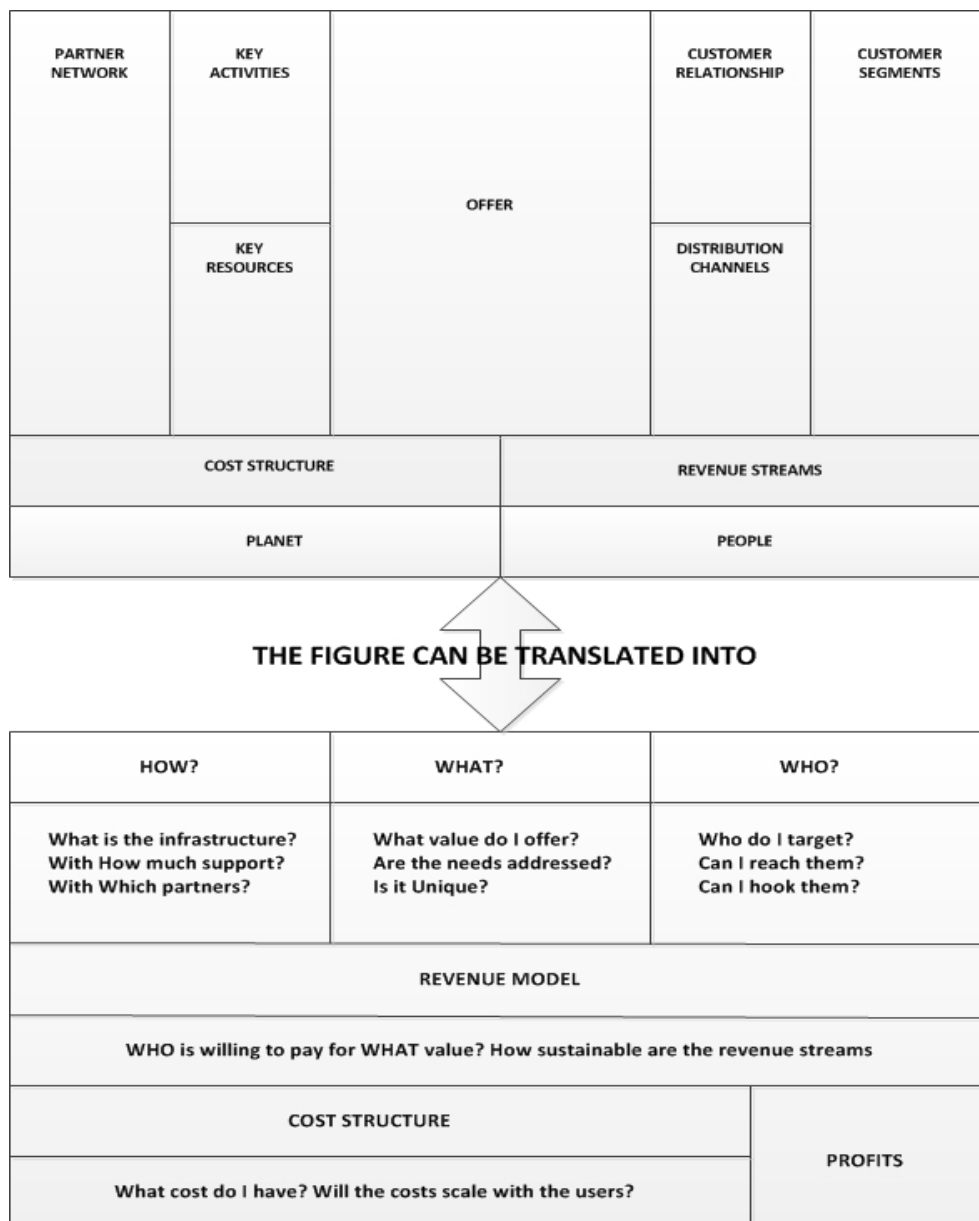


Figure 13 : Osterwalder Business Model Canvas

The above *figure 13* shows how Alex Osterwalder arranged the nine building blocks and how it structures the business model. When formulating these blocks the following questions must be posed; with who am I working, who are the customers for my unique product / service, and who is willing to pay for what value? The figure clearly shows and explains how the model has been structured and what components are required. Besides that it also shows how to design and fill the model. Recently two more blocks have been added to the Osterwalder model namely people and planet.

2.5.3. Conclusion

The below stated sub questions can now be answered:

What are the business models and why are they important?

From the above literature research we can conclude that for any company to be successful and reduce the failure rates, the company needs to have a good BP whose main role is to act as a guide in obtaining the final goals as well as attract new investors. Only four business models were discussed because the selected four cover all the general aspects of a business model.

It's important to notice that each of the four different models had some similarities but the intentions remained the same. We can conclude that some of key elements which must be defined in a business model are; how value is created, how value is captured by the company, how strategic choices are made in order to realize the goals, and finally the value network.

What are the most commonly used business models?

The four business models that are most commonly used and cover all the general aspects are used in chapter 2.5. These business models are those of Osterwalder, Morris Model, Henry Chesbrough Model and Shafr, Smith, Linders Model.

2.6. Risks for high tech start-ups

In this chapter we answer the following sub question:

What are the risks involved for high tech start-ups?

In this part the risk management standard will be introduced. We follow this standard for several reasons; one of these reasons is the use of the same terminology and understandings for categorizing different types of risks. Furthermore this standard will help with organization for risk management, the process by which risk management can be carried out, and the objective for risk management.

Main Key risks

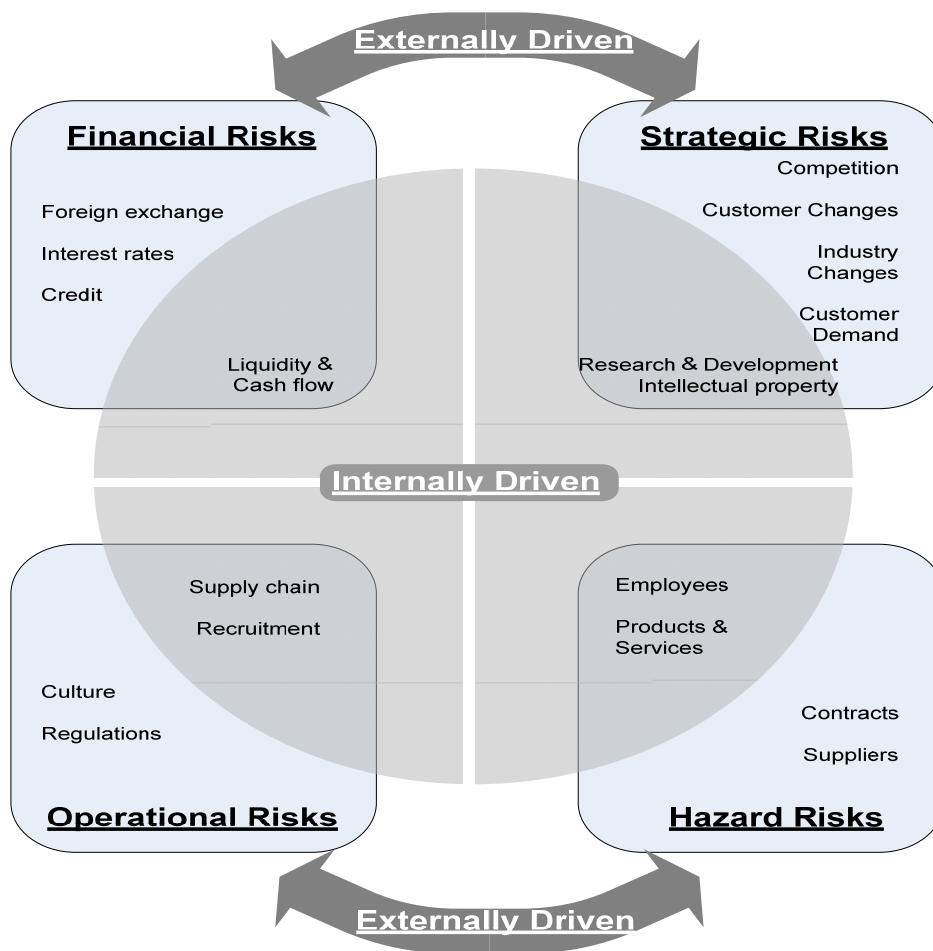


Figure 14 - Main Key risks

In the standard, shown above in *figure 14*, provided by a team consisting of organizations IRM, AIRMIC and ALARM the four main categories of risks are shown. The above shown standard has been adjusted slightly, since this model was produced for mature companies. The goal of this research is to enhance the internal factors so that external risks can be eliminated. Enhancing

the internal factors will be done by first exploring the internal and external key risks. With the information from the desk research a new design will be made to cover all external factors by configuring the internal factors. By enhancing the internal factors we should be able to eliminate the external factors. In short this means that all the external factors which can be covered should be covered by the internal factors which are located in the circle. In the preconditions the four key risks are explained.

2.6.1. Risk management process

Before going to the preconditions and the design part of our research the risks should be analyzed properly. In *figure 15* a scheme is shown about how risk processes could be managed. In these processes the risk assessment is a very important on which we will elaborate below.

In every goal that a company wants to reach the risk management process can be used. As shown in *Figure 15*, this model gives a good and clear step by step overview for tackling risks.



Figure 15 - Risk process management

In order to identify the risks that high tech start-ups will encounter, as shown in the risk analysis of *figure 15*, a desk research has been done to the reasons why start-ups fail. According to the report from EIM Meijaard, et al. (2007) the main reasons for stopping in the first three years differ much. In the first three years 14% of the start-ups stop the company for a variety of

reasons. Key elements which are involved in the company's development are personal circumstances, having a bad start (wrong unique selling point, wrong place, client database, etc.), and the exposure of chances. In the stage after three years the customer demand and matching company supply will play a big role in the company terminations.

2.6.2. Most common factors linked to failure

The personal qualities of the founders appear to give a leading role to the company termination or success. Research shows that the amount of experience that the entrepreneurs have is linked to the survival chances. More experience means a higher chance of survival.

The amount of the starting capital is not surprisingly an important aspect. Companies with a starting capital less than €4.538,- have a bigger chance on failure then the companies which have a starting capital between €4.538,- and €11.345,- available. In the report of EIM it is noted that just having a bigger starting capital doesn't increase your chance on success, but that a higher starting capital also means commitment and determination of the entrepreneurs.

The last aspect that was revealed in the EIM study is that entrepreneurs that acknowledge their lack of knowledge and experience have a bigger chance in company's success. This can be explained that because of their lacking, they are eager to make up for their shortcoming. Below the list of common factors that influence a failure is shown with each factor categorized in the key elements as explained and identified in *chapter 2.2.3*. Furthermore it is linked to internal or external reasons as explained in 2.6.1.:

<i>Factor</i>	<i>Key attribute</i>	<i>In-,/ External</i>
• Personal circumstances	Stakeholders management	I
• Few of knowledge & experience	Assets configuration	I
• Problems with law, and regulations	Assets configuration	E
• Too low customer demand	Stakeholders management	E
• Too much competition	Choice value discipline & strategy	E
• Chances to get job	Stakeholders management	I
• The company didn't start properly	Having a proper business model	I

2.6.3. Conclusion

The below stated sub question is now answered:

What are the risks involved for high tech start-ups?

It can be concluded from figure 14 that the four main types (Finance, Strategic, Operational, and Hazard) of risk sectors have great interrelations with the above list of common factors that influence a failure. The actual main external reasons for a company to fail are the problems with law and regulations, a customer demand which is too low, too much competition and chances of the entrepreneur of getting a job. Every factor except for the last one can be covered through proper research. From this we can conclude that many start-ups are ambitious and start their company without doing proper research and thus have a big chance of failing. This finding is of great importance for BK Solar and all other start-ups.

3. PRECONDITIONS

3.1. Introduction

In this chapter the important findings from the literature study are discussed and checked how they are going to be implemented. Here the basic assumptions are made for the design of a new improved business plan, which we think will increase the success chances for BK Solar and other high tech start-ups. We start with a pre-planning followed by the things to consider when starting up a business.

3.2. Pre-planning

The desk research explains us the things that we considered to be key elements in a BP. We think that it's really important to have a sound pre-planning before writing a business plan. This is needed in order to construct a good foundation and it also makes it easy to identify the necessary resources required before the setup of a business plan. Identification of involved people while writing a business plan is important and it's also necessary to determine their level of participation since a business plan cannot be written by one single person. There has to be some resources to generate ideas, input and recommendation from coaches, advisory board, technical information etc. A basic SWOT analysis should be conducted to evaluate internal strength, weakness, opportunities and threats. Here the external marketplace is also analyzed which finally leads to setting of goals which define where necessary improvement have to made internally for setting up a good Business.

After completion of the pre planning process, a business plan is written which is a blue print of the product/ service that the high tech start-ups is going to launch. After the literature study we identified that there is a high percentage of failure rates for start-up due to internal factors and external factors. Here we assume that making a sound foundation in the form of a business plan will reduce the effects of external risks and increase the chances of success for BK Solar and other high tech start-ups.

3.2.1. Reason why start-ups fail

As discussed in *chapter 2*, only 50 % of the companies in Netherlands survive after a period of five and half years. This means that the remaining 50% of the start-ups fail or stop. In the literature study it's identified that there are several reasons for a company to fail or stop. Assets configurations, stakeholders management, selection of a value discipline, strategy based on value discipline and having a proper business model are the key elements for any start-up ventures to be successful or fail.

3.2.2. Asset configurations

For any start-ups the assets layout would be in the form of inverted pyramid as shown in *figure 16* below.

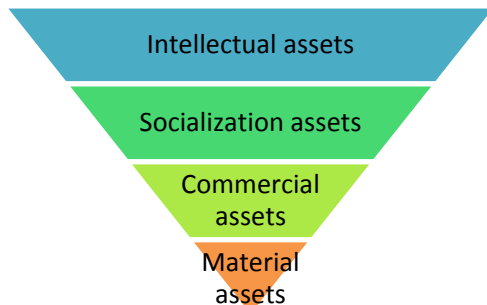


Figure 16 - Assets configuration at firm initiation

For the start-ups, intellectual assets have the highest level of importance (Winter, 1997) followed by socialization, commercial and material assets. These assets contribute to the combustion process. But the combustion process would be at its best when the contributions and role of material assets is high.

“The question is how to fill in the pyramid, which material assets play a more vital role at the early stages for our company (BK Solar)?”

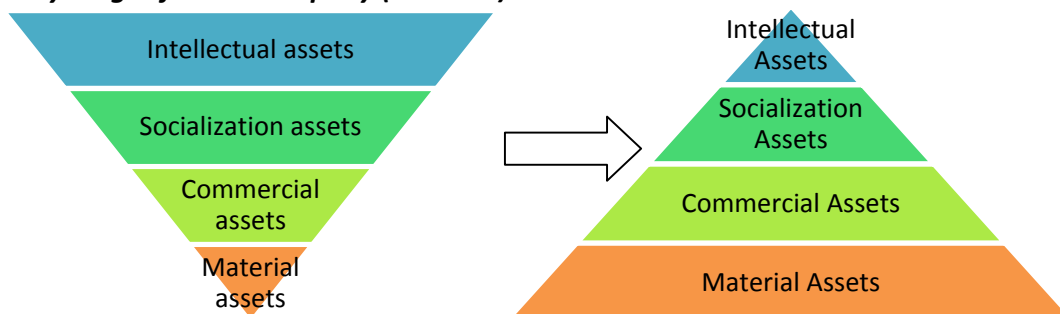


Figure 17 - Assets configuration transformation

3.2.3. Value discipline

Depending on the chosen value discipline, the importance of assets and their role in the business model changes. This shows the inter-relation between the value discipline and assets. For BK Solar it's quite important to choose the right value discipline, since the assets configuration plays a vital role on the longer run. The choice of value discipline will determine how each and every asset will evolve over the years. The short term activities of the company should be matched accordingly in order to reach the goals set by the company.

The value discipline can also be linked to the assets as follows:

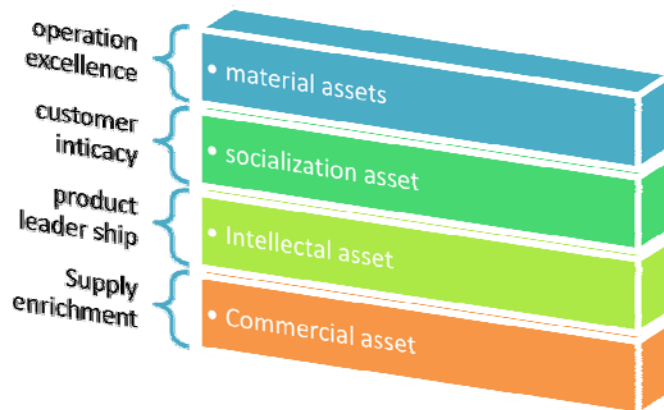


Figure 18 - Value discipline linked to asset

3.2.4. Business Models

A company needs to have a solid business plan, which acts as a guide in obtaining the final goals as well as attracting new investors. Four different kinds of business models were discussed and all the four different models had some similarities. It was decided that the Osterwalder business model should be used since it's a comprehensive business model which covers almost all major elements (the nine key building components) necessary to formulate a complete business model.

3.3. Elements of a Business Plan

From the extensive desk research done in *chapter 2*, we are now clear on how we can proceed in formulating a new improved business plan for BK Solar. We assume a certain path of when followed will lead to a successful business plan format. This format will include all the vital elements like strategy based on value discipline, assets configuration, the best business model and finally a business flow model, which should increase the success percentage of high tech start-ups. The business flow model shows how to achieve short term goals towards the maturation of the company. The findings and design are checked by applying them on the new improved business plan for the start-up BK Solar.

From the desk research we think the following entities below are vital for formulating a comprehensive business plan format:

1. Pre Planning
 - a. Who are involved and who should be involved? (Coaches, advisors, technicians)
 - b. SWOT analysis (for identification of strengths, risks etc.)
 - c. Setting of goals
2. Business Plan
 - a. Back ground and Value proposition
 - b. Market study (To identify the market and competitors)
 - c. Design of product based on market research and IP of product
 - d. Mission and vision statements/objectives and goals
 - e. Selection of value disciplines
 - f. Configuration of assets
 - g. Business model (Imp elements)
 - h. Resource and process management
 - i. Risks and Problems (Management)
 - j. Organization and management
 - k. Financial estimates and requirements

} Business Flow Model

3.4. Conclusion

The preconditions mentioned above give a complete foundation for the design part. It's important to identify and explain why the following elements were chosen and analysed for the improved business plan design. Attributes like assets configuration, selection of value discipline, and the identifying of a solid business model are briefly discussed and implemented in the design.

The assets are the focus for the format BP design, since this is the core of a company. Therefore the assets will return in the BP design as the BFM. We conclude the extensive literature study by formulating how a business plan should be designed in *chapter 4*.

4. DESIGN

4.1. Introduction

In this chapter the pre-conditions described in *chapter 3* will be applied on the format BP design. First the elements of a BP, as described in 3.3, are elaborated in order to explain the content for the format. Following the description of the BP elements is the design shown in *chapter 4.2.1*. We believe this design is the best way to set up a BP for a new high tech start-up. We will use our company BK Solar to give clear examples of how to translate the design into practice.

In order to prove this, the core of this design (the business flow model), was applied simultaneously on BK Solar. This is evaluated in *chapter 6*., which gives an extensive explanation for the Strategy, Assets configuration, and Business model for the high tech start-up. To make the translation of the BFM complete the attributes are described.

4.2. Business Plan

After completion of the pre planning process, a business plan is written which is a blue print of the product which BK Solar is going to launch. After the literature study we identified that there is a high percentage of failure rates for start-up due to internal factors and external factors. Here we assume that; making a sound foundation in the form of a BP will reduce the effects of external risks and increase the chances of success for high tech start-ups.

The core components which we think to be vital in writing a successful business plan are as follows:

a. Background and value proposition

Here a brief description of the product is written by stressing on its unique selling points. Next the current state of the product has to be described and also the customers (who are they and what do they want). The description of the product should also be written. Also a brief description of the founder's credentials, experience and skills need to be mentioned.

b. Market study (To identify the market and competitors)

It's a known fact that prospects of a new venture are influenced by the dynamic nature of the market. This is one of the important core components because it's basically explains the size of the market, the competitive factors and also the risks can be identified. So it's necessary to have an extensive market survey explaining the size of the market. This data will literally decide if the company can be successful. It's also important not to forget the competition (analysis) and it's necessary to mention how it is going to be handled. This should be written in a way which can enable readers to recognize the company's potential.

c. Design of product based on market research and IP of product

After the extensive market survey and risk identification, required modification must be done to the product (if necessary) to sustain in the market after launch and also to have a competitive advantage. In this chapter we explain what changes have been done and later also explain how the Intellectual Property is going to be protected.

d. Mission and vision statements/objectives and goals

After the explanation of all of the above components we can translate these findings into specific goals and objectives and finally write down the company's mission and vision statement.

e. Selection of value disciplines

f. Configuration of assets

g. Business model

h. Resource and process management

} Business Flow Model

Here we describe the business flow model of the company. Here the selection of value discipline (explaining why the particular value discipline was chosen which depends of marker study and vision of the company) takes place. Configuration of the asset is the next vital step which has to describe what the assets are and how they are configured (Considering the risks). A detailed description of the business model of the company is explained. After the configuration of assets we show the utilization and management of resources used (Which is covered in the simulation chapter). A brief description of company's roadmap is also explained in this chapter.

i. Risk Management

Here we discuss the management of risks. As explained in *chapter 2.6* for there are a lot of risks involved both internally and externally any start-up and it's important for us to identify what these potential risks are. These will portray the managerial skills of founders showing the investors that they are prepared to tackle the risks.

j. Organization and management

For any business plan its necessary to describe the quality of management. Here we need to provide a description of management and members involved in the organization highlighting their capabilities. It's also important to outline the legal structure of the company and mention the type of corporate entity.

k. Financial estimates and requirements

In this chapter we discuss about the financial forecast by presenting the break even analysis up to a period of five years. Next it is vital to outline the budget details and expenditures for the next four years.

4.2.1. Business Plan composition/ Design

By using the core components, the BP can be formed in the best possible way. In *figure 19*, the design is shown with the relations of different key aspects of a BP. These aspects will in our opinion, if maintained, form a better and more comprehensive BP then the BP format currently

used at the TU/e for company starters. In respect to the TU/e format, it is used for educational purposes while our design is made to develop the best possible business.

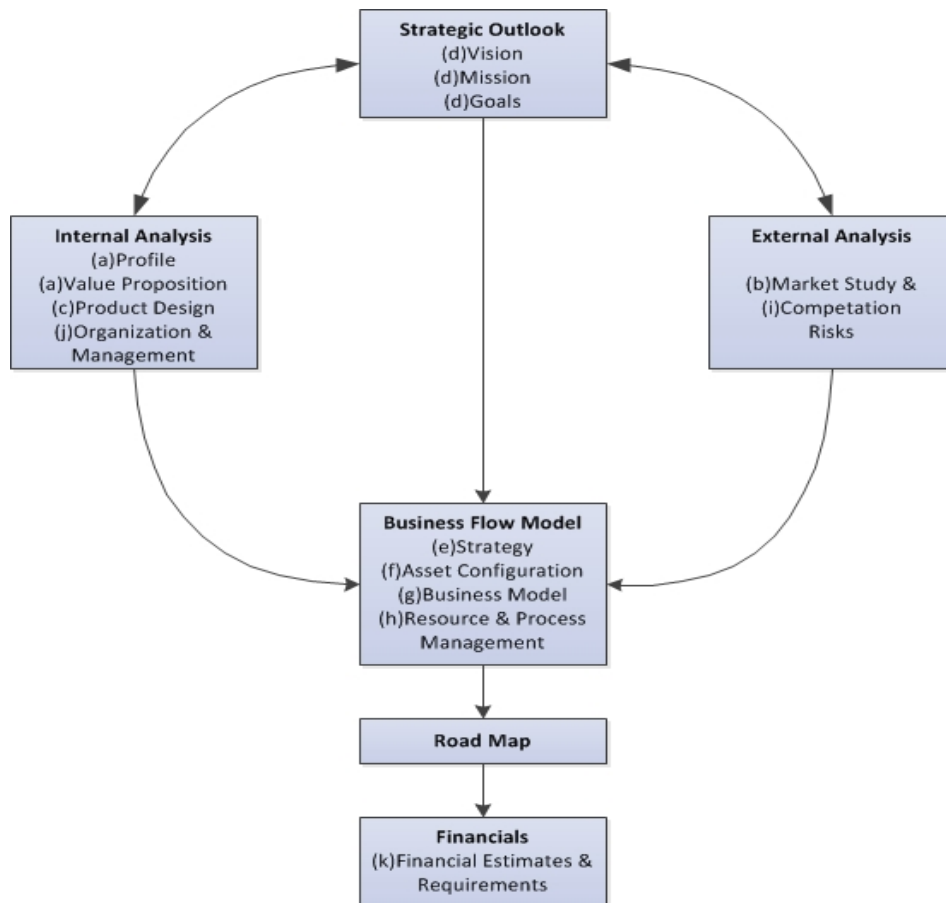


Figure 19 - Business Plan Design

Figure 19 shown above illustrates how we perceive a BP should be formatted, along with clear distinction between all the key elements. This BP also uses the BFM, which we incorporated in the plan. From figure 19 it can be clearly understood that the depending on the internal and external analysis results of the company one can easily formulate the company strategic outlook and so the BFM.

Business Flow Model

Assets configuration forms the heart of a BFM as explained in the research method. Assets configuration can be done only after narrowing down what value discipline the company chooses and what strategy the company is going to follow. After the assets are configured, a business model is developed followed by the other entities. These entities are the combustion process, management of resources, process, and roles played by the contributors/ payers.

Business Model

Next important step is formulating a business model. Here we use the Osterwalder business model. We selected Osterwalder's business model, because it covers all the key elements of a business model. The systematic way to approach and design a business model of the company, is done by using the key elements which are called building blocks of a business model.

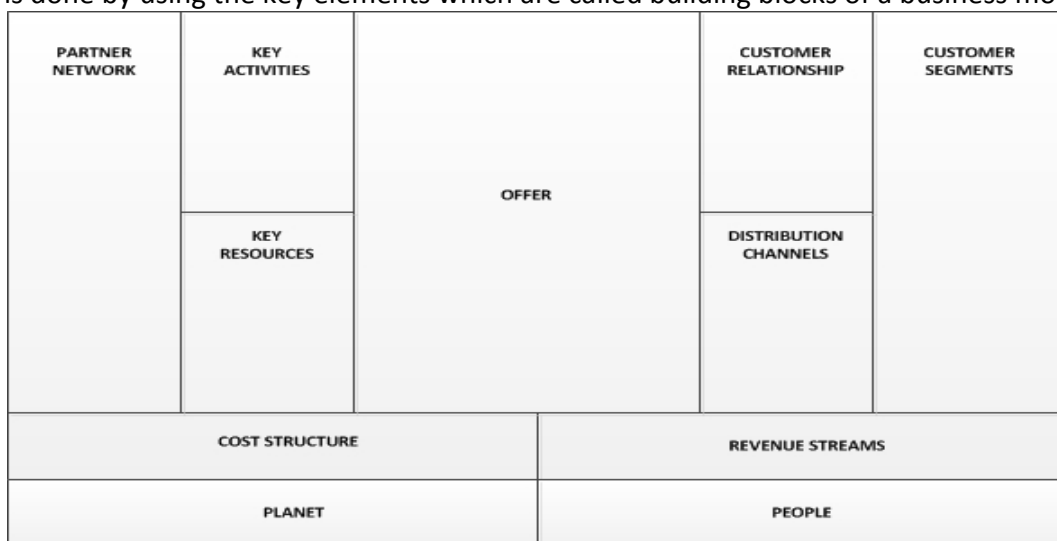


Figure 20 - Osterwalder Business Model

Resource and Process Management:

In this part we'll use the BP design on BK – Solar to give clear examples. From the desk research it was identified that configuration of assets is based on the value discipline. BK Solar chose Operational Excellence as their value discipline and their strategy is based on this value discipline. It's logical that material assets should have the highest importance in the asset configuration, since Operational Excellence emphasizes amongst others to reduce transaction costs, minimize overhead costs, optimize business processes and make operations lean and efficient. The resources are diverted more for improving the material asset of the start-up as the company grows. For material assets to grow, the three important elements namely assets (intellectual, socialization, commercial), contributors and payers play an important role. This is true for every other asset, but focus lies on the asset linked to the value discipline as shown in figure 18. This constitutes to resource management which should be done as effectively.

After formulating the business model shown in figure 21, it's necessary to describe how the process is managed which indirectly also explains the combustion process. Here the involvements of contributors should also be described. Combustion process is driven by input

from contributors both direct and indirect and also utilization of resources (Assets) which is a cyclic process. Managing this cyclic process is important, in order to do so efficient management is necessary and this is known as process management.

Asset Management

According to Bell Mason Framework the most important phase is the Venture phase, which includes the following stages shown in *figure 21*, besides that it shows how the assets should develop from stage to stage:

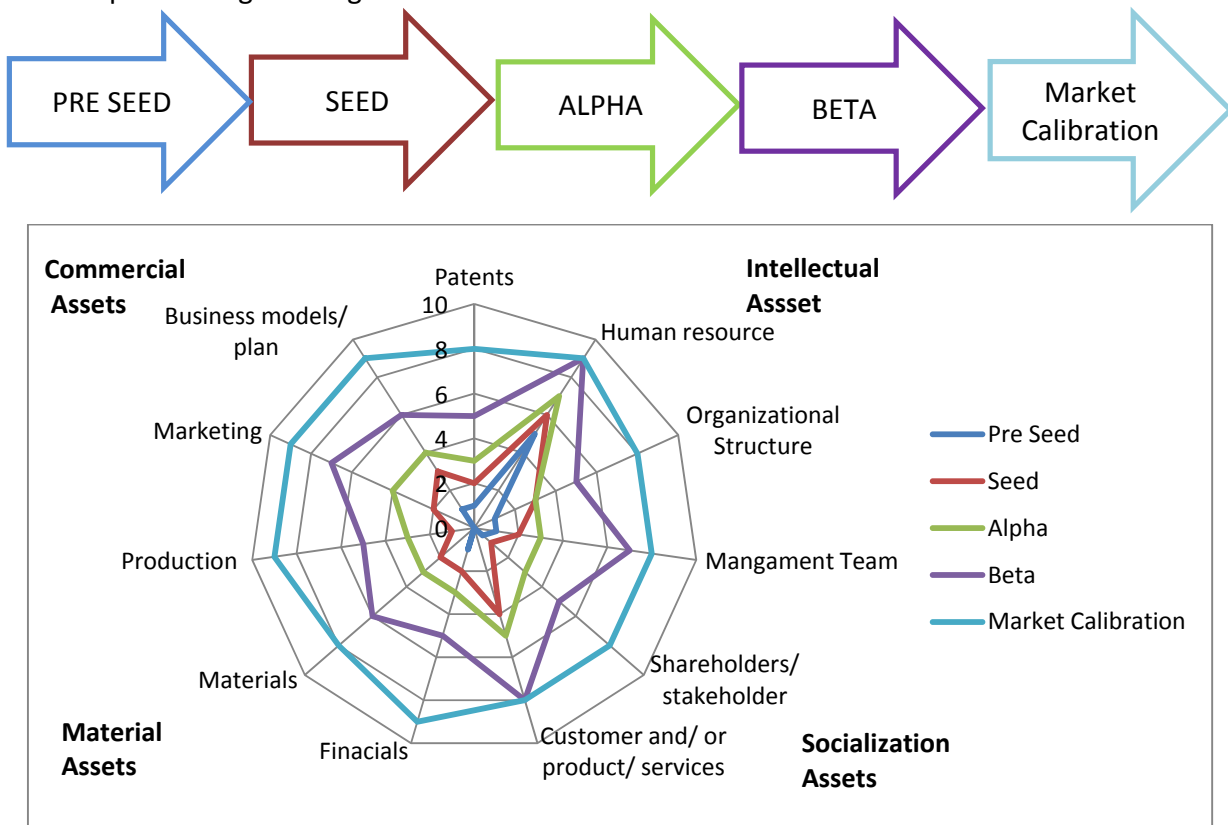


Figure 21 - Example Assets Development

Example: Understand that an entrepreneur, still in the process of making its first prototype (Pre-Seed stage), in almost every case still has no patents or staff with special knowledge. This entrepreneur will have a big creativity and ideas for application of his product/ service which shows in the human resource. For the financial situation no products are sold and thus there is no serious cash flow yet, which explains the low material assets.

4.3. Theory for BP composition

The above design gives a clear overview of what important elements should be included and discussed in a business plan. The design in *figure 19* is sequential and has logical layout. High tech start-ups should start with Pre-Planning before writing a business plan. In the business plan we make a differential between the internal and external analysis. This is mainly done to distinguish the plan and to identify the risks involved. By this identification ways of tackling these risks can be proposed. We then come to business flow model which is designed based on the internal analysis, external analysis and strategic outlook of the company. The business flow model is often lacking in business plans and may cause unexpected problems. Further implementation and explanation of the business flow model is done in chapter six which has clear overview of how the assets were configured and how the assets changed in BFM over a period of time.

5. VALIDATION

5.1. Introduction

The design made in *chapter 4* is based upon the desk research and conversations we had with entrepreneurial experts. In order to validate the constructed BP, a panel of experts will be selected for which the BP will be presented. In this interactive presentation the panel members had the opportunity to comment on the BP and the underlying theory. For those panel members whom we couldn't reach, emails were sent with a reply request. A design and related questions of a format BP were presented to the panel which can be seen in *appendix A*. This validation is done in order to answer the following questions given below:

- What role does assets managements play in the development of the company?
- Does the inclusion of the business flow model add value to the BP design compared to the standard business format?
- What are the strengths and weaknesses of the BP design?
- Can the design be implementable in practice professionally and does it reduce the failure rates of the company?
- Is this theory valid?

5.2. Selection of the panel members

The panel members are selected by common sense and logic. The panel members should not have the same specialization but differ as much as possible to get a solid feedback on the proposed BP and theory.

- | | | |
|----|-----------------------|--------------------------------|
| 1. | Prof. C. Kokke: | An entrepreneurial expert |
| 2. | Ing. M. Dierselhuis: | A business and coaching expert |
| 3. | Ir. J.H. van den Berg | A business and coaching expert |
| 4. | F. de Bruijne | A business and coaching expert |
| 5. | Drs. Joop Dat | A business and coaching expert |

5.3. Presentation session

The presentation session of the BP design and theory will be done within an hour. The first 15 minutes will be used for the explanation of the terminology and BP while the remaining 45 minutes will be used for feedback and questions.

During the presentation it is important to first explain the goal, which is to increase success chances of BK Solar by eliminating and/or covering the external risk factors. Secondly the BP design itself will be explained. An important part of this explanation is the theory about how we think the effect of external risks can be reduced with this design. For some of the coaches an

email was sent with a design. Besides that a relevant theory was attached in order to understand the design, which can be seen in *appendix A*.

5.4. Feedback on Theory and Design

In this section the feedback on the design is shown and questions are answered. All the data used for the validation can be found in *appendix B*.

What role does assets management play in the development of the company?

In the interviews we held and emails returned it was confirmed that assets management plays an important role in the development of the company. This is due to the fact that assets are the key elements which can be controlled by a company. Necessary actions can be taken to achieve and manage the assets properly. Identification of assets at early stages combined, with their management, during the formulation of the business plan is important. It also depends on the character of the company (i.e. the characteristics of a small company are different than those of a big company). The potential of the company can thoroughly be exploited by proper assets management and ultimately lead to an increase in chance of success for the company. If start-up companies validate innovation power (i.e. the intellectual asset in the balance sheet), the financial results would be more realistic and far more comprehensive leading to company's success.

Does the inclusion of the business flow model add value to the BP design compared to the standard business format?

Success and failure of the company depends on the way the company acts on the presented information and knowledge, which can be managed internally and should be identified at an early stage. All the panel members agreed that a BFM is a comprehensive way of identifying and the managing the whole business process. A BFM will indeed lead to the achievement of measurable short terms goals. All interviewed experts agreed that having a BFM will add value to a BP.

What are the strengths and weaknesses of the business plan design?

Strengths:

- All the panel members concluded that the design has a solid structural formulation.
- The most important elements, which had to be considered, were taken into account.
- The inclusion of the BFM made sure that necessary assets were identified, besides that the process on how to manage was also covered.
- The importance of resource and process management was also taken into account.
- One important factor which is "(c) Product design and IP" was particularly highlighted. This factor strengthens the business and the BP as a whole, since our main focus is on high-tech start-ups.

Weakness:

- Some of the experts pointed out that the design is more qualitative and there is lack of measurements.
- One of experts pointed out the design was lacking a measurable bottom line with decision making moments. As an example the design didn't show the iteration process, since a business is a continuous process and has to respond on situations.
- SCOPE is missing in the strategic outlook part of the design.

Response to commented weaknesses:

The first weakness pointed out by the panel of experts was that the design was more qualitative, which we understand since we chose to limit our research to the time period we had. Further investigation can be done based on this feedback, which is discussed in *chapter 7.5.3*. The second weakness was lacking of the measurable bottom line with decision making moments in the design. In order to tackle this weakness a framework has to be setup, which should include a method and the measure of the blocks represented in the format business plan. As mentioned earlier, further studies can be done on this topic. We think that "scope" is already included when defining the strategic outlook of the company.

Can the design be implementable in practice professionally and does it reduce the failure rates of the company?

All the experts concluded that indeed the design has the potential to be practiced professionally by high tech start-ups, if the quantitative factors are also considered. A measurable bottom line with decision making moments should also be incorporated, which adds value to the dynamic form of the design. The design also makes sure that both the internal and external analysis are differentially represented so that the company has overview of what has to be done (Internally) to gain entrance the required markets (External).

6. PROGRESS

6.1. Introduction

In this chapter the requested company progress is shown with highlighted events which were a direct choice or effect of the used literature study. These moments are explained in 6.2.1., furthermore the effects of these moments are explained and discussed. In 6.3., all events are used to show how much the company has grown from ideation to a SEEDING stage. This means that the assets configuration at July 2010 is shown and how it grew to its current size. The timeline and developments start in September 2009 since this was the period where the thoughts of having an own company started to grow.

6.2. Progress BK

To show the effect of implementing the Business Flow Model the progress on the company will be shown in a chronological order. Important decision making moments will be highlighted and elaborated what the effect was on the company growth. In *appendix E* the entire progress can be found. In this overview all important conversations, new contacts and new events are described.

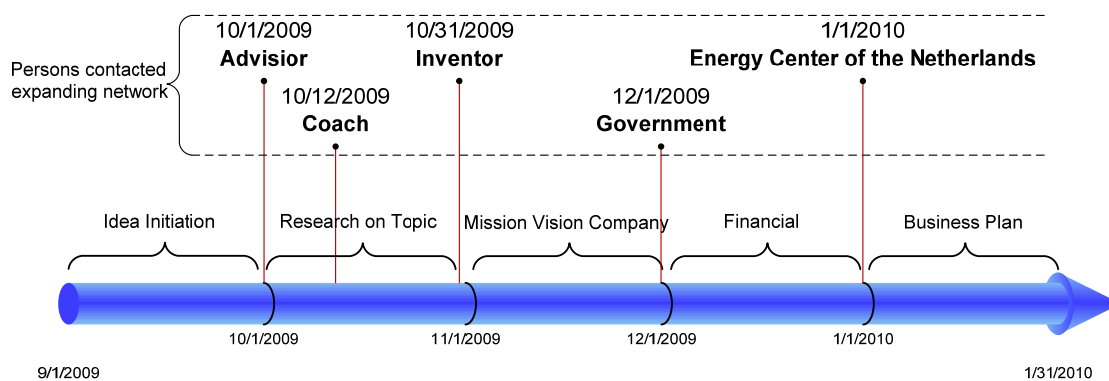


Figure 22 - Timeline Sep 2009 / Jan 2010

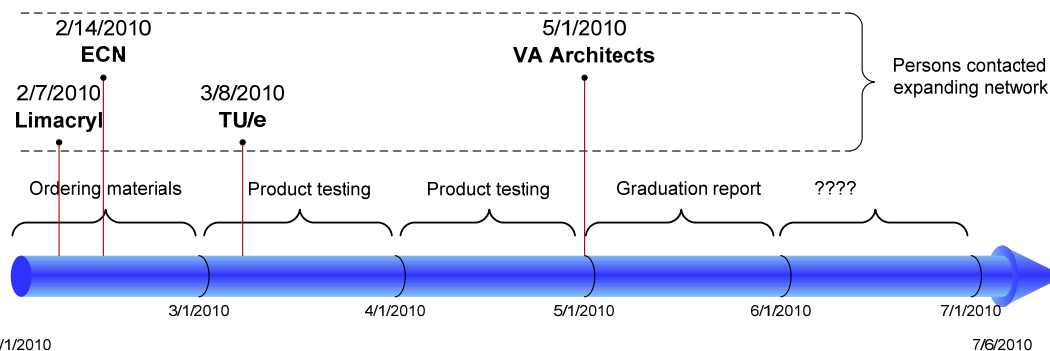


Figure 23 - Timeline Jan 2010 / Aug 2010

6.2.1. Important decision making moments

The first important decision in September 2009 was of course starting the company or not. With both of the entrepreneurs enthusiastic with the thought of starting a company the choice was quickly made. A second factor important for the decision for starting a company was the timing; since the entrepreneurs were still students and didn't have any big expenses like a family or mortgage, there wasn't any reason not to start the company. Besides the previously mentioned, many other things were to be considered. The Entrepreneurship Course provided sufficient time to eliminate all doubts.

During the first semester, from September to January, research was done on the possible market, the product and also estimations were done on the efforts and time period before the money started coming in. It was quickly discovered and accepted that running a company is a fulltime job and more.

On the 6th of January 2010 the Entrepreneurs were almost finished with the Entrepreneurship course and registered the company, Bogaert – Kalyanapu, at the Chamber of Commerce. This was also the important decision to try and make the company successful by putting the required efforts in it.

In the months before January there were some meetings about the field of research for the graduation. In one of these meetings it was noted that this graduation atelier should lead to making Brainport energy neutral and so stimulating new ventures to participate in this. Both entrepreneurs saw their chance and in one of the first meetings the CME graduation committee agreed to support this idea. This would also mean a risk since the graduation process and final report wouldn't be in the normal format of graduating. This initiative of the innovative idea and pro-active attitude was stimulated and supported by the University.

In order to ensure professional coaching BK Solar joined the CTE program of the Brabant Centre of Entrepreneurship (BCE) organization. The BCE gives wildcards to students/ PhD candidates who want to start their own company and have a high chance of success. The wildcard includes a professional coach, a small financial backing for the purchase of materials and skills trainings. Joining this CTE program was done with success and we still have support from the coach which was assigned to us.

Furthermore BK Solar submitted the proposal for the SBIR subsidy which was a chance to secure financing for the research period needed to test the feasibility of the product. This request was unfortunately not honoured, but was a great learning process for the entrepreneurs. The SBIR proposal is shown in *appendix C* and the outcome is discussed in *chapter 6.2.3*.

The paragraphs mentioned above include in many cases contacting organizations and persons involved in similar fields and conveying them the idea. Later feedbacks and advises were taken for development of the business. BK Solar realized that without any patents and other forms of

protection it was very easy to copy the idea, therefore BK Solar used None Disclosure Act's in important meetings. Not in all meetings NDA's were used, since it sometimes gives of a signal of distrust between the parties.

6.2.2. Learning moments

During the execution of the idea to start up a company, a coach, J. v/d Berg was assigned to us through the entrepreneurship course. This coach advised us in the first steps from an invention to a product/company. The lack of the entrepreneur's technical/ chemical knowledge was quickly shown to be a weakness. This triggered to read additional papers and explore the web for technical information. Also the assistance of Peer+ was sought out since it's a company with a similar product.

The registration of the company on the Chamber of Commerce was also a learning moment, which meant that this was much more easily then BK Solar thought. Some explorations were done in the tax return possibilities and legal obligations for this.

To make the project successful, BK Solar collaborated with Mr. Cox and Mr. Debije, since there was a lack of technical knowledge and advice. These persons could give the support and advice to increase the chance on success. Mr. Cox is familiar with many persons inside and outside the university; his contribution would be in advice and contacts. The support on the invention was given by Mr. Debije, which is an inventor specialized on the system that BK Solar is using.

Showing initiative to the graduation committee was rewarded by accepting the graduation proposal of starting up a new company. This taught BK Solar that efforts are often appreciated. In our case it triggered the pro-active attitude in us which helped to obtain many contacts such as suppliers and possible competitors/ partners.

One of the direct pro-active attitudes was contacting SABIC and obtaining the required testing materials. These materials could only be used for testing purposes and not for commercial applications. Besides that also the results of the test should be shared with SABIC itself. The inventor, Mr Debije, would really like to get his hands on these materials but he never succeeded. For BK Solar this took a few weeks to arrange and showcases that their communications skills were sufficient to convince people of their ambitions.

In March 2010 we joined the CTE program and a new coach joined our team. The previous coach, J. v/d Berg, took a step back as long as the other coach was there to support us. After the CTE program he offered to come back and continue coaching, which was much appreciated. This showed BK Solar that relationships are important to invest in.

The SBIR proposal was more a learning point for Mr Bogaert, since the proposal should be written in the Dutch language. Mr C. Kalyanapu supported his colleague by putting more effort in the graduation progress and so relieved the tasks for Mr Bogaert. Writing the proposal was a rather difficult since a format should be maintained and the document was discussed with

persons with legal, commercial and technical backgrounds. The document had several revisions and inspections. It was checked by various persons who are well versed in this area which made their feedbacks more valuable. The feedbacks were analyzed and implemented. Every time somebody viewed the document it was adjusted and in the end checked with the project description. By this we learned that documents should be finished more than two week before the deadline, because sometimes you are depending on others to complete their work. Furthermore much was learned about how to answer project descriptions as comprehensive as possible.

As a last learning point there was the combination of the graduation project and the company start-up. In the beginning the advice from the graduation committee was to focus mainly on how to start-up the company as successful as possible with the help of the necessary literature. This went very well, but in the end when the report had to be written it took a lot of effort to construct a report pleased both the students and all the members of the graduation committee. All the information was there, but the general impression on the quality of a graduation report was hard to judge due to the innovative graduation proposal we had. Therefore many changes were made in the report content and required a flexible attitude of the students.

6.2.3. SBIR Proposal

Subscribing for subsidy

In the first phase it was discussed whether the start-up of a company can be used for a graduation project, here it was highlighted that when starting up a company all efforts should contribute to the company growth since this is a fulltime job. Quickly it became clear that we had to grab every opportunity that could boost our company growth. So when the opportunity appeared for participating in a subsidy proposal, we didn't hesitate long and joined the game. The word 'game' is chosen since participating in the subsidy rounds was also a very good training for the entrepreneurs unrelated to the outcome of the proposal.

Writing the subsidy

When the deadline for handing in the documents approached, more and more comments were given on the document. These were two stressing weeks and especially the last week since one day before handing in the document a business plan was required. This meant that the English typed business plan should be translated into a Dutch document and enhanced since it was already out of date. This surprise was created by some incoherent demands in the project description.

Submitting the subsidy

Eventually all documents were present on the day of the deadline and were all handed in. After three weeks an e-mail was received that invited BK Solar to give a short presentation in front of the panel of judges. In some way this was a small victory for BK Solar, since the company was still in the game for getting the subsidy.

The presentation

The presentation was held in Utrecht in front of five panel members. This presentation should be done in Dutch, which is why Mr Bogaert had to present. In total the presentation went as strictly as planned; the four minutes available were enough to make our point and introduce the products prospects. After this five minutes were available for questions, which showed to be difficult since not all panel members had the acquired knowledge to understand some answers. When the presentation was finished the organization showed their gratitude towards us showing interest in innovative developments in the Netherlands.

Result of SBIR

On the 29 June 2010 we got the responds of Agentschap NL that the subsidy proposal was rejected. Several reasons were addressed, with the main reasons to be that no efficiencies were given yet. We did include scientific papers to give an expectation of these efficiencies, but we think that personal test would have been more valuable. One week later we got a call from Agentschap NL suggesting that we should enrol for other subsidies such as the KTO. This process is on-going, and we are looking positive towards it.

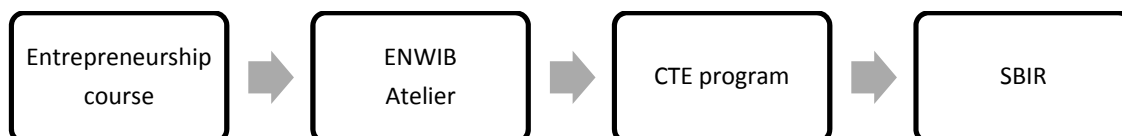
6.3. Transformation to mature state

Showing the transformation of the assets is a solid way of showing the progress that the company has made until now. As a starting point September 2009 is used since this was the moment that the idea started to grow. In the end these descriptions will show that BK Solar has developed from idea to almost the commercialization phase as shown in *figure 7*, Mayo (2008). To see the exact time that certain developments happened see *appendix E* for an overview of progress BK Solar.

Material assets:

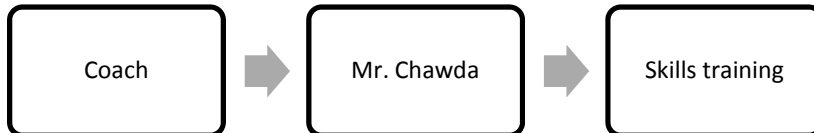
The material assets were increased the moment when a coach was assigned in the Entrepreneurship course. No financial obligations were needed to get this coach, because the TU/e provided them. A second important moment was participating in the KENWIB atelier, which meant support on developing the business and getting financial support. This financial support was used to buy materials, registration at the Chamber of Commerce and get some external support.

Participating in the CTE program meant a second financial support for BK Solar. Here a coach provided with which a contract was made to spend a certain amount of time on us. In addition to this there was also a financial amount available for buying market reports, materials or hiring third parties.



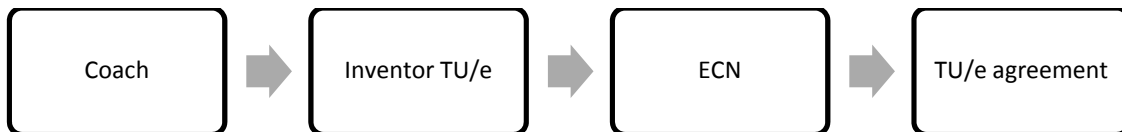
Socialization asset

Between the founders of BK Solar the socialization assets didn't demand a big growth. Working with the first coach did increase the socialization assets as did the involvement of Mr. Roy. To expand these assets skills trainings were followed for intercultural communications, MBTI you as an entrepreneur, and social networking.



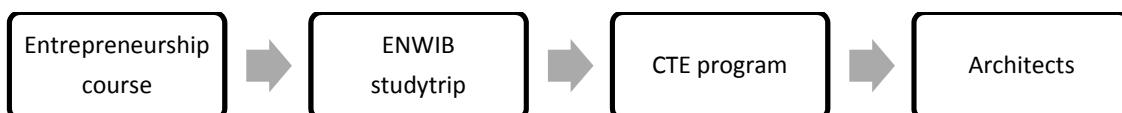
Intellectual asset

The intellectual assets didn't develop much, because there were no developments done until now and the material assets are not sufficient to file in for patents. Nonetheless both coaches increased the intellectual level of BK Solar. This level was even higher when the Inventor of the TU/e and ECN were involved in the developments of BK Solar, since they brought great intellectual knowledge. A final important part is that an agreement was set up between the TU/e and BK Solar in order to get the SBIR proposal.



Commercial asset

In September 2009 until 2010 some energy was used to develop the commercial assets, because the company had a product idea. Market studies were done based on desk research. During the presentation of the Entrepreneurship course many contacts were made, through which BK Solar increased the public awareness of their company and product. In the KENWIB program commercial assets grew after visiting key players abroad and meeting with the key players behind the KENWIB program. In April 2010 much energy was put in expanding the contact network and talking with more key players such as architects. This way the market was more open for BK Solar and got valuable information out of it to increase the products value and potential.



6.4. Risk analysis

From the research done on risk identification in *chapter 2.6* we can now transform the findings which were considered in the business plan design. . Four main types of risk factors are described for BK Solar. Besides the four main risks described below it is important to notice that many start-ups fail because of a lack of research on problems with law and regulations, too low customer demand, too much competition.

1. Financial

Financial risks are the most difficult to cover since interest rates and foreign exchange are impossible to control. It is therefore in wise to delay or avoid any external financing when the company starts-up. By doing this we don't have to work with external interest rates and foreign exchange values. Of course there is the question how we are able to generate the required financial goods.

2. Strategic

When talking about strategic risks we have to think about competition, industry changes customer changes, and customer demand. The last two are risks which the characteristics of the product can cover. The product we are offering has a specific size, shape, colour and efficiency, but if the customer changes and so will his demand, we can adjust the size, shape and colour. Even the efficiency will increase over time.

The competition belongs to external factors which right now are of little importance since the companies which are working with the same technology are not entering the same markets yet. Further market studies can be found in BP which is added in *appendix D*. Nonetheless we believe that within one or two years after introduction on the market similar products will appear. At that time the research and developments will be progressed. Through these developments the intellectual capital will be increased and patents can do their job. To ensure that we are able to claim the intellectual property rights, we will sign a first right of refusal with the inventor of the system. Any other important players identified during our development process will be contacted to become stakeholders in our company.

3. Operational

Regulations, culture, and board composition are the bigger external operational risks. A cultural difference within the company or externally are already limited by the founders, since one is from Europe and the other from Asia. Besides that both of the founders have experience in working with different cultures and also followed specific cultural skills training to eliminate the risks here.

During the recruitment of new employees, people from different cultures will be hired in order to have cultural knowledge in hand. For the composition of the board of directors a good selection of experienced professionals has already been made explained in the BK Solar business plan in *appendix D*. This would include several TU/e members such as an inventor

which has worked several years on the topic, professional coaches involved, and financial expert.

4. Hazard

The last remaining internal risks come from public access, employees, properties, products & services and the last external are contracts, natural events, suppliers, and environment. Natural events are not going to be of any hazardous risk except for the chance of both founders fading away, which is unlikely seen their age and energy. The contracts and suppliers on the other hand are of great risk since suppliers can steal the invention and/or application or might have conflicting contracts with other stakeholders which we can't control. It is therefore in the company's best interest that suppliers are made stakeholders of BK Solar. This way BK Solar and the suppliers have the guarantee that everybody profits if BK Solar is doing successful business.

7. CONCLUSIONS & RECOMMENDATIONS

7.1. Introduction

In this chapter a summary and conclusion will be given about the graduation project. An important part of the conclusion is checking whether the hypothesis was proved. Furthermore the assumptions made in this project will be confirmed. Recommendations are given for the graduation, KENWIB project, and future studies. All the answers are gathered after extensive desk research, interviews and from the feedbacks of expert panel.

The main question, which is *“Can we make a format business plan, by identifying and analyzing the factors responsible for the high failure rates of high-tech start-up in the Netherlands to increase the success chances of the start-ups?”* is answered. The final result of this research is the designed BP format, which does increase the success chances of high tech start-ups. This design is realized from the gathered information during the research.

The BP design includes an internal and external analysis, aimed to reduce external risks. The most important internal and external factors were taken into account while setting up the components of the design. Furthermore the BP design includes the BFM, which includes the strategy based on value discipline, assets configuration, business model, and resource and process management. All these elements were identified to be critical elements to increase company's success chances.

7.2. Hypothesis

The reasons for high failure rates were identified and categorized as internal and external factors. Based on the desk research, it was concluded that external influences can't be controlled by a company, but the internal factors can be controlled. The several reasons for failure of a company are lack of assets configuration and management, lack of strategy based on value disciplines, not having a proper business model. These are the key drivers which a company has to be clear on. The above mentioned factors also form the elements of a business flow model which is now a part of the new designed business plan. This new design makes sure that all the necessary components are considered, while a high tech start-up formulates its business plan.

The hypothesis of the research was ***“Making a sound foundation, which includes a business plan for high tech start-ups can cover the external risks, increasing the success chances of the start-up”***. This hypothesis is valid. The design of the business plan covers all the major attributes by the inclusion of a business flow model according to the questioned experts.

The roles played by assets are also critical for a company's success. Since our main focus was on the new high tech start-ups, the main priority was to focus more on intellectual assets and socialization assets since they form the base in the development of the company (Pre Seed and

Seeding stages). Other assets start playing important roles by the time the company is in the Alpha stage. After the Beta and later stages the commercial assets and the material assets start to play an increasingly significant role. The emphasis, on which assets needs to be focused on and developed, depends on the choice of value discipline chosen by the company.

7.3. Company

Adjustments

The company was set up while desk research was conducted for the graduation project. This choice turned out to be more valuable than previously expected, since we knew in a very early stage what the main reasons were for companies to fail. This knowledge made sure that with all the necessary steps were taken by focusing on the main reasons for start-ups to fail. As explained in the graduation report not all main reasons (the external factors can't be controlled or managed by the company) can be covered, but most can be influenced by the company management.

The CTE program contributed in time to the professionalism of the company. The assigned coach not only made sure that the business plan was written in a proper way for the company, but also contributed his experience and knowledge for developing themselves as entrepreneurs. Besides the coach the personal skills trainings did increase our social and self-awareness, though we concluded that attending these trainings is not enough; you should also set yourself open for these trainings and do some preparation. We got some good advice, but it is only good advice if you do something with it.

Future

The future of the company depends on several factors, but it is always the decision of the founders to judge whether the company is feasible or not. The attached business plan shows that the company has three years in front in which it establishes itself in the market, before achieving the break-even point.

At this time the product is implemented in the first project, which is a recreation house, and is a practical example of the interest that external persons and companies have in our product. More pilot projects are in the making, which will be bigger than the first one. Eventually these pilot projects will give investors security that the product works, the company is reliable and that external clients are there.

The following overview gives an indication of what the steps of BK Solar will be in the upcoming year:

- Execute the Business Plan
- Produces four different products for four different markets as explained in appendix D (Business Plan).
- Start-up first pilot for Emergency Sheltering market with NGO's
- Get initial investments
- Apply for additional subsidies
- Use the WSBO agreement
- Form possible alliances with suppliers

7.4. Recommendations

In this part we give recommendations about the KENWIB Project, for CME students and future studies. The KENWIB project will continue for several semesters, which is why we think it is valuable to give our opinion about how our graduation project looks to making Eindhoven energy neutral. In this KENWIB project many CME student are participating and we heard that some of the upcoming student are interested in following our unique way of graduating. We therefore will give advice about how the graduation can go as smooth as possible and within the lines of the KENWIB project.

The last recommendation we do is towards future studies based upon our explorative project. We classify our project explorative, since we have a unique way of graduating, namely setting up a company simultaneously to graduating. Besides that we are in one of the first unique sustainability graduation projects and have the unique opportunity to start a high tech company.

7.4.1. KENWIB Project

Through our study for entering the market with an innovative energy generating product, we had to see what's required to become energy neutral in 2020. It was quickly discovered that a combination of innovations is necessary and that all projects are unique. In future the energy generation by PV cells, wind and water energy will show to have some defaults for implementing them in housings the way they are right now. If you turn on your washing machine and the machine consumes energy from solar cells, it would be a problem when the solar light is blocked by clouds. The same is true for when the wind drops, there simply is no energy. Therefore we see opportunities for our product, since it still generates 80% of its energy on a cloudy day.

In order to become energy neutral in 2020 the use of solar energy, water and wind energy is mandatory, but in order to have the same freedom with sustainable energy as we have right now other innovations are needed. Innovations such as our product are the innovation which will fill in the gaps to keep our energy freedom and still are biodegradable. Storage is important and even energy generation during the night should be taking into consideration.

For the KENWIB project we also advice to start thinking about independent systems, with secondary connections to other independent regions which can be used when low on energy.

7.4.2. CME Students

In the CME education there are many students which have entrepreneurial ambitions. Therefore we write down a few suggestions that can help with these ambitions.

1. If you have the ambition to start a company and you want to graduate on it, it should be an sustainable innovation. This means that it should contribute to sustainability in the field of our education.
2. The best place to test your idea and roadmap to a company is in the Entrepreneurship course given at the TU/e. Here you get much entrepreneurial knowledge and also get assign a coach.
3. Make sure that you have enough professionalism on board. Don't think you can do it on your own, because even if you can, another view on situations makes decisions more comprehensive. This professionalism can be addressed by contacting the BCE institute. The institute will judge your idea and assign a professional coach which has much time available for you. Besides that other support is available such as financial support, but your idea should have a big chance of succeeding.
4. Innovation Lab of the TU/e is also a checkpoint you shouldn't ignore. They give advice about IPR and also now about many contract agreements and competition that can be present in the TU/e.
5. The Chamber of Commerce also has much advice and valuable information ready, which they are happy to share with you.
6. Calling the tax office is free, so before setting up a company and determining the legal form of the company investigate the pro's and con's.
7. Though all institutes are willing to help you faults can be made. The persons that help you are human and thus make mistakes. If you made agreements or heard that the IPR is free to use, you should get it on paper preferably with a signature.
8. Last point of advice, make notes of every meeting you have and send it to the participants that where present in that meeting. You will get busy and forget things, therefore these reports will help you and other participants remember what needs to be done, or what has been agreed upon.

7.4.3. Future studies

This graduation report can be used for a several purposes. The most important part is that it can be used for persons that are willing to start up a company; these persons can be students, unemployed, employed or just ambitious people.

This study has showed the pitfalls for starting companies. With the starting phase we mean the steps to take from the idea phase to the maturity of the company. We didn't define different branches in this study nor did we categorize on initial investments done in the start-up of the company.

For further study we suggest an investigation starting from the official registration at the Chamber of Commerce to two years after it. Furthermore a difference should be made between students and non-students, since the last category has often already work experience and is familiar with the business environments.

Due to a lack of measurements of the critical elements for a business, an investigation on measureable bottom-line decision making moments would add more value to the design of a business plan. This will make sure that the design is quantitative and that the critical elements can be measured. Incorporating the decision making moments will make the design more dynamic and more adaptable for the high-tech companies. These decision making moments could be matched with each, by Bell Mason introduced, phase that a new venture will go through.

7.5. Reflection

7.5.1. Graduation

This master thesis has been a complex, interesting and difficult process to realize mainly due to the fact that we were also working on a high tech company start-up. This included the activities of writing a business plan for the company itself under the CTE program. This was also the other main reason for us to do this research, because we always had the motivation to start up a company. This resulted in doing the innovative master graduation which has been done for the first time in Construction Management & Engineering department. A lot of research was done in this field, which means that a lot of related information was published and this has been a great benefit, though we wanted to differentiate our project from the already published results. We took a different approach, which yielded different results than the conventional ones in the short span of time we had. This also meant that the structuring of the information i.e. the final report in a logical order and at the same time being descriptive has been a difficult process. There were a lot of difficulties while working on the graduation thesis, writing a business plan, and validating both of them simultaneously. Even the business plan, designed in the graduation thesis, was applied while writing the business plan of the company.

7.5.2. Personal life

During the graduation there was a personal incident in the family of one of the authors, this happened in a very busy period. On this particular moment the tasks of the authors became more difficult due to emotion and of course increased workload for the other author. The friendship between the authors was definitely strong enough to overcome this hurdle, but still we needed to be creative in making the deadlines.

On top of that a month later, in the last weeks of the graduation one of the students had to go to India, because of health problems. This meant that the other graduate student had to step up the pace, so the workloads in the end were rather equal. Unfortunately the event itself caused again ten days of hospital-, but the author was able to work and complete his task on time. This incident happened after the green light meeting where our graduation was given the “green” signal. In this meeting adjustments for the report were suggested. The friendship between the authors was definitely strong enough to overcome this hurdle, but we still needed to be creative in making the deadlines. We like to think this had influence on the graduation, but was again a valuable experience.

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INCREASING NEW VENTURE POTENTIAL

Design and Validation of a Format Business Plan to increase start-ups success rates.

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Abstract

For any High-Tech start-up there are high failure rates and the chances of failing are even higher if company enters into a new market with a new product. The start-ups failure rate was 42% within three and a half years after start-up, and 33% for high tech start-ups after five years. The failure factors were identified and studied which were categorized into Internal and external factors. It was also concluded that external factors can't be controlled by the company, so a hypothesis was formulated i.e. "having a good internal foundation will reduce the influence of external factors and increases the success chances". Ultimately the study results in formulating a new improved business plan (BP) design which includes a business flow model (BFM). The BFM model includes a selection of strategy, asset management, business model and resource and process management. This design is validated through a panel of experts to prove the hypothesis. The high tech start-up of the authors, based on this format, successfully joined several stimulating programs and set up their first pilot within six months.

Keywords: Assets management, Business Flow Model (BFM), Business Plan, Value Disciplines, Business Model.

Introduction

During the development of a business plan for the entrepreneurship course, an idea grew to start a company for which the BP was written. Important to consider when starting up a company in a high tech sector is that many of the companies entering a new market with a new product have high chances of failing. It was also said by Philips and Kirchhoff (1989) that out of ten new businesses nine close down in the first year. But based on recent studies, it's clear from **Error! Reference source not found. figure 1** - that there is still a high percentage of failure for new start-ups. Entering a new market with a new product is proven to be a challenging task. The problem is that there is a high percentage, since 42% of start-up companies fail in their first three and half years due to various reasons, according to the EIM report Meijaard, et al. (2007). Therefore BK Solar wants to investigate the reasons why new ventures fail. By identifying the problems and solutions BK Solar can increase its own chances of succeeding and surviving.

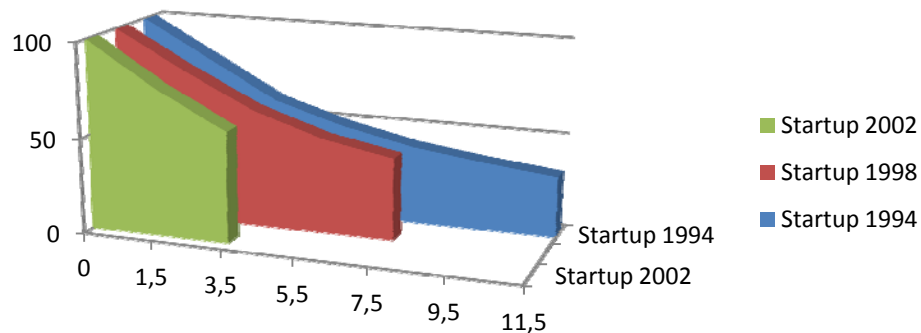


Figure 1: Failure of start-ups in the Netherlands

In this article a design of a BP for the company BK Solar is created to partially solve the problem which also answers the main underlying question i.e.

“Can we make a format business plan, by identifying and analyzing the factors responsible for the high failure rates of high-tech startup in the Netherlands to increase the success chances of the start-ups?”

The report shows that making a sound foundation, which includes a business plan, for high tech start-ups can reduce the external risks and increase the success chances of the companies.

Methodology

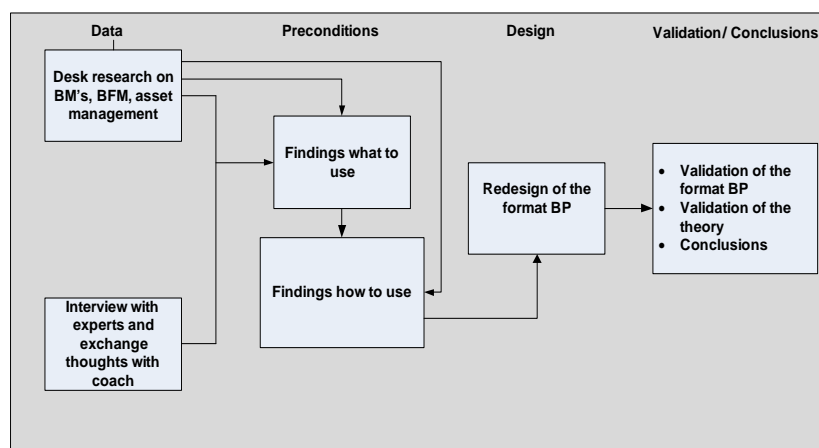


Figure 2: Research model

New venture failure rates

Key Elements involved in new venture failures

Failure of the firms can be categorized into internal and external factors. Internal factors are mainly within the business organization related factors, which are for example; managements, strategy etc. It's also known that business cannot only function within a vacuum of closed space internally; also external factors, which mainly occur outside the business boundaries, are also responsible for the success or failure of a firm. It's was identified that they will have effect on the internal functions of the firm and might affect the strategies and objectives.

Internal factors

The internal factors responsible for failure of new venture startups are:

- Assets
- Business strategies/Value disciplines
- Business models

External factors

The External factors responsible for failure of new venture startups are:

- External Micro environment-Factors which can be partially controlled by the organization like suppliers, warehouses, wholesalers, distributors etc.
- External Marco Environmental-Factors which are totally out of companies control like degree of competition, economic factors, political and legal factors, technology, social and cultural factors, etc.

It's now clearly understandable that internal factors are controllable within the company, but that the external factors are out of the company's control. It can be concluded that if a good solid and structured internal foundation is made, irrespective of the external reasons, a company can survive and it increases success ratio.

Assets

It was identified that in new firms the absence of assets given in this paragraph could limit the growth of that firm while the presence of the given assets could promote growth in such firms (Penrose, 1959). We can name these assets in a company as resources. There are four main assets for a company which are; the intellectual assets, commercial assets, socializations asset and finally the material assets. A company can be seen as composites of various assets. This stress is supported in the entrepreneurship literature, which records that a principal cause of high-technology firm failure is a lack of resources. (Garry D. Brutona, Yuri Rubanikb, 2001). The review on literature concerning assets makes clear that assets are vital and have important role to play in either the company's success or failure. Having a solid intellectual asset is necessary during the start of the company and it should be higher compared to the other three assets. Possessing good socialization assets is also necessary, because it makes sure the company maintains a good working relation with the involved parties (Internally and externally). Having sound commercial assets makes sure that the company is able to understand and act according to the market needs. Finally material assets have a huge role to play when the company

matures, because they reflect the company's growths which in turn depend on cash flow or profit on the balance sheet.

Strategy is defined as the direction and scope of an organization over the long-term, which achieves advantage for the organization through its configuration of resources within a challenging environment, to meet the needs of markets and to fulfil stakeholder expectations. It's been said that high-performance organizations know that resources must be allocated to develop a sound and matching strategy (Carter, 2000). There are three main types of "value discipline" identified by Michael and Wiersema, which are namely:

- Operational Excellence *-Best price with least inconvenience*
- Product Leadership *-Innovation that delivers the best products*
- Customer Intimacy *-Deep customer relationships for customized results*

The fourth value discipline was newly introduced, which is called as resource enrichment. Furthermore Treacy (2000) recommends that companies need to choose their value discipline based on the needs and vision. Depending on value discipline the strategy should be developed and evolved.

Business Models

Business models play a vital role in innovation processes and are used as a marketing device focusing on the use of materiality and dynamics (Liliana, Renault, 2009). More and more emphasis was given to business models of the companies after the dotcom explosion in which most of the start-ups failed. (Liliana, Renault, 2009). So a new venture must have a comprehensive business model, which guides them in obtaining the final goals as well as attract new investors. A business model allows entrepreneurs to explore the market and at the same time promotes the existence of a new product venture. New ventures use a business model to plan on how to make money in the long term (Afuah, Tucci, 2001). Money generation is done by articulating the value proposition, identifying the market, estimating the cost structure and profits potential which all become the key attributes of a business model.

Business flow model

Assets configuration forms the heart of a BFM as explained earlier. Assets configuration can be done only after narrowing down what value discipline the company chooses and what strategy the company is going to follow. After the assets are configured, a business model is developed followed by the other entities. These entities are the combustion process, management of resources, process, roles played by the contributors/ payer.

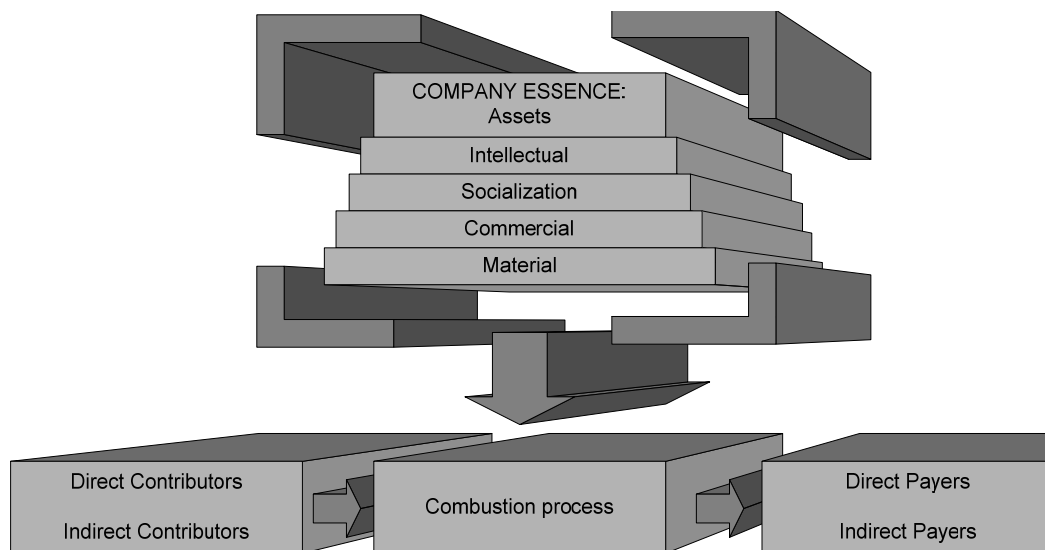


Figure 3: Business flow model

Figure 3 above shows an overview and relationship between each entity of the business flow model. The management of assets and process is critical since they contribute to the increase in assets and efficient combustion process respectively.

As shown in figure 3, the direct and indirect contributors also play an important role, because they are the ingredients for the combustion process. In this process the actual productions/ services takes place. The combusting process leads to the revenue of the company, which is a cycling process. The payers are the clients, which pay for the product/service. Indirect payers can be organizations that stimulate the product by advertisement or subsidies, as the government are currently doing for innovations.

Risk analysis

From literature research it can be concluded that many start-ups are ambitious and start their company without doing proper research and thus have a big chance of failing. This finding is of also great importance for BK Solar and all other start-ups. There are four main types (Finance, Strategic, Operational, and Hazard) of risk sectors identified by organizations IRM, AIRMIC and ALARM, which have great interrelations with list of common factors that influence a failure. The actual main external reasons for a company to fail are the problems with law and regulations, too low customer demand, too much competition and chances of the entrepreneur of getting a job.

Design of a Business plan

From the extensive desk research, it's now clear on how to formulate a new improved BP for BK Solar. A certain path is assumed, which if followed will lead to a successful BP format. This format will include all the vital elements like strategy based on value discipline, assets

configuration, the best business model and finally a business flow model, which should increase the success percentage of high tech start-ups. The business flow model shows how to achieve short term goals towards the maturation of the company. After processing the information found in the desk research, we think that the design below is the best format to develop a BP:

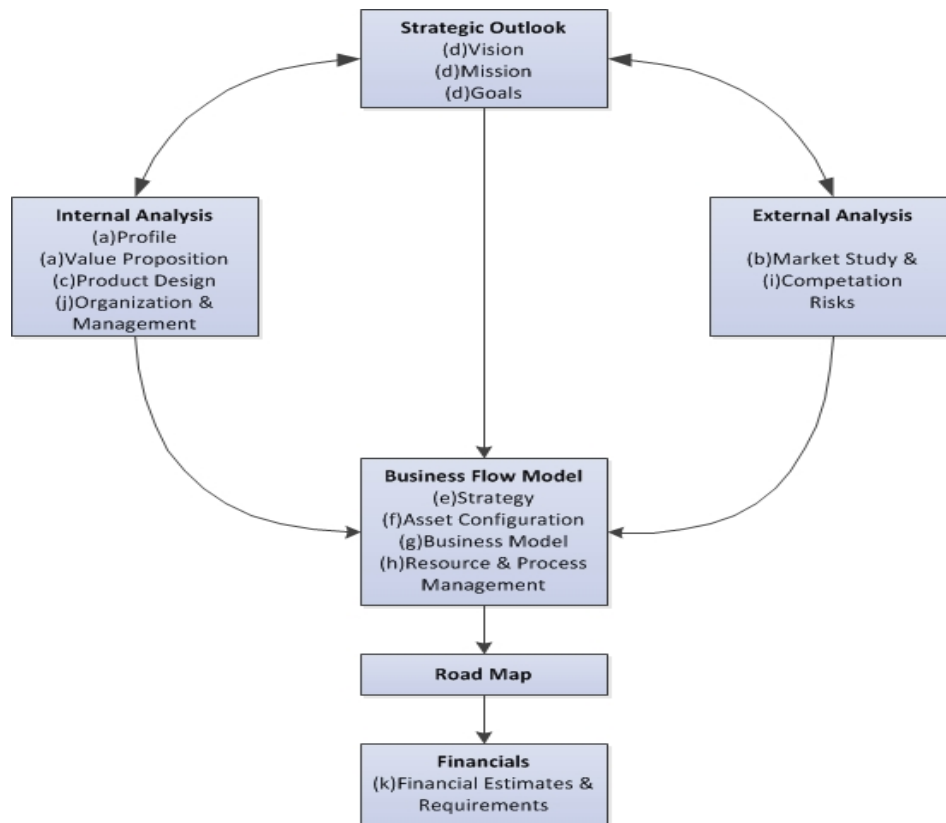


Figure 4: Business Plan Design

Figure 4 shown above illustrates the format BP design, along with clear distinction between all the key elements. This BP design also uses the BFM, which we incorporated in the plan. From the figure it can be clearly understood that the depending on the internal and external analysis results of the company one can easily formulate the company strategic outlook and so the BFM.

Validation

The design is made based upon the desk research and interviews. Validating this design was done by presenting the design for a panel of experts. In this interactive presentation the panel members had the opportunity to comment on the BP and underlying theory. For those panel members who couldn't be reached, emails were sent with a reply request. This validation is done in order to answer the following questions given below:

- What role does assets managements play in the development of the company?
- Does the inclusion of the business flow model add value to the BP design compared to the standard business format?
- What are the strengths and weaknesses of the business plan design?

- Can the design be implementable in practice professionally and does it reduce the failure rates of the company?
- Is this theory valid?

With the Feedback on the design the answers were found:

What role does assets management play in the development of the company?

In the interviews held and emails queries, confirmed the fact that assets management plays an important role in the development of the company. This is due to the fact that assets are the key elements which can be controlled by a company. Necessary actions can be taken to achieve and manage the assets properly. Identification of assets at early stages combined, with their management, during the formulation of the business plan is important. It also depends on the character of the company i.e. the characteristics of a small company are different than those of a big company. The potential of the company can thoroughly be exploited by proper assets management and ultimately lead to increase in company's success chances. If start-up companies validate innovation power i.e. the intellectual asset in the balance sheet, the financial results will be more realistic and far more comprehensive leading to company's success.

Does the inclusion of the business flow model add value to the BP design compared to the standard business format?

Success and failure of the company depends on the way the company acts on the presented information and knowledge, which can be managed internally and should be identified at an early stage. All the panel members agreed that a BFM is a more comprehensive way of identifying and the managing the whole business process. A BFM will indeed lead to the achievement of measurable short terms goals. All interviewed experts agreed that having a BFM will add value to a BP.

What are the strengths and weaknesses of the business plan design?

Strengths:

- All the panel members concluded that the design has a solid structural formulation.
- The most important elements, which had to be considered, were taken into account.
- The inclusion of the BFM made sure that necessary assets were identified, besides that the process on how to manage was also covered.
- The importance of resource and process management was also taken into account.
- One important factor which is "(c) Product design and IP" was particularly highlighted. This factor strengthens the business and the BP as a whole, since our main focus is on high-tech start-ups.

Weakness:

- Some of the experts pointed out that the design is more qualitative and there is lack of measurements.
- One of experts pointed out the design was lacking a measurable bottom line with decision making moments. As an example the design didn't show the iteration process, since a business is a continuous process and has to respond on situations.

- SCOPE is missing in the strategic outlook part of the design.

Can the design be implementable in practice professionally and does it reduce the failure rates of the company?

All the experts concluded that indeed the design has the potential to be practiced professionally by high tech start-ups, if the quantitative factors are also considered. A measurable bottom line with decision making moments should also be incorporated, which adds value to the dynamic form of the design. The design also makes sure that both the internal and external analysis are differentially represented so that the company has overview of what has to be done (Internally) to gain entrance the required markets (External).

Conclusion and discussions

This paragraph contains the final conclusion of the research. The main question will be answered.

The main question, which is *“Can we make a design, by identifying and analyzing the factors responsible for the high failure rates of high-tech start-up in the Netherlands to increase the success chances of the start-ups?”* is answered. The final result of this research is the designed BP format, which does increase the success chances of high tech start-ups. This design is realized from the gathered information during the research.

The BP design includes an internal and external analysis, aimed to reduce external risks. The most important internal and external factors, were taken into account while setting up the components of the design. Furthermore the BP design includes the BFM, which includes the strategy based on value discipline, assets configuration, business model, and resource and process management. All these elements were identified to be critical elements to increase company's success chances.

Hypothesis

The hypothesis of the research was *“Making a sound foundation, which includes a business plan for high tech start-ups can cover the external risks, increasing the success chances of the start-up”*. This hypothesis is valid. The design of the business plan covers all the major attributes by the inclusion of a business flow model.

Implementation in reality

The new design of the business plan already proved its reliability for BK solar, so it can be implemented in reality. The validation by the panel of experts supports this statement, though some improvements can be made to make the design more reliable.

Recommendations

This graduation report can be used for a several purposes. The most important part is that it can be used for persons that are willing to start up a company; these persons can be students, unemployed, employed or just ambitious people.

This study has showed the pitfalls for starting companies. With the starting phase we mean the steps to take from the idea phase to the maturity of the company. We didn't define different branches in this study nor did we categorize on initial investments done in the start-up of the company.

For further study we suggest an investigation starting from the official registration at the Chamber of Commerce to two years after it. Furthermore a difference should be made between students and non-students, since the last category has often already work experience and is familiar with the business environments.

Due to a lack of measurements of the critical elements for a business, an investigation on measureable bottom-line decision making moments would add more value to the design of a business plan. This will make sure that the design is quantitative and that the critical elements can be measured. Incorporating the decision making moments will make the design more dynamic and more adaptable for the high-tech companies. These decision making moments could be matched with each, by Bell Mason introduced, phase that a new venture will go through.

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