

Recognizing, Developing and Evaluating Business Opportunities to Successfully Create and Deliver Additional Value to ParnasSys Users





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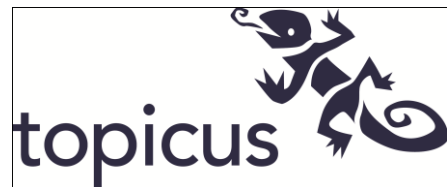
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Preface

After a year of considerable study and hard work, the research that I have executed to acquire my Master's degree and complete my education at the University of Twente has come to an end. The Master thesis lying in front of you is the result of my research at Topicus, focusing on new business opportunities that can be developed for ParnasSys, in order to create and deliver additional value to its users.

Although this research is completed, the implications of the conclusions and recommendations, and the development and implementation of new services that follows has yet to begin. I leave this challenge in the capable hand of the professionals at Topicus.

This thesis can be regarded as the starting point of the development of new services. It presents the important value attributes of ParnasSys users, identifies business opportunities and selects interesting business opportunities for further development into business models, based on relevant criteria. Two of these business opportunities stand out in the creation and delivery of user value, which is why these are recommended to be implemented in the ParnasSys system.

The completion of this thesis would not have been possible without the help of the people around me. Therefore I want to thank a number of people for their support, their help or their patience. First of all I want to thank Martin de Goffau for hiring me for this assignment, assisting me in acquiring the data and information required, and offering me the flexibility and patience to determine my own schedule. Without this flexibility and patience, this result would not have been possible.

Second, the employees of Topicus with which I shared an office space have brought fun to the hours that I have spent in Deventer, and have provided me with the space and information I needed to complete the research. Their support made me feel like home from day one, has kept me motivated to achieve the best possible outcome for ParnasSys, and we've even created some new friendships in the process.

Third, I would like to thank dr. Ehrenhard and dr. Wijnhoven from the University of Twente for their advice and their patience with my elaborate emails, my hard-minded convictions of being right and my prolonged graduation period.

Finally, I am grateful to my friends and family and my fellow students for helping me with comments and remarks, as they have been of great value to me in the last stage of my education. In particular, I want to mention Ramon Schutte as my absolute savior in distress. Without his assistance in my other obligations, the combination of responsibilities would have surely failed.

Raymond Bramer

Vriezenveen, August 11th, 2010.

Management Summary

ParnasSys is an online student administration and tracking system that can be used by primary schools in order to manage student data and student performance efficiently and effectively. The system consists of several modules, which are all charged for separately by an annual license fee per student. In order to stay competitive, Topicus, the owner of the ParnasSys system, wants to implement new services that can create and deliver additional value to its users.

This research was started to determine which services should be developed in order to achieve the creation and delivery of this additional user value to ParnasSys users. Therefore, the research goal is stated as follows:

“The goal of this research is to develop a method to recognize, develop and evaluate opportunities, and to identify which services can best be developed in order to create and deliver value to the fixed user base of ParnasSys”

The first step of business opportunity development is to determine which unfulfilled desires, wants and needs are present in the market. The next step is to determine if there are methods in which ParnasSys can fulfill these needs. Depending on the method of determining business opportunities, this process can also be reversed, when underutilized resources are detected and a certain market need is sought to exploit with this underutilized resource.

Regardless of how the development process is executed, the “fit” between what our users want and the possibilities that exist to fulfill these desires are the business opportunities that are sought. When a business opportunity is identified, it can be developed in the business development process, until finally a business model is created that can be executed to realize the value creation and delivery to the users of the ParnasSys system. Business models describe the delivery of value to all actors involved in the process. It prescribes that for a service to be successful, business models should offer some positive value to all involved actors.

The data gathering process indicates what our users want, and whether or not ParnasSys is capable of developing this opportunity into a service that can create and deliver user value for this need. Four sources were used to acquire the required data: Financial reports of 31 schools over three school boards, twelve semi-structured interviews with ParnasSys users (four interviews with members of each user group: schools, school boards and parents), several unstructured conversations with sales agents within Topicus, and the Delphi users society, in which complaints and suggestions for improvement are made and reviewed by ParnasSys users that have access to the Delphi system.

The results of the data analysis show that schools, school boards and parents share some value attributes, and have some attributes that are unique to that user group. Common value attributes are usability of the system and the quality of education, which are important to all users. Attributes like children’s health and insight into financial information are relevant specifically for individual user groups.

What should ParnasSys do?

From a comparison between the interviews with ParnasSys users, and the conversations with sales-agents, it is clear that there exists a “gap” between the user’s perceived value from ParnasSys, and how ParnasSys employees estimate this value. This research is a first step in closing that “gap”.

A list of business opportunities that were identified is presented in the results section in Chapter 4. From these results, two business opportunities stand out, based on an estimate of how much value is expected to be delivered to an individual user, and the number of users that can benefit from this business opportunity, thus the total value creation and delivery that can be realized by developing this business opportunity.

The first business opportunity is a Single Sign-On (SSO) system. The intention of this business opportunity is to relieve users of the need to remember usernames and passwords of the systems that they use besides ParnasSys. There are many companies and institutions that require some form of login to web-based systems in order to provide its services to the schools. This research shows that many users experience the login process as irritating. It has become a symbol of the use of IT-systems, of which especially the employees of schools generally have an aversion. The SSO system can take away this burden by logging the user in into external systems automatically after clicking on a button, without requiring the user to enter the actual login data.

It is expected that this system provides user value in the form of usability, which is important to school employees. Moreover, a large portion of ParnasSys users can benefit from this system. Since age is an important factor in the acquisition and application of IT systems (Davies & Westerman, 2000) and the average age of employees at schools is expected to increase in the coming years, it can be expected that the SSO system will continue to provide value to ParnasSys users for the foreseeable future. This business model is deemed both feasible and viable.

The second business opportunity that is developed is the error analysis system for Cito tests. An error analysis system provides users with the possibility of analyzing what a student did wrong in Cito tests, and to detect patterns of errors that indicate an arrearage in a certain area.

There is no LVS-system in the market that offers this possibility in combination with storing method-related test scores and other student data. Therefore, many schools use two separate LVS systems. With this system, ParnasSys would be the sole supplier of a complete LVS system that leaves other systems redundant. The value creation and delivery would lead to an increase in the ease of use of LVS systems in general, since all relevant student performance data can be tracked in one system. It also provides the possibilities to create a better image of how a student is performing, thus creating opportunities to increase the quality of the education provided by the school.

Moreover, when an error analysis system is implemented in ParnasSys, new possibilities arise like automatically drawing attention from parents to the fact that their child has some arrearage in a certain area, and offering the possibility to parents to reduce or clear this arrearage by practicing with small software packages that are designed to tackle the specific problems that their child is affected by. This in turn can increase the popularity of the school portal and therefore increase the number of users in this system. This business model is also deemed both feasible and viable, and services should be developed to create and deliver value to ParnasSys users with this.

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Chapter 1: Introduction

This report is written as a Master’s thesis for Business Administration, and it focuses on new business opportunities for ParnasSys. This chapter starts with the company description and a short summary of the ParnasSys system. Section 1.3 and onwards form the detailed description of this research.

1.1 Company Description

Topicus is a Dutch innovative IT-service provider founded in 1998. The company offers IT solutions for companies and institutions in the sectors healthcare, finance and education. Because of its divisional structure, in which divisions are called cells, the company is located in 4 buildings in the center of Deventer. Its total revenue in 2009 was just under € 20.000.000,-

Topicus believes that the company as a whole should be regarded as an organism. Each cell can be kept small and dynamic and it can operate in its own field, while the organism as a whole can grow to be big and strong. If a cell grows larger and requires more personnel and resources, Topicus tries to split up the cell into two smaller cells to keep this structure functioning optimally. This can be seen in the organogram in figure 1.1, where several company names show large similarities, e.g. Topicus Zorg BV and Topicus Healthcare BV. By doing this, the company can both benefit from the energy and commitment that employees have in small companies and have the bargaining power and the economies of scale of a large IT service provider. Currently Topicus has around 190 fte’s.

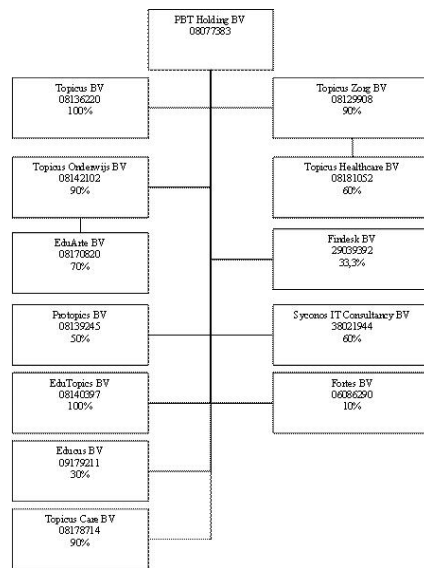


Figure 1.1: Organogram of PBT Holding BV (Powered by Topicus).

The coordination between the cells is stimulated by a strong company culture. Examples of this culture can be found throughout the entire company. The company logo, a small salamander, is printed on every official document, and small plastic versions of the salamander can be found in every office, all employees work with a @topicus.nl mail address and they even brew their own beer, called Gifkikker. Besides this, a lot of thought is given to the organism - cell approach. The unique characteristics of Topicus are called “company DNA”, which consists of three fundamental building blocks:

- Topicus is a company concept: Every cell moves according to this concept.
- Topicus is a product concept: Every cell develops products according to this concept.
- Topicus is clear on the position of and the relation between employer and employee.

Topicus specializes in SaaS-applications, which are gaining in popularity all over the world. SaaS stands for Software as a Service. It entails that software applications are no longer offered as a package that can be installed locally on a computer, but as software applications that are accessible through the internet. This way, the only requirement to use Topicus's products is a computer with an internet connection. Also, maintenance and updates are controlled by the SaaS provider, and data can be stored and managed safely, without any danger that outdated firewalls, virus scanners or computer hardware of users can affect the safety of the software service or the data behind it.

One of the main advantages of the SaaS concept is the information sharing possibilities that it provides. Supply Chain Integration and Process Management are keywords in this. In healthcare for example, the information sharing between medical professionals and pharmacies can improve the service level provided to customers, prevent mistakes and provide massive efficiency gains for the entire supply chain.

The part of Topicus that focuses on the education sector has developed several SaaS systems. Topicus Onderwijs BV is responsible for the development of these systems. Alleva is developed for kindergarten and daycare centers for small children below the age of four. ParnasSys is developed for primary schools with children ranging from ages four through twelve, Vocus is for high schools that educate children from ages twelve through eighteen and EduArte is developed for vocational education.

EduTopics BV is responsible for the exploitation of ParnasSys, and it is for this cell that this assignment is executed. EduTopics is the only full daughter company of Topicus. The other cells are all in some form collaborations with other companies. EduTopics is also the only company within Topicus that exploits one of their products. The exploitation of other SaaS systems is done by external parties, which makes EduTopics different from all other cells within Topicus. EduTopics currently employs twelve fte's, that operate either in sales or in helpdesk functions.

1.2 ParnasSys

ParnasSys is a student administration and performance tracking system for primary education, designed, developed and maintained by Topicus. The system is designed for primary schools, therefore it tracks children from ages around four through twelve. All students have their own record and depending on the school, all kinds of information is stored.

One important aspect of the ParnasSys system is that it is completely web-based. All information is stored in one location, which makes data backup and accessibility easier and safer to manage. Another advantage of the web-based system is that no installation is required on customer's computers. Therefore, setting up the system for a new customer is very easy.

The system consists of several modules. The first is the administration system. In this system, the students name, address, date of birth, etc. is stored. Teachers and employees of schools can add or

modify information that is stored in the database through their web portal which gives them access to all relevant information, like names, addresses, absences, etc. The second is the student tracking system. This system allows teachers to keep track of the grades for all the tests the students make, and it provides the report cards at the end of every period. This is the basic system that Topicus provides to schools in order to manage their students data and performance efficiently. Access to this system is provided on a license based on the number of children listed in the school's student database. A fee of € 3,24 (excl. VAT) is charged per student per year.

There are several modules that can be added to the ParnasSys system. One is the access for school boards. These boards get access to information of every school under their control and they can review the performances per student, per group or per school individually. A fee of € 1,00 per student per year is charged for this module, on top of the standard license fee of € 3,24. 501 school boards make use of this system.

Another available module is the parent module, which gives parents of children listed in the school access to information regarding their child. Again, this information is provided through a secure connection between the central database and the internet browser of the user. Schools decide which information is shown, and which information is not. Again, a fee of € 1,00 per student per year is charged for this module, on top of the standard license fee. At this point, 132 schools have adopted the parent module, but not all of these 132 schools actually use this system.

The final module that is available for schools is the "Zien!" system. This system allows schools to keep track of relevant social and emotional information of children like undesired behavior, social skills and motivational issues. It also suggests solutions to detected problems and provides contact with experts on these issues. Tracking this data is obligated by law. This module is also available for a license fee of € 1,00 per student per year. At this point, 573 schools that use the ParnasSys system adopt the Zien! module and nine schools use the standalone version of Zien! Screenshots and detailed information about ParnasSys can be found on www.parnassys.nl.

Currently ParnasSys serves over 2750 schools (ParnasSys, 2010) of the 7546 primary schools (CBS, 2009) in The Netherlands, which is a market share close to 40%. The web-based system is generally regarded as superior to systems developed by large competitors, but competitors are trying to close the gap between ParnasSys and their system. This causes many schools to make the switch to ParnasSys as the development of competitor's new systems result in bugs and other problems that schools would rather avoid. The advantage of the completed and relatively bug-free system is considered to be the main reason for the rapid growth in market share in the past months.

1.3 Research Goal

At this point, Topicus only generates revenue from these user groups by charging license fees for the use of the system and some extra applications. From its core business of chain integration, Topicus wants to do more with these communities. Therefore they have started experimenting to see which possibilities can be exploited. This research was started to shed light on this topic.

It's clear that Topicus has an aim for profit and continuity. This research should provide Topicus with new insights on the possibilities to achieve these aims. Opportunities that create user value may

present a competitive advantage and have a direct or indirect effect on the profitability and continuity of ParnasSys without generating a direct revenue stream. Therefore the user value is the key variable of this research. To prevent any ambiguity about the term customers or users, the term “users” will be used in this research, and this term implies everyone who has access to ParnasSys through their login data.

This research is set up to identify which opportunities are available to generate user value, and to determine how to make use of these opportunities in order to create and deliver user value, and eventually to generate revenue. It’s expected that some business opportunities will use ParnasSys as an intermediary, between the user groups and companies and institutions that want to reach these user groups or are specialized in certain fields of interest. Therefore, the research goal is defined as:

“The goal of this research is to develop a method to recognize, develop and evaluate opportunities, and to identify which services can best be developed in order to create and deliver value to the fixed user base of ParnasSys”

The most important core elements of this research are defined below:

Core element	Definition
Value	The worth in monetary terms of the economic, technical, service and social benefits a customer firm receives in exchange for the price it pays for a market offering (Anderson & Narus, 2004).
Business Opportunities	A business opportunity consists of a possibility to combine certain resources to meet some market need, and an idea to do this in a way that creates some superior value to customers.
Business Models	A blueprint for a service to be delivered, describing the service definition and the intended value for the target group, the sources of revenue, and providing an architecture for the service delivery, including a description of the resources required, and the organizational and financial arrangements between the involved business actors, including a description of their roles and the division of costs and revenues over the business actors. (Bouwman, Vos, & Haaker, 2008).
Intermediaries	An independent, profit maximizing economic agent between two market sides in presence of market imperfections (Rose, 1999).

Table 1.1: Definition of core elements

This research goal presents two major topics that have to be addressed. The first is the exploration of the business opportunities that exist for ParnasSys to create value, and the second is the determination of how to turn these possibilities into successful business models for ParnasSys that deliver this value to the fixed user base. This is elaborated in the next section.

1.4 Research Questions

The business opportunities that will be selected will have to provide value to the ParnasSys users, since value creation for users is the central goal of this research. Therefore, it is imperative that is determined what ParnasSys users value, which opportunities are available that offer this user value in the best way possible, and how these opportunities can be developed into business models that generate user value. Therefore, the following research questions have been devised:

1: What are the most important value attributes for ParnasSys users?

To answer this research question, the following sub questions have been devised. A literature study, complemented by desk research and interviews answers this research question.

- Who are the ParnasSys users?
- What is user value, and how can user value be determined?
- Which value attributes are the most important for ParnasSys users?

2: Which business opportunities offer the most value for ParnasSys users?

There are endlessly many possibilities to create (some form of) value for ParnasSys users. It is important to determine which business opportunities deliver the most value. Interviews should present an answer to this research question.

- Which business opportunities can be devised to deliver this user value?
- How can business opportunities be evaluated?
- Which criteria for business opportunities are important for ParnasSys?

3: How can the value generation and delivery to ParnasSys users be realized?

After determining which business opportunities are the most successful in delivering user value, business models can be designed to realize the value creation and delivery. Literature study presents the answer to this research question.

- What are intermediaries?
- What are business models?
- How can business models be designed?
- Which criteria for business models are important for ParnasSys?

1.5 Research Approach

To achieve the research goal stated above, first a literature study was performed. Based on literature regarding user value determination, business opportunities and business models, the basis on which this research is grounded is designed. Based on opportunity recognition and user value determination literature, the data gathering methods were selected. A total of four data sources are used to explore the user value and the business opportunities. These data sources are the financial annual reports of schools and school boards, the Delphi users society, the ParnasSys sales/helpdesk agents, and the users themselves.

The financial annual reports of 31 schools in three school boards are used to determine how schools spend their money. The Delphi users society uses a system in which users can post requests for changes and their wishes for ParnasSys, which may present new business opportunities. The sales agents/helpdesk employees are asked in several unstructured interviews (conversations) about opportunities that they feel may be interesting to exploit. The information gained from this is relevant to both understand the market and to determine the attractiveness of the business opportunities that are developed.

Furthermore, a total of twelve semi-structured interviews were conducted, from each user group four subjects were selected to be interviewed. These interviews were conducted with members of the user groups that were familiar with ParnasSys. The schools and school boards that were used to select the subjects to be interviewed differed in size, location, and method of organization, variables

that are deemed to be of relevance to the outcomes of the interviews. Moreover, an attempt was made to interview subjects with different functions within the schools and school boards to broaden the understanding of the aspects that the users value. For parents, the estimated income of the parents was used to select subjects. A list of six questions was devised to structure the interviews, based on the outcomes of the literature study.

The data acquired by the interviews was analyzed by using the general inductive approach. This approach provides a convenient and efficient way of analyzing qualitative data for many research purposes (Thomas, 2003). This analysis presents the attributes that ParnasSys users value, the relevant differences within user groups, and the business opportunities that can be developed into business models.

The evaluation of business opportunities, and the design of business models for these business opportunities concludes this research, and presents recommendations for the implementation of new ways of generating user value. The design of business models for other business opportunities is outside of the scope of this research, but the methodology used to design business models in this research can be used for designing other business models as well.

1.6 Structure of this report

This section presents a step by step overview of the steps that are executed in this research. The first step in this research is presenting the research setting and the research design. Chapter 1 describes the company background, the markets in which Topicus operates and the research design. Chapter 2 addresses the theoretical framework that is used to validate this research and to collect the required information to execute it. The framework addresses customer value determination, business opportunities and (intermediary) business models. In chapter 3 the methodology that is used to execute this research is described.

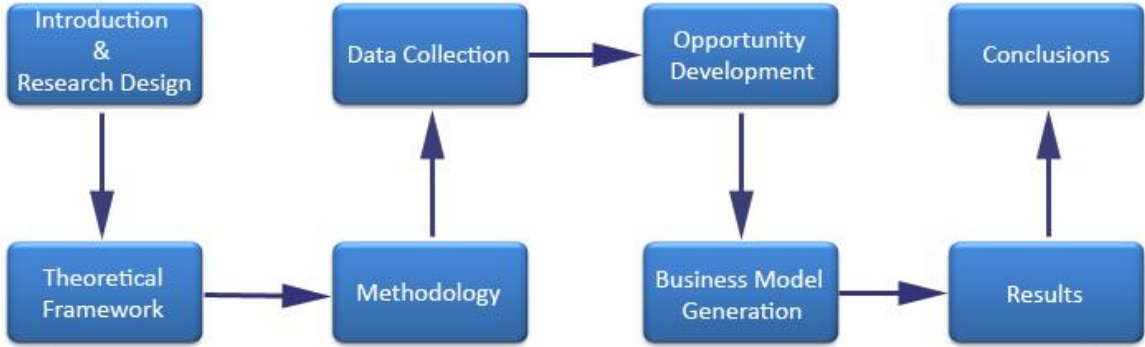


Figure 1.2: Research approach

With the methodology ready, the actual data can be gathered and analyzed. Then, the market needs or un(der)used resources can be identified and developed into business opportunities. From this, a selection is made regarding the opportunities that will be used to develop business models, based on the criteria that literature prescribes. The results of these endeavors will be presented in chapter 4, and chapter 5 will present the conclusions and recommendations of this research, both for the academic world, as for Topicus. Chapter 5 concludes with a discussion regarding the acquired results and presents suggestions for further research. This sequence of steps is presented in figure 1.2.

1.7 Relevancy

1.7.1 Scientific Contribution

The identification of business opportunities, and its development through business models into successful products and services is well discussed in recent literature. Although there is some ambiguity about the term business opportunity, the identification of business opportunities is usually done by detecting a market need and trying to find ways of meeting this need, or detecting an un(der)utilized resource and searching for a market need to fulfill with this. This research differs from the normal identification of business opportunities because the starting point of the identification is the current user base of ParnasSys, not a single market need or a resource.

The determination of value attributes from the current user base of ParnasSys is done through Customer Value Determination. The results of these efforts are used to evaluate numerous business opportunities. The most interesting business opportunities are selected, and these opportunities are developed into business models. By doing this, this research presents a method to create and deliver additional value to an existing user base by developing services that deliver value in attributes that are generally considered to be important to that user base. Moreover, this research presents empirical data regarding the applicability of this description of business opportunities, and regarding the model that is designed to recognize and evaluate these opportunities.

1.7.2 Economic contribution

This research is aimed at creating additional value for ParnasSys users. This can, in time, lead to the generation of additional revenue, both for ParnasSys and for companies and institutions that are involved in the business models. Furthermore, it presents the first outlines of business models for an error analysis system, which offers new possibilities like the use of digital study materials, that may lead to an improvement of the quality of education in schools. This may revolutionize the way primary schools organize their lessons.

1.8 Limitations

Some limitations to this research are important, and need to be addressed. The first limitation is in space. Since ParnasSys is focused on the Dutch market for primary schools, the business opportunities should comply with this. Therefore, this research will only take into account the possibilities that the Dutch market presents.

Another major limitation is in ethics. ParnasSys is aimed at primary schools and its stakeholders, and they share one common interest, which is the benefit and wellbeing of the children attending these primary schools. All opportunities that this research will take into account will have to be suited for primary schools. When dealing with children and their education directly, the question comes to mind whether advertisements or revenue generation options should be included in the first place.

The final limitation that this research is subject to is time. Since this research has to be performed in approximately 6 months, it isn't possible to explore all business opportunities, as the exploration of these opportunities is a very time consuming endeavor. The exploration of business opportunities is performed by using four available data sources. Moreover, to write and test business models for all business opportunities that are uncovered in this research is impossible, so a selection of business opportunities is made for which business models will be written.

Chapter 2. Literature Review

2.1 Theoretical framework

In order to achieve the goals of this research, the literature study provides the basis on which this research is performed. It provides knowledge of the topics of interest, discovered in prior research. The literature review should present the knowledge that exists on the topics of relevance.

The search for relevant literature is done through several search engines and databases. A first selection of literature is made based on the abstract of the articles on the topics that were addressed. A further study into these articles distinguished relevant from irrelevant articles. The relevant articles were studied, and where a more thorough analysis of a subject was deemed desirable, the articles from other authors that have been cited in the article at hand were retrieved.

When determining which services should be developed to create and deliver additional value to a fixed user base, the first step is to identify ideas or opportunities that can provide value to the user base. The next step is to develop these ideas or opportunities into complete descriptions of the service, and the value delivery that is intended. Finally, these business models that have been created have to be evaluated to determine the feasibility and viability of the opportunity. These steps have been used to develop a theoretical framework that can be used to perform this research. This framework is graphically represented below.

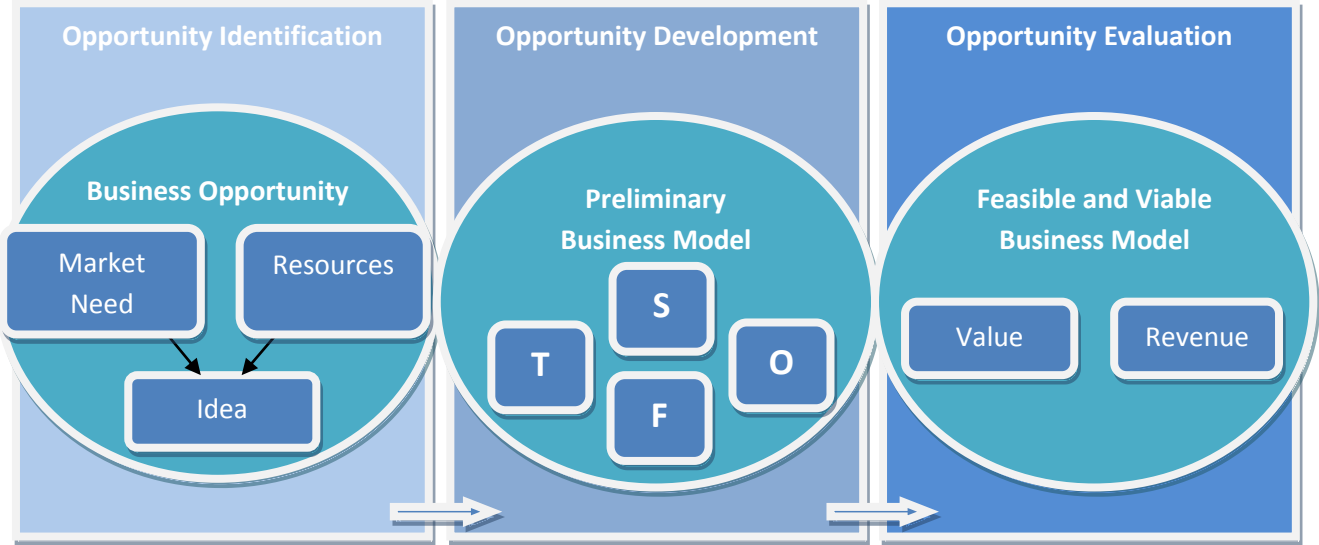


Figure 2.1: Theoretical Framework for Developing Business Opportunities

In this figure, the squares represent the processes that have to be performed by the researcher, the oval shapes represent the end result of these processes, which serve as the starting point for the next step. The result of this model is a business model for an opportunity, that can be used as the starting point for the execution of the idea, created to benefit from an opportunity.

Each step of this model is addressed in detail in the next sections. Section 2.2 addresses opportunity identification, section 2.3 addresses the development of opportunities, and opportunity evaluation is addressed in section 2.4.

2.2 Opportunity identification

The first stage of this model is identifying business opportunities. In literature this process is also called opportunity identification, opportunity recognition or opportunity discovery. There are infinitely many business opportunities that can be developed. Identifying and selecting the right opportunities are amongst the most important abilities of a successful entrepreneur (Stevenson, Roberts, & Grousbeck, 1985). In order to perform this step, two questions are important: What are business opportunities? And How can business opportunities be identified? Ardichvili et. al. define business opportunities as the chance to meet a market need (or interest or want) through a creative combination of resources to deliver superior value (Ardichvili, Cardozo, & Ray, 2003). Many authors build on this definition, but there are some irregularities, that need to be addressed.

The opportunities that are seen from the perspective of customers represent *value sought (expected value)*. The un- or under employed resources or capabilities are called *value creation capabilities (intended value)*. Prospective customers may or may not be able to articulate their needs. Even if they are unable to do so, they may still be able to recognize the value to them in something new when they are presented with it and have its operation and benefits explained (Ardichvili, Cardozo, & Ray, 2003). The under-employed resources, as well as new capabilities and technologies offer possibilities to create and deliver new value for prospective customers, even though the precise forms that new value will take may be undefined.

Both the market need, and the resources to meet them are not dependent on any individual to exist. Opportunities emerge – and become available for discovery by specific individuals – out of a combination of many factors, economic, technological, and social (Baron & Shane, 2008). So why do some individuals recognize business opportunities, where others don't? Many variables affect an individual's ability to recognize business opportunities. The table below summarizes what is written about this up to 2003 (Shepherd & DeTienne, 2005).

Subject Matter	Date	Author/Authors	Theoretical	Empirical
Alertness	1973	Kirzner	X	
	1991	Kaish & Gilad		X
	1996	Busenitz		X
	2001	Gaglio & Katz	X	
Cognition	2001	Alvarez & Busenitz	X	
	2003	Baron & Ensley		X
Creativity	1984	Long & McMullen		X
	1988	Amabile	X	
	1999	Hills, Shrader, & Lumpkin		X
Extrinsic Motivation Financial Reward	1976	Schumpeter	X	
	1990	Baumol	X	
	1997	Kuratko, Hornsby, & Naffziger		X
	1997	Venkataraman	X	
Human Capital	1994	Cooper, Gimeno, & Woo		X
	2003	Ucbasaran, Westhead, & Wright		X
Learning	2002	Corbett		X
	2003	Dimov		X
Networks	1985	Birley		X
	1988	Low & MacMillan	X	
	1999	Floyd & Wooldridge	X	
	1999	Singh, Hills, Hybels, & Lumpkin		X
Prior Knowledge	1945	Hayek	X	
	1997	Venkataraman	X	
	2000	Shane		X

Figure 2.2: Opportunity Recognition in the Literature (Shepherd & DeTienne, 2005).

Recent literature from 2005 to present seems to focus on cognition processes as the most important area of research (Krueger, 2005) (Mitchell, et al., 2006). There is a growing interest in the role of cognitive psychology as a driver of entrepreneurial initiatives (Kasouf, 2007). Gender can also be of influence as to which opportunities are recognized, but not to its success. (DeTienne & Chandler, 2007.)

Some elements reduce the chance of an entrepreneur recognizing an opportunity. Surrounding the process of opportunity recognition are elements such as chaos, information asymmetries, resource scarcity, uncertainty, risk, paradoxes, confusion (Timmons, 1994). Moreover, Timing is an important element in opportunity recognition. Recognizing an opportunity too early or too late may render the opportunity useless for the individual that recognized it.

Although this information is useful in determining why certain individuals recognize opportunities, and others don't, it doesn't explain how these entrepreneurs recognize opportunities. Singh, Hills and Lumpkin have suggested in 1999 to distinguish between a new venture idea and an entrepreneurial opportunity (Singh, Hills, & Lumpkin, 1999), but this hasn't been adopted in later research. Ardichvili et al suggest three phases in opportunity recognition: perception, discovery and creation. This suggests that perception is the first phase of opportunity recognition, but this also doesn't provide a starting point for opportunity recognition.

This raises the question whether opportunity recognition is something that can be done, rather than something that overcomes you. According to several authors, it can be taught. Long and McMullan describe the opportunity recognition process as being at least partially under the control of the entrepreneur. They argue that a combination of factors, including both uncontrollable and controllable factors, affect the ability of an individual to recognize the opportunity (Long & McMullan, 1984). Krueger states that the ability to recognize opportunities comes forth from both personal trait level phenomena, such as tolerance for uncertainty, and some necessary skills, like critical thinking (Krueger, 2005). Kasouf (2007) states that the interplay between individual factors that may affect efficacy have the potential to explain how some individuals recognize opportunities where others with similar backgrounds or technical skills do not (Kasouf, 2007).

DeTienne and Chandler (2004) have shown that opportunity identification is a competency that can be developed just like any other competency. This means that there are ways to increase the chances for an individual to recognize opportunities. They have discovered that literature proposes four opportunity identification methods: active search, passive search, fortuitous discovery, and the creation of opportunities (DeTienne & Chandler, 2004). Ardichvili et. al. (2003) only distinguish between discovery and purposeful search.

The discovery of an opportunity is clearly present in both articles. Active and Passive search can both be summarized under purposeful search. However, the method of creating opportunities that DeTienne and Chandler propose contradicts Baron and Shane, and Ardichvili et al, who claim that an opportunity emerges from economic, technological, and social developments, and that it's not created by the entrepreneur. This contradiction indicates that the definition of an opportunity is unclear, and it gives rise to the notion that an alternative version of Singh, Hills and Lumpkin's (1999) suggestion to make a distinction between an idea and an opportunity may be useful. Moreover, some thought should be given to the use of the term opportunity or possibility.

A possibility is simply something that is possible. An opportunity is some favorable or advantageous circumstance or combination of circumstances, or a chance for progress or advancement (The Free Dictionary, 2010). If the “opportunity” that is discussed emerges from external developments, and is not dependable on the entrepreneur to detect it for it to exist, then it cannot be called an opportunity. The exact same “opportunity” may be a threat to another entrepreneur, who would call the emergence from developments unfavorable. I therefore suggest to use the word possibility for the chance to combine resources to meet some market need. This possibility can only be called an opportunity when some entrepreneur has an idea to benefit from it, hence having a favorable combination of circumstances, that can result in the creation and delivery of value to customers.

So to comply with both statements, that alternative version should comprise that a possibility of meeting some market need with certain resources emerges from external developments, an individual can recognize that possibility, and create and develop an idea to benefit from it, and thus creating an opportunity from a possibility. Therefore the definition of a business opportunity is: a business opportunity consists of a possibility to combine certain resources to meet some market need, and an idea to do this in a way that creates some superior value to customers.

Identifying market needs or finding un(der)utilized resources is not a deterministic process. It’s not true that everyone will detect an opportunity, when they try long and hard enough. However, by increasing the controllable factors that are of relevance to the identification process or reducing the elements that form the cloud, the chance that an entrepreneur discovers an opportunity can be increased. From the literature described above, I propose the following framework for opportunity identification. The process of perception, discovery and creation can be seen as breaking through the cloud in the picture below. This breaking through the cloud can be enhanced by increasing the entrepreneurial traits and skills that can be influenced by an individual, or by reducing the elements that form the cloud.

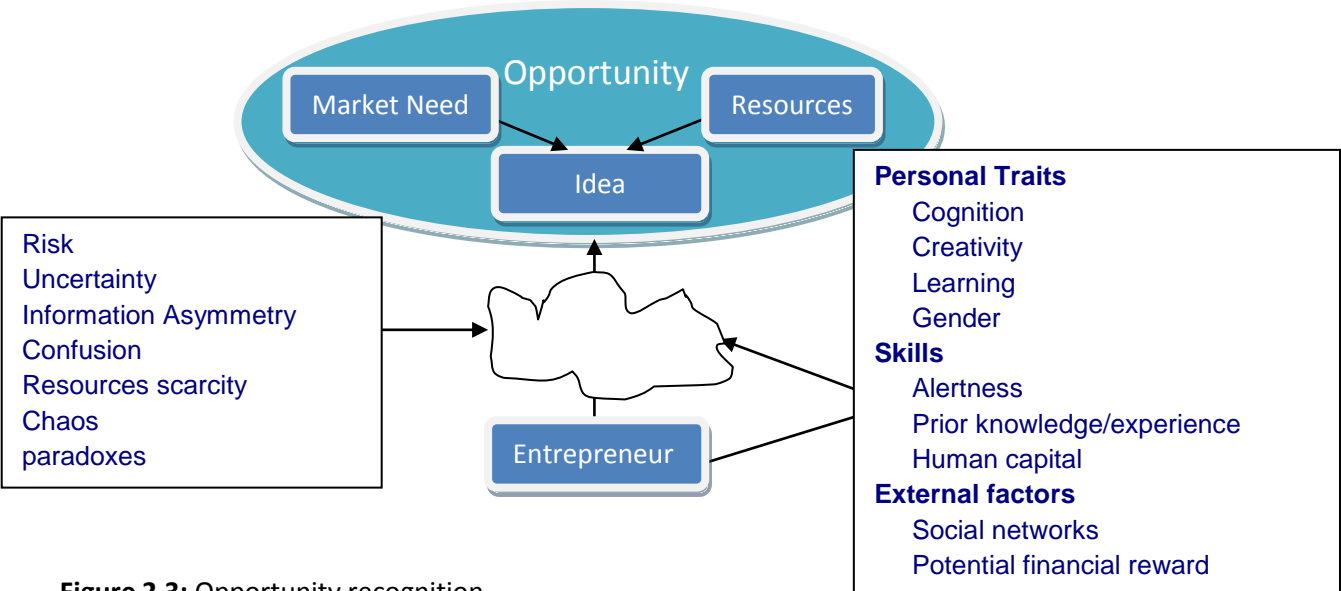


Figure 2.3: Opportunity recognition

Recognizing opportunities that exist for a fixed user base has never been studied in literature. The closest to this topic is customer retention by innovating and developing products and services, but this does not explain anything about opportunity recognition for new services. Building on the

literature of opportunity recognition in general, I propose the following model for opportunity recognition for a fixed user base.

Assuming that the user base is fixed, and the users can be contacted, it is possible to explore the market needs of the users by actively searching for them in a data gathering process, thus providing a starting point for actively searching for opportunities. Since this assignment focuses on creating additional value for users, it makes sense to explore the value attributes of users while seeking these market needs, as it is important to deliver value to all users, and not just a small number of them.

When the entrepreneur understands certain market needs, he can attempt to meet them by combining or bundling resources in a way that value is created and can be delivered to the users, thus creating an idea to benefit from a possibility. This model is depicted in the figure below.

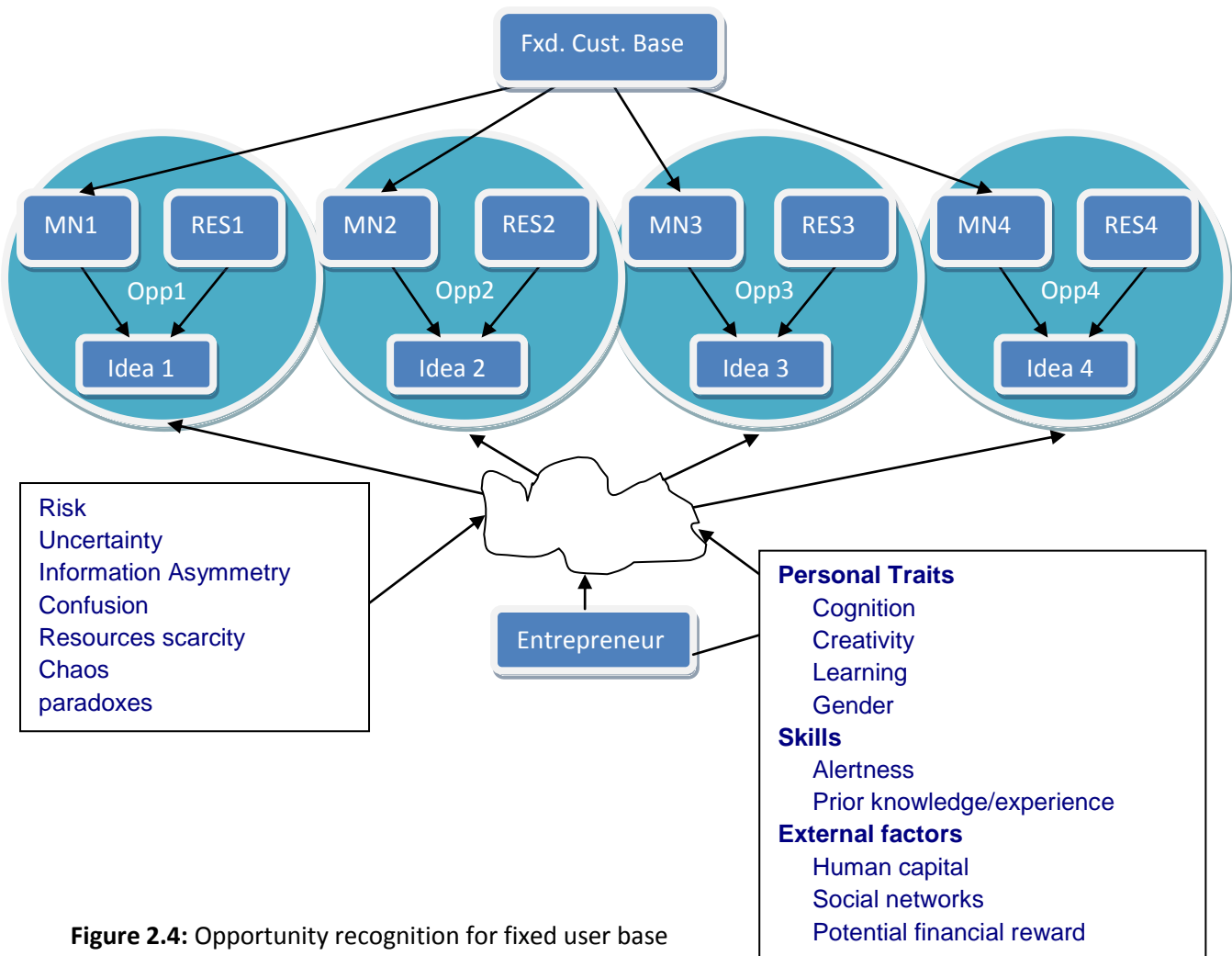


Figure 2.4: Opportunity recognition for fixed user base

2.3 Opportunity Development

As the combination of the imprecisely defined market need and/or the un(der)utilized resource becomes more precisely defined, a business concept begins to emerge out of the idea that is created to benefit from an opportunity. The process of idea development then forces the entrepreneur to fill in specific details. If the concept originated as a market need (value sought), the type and amount of resources required to address that need will be identified. If the concept arose from underemployed

resources (value creation capability), the benefits and value that the capability brings to particular users and uses will become more explicitly detailed (Ardichvili, Cardozo, & Ray, 2003). This process eventually develops the business concept into a business model, in which the service is described, and the value that is intended to each actor is clear.

Business models are perhaps the most discussed and least understood terms and aspects in the areas of eBusiness, eCommerce and markets. Importance is usually regarded as high, since a sound business model seems to influence the (potential) revenues and the future success of the eBusiness initiative. However, there are multiple indications that neither the understanding nor the elements of business models are broadly available (Alt & Zimmermann, 2001). The lack of sound business models has led to the failure of many eVentures (Vickers, 2000). This section presents the aspects of business models and its design.

2.3.1 Basic concept and functions

Recent studies and literary reviews provide insight in the concept of a business model. Although there are many different definitions of the term business model, many of these revolve around two central themes: Value and Revenue. The main goal of e-business modeling is to reach agreement amongst stakeholders regarding the question “who is offering what of value to whom and expects what of value in return” (Gordijn & Akkermans, 2001).

A straightforward and generally accepted definition of business models does not seem to exist, as many authors define it differently. A single coherent description is lacking due to the multi-disciplinary nature of business models (Mahadevan, 2000). Hedman and Kalling (2003) point out that the relevant literature regarding business models is dominated by descriptions of “specific” empirically identified business models, and that little attention has been paid to the theoretical sub-constructs of these models (Hedman & Kalling, 2003).

The lack of a common understanding on both the definition of business models and its content has some implications for this research. The selection of the references that will be used to build the theoretic framework of this research has to be done carefully as a different selection of business model literature may present different outcomes of the literary review and thus differences in the results of this research. In recent literature, two articles elaborate on the sub-constructs of business models that are required to design new business models. These articles are addressed below.

EBusiness model design, classification and measurements

Dubosson-Torbay, Osterwalder and Pigneur (2002) present a fairly elaborate description of business models and their constructs. They define a business model as “*nothing else than the architecture of a firm and its network of partners for creating, marketing and delivering value and relationship capital to one or several segments of customers in order to generate profitable and sustainable revenue streams*” (Dubosson-Torbay, Osterwalder, & Pigneur, 2002).

From this, they construct a business model framework from four principal components: (1) Product/Service innovation, in which the value proposition is composed, (2) the relationship capital with customers, (3) the infrastructure and network of partners required to create value, and (4) the financial aspects that can be found throughout the first three components such as costs and revenue.

Mobile Service Innovation and Business Models

Bouwman, De Vos & Haaker (2008) have composed and co-written a book on business models, business model design and the application to mobile services, in which a similar description is given. They refer to Dubosson-Torbay, Osterwalder & Pigneur's article, but they present their own definition of a business model:

"A business model is a blueprint for a service to be delivered, describing the service definition and the intended value for the target group, the sources of revenue, and providing an architecture for the service delivery, including a description of the resources required, and the organizational and financial arrangements between the involved business actors, including a description of their roles and the division of costs and revenues over the business actors." (Bouwman, Vos, & Haaker, 2008).

From this, they define four components of which business models should exist. These are: (1) the Service domain, in which the value offering is described, (2) the Technology domain, in which the technology requirements that result from the service domain are described. (3) the Organization domain, which presents the resources and capabilities necessary to deliver the value offering, and (4) the Finance domain, in which the revenues, risks and costs are described.

Comparison

The intention of this research is not to falsify one of these models, nor is it aimed at ranking them. What is relevant is which model is more appropriate to this research. To a large extent, these definitions are similar. Differences exist in the separation of the infrastructure component (A) into the technology domain and the organization domain (B), and the combination of the product/service innovation and the relationship capital with customers (A) into the service domain (B). These differences do not seem to have any material effect on the content of a business model when designed according to these papers.

However, Bouwman, de Vos & Haaker elaborate on the subject by decomposing the term value into four types, giving critical design issues and critical success factors that need to be addressed when designing a business model, and they present a method with which business models can be designed, called the STOF-method. Their definition of business models captures the central notions of value and revenue, and it involves the partners for value creation and delivery, and the customers that receive the value offering. Moreover, it is composed for ICT and mobile services, which is the focus of this research. Therefore, this method is more appropriate for this research, and will be used as a guideline for designing business models in the second phase of the theoretical framework.

As with the definition of a business model, no general consensus exists on the elements that should be addressed when designing a business model. The existence of so many different classifications of components, illustrate the lack of a common framework (Haaker & de Vos, 2008).

Bouwman, Faber, Haaker, Kijl & de Reuver (2008) present four generic business architecture domains which should be addressed in order to design a business model for services. Service, Technology, Organization and Finance (Figure 4.1). These domains are explained below.

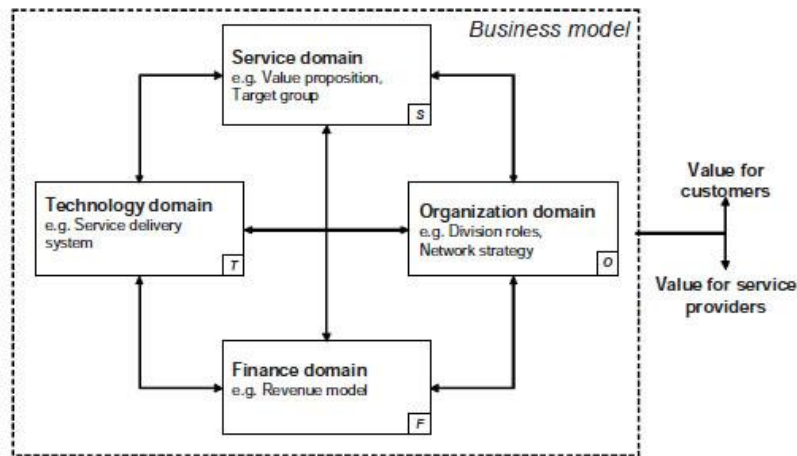


Figure 2.6: Business model components (Bouwman, Vos, & Haaker, 2008)

2.3.2 The Service domain

The service domain is the starting point of the STOF approach. It entails an elaborate description of the service that will be offered, the value proposition and the customers, and it serves as a reference for the other domains. Every service has specific issues that ask for closer attention, but some generic issues are relevant to all services.

The most important aspect of the service domain is the *customer value* of a product or service that an individual company or network of companies has to offer and which will satisfy customer demands (Bouwman, Vos, & Haaker, 2008). To be able to satisfy customer demand, a thorough knowledge of the customers and end-users is required. The term customer is used to refer to the person(s) paying for the service and end-user to refer to the person(s) actually using the service.

Within the markets on which a company offers its services, different *market segments* can be distinguished, each with different needs, wishes and preferences. Important aspects of market segments are the size of the installed base, size of the target group and the maximal size of the potential market. Knowing and understanding customers and end-users is crucial to successful innovation, and must serve as a starting point for formulating intended value.

Furthermore, the context in which the service is offered, the price of the service, the effort users have to make, and the bundling of services should be addressed in this domain. In this research the concept of intermediation can be important, as offering services of other companies through the ParnasSys system may provide a substantial amount of customer value. Intermediation is therefore addressed in detail in appendix H.

2.3.3 The Technology domain

The technology domain focuses on the core technologies that are required for a company to offer the service to its customers and on their possibilities and limitations. The requirements that are defined in the service domain determine and specify the technical architecture. Some of the generic issues that need to be developed in services and applications are authentication, security and the management of user profiles. The most important design variables that need to be addressed are the technical architecture, the backbone infrastructure, the service platforms (including billing, data management, etc.), devices, applications, data and technical functionality.

2.3.4 The Organizational domain

The organizational domain describes the value network that is needed to realize the particular service offering. A value network consists of actors with certain resources and capabilities, which interact and together perform value activities to create value for customers and to realize their own strategies and goals. Resources include all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable it to conceive of and implement strategies that improve its efficiency and effectiveness (Barney, 1991).

An organization has to collaborate with others in order to be able to provide all the necessary resources and capabilities that are required for developing and offering the service to the market and to develop a viable business model for involved actors. From a value chain perspective, processes create value, and it is important to determine where these value creation activities are executed. This differs from the resource based view, in which the competitive advantage of a firm is derived from the resources and capabilities the firm controls that are valuable, rare, imperfectly imitable and not substitutable. Both perspectives illustrate the importance of determining the key value creating activities/products/processes.

Value networks need to be customer aligned, collaborative with network partners in a systemic and information based way, and they have to be agile and scalable to be able to react to changes from the environment. These characteristics determine the advantages of the value network with regard to traditional businesses.

2.3.5 The Finance domain

The financial resources are the most important resources to be required by the value network. The main components that make up the financial domain are investment decisions and revenue models. These aspects have to take into account the costs, revenues, risks and pricing methods of the service.

Revenue models specify how a firm translates customer value into a revenue stream. In effect, they specify where the money comes from (Hoffman & Novak, 2004). Revenue models indicate what methods of payment are used, what is being paid for, and thus in what way income is generated (Bouwman, Faber, Hakker, Kijk, de Reuver (2008)). The web makes possible a variety of revenue models for a firm, and it can be expected that further types of revenue models will be available in the future (Rayport and Sviokla, 1995). Hoffman & Novak have devised a list of 17 different revenue models, but also state that this list is non-exhaustive.

Dealing with risks means addressing both positive and negative aspects, taking the likelihood and subsequent consequences of any defined event into account. Actors involved in a value network constantly examine the prospects of new technologies, possibilities and performance, and must decide whether or not to replace existing technologies.

Pricing is, in its simplest form, the amount of money that a customer has to pay for using a particular service. An extension to this form is all the sacrifices the customer has to make to obtain and use the service. Setting prices for a product or service is a dynamic process that takes internal and external factors into account, e.g. cost considerations and competition from alternative services. Different pricing strategies can be applied. Short term profit or long term market share are important values that can be achieved by different pricing strategies.

2.3.6 From business model components to business model design

In order to develop business models that create and deliver value to the actors involved, just determining the components of business models is insufficient. Haaker & De Vos indicate that for business models to be successful, they have to match their environment, and be 'balanced' properly on the issues that are important. They describe this by defining critical design issues and critical success factors.

Critical Design Issues (CDI)

To develop insight into how organizations can design 'balanced' business models, designers need to understand the critical design issues (CDIs) in business models and their interdependencies. A CDI is defined as a design variable that is perceived to be (by practitioner and/or researcher) of eminent importance to the viability and sustainability of the business model under study. For each of the four elements in the STOF model, these CDIs can be defined.

For the Service domain targeting, creating value elements, branding and customer retention are critical processes that have to be executed in order to design feasible and viable business models. Because the importance of the design issues is perceived by the designer, other CDI's may be applicable, depending on the service at hand.

The technology domain requires designers to consider security, the quality of service, system integration, accessibility for customers and management of user profiles when designing business models. Again, other CDI's may be included when this is relevant.

For the Organizational domain, Partner selection, network openness, network governance and network complexity are issues that have to be addressed. In innovating companies and network relations the openness is of particular importance. The open vs. closed innovation discussion can be very relevant in this case. Finally, the financial domain requires pricing, division of investments, valuation of contributions and benefits and the division of costs and revenues to be discussed in detail.

In all these CDI's, the right balance has to be found to develop business models that are both viable and feasible. For example, in designing the quality of service, a balance has to be found between the quality level, and the costs incurred. Too much quality will result in high additional costs, whereas too low quality will result in customer complaints or in the worst case, termination of relationships.

Critical Success Factors (CSF)

The viability of a business model is determined by the creation of value for the customers and for the organizations in the business network. Critical success factors (CSF) refer to the limited number of areas in which satisfactory results will ensure that the business model creates value for the customer and for the business network.

For the creation of customer value, there are four CSFs that are relevant: a clearly defined target group, a compelling value proposition, unobtrusive customer retention and an acceptable quality of service. High scores on these success factors will result in a service that meets the user's expectations, i.e. a service that generates customer value.

To achieve high scores on these critical success factors, the critical design issues mentioned above need to be properly designed. A service that generates customer value in the long run can be expected to result in a viable business model.

For the creation of network value, there are four CSFs that are relevant: an Acceptable profitability, Acceptable risks, sustainable network strategy and acceptable division of roles. High scores on these success factors will result in a win-win situation where value is created for the customers and for the network partners that provide the service. It can be expected that network value in the long run will result in a viable business model.

The CDI's in the organizations domain are instrumental for dividing value activities among multiple actors and aligning their resources, capabilities and strategic interests. Similarly, the CDI's in the finance domain are instrumental in defining financial arrangements that lead to a profitable business for all parties involved.

Together, these relations form a causal model that explains the viability of business models based on the assumption that a viable business model should provide both customer and network value. In this model, the CDI's are the instruments used to influence business model feasibility and viability.

In addition, the offerings from other companies or institutions may be of particular relevance in the organization of additional value offerings. Therefore, the process of intermediation can also be important, and needs to be addressed.

2.4 Opportunity Evaluation

At each stage of the development process, the idea has to be evaluated in order to determine the attractiveness of pursuing the opportunity. Two elements return in literature regarding the evaluation or screening of business opportunities or business plans, namely uncertainty and risk (Palich & Bagby, 1995), (Sherman, Digman, Sebora, & Hansen, 2006). Where one individual may detect a certain opportunity, but regard it as having too much uncertainty, and thus being too risky, another may see an opportunity to create and deliver value to its prospective customers.

2.4.1 Uncertainty and Risk

Uncertainty is inherent in the entrepreneurial process, and in the evaluation of opportunities. This uncertainty can present itself in many forms, like uncertainty regarding market demand, availability of sufficient resources, competition, etc. This uncertainty eventually results in risk. Opportunity evaluation is a critical step in the entrepreneurial process and inextricably tied to risk (Sherman, Digman, Sebora, & Hansen, 2006). The ability and tolerance to deal with this risk is key in predicting the success of a new opportunity.

Palich and Bagby (1995) examined the role of risk in opportunity evaluation. They found that entrepreneurs differed not in their desire to take risk, rather in the amount of risk they perceive which influences how they evaluate opportunities (Palich & Bagby, 1995). Therefore, the cognitive processes of an individual are of relevance in the process of opportunity evaluation. Research has indicated that entrepreneurs are prone to biases in their evaluation of opportunities and have a propensity to perceive less risk than others. Giving entrepreneurs a realistic preview of

entrepreneurship reduces this bias, and allows entrepreneurs to develop a better risk perception of their opportunity, thus improving the quality of the evaluation (Sherman, Digman, Sebor, & Hansen, 2006). It can be expected that previous experience with entrepreneurship has a similar effect on cognitive biases.

De Koning (1999) claims that entrepreneurs evolve opportunities by pursuing cognitive activities through active interaction with an extensive network of people (De Koning, 1999). From this can be concluded that in dealing with the uncertainty and risk involved in developing new opportunities, literature indicates that many of the variables that determine an individual’s ability to recognize opportunities are important in the evaluation process as well. Both the personal traits and the skills of an entrepreneur, and its environment that are important in opportunity identification are important in opportunity evaluation. This makes it easy to understand that Ardichvili et al (2003) regard changes that are made in the development stage of the opportunity as recognizing a better idea for the same opportunity. However, this does not mean that an individual who is good at recognizing opportunities will also be good at developing and evaluating them.

2.4.2 Analyzing feasibility and viability

Again, this information is useful in determining why certain individuals develop successful opportunities and others don’t, but it doesn’t prescribe how entrepreneurs evaluate opportunities. Morse & Mitchell have developed a model for evaluating business opportunities. Their version of opportunity evaluation consists of a feasibility analysis, and a financial analysis, or viability analysis.

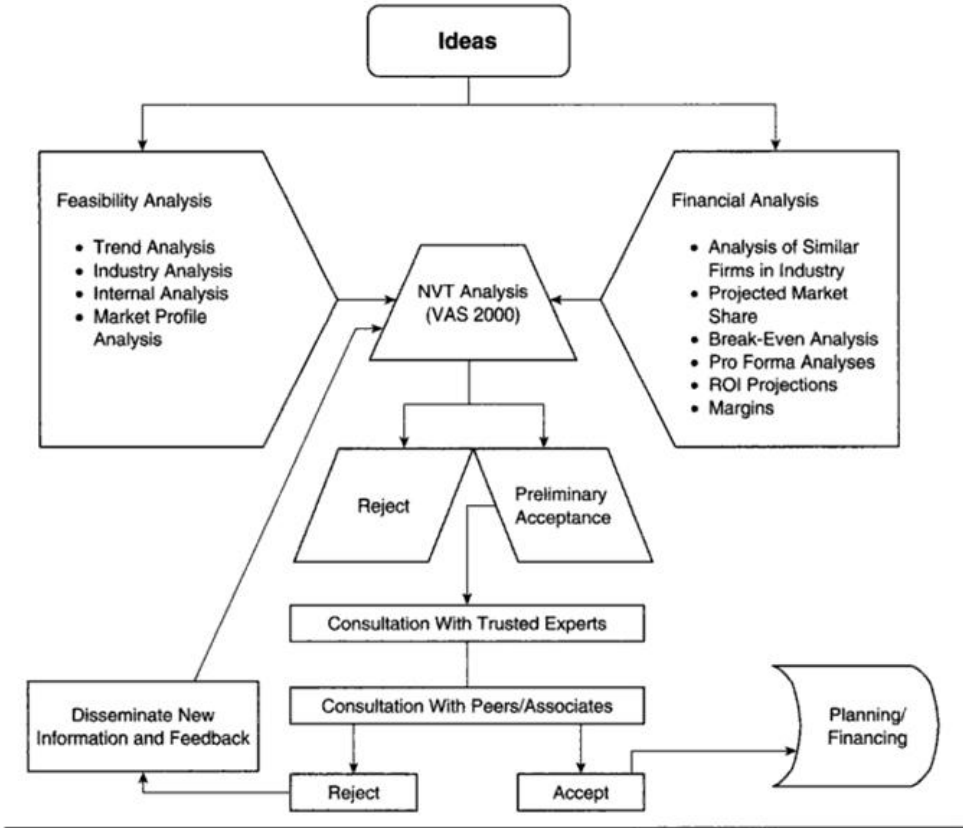


Figure 2.5: Opportunity evaluation (Morse & Mitchell, 2006)

The feasibility analysis consists of a PEST analysis, an industry analysis, an internal analysis and a market profile analysis. The viability analysis includes looking at similar firms in the industry, projecting market share, margin, break-even point, etc.

The next step in their opportunity analysis model is to combine the results of both analyses to project the success of the proposed venture. They suggest to do this by answering 15 questions about the opportunity. A list of these questions is added in appendix I. If the answer to any of the questions is no, do not go on, but review the information and (partially) redo the analysis. If the answers to all questions is yes, continue to consulting peers/associates or experts. If that proves the idea to be favorable, move on to the planning, etc. This is called their New Venture Template (NVT).

While these variables (risk, ROI, Break even point, etc.) typically arise in many models for evaluating business opportunities, there is no generally accepted list of criteria (how much risk is tolerated, how much ROI, when to break even, etc.) for use in forecasting business success or failure (Lussier, 1995). Bouwman et al. describe some critical success factors, and use terms like acceptable, clearly defined and sustainable (Bouwman, Vos, & Haaker, 2008), which are terms that need to be specified for each opportunity. Therefore, no prescribed checklist can be used to evaluate business opportunities and the criteria to which business opportunities should meet should be defined with regard to the environment of the opportunity, and the preferences of the entrepreneur.

McGrath & MacMillan agree with this and indicate that the entrepreneur should develop screening-in and screening-out criteria that are consistent with their definition of which kind of opportunity to develop. Screening out are “drop dead” if a proposal has that characteristic. Screening-in criteria are “the more the merrier” (Gunther McGrath & MacMillan, 2000).

Literature presents a fairly commonly accepted method of opportunity evaluation. Morse & Mitchell’s model has all the elements in it, so this model can be used for this research. This method (and the others for that matter) eventually result in a reject or an accept statement, so multiple business opportunities, that have been developed into detailed business models, and evaluated on their feasibility and viability can and will be accepted. Unfortunately, this model doesn’t rank business opportunities based on their relative attractiveness.

Since entrepreneurs develop business opportunities to create and deliver value for stakeholders (Ardichvili, Cardozo, & Ray, 2003) it would make sense to select the business opportunities that are expected to deliver the most value to its stakeholders. This research attempts to create additional user value, and therefore, the accepted business opportunities are developed into fully developed business models, and then a ranking is made based on their relative attractiveness, based on how much value is expected to be created, and what type of value this business opportunity creates.

2.4.3 Value and Revenue

Since the design of new services is focused on delivering value to a fixed user base, it is important to understand what value is and how it can be determined. Since this is the goal of this research, it’s important to understand what they value in order to determine which business opportunities are worth pursuing.

What is value?

In order to do this, it's important to define value, and to discover how to determine what customers and end-users value. Anderson and Narus (2004) define value in business markets as the worth in monetary terms of the economic, technical, service and social benefits a customer firm receives in exchange for the price it pays for a market offering. This definition has two elements that are fundamental to market offerings: value and price. Since the market offering takes place within a certain context, there is always a competitive alternative to the product or service that is offered. Therefore, the essence of the concepts of value can be captured in the fundamental value equation:

$$(\text{value}_f - \text{Price}_f) > (\text{Value}_a - \text{Price}_a)$$

Anderson and Narus define the outcome of value minus price the customer incentive to purchase. In this concept of value, raising or lowering the price doesn't change the value of the offering. Rather, it changes the customer's incentive to purchase that offering. The value offered has to exceed the price paid for a certain offering because if the price exceeds the value offered, the incentive to purchase would be negative, hence the offering will not be purchased.

Monroe (1990, from Woodruff (1997)) state that buyers' perceptions of value represent a tradeoff between the quality or benefits they perceive in the product relative to the sacrifice they perceive by paying the price. This implies that the value of an offering does increase when the price of the offering is lowered. Both authors agree however that a reduction in the (perceived) purchasing price does increase the attractiveness of an offering to a customer.

The determination of value in monetary terms is argued (Monroe, 1990), (Woodruff, 1997), since not all aspects of a service can easily be expressed in money. However, since the value of the services a company will offer to its users is linked to its price through the process of transactions, customers have to consider the perceived value of the offering to be higher than the price they pay for that service, hence the value of the service is expressed in monetary terms. Therefore, this definition of value is suited for this research.

Anderson and Narus emphasize that value is a construct, therefore it cannot accurately be measured. It can only be estimated. It's important to regard the perspective in which this estimation is made to understand differences in valuations. A company may overestimate the value of their market offering while customer may underestimate it. Woodruff supports this, and states that customer value is something perceived by customers, rather than objectively determined by a seller (Woodruff, 1997). According to Bouwman et al.(2008) there are four forms of value relevant to a service offering:

- *Intended value*: The value a provider intends to offer to customers / end-users of the service.
- *Delivered value*: The value a provider actually delivers to customers /end-users of the service. (Anderson and Narus claim that value is a construct, therefore the delivered value cannot be calculated)
- *Expected value*: The value a customer / end-user expects from the service.
- *Perceived value*: The value a customer / end user actually perceives when they consume or use the service.

From this, it is clear that for this research no definition of value can be given without asking the question: Value to whom? This implies that, before any claims about value can be made, the different actors in a service offering need to be explored.

Customer Value Determination

Now that is clear what value is, it is important to understand what the fixed user base values. Research typically shows that there are differences in what managers think their customers value and what customers say they value (e.g., Parasuman, Berry and Zeithaml, 1985; Sharma and Lambert, 1994). Customer learning processes should be aimed at reducing such gaps (Woodruff, 1997).

The customer value determination process starts with identifying target customers. These are the users of whose value matters to the seller. These customers are used to answer these five questions:

- What do target customers value?
- Of all the value dimensions target customers want, which are most important?
- How well / poorly are we doing in delivering the value that target customers want?
- Why are we doing poorly on important value dimensions?
- What are target customers likely to value in the future?

Woodruff (1997) presents several data sources and methods that can be used to answer these questions. Although this process is designed to improve current business processes, and not to develop new business opportunities, the determination of what customers value is essentially the same, and is required in both situations. The only difference is that reviewing current value delivery is less relevant in this assignment.



Figure 2.1: CVD (Woodruff, 1997)

Determining what users value is similar to determining user needs or customer preferences. Several authors have claimed that it is difficult to determine such information. Some customers have needs of which they are not fully conscious, or they cannot articulate these needs, or they use words that require some interpretation (Kotler, 2003). Moreover, customers are notoriously lacking in foresight (Hamel & Prahalad, 1994). Still, interviewing customers is a recurring method in determining what customers value, what their needs are, or what preferences they have because it does present a (partial) description of what target customers value.

Moreover, interviewing users presents opportunities to discuss possibilities to deliver value to the users with actual users. Woodruff suggests to use laddering interviews, Kotler states that semi-structured interviews are the best method of interviewing customers about what they value.

As mentioned above, the interviews only partially present data that can be used to analyze what our users value. Besides the interviews, studying complaints and talking to sales persons may provide relevant information in determining what customers value, and how a company can deliver this value to their users or customers. Depending on the availability of these data sources, a methodology of data gathering about customer value can be developed to perform the research, based on this literature. More about this is addressed in the methodology in Chapter 3.

Chapter 3: Methodology

This research aims to identify, develop and evaluate opportunities that can offer value to a fixed customer base. This chapter describes the methodology that is used to find answers to the research question, and with them, reaching the research goal stated in Chapter 1. Section 3.1 discusses the population and the sample. Section 3.2 addresses the measurement of variables that are important in the three steps of the opportunity development model. Section 3.3 discusses the gathering of data and section 3.4 addresses the analysis of the data that was acquired.

3.1 Population and sample

This research starts with identifying market needs of the target population and ends with ranking them, based on the value attributes of the target population. The target population in this research consists of all users of the ParnasSys system. Since ParnasSys has three portals for three different user groups, the users can best be described according to the way they use ParnasSys. The first portal is aimed at the employees of the school. The second is aimed at school boards and the third is for parents of students attending the school. These user groups can respectively be found in sections 3.1.1, 3.1.2 and 3.1.3. Section 3.1.4 addresses the sample that is taken from these user groups.

3.1.1 Schools

The school portal is the standard portal in which ParnasSys operates. Teachers, principals, IB'ers and administrators of schools can login, and work with the system. In total, ParnasSys has over 2750 out of the 7500 schools in the database, located throughout the Netherlands. A total of 58.467 accounts are active for users in this system (d.d. 11-5-2010). It isn't possible to determine who has or doesn't have the authority to make purchasing decisions on an individual basis.

3.1.2 School boards

The portal for school boards is an optional module that can be added to the ParnasSys system in which school boards can see summarized information of the schools they command, provided that these schools use the ParnasSys system. This information is only useful if the boards command multiple schools. Single schools (boards with one school) will not experience any added value from the School Board module. There are 333 (d.d. 11-5-2010) user accounts for the school board portal.

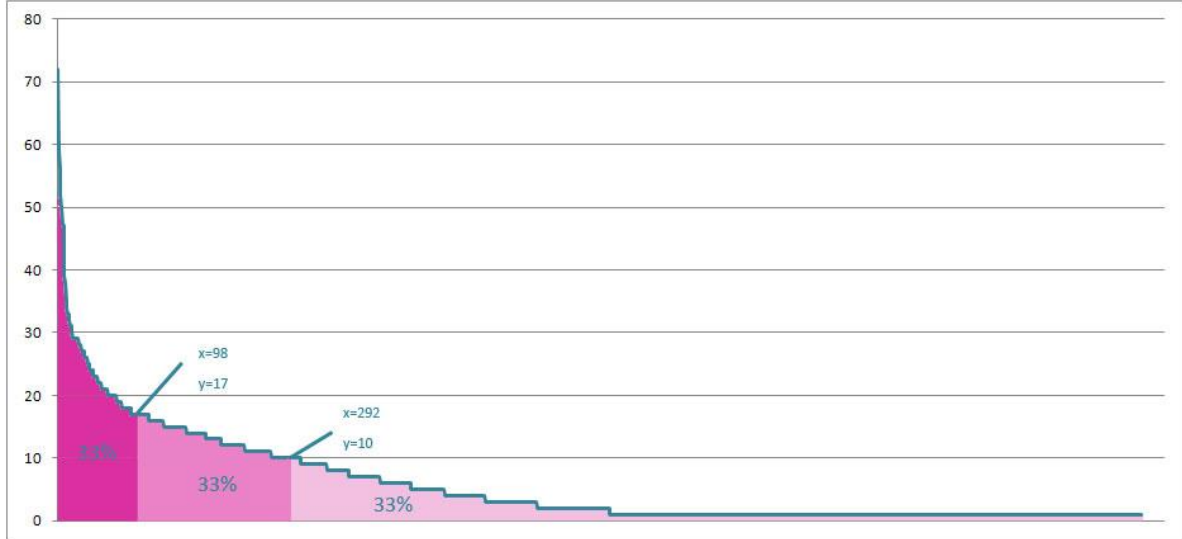


Figure 4.1: School boards sorted by size. Derived from (ParnasSys, 2008)

The organization of school boards is largely dependent on the number of schools that are controlled by this school board. Above is the graph in which all the schools boards (x-axis) are graphed according to the number of schools they command (y-axis).

This list was created on July 2nd of 2008, which means it is two years old. Unfortunately it isn't possible to update this list. It can be expected that some changes have occurred since then (schools that have merged, schools that have been closed, etc.) but this will not drastically affect the structure of primary schools in general. Therefore, the figures below will still approximate the current organization of school boards in the Netherlands.

1342 school boards
7599 schools
659 school boards with one school (no added value from the ParnasSys school board system)
5,66 Average number of schools per board (schools / boards)
11 Median (3800 schools with boards of 11 schools or more, and 3800 with 11 schools or less)

The 98 largest school boards control 33,3 % of the schools

The 194 following school boards control 33,3% of the schools

The remaining 1050 school boards control the remaining 33,3% of the schools

There is no way of determining where the authority to make purchasing decisions is located within schools or school boards in general, which means that the business opportunities that will be developed cannot be offered as one standard system. Therefore, the business models that are developed have to address this. Also, services in which purchasing decisions are required to use the system are difficult to set up and maintain.

3.1.3 Parents

The parent portal is an optional module that can be purchased by schools. Currently, it requires the payment of a license fee of € 1,00 per student per year. The portal shows, depending on what the schools want the parents to know, all kinds of information about the school that are relevant to the parents. Since parents do not follow hierarchy rules, they decide about their purchases themselves. This allows ParnasSys to create services in which transactions are done with the user.

For all students in the database, the names and addresses of the parents and caretakers are available. Currently there are 16064 parents with an active account that can login to the parent module. It is important to clarify that schools decide whether or not they make use of the parent module, and that parents can only use this portal if the schools have agreed to this.

3.1.4 Sample

This research uses four data sources to determine market needs and value attributes for the population described above. The primary method of data gathering for this research are interviews with users. The sample made for this data collection consists of four users of each user group, resulting in total in twelve interviews with ParnasSys users.

It's clear that schools and school boards are heterogeneous in multiple attributes, which increases sampling errors. To prevent this error, the four selected schools and the four school boards differ in size, location, religion and form of education. Moreover, with school boards, it appeared relevant to assume that the use of Microsoft SharePoint is relevant to the products and services the school boards would value. Therefore, two school boards were interviewed that used SharePoint and two boards were interviewed that didn't. It is expected that these variables are relevant to the results of the interviews because these users will probably value attributes differently. Within the schools and school boards, the subjects that were selected varied in function in order to broaden the view of the valuation of attributes.

For the parents, only the geographical location is known with certainty, however there is no reason to assume that location is a relevant variable in determining the expenditures of parents. The religious orientation of a school does not provide information about the religion of the parents of a child attending these schools, nor does the size or the form of education provide any useful information about the parents. Country of origin and the height of the income are more likely to be of influence in the expenditures, or at least to the perceived value of an offering.

The results of the interviews are complemented with three other sources of data collection that do not require sampling, since the availability of data is limited. This may slightly compromise the external validity of the data that is acquired, but the use of several data sources are used should prevent any bias from occurring.

3.2 Measurement

The model that has been created in section 2.1 of this research requires the gathering of data to provide information on two items: The market needs of ParnasSys users, and their value attributes. These items will be addressed in the sections below.

3.2.1 Market needs

When identifying market needs, it is impossible to identify all the market needs that exist in the population under study. Moreover, it is also impossible to determine the market need that can be developed into an opportunity that offers the most value to the population under study (it's not impossible to determine the most interesting market need, but it is impossible to know that there is no market need more interesting to pursue than the one currently identified). It is only possible to identify market needs, develop opportunities that pursue this need, and analyze their feasibility and viability, thus concluding the attractiveness of pursuing that opportunity.

This research attempts to identify numerous market needs by interviewing a sample of the target population, analyzing feedback from users in the Delphi System, and analyzing financial reports of 31 schools in three school boards. These sources should provide enough information to identify a number of market needs that are worth pursuing.

3.2.2. Value Attributes

The second item that needs to be examined are the value attributes of ParnasSys users. Since there are three different user groups, some differences can be expected, but since all user groups have some common reason for using ParnasSys, similarities are also expected.

Customer value analysis literature indicates that there are several methods of gathering data to draw conclusions about what customers value. This research attempts to find the most important value attributes of each individual user group, and the most important value attributes that are shared amongst the different user groups by interviewing users, analyzing feedback of users from the Delphi system, analyzing financial data from 31 schools to determine how schools and school boards spend their budgets, and interviewing sales- and helpdesk employees to draw from their knowledge about the customer base.

3.3 Data collection

This research uses several sources of data to acquire the necessary information to answer the research questions. Since our user groups differ, the available options for data gathering differ as well. For the schools and school boards there are four sources of data that are used to determine what our users value, and how this value can be delivered. For the parents, there is just one data source available.

The first data source is the financial information of 31 schools in three school boards that is published in their annual reports of 2008. This information is objective and complete but difficult to find, probably because this information is not to be made public. Although no sampling is done and all available data was acquired through search engines, the sources that are used for data gathering differ in school size, geographical location, religion, and in organization structure. This offers high external validity of this information because these variables are likely to influence the user's perception of value. The differences in users that are studied prevent a biased result. Moreover, the objectivity of desk research increases the reliability of the data obtained. Therefore, both the validity and reliability of this research method are addressed.

The second source of data is the Delphi system. This system is used by the user's society of ParnasSys to report complaints and requests for changes to the ParnasSys system. Although this system will mostly contain complaints about the function of the current system, it does provide some data that can be used to determine what our users value. When a complaint or request is made, other users are asked to review these requests and complaints and indicate whether they agree or disagree with it. This separates individual suggestions from complaints and requests that affect users in general, which offers high external validity. However, entrance to this system is provided to those schools that pay an additional license fee of € 0,59 per student per year. Therefore, this system provides data from the population of ParnasSys users that are willing to pay for changes, which compromises external validity.

The money that is collected through this license fee is used to buy developer time at a rate of € 100,00 per hour. This way, the users have a direct vote in the development of suggestions in ParnasSys. This suggests a direct motive for individual users to make sure that the money that is collected through the license fees is spent correctly, thus to vote on all suggestions that are made.

The third data source are the sales- and helpdesk employees of ParnasSys. Unstructured interviews (conversations) are used to explore which possibilities exist to create and deliver value to ParnasSys users and to estimate how business opportunities score on the criteria to which they should meet to

be interesting to develop business models for. These three sources of data should be regarded as preliminary exploration to get acquainted with the topic, the company and the market.

Finally, interviews with four subjects of each user groups are conducted to determine what our users value, and to determine which market needs exist to create and deliver value for these users. For each user group, four users are selected to be interviewed

The interviews are conducted face to face at the location of the subject's choice. The interviews are semi-structured. A framework of six questions is devised, and the details of the interviews are dependent on the replies of the interviewee. The six questions are listed below.

- 1: Which products and services do you buy?
- 2: Which payment forms do you use?
- 3: Do you detect structural problems with certain processes within schools?
- 4: Which products/services would you like to see within ParnasSys?
- 5: When would you use / not use these products and services in ParnasSys?
- 6: For schools and school boards: Who has the authority to make purchasing decisions?

These questions can be categorized into three topics. The first two questions lead to insight in the way our users spend their money. Questions 3, 4 and 5 lead to the (partial) answer of the first and second research question of what our users value. In my estimation, simply asking the question: What do you value? Doesn't get the answer I want. These questions are devised to discover the value attributes of schools, school boards and parents, and to see which products or services may deliver this value. Question 6 leads to insight in the way new products or services should be offered.

It is important to note that the user groups consist of schools, school boards and parents that use the ParnasSys system. Therefore, the results of the data gathering can be extrapolated to ParnasSys schools, ParnasSys school boards, and ParnasSys parents. It cannot be extrapolated to schools, school boards or parents in general. This offers no restrictions to the research goals or the conclusions that can be drawn, as the population that is studied consists of ParnasSys users. Together, the data that is gathered is complete, accurate, reliable and valid and presents a correct overview of the attributes that our users value.

3.4 Qualitative Data Analysis

The four data sources provide a large amount of data, that needs to be processed and analyzed to acquire usable results from which conclusions can be drawn. The data is clustered into three topics: and Business Opportunity data, Financial data, and User Value data, and used to walk through the three steps of business opportunity development. This classification is also used to present the results in chapter 4.

Within each topic, the data is coded and grouped into similar clusters of data that point to the same underlying themes, according to Ryan & Bernard's method of data analysis (Ryan & Russell Bernard, 2000). This method is based on the Grounded theory of Straus & Glaser. This presents a sound and relatively fast method to analyze and process the acquired data, and it allows the researcher to draw conclusions from the results of the analysis.

3.4.1 Business opportunity identification

The analysis of the data regarding market needs provides numerous market needs and opportunities. The stage of development of these new business concepts may be limited to a single market need, or it may be an idea that can create value with both the market need and the resources required already recognized by the interviewee. Regardless of the stage of development, all market needs are developed into a short description of the business opportunity, and are then ranked in a table in which is indicated which value attribute is intended with this opportunity, and to which user group it delivers value. At the end of stage one, several business opportunities have been identified, and a short description of the opportunity is given.

The Business opportunity then enters the second stage of development, where it is developed into a business model. The design process of business models is, based on the four components mentioned in section 2.3, called the STOF method. The STOF method consists of four steps. Step 1 refers to the Quick Scan, in which specific design variables of the four components are examined and initial design choices are formulated for the service idea under investigation. In step 2, this outline is evaluated on the basis of eight Critical Success Factors with the aim of assessing the expected viability of the business model. Step three, the initial business model is refined by specifying the Critical Design Issues. Finally, a robustness check is performed in step 4. A detailed description of this process is given in figure 3.1.

3.4.2 Business Opportunity development

Step 1: Quick scan

In the quick scan phase, a rudimentary business model is developed, which includes the four domains of the STOF model. The content of business models has been addressed in Chapter 2.

It is likely that the requirements in the four domains affect each other. Therefore, the activities need to be balanced. To increase this balance between the domains, some simple and qualitative adjustments can be made. The robustness of the preliminary model can be checked superficially by performing a sensitivity analysis.

Step 2: Viability assessment

The viability in this step focuses on the Critical Success Factors. The underlying logic is that a negative assessment of certain CSFs implies that there will be bottlenecks in the business model's viability, and that CDIs related to such CSFs should be redesigned. To achieve high scores on these critical success factors, the critical design issues mentioned above need to be properly designed.

In order to do this, the balance between aspects like quality vs. price, individualization vs. market size, etc. are important. When the viability is estimated to be low, these balances can be reassessed to improve the viability. This is done in step 3. The relation between the critical design issues, the critical success factors and the viability of a business model is described in the charts below.

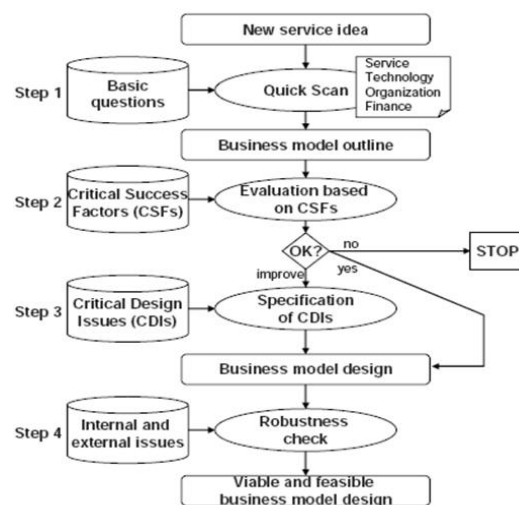


Figure 3.1: Business model design process

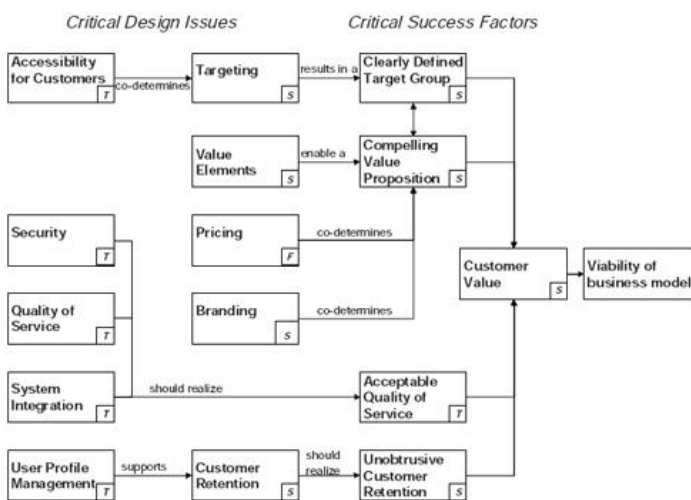


Figure 3.2: Business model Viability (1)

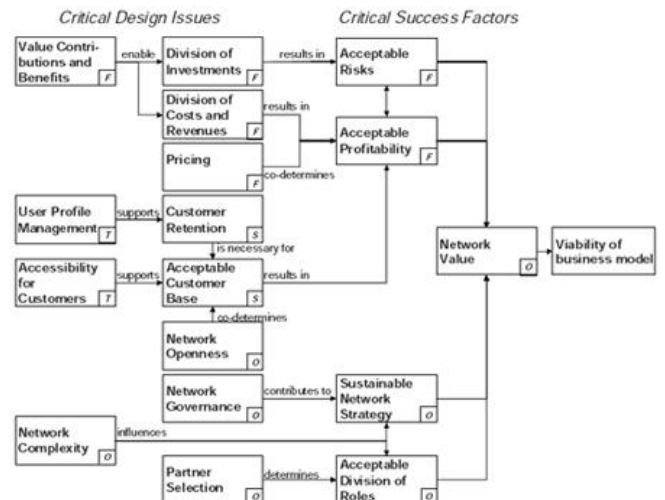


Figure 3.3: Business model Viability (2)

Step 3: Business model refinement

The evaluation of the critical success factors in step 2 results in a set of critical design issues that should be specified in greater detail. The refinement of these critical design issues should be executed in this step. This can either be done by considering all critical design issues for each of the domains or by addressing all critical design issues for each of the critical success factors. The process of refining is similar to the Quick Scan explained in paragraph 6.3.1, but it is more elaborate.

Again, after the elaborate description of each critical design issue, the business model domains should be balanced to comprise a complete and functional business model.

Step 4: Evaluation

When the viable business model which provides value to both the customers and end-users and to the suppliers, an evaluation with respect to the robustness and adaptivity of a business model can be executed. Business models are dynamic models that evolve over time and should therefore be equipped to handle changes. Robustness may be assessed by asking these “what if” questions:

- What if the demand enormously exceeds expectations? (10x the estimated demand)
- What if the demand doesn't meet the expectations? (0,1x the estimated demand)
- What if other target groups are interested than expected?
- What if new developments require new technological architecture? (is the basis modular so changes can be made or new options can be added?)
- Is there a vendor-lock that makes it hard to switch between providers?

The design of business models is an iterative process, and business models have to be designed to fit their environment. Since environments are unstable and change continuously, the fit between the business models and their environment has to be checked to make sure it still offers the value it was intended to do.

Since this research is aimed at making recommendations for the integration of new business opportunities in ParnasSys, the business models will be described as recommendations. This implies that no agreements with external parties can be made, or that investments will be done to acquire resources that make the success of the business models more probable. Therefore, the elements of the design of business models that require any commitments of the company will be can and will not be executed.

3.4.3 Business opportunity Evaluation

The process of business opportunity evaluation is an iterative one. This research will perform three evaluation rounds. A first (informal) evaluation distinguishes opportunities, based on a rough estimate of its contribution to the goal of this research. This selection has to be made to limit the number of business opportunities because developing and evaluating business models for all business opportunities is not possible within the time frame in which this research has to be performed. The selected business opportunities are developed into preliminary business models.

These business opportunities are then evaluated, based on the evaluation model described in section 2.2.3. The criteria to which these business models should meet are determined, and the business models are tested to see if they meet these criteria. This results in a list of accepted and rejected business opportunities. The value attributes of the users are then used to determine the attractiveness of the opportunity. Based on this evaluation, a ranking is made to determine the most interesting business opportunities. The most interesting business opportunities are further explored, and the business models are developed up to the final stage of development, where the implementation of the business model starts. A final evaluation of the business model is performed in order to determine if the business model are both viable and feasible. The STOF method of evaluation is used for this. From this, recommendations can be made regarding the implementation of these business models into ParnasSys.

Chapter 4: Results

The findings of the data gathering process are analyzed and the results of this process are listed below. First, the results of the data collection are presented. Section 4.1 presents the results of the financial analysis, and section 4.2 presents the value attributes that were discovered. Section 4.3 contains the market needs that have been recognized.

Then, the results of applying the opportunity development model to the market needs that have been detected are presented. Section 4.4 presents the opportunity identification process, section 4.5 addresses the development of opportunities, and 4.6 presents the opportunity evaluation process. The actual business opportunities and business models that are the result of applying the model are added in the appendix, in order to keep this report compact and readable.

4.1 Financial analysis

The information acquired from desk research presents a good overview of the structure of the expenditures of schools. The most important elements are mentioned. Schools are financed primarily by funds from the national government. This is done by a “lumpsum” system. Schools are given a certain amount of money, based on criteria like the number of employees, the age of the employees, the number of students, etc. There are guidelines on how schools should approximately spend their money, but they are free to spend it in any way they like. Schools are reviewed periodically based on their performances by the educational inspection.

From the information of the 31 schools can be concluded that the average income per student for a school in 2008 was € 4.222,-, mostly derived from the national government. The average expenses for a student were € 4.006,-, of which 85,4 percent was spent on personnel, 1,48 percent on depreciation, 5,80 percent on housing, and 5,69 percent on miscellaneous. One school distinguished study materials from these categories, therefore 1,64 percent was spent on that.

From the interviews, a similar picture arose. One of the respondents replied that the 85% expenses on personnel is set as a guideline in the lumpsum system. A budget of € 200,00 per student per year for study materials and ICT was confirmed in 6 of the 8 interviews (although research by PricewaterhouseCoopers has shown that school spend just 75% of their budget, or € 149,00 on study materials, because of the fact that the total budget for education is insufficient to cover all the expenses (GEU, 2009)). In the lumpsum arrangement from the government in 2007, € 198,00 was reserved per student per year for study materials and ICT, which is around 5% of the total budget.

The law states that the local government is responsible for the payment and the realization of expenses like building, expanding, changing, renting, basic arrangements and maintenance of study and gymnastics buildings. Schools boards are responsible for the conservation of these locations (Gemeente Hoogeveen, 2004).

Since the average percentage that schools spend on personnel is 85 percent, with just small deviations between schools, it is valid to conclude that this is the major expense in primary schools. Although this expense includes wages, sick leave and replacement, education/training, etc., no

specification of these costs is available. Summarizing the data acquired through desk research and interviews, schools spend their money as follows.

Cost allocation	Percentage	Per student	Per 210 students
Personnel Expenses	85	€ 3400,00	€ 714.000,00
Housing	5	€ 200,00	€ 42.000,00
Study materials & ICT	5	€ 200,00	€ 42.000,00
Miscellaneous	5	€ 200,00	€ 42.000,00
Total:	100	€ 4000,00	€ 840.000,00

4.2 Value Attributes

From the data gathering process, a large quantity of data was collected. Analysis of the data was done per category of users, separating schools, school boards and parents. The schools and school boards showed major similarities in value attributes. Although there are many differences within schools and school boards, the value attributes seem to be similar. The importance of each individual attribute differs between these user groups, but the same attributes can be derived from the data.

4.2.1 Value attributes for schools

The following value attributes were derived from the data gathering process from users of the school portal. The first section addresses the results from the interviews. The interviews present 5 attributes that were of relevance to the users. The ordering is done based on the number of references found to these attributes. Next, the results of the analysis of the data from the Delphi system are presented. Although these data gathering methods differ completely, the results show major similarities.

Interviews

1: Ease of use

Data suggests that employees at schools have many responsibilities outside the classroom. Many of these tasks are performed with the use of ICT in some way. The inability of especially older employees to cope with ICT forms a problem within the primary education. Therefore the usability of products and services is very important to schools. Making existing systems easier to use appears to be a major contribution to the execution of tasks within primary schools, and would be valued by ParnasSys schools.

2: Quality of education

The quality of the education that schools provide is their major reason for existence. Poor performance is punished by reducing funds or eventually the closing of the school, good performance is rewarded. It's every student's right to receive proper education, and the schools are the primary source of this. Systems that contribute to improving the quality of education in any way provide value to schools.

3: Correct Functionality

Although this research concerns itself with the development of new possibilities, the data gathering points out the importance of the proper functioning of the products/services that are offered. There are some flaws in the functioning of the current system, and these are damaging the trust of users in

ParnasSys. Considering the expectations in the market, these flaws may become a bottleneck in the continuation of the growth of ParnasSys, or the adoption of new products and services that ParnasSys offers.

4: Economic benefits/Cost reductions

Since schools are under continuous budget cuts by the national government, resources are scarce, and reduction in costs becomes important. Interviews have shown the importance of cost reductions. However, cost reductions are less important than ease of use. Two interview subjects indicated that they were willing to spend more if products/services would be easier to use, but not to make additional effort to save money.

5: Budget information

The “lumpsum” system that is used to finance the primary education in The Netherlands offers freedom to schools to spend money in the way they deem desirable. School boards are responsible for the way that money is spent. When the decisions that the school boards make aren’t communicated clearly throughout the school, some ambiguity may arise about which expenses are allowed, and which expenses aren’t.

Interviews have shown that frustration arises when expenses are denied, especially when these are already made. Access to or knowledge about the financial decisions the school boards have made may resolve this problem and take away the frustration. Similarly, it can be of relevance to schools to have a direct insight in detailed information regarding the depreciation of study materials and ICT products that have been bought in the past.

Delphi system

From the Delphi system, a similar picture arose, albeit in a different form. The system allows users to suggest some improvement, and then, other members of the Delphi system can cast their vote on this suggestion. Their options for judging a suggestion are (--), (-),(0), (+) and (++), which is counted from -2 to 2. Therefore, two (-) votes equal 1 (++) vote.

In total there were 176 suggestions made in the system, and a total of 1566 votes were cast. The total sum of all votes amounts to 2090, which means the average vote on a suggestion is 1.334, or between (+) and (++). From the 176 suggestions for improvements, 82 of them received a score of ten or more. Although this line is somewhat arbitrary, it discards ideas that aren’t broadly supported by Delphi users, yet it is not so high that good suggestions that were recently added are left out of the analysis.

Of these 82 suggestions, 63 revolve around ease of use. In this, the suggestions about the layout of the system were also included, which were a substantial share of the total amount of suggestions. Other suggestions include adding buttons or links to improve navigation, improving the resolution compatibility of fifteen inch monitors, automatically selecting the current school year in drop-down menus instead of having to scroll each time a user wants to use this, etc.

Fifteen suggestions revolved around the improvement of the system to benefit the quality of education. For example, the creation of a summary of students that do not pass to the next year,

being able to distinguish sufficient and good in a five-point scale instead of a four-point scale, or the possibility to develop multiple choice tests in ParnasSys.

Nine suggestions were done to improve the functionality of the system without benefiting ease of use or the quality of the education of children. For example, including the school logo in reports, distinguishing the lower grade and upper grades in report card periods, or entering the first name of the parents, not just the first letter.

Finally, one remark handled the internal function of the Delphi forum, and six remarks were estimated to have a positive effect on both the quality of education as the ease of use, and are therefore counted double.

These results support the results from the interviews that the ease of use and the quality of the system are the most important attributes that the users of the school portal value. The functionality attribute that was used to code certain findings typically revolve around small additions to the current ParnasSys system. The relevance of these points is expected to be low, as these are minor changes. Moreover, the number of votes on these points exceed the threshold of 10, but the highest score is 41, indicating that the support of these points is generally not that high.

4.2.2 Value attributes to School boards

School boards have shown similar value attributes that are of relevance to them. Unfortunately, the Delphi system only allows school employees to make suggestions or vote, so there is only the possibility of the interviews. There is no ambiguity to be expected about financial information within school boards since the school boards decide this. Data management seems to be of importance to school boards to detect problems and to improve the quality of the education their schools provide. Below are the results of the interviews:

1: Quality of education

The school boards are responsible for the quality of their education. Educating their students is their primary goal. Products or services that contribute to the improvement of the quality offer value to the ParnasSys users.

2: Data management.

School boards have a lot to do with data management. This allows them to locate problems and take the necessary measures to assure improvement. Elements of data management that were detected in the data gathering process are the exchange of data, the availability of data, the correctness of data and the security of data. These elements are important to allow the school boards to function properly. Offering this is of value to the school boards.

3: Ease of use

For school boards, the ease of use also of great importance. Although no indications were found that school board employees have difficulties with working with ICT, the discomfort of school employees does affect the school boards. The importance of usability of products and services may be a result of efficiency demands of school boards. To make school employees use the systems correctly to provide the relevant data to the school boards, the products and services that are used need to be easy to use in order to prevent mistakes.

4: Correct Functionality

The interviews indicate that school board employees also condemn the flaws of the system that appear every now and then. One interviewee replied that ParnasSys should first focus on solving the problems at hand before engaging in new activities. Obviously value delivery can only be accomplished fully if the system works as it should work, therefore the correct functionality may be a condition to which the system should meet to deliver value to the users.

5: Economic benefits / cost reductions

As with the schools, the resources that are available are scarce. Therefore, reducing expenses on certain products/services is important for both schools and school boards.

4.2.3 Parents

For parents, the value attributes are somewhat different from the other users, which is understandable, as they have different role in the education of the child. The education of children is very important, but the children's health is more important than anything.

1: Children's health

It appears that parents value their child's health more than anything. Their education is important, parents seem to be willing to help their child with extra study materials. However, parents do realize that their child may not have the ability to score best of the class. Therefore, straight-A's are generally not a demand from the parents. In one of the interviews, a fear of teasing (psychological health) was mentioned as a motivator for spending money.

2: Children's education

The education of the child is, especially when asked in a conversation about a school software system, very important to parents. The primary education is deemed to be important for the chances and possibilities the child will have in the rest of his/her life. Parents claim that the quality of the school is one of the most important aspects on which the choice of school is based (although they generally cannot provide an answer to the question of how they have measured this quality). Religion and distance to home are also regarded as important. The performance of their child is one of the most important value attributes with regard to the child's education.

3: Cost reductions

Cost reductions are, in some cases, very welcome for parents of school children. This depends on the budget that parents have. Rich parents will probably not value this attribute, but the parents that have to be careful how they spend their money indicate that they may be interested in this. A 10% discount on "Scapino" products, or free tickets to amusement parks are examples of this.

4: Student performance information/ materials

Parents value the education of their child. If there are no problems, parents are generally fine with the current information that they receive from the schools (10 minute sessions and report cards). When extra attention by the parents is required, parents would like to receive information and also the possibilities to provide the attention their child needs. The information about poor performance in itself only stimulates parents to indicate these problems with the teacher. Providing possibilities to address these problems may stimulate parents to take action themselves. Whether this is desired is a matter of discussion, and probably depends on the situation at hand.

4.2.4 ParnasSys users in general

As mentioned, the attributes these user groups value is similar on some points, but differs on others. Similarities can be found in the valuation of the quality of the education, cost reductions and in ease of use. The quality of education was mentioned in all user groups. The cost reductions were also apparent in all user groups, but were deemed less important, except for the less rich parents, who did see an important value attribute in this. Ease of use is a commonly mentioned value attribute for schools and school boards.

The data gathered from specific user groups presents indications to which value attributes are important to those user groups, but is insufficient to extrapolate to the entire user group. However, the attributes that were mentioned in all user groups, along with the results of the other methods of data gathering does provide sufficient data to conclude that these elements are important to ParnasSys users.

4.3 Recognized Business Opportunities

The data gathering process presented the 22 market needs, ideas and business opportunities that I have been able to detect. These results have been developed into descriptions of products/services, that can be called business opportunities. These business opportunities are listed, as well as the user value this possibility should provide, in table 4.1. Since the value attributes for schools and school boards overlap to a great extent, some of these products/services will overlap as well. The numbers in the table correspond with the number of the value attribute of each user group from section 4.2.

The 22 business opportunities that are listed above were subjected to a screening, based on how well these opportunities contribute to the goal of this research, which is to develop new services to create additional value.

Some of these market needs, ideas or opportunities (website kit, scheduling system, building maintenance) are opportunities that have no relation with ParnasSys, which means that the users of ParnasSys will barely be affected and hardly any value is delivered. Other opportunities (applicable manuals, sortable drop down menu options) can best be described as improvements of the current ParnasSys system, and not as new services, thus providing no additional value. These opportunities will not be developed any further because they do not contribute to the research goal.

After eliminating the uninteresting market needs or opportunities, ten separate promising opportunities remain. The ten opportunities that have been selected for development have been underlined in table 4.1. These opportunities are then developed into business models, and formally evaluated according to Morse And Mitchell's method, described in figure 2.5.

Business Opportunity	School boards	Schools	Parents
<u>Single sign on</u>	<u>3</u>	<u>1</u>	
Sortable dropdown menu option	3	1	
<u>Digital study methods</u>	<u>1,3,5</u>	<u>1,2,4</u>	<u>2,4</u>
Applicable manuals	3,4	1	
<u>Quality Management System</u>	<u>1,2</u>		
Start portal (summarized relevant data)	2,3	1	
<u>ARBO (Poortwachter law)</u>	<u>2,3</u>	<u>1</u>	
Sick leave replacement	2,5	1	
<u>Data management / Exchange</u>	<u>2,3</u>	<u>1</u>	
<u>Electronic study environment (ELO)</u>	<u>1,2</u>	<u>1,2</u>	
Building maintenance	5	4	
<u>Data backup possibility</u>	<u>2,4</u>	<u>1</u>	
Website kit	3	1	
Scheduling system		1	
Teleblik/Kennisnet		1,2	
<u>Error analysis</u>	<u>1</u>	<u>1,2,5</u>	<u>2,4</u>
Budgetting system	2	5	
Private teacher products Insurance, financial products, etc.			
Student portal	1,2	1,2	2,4
<u>Product discounts</u> Surfspot, clothing, bicycle, school materials			<u>3</u>
<u>Additional study materials</u>			<u>1,2,4</u>
Integration materials for foreign parents			-
Study materials for parents			-

Table 4.1: Identified Business Opportunities

4.4 Business Opportunity Identification

As explained in the theoretical framework in section 2.1, the identification of business opportunities in this research starts with identifying market needs. How this is performed and how the relevant data is acquired has been explained in previous sections, and the resulting market needs have been listed in table 4.1.

These results have been identified in different shapes. Some of them are pure market needs, without resources or ideas attached, others that have been identified are halfway through the phase of opportunity development. The Business opportunity identification phase requires the creation of opportunities for every market need that has been identified. For this, I have attempted to find the resources required to meet that market need, and create an idea to do this in a way that creates value for the fixed user base. A complete list of all the business opportunities that have been identified or created has been added in appendix J.

4.5 Business Opportunity Development

The second stage of the model requires the development of the business opportunities into business models, where the service, technology, organizational and financial elements are addressed. The starting point for this phase are the descriptions of the business opportunities from section 4.5. For these opportunities, business models are created, that describe the intended value of the business opportunity to each actor involved.

It's interesting to see that most opportunities acquire a fundamental part of their value delivery from the bundling of services with the ParnasSys system. One of the most important sources of value creation is synergy. Both the combination of two separate services that create more value when combined than when remained separate, and the use of ParnasSys as a necessity for the other service to succeed can deliver value to our users because of this synergy.

For nine out of the ten described opportunities, business models were created. For the sake of relevance, only the two most interesting business models were added in appendix A and B. The other business models and their evaluation for the business opportunities that are successful, but are estimated to be less interesting are added in appendix C, D and E.

4.6 Business Opportunity Evaluation

After the creation of business opportunities, and their development into business models, these business models have to be evaluated to determine their feasibility and its viability, and thus to determine the attractiveness of these business models.

The feasibility analysis of business models that describe additional services for a system that already exists and has proven to be successful and profitable, is clearly different from an analysis for a new venture. The availability of resources like knowledge and money reduce the feasibility analysis by quite much. What remains is to determine the possibility of creating that service, the possibility of attracting resources that are required for the service to be successful, but aren't present within Topicus at this time, and the market's interest in the service that is created. Since the resources that are available are clear, and the market is clearly defined already, the feasibility analysis diminishes to a set of conditions that the opportunity should meet to proceed with the evaluation.

The viability analysis is, unlike the feasibility analysis, not that different from a normal viability analysis. The service that will be developed from a business opportunity has to create value and be profitable, in a way that suits the investments and risks that are taken to create the service. A small investment for a small value creation may be just as relevant as a large value creation requiring a large investment. The criteria to which a business model should meet to be considered viable depend on the opportunity at hand. The criteria are therefore stated with the business models in the appendix.

After the feasibility and viability analysis, the business opportunities are mirrored against the new venture template, and altered the business models where necessary to acquire a "do" on all fifteen questions. Finally, the resulting business model is reviewed with one technical expert and one sales expert within Topicus to determine their view of the business models that have been created. The evaluation of these business models is added in the appendixes.

4.7 Ranking Business Opportunities

The identification of business opportunities, their development into preliminary business models, and the evaluation of these preliminary business models to ensure their feasibility and viability has resulted in five viable and feasible business opportunities. These business models are:

- Single Sign On
- Cito Error Analysis
- Digital Study methods
- Backup possibility
- Additional study materials

A final ranking of these business models is performed to order the business models from the most interesting to the least interesting of possible business opportunities, is based solely on the amount of value that these business opportunities create, since this is the goal of this research. The amount of value is defined as the amount of value that is delivered to an individual user (low, medium or high (1, 2 or 3)) and the amount of users that is expected to benefit from this service (low, medium or high (1, 2 or 3)).

Since ParnasSys is a system that is accessible to all users, with little room for individual needs, the amount of users that is expected to benefit should weigh heavier, than the amount of value that is delivered to a single user. Therefore, a 60/40 scale is used, which results in the following table.

	# Users Benefits	# Value Created	Benefit Score	Value Score	Total score
Cito Err. An.	High	High	0,6	0,4	3,6
Single Sign On	High	Medium	0,6	0,4	2,6
Dig. St. Meth.	Medium	Medium	0,6	0,4	2
Backup Poss.	Low	High	0,6	0,4	1,8
Add. Study Meth.	Low	High	0,6	0,4	1,8

Table 4.2: Most Interesting Business Opportunities

This table clearly states that the most interesting business opportunities to develop are the Cito Error Analysis system, and the Single Sign On system. Without the scaling of criteria, this result would not have changed, meaning that with different views on the relevance of the number of users that benefit and the amount of value they perceive when using this new system, the result of this analysis would not have changed.

Chapter 5: Conclusions & Recommendations

5.1 Conclusions

The goal of this research was to explore which services can best be developed in order to create and deliver value to the fixed user base of ParnasSys. In order to do this, a model has been created, that is tested based on the case of ParnasSys. The results present many business opportunities that have been identified in executing this research. Two of these business opportunities are expected to be the most interesting. Since the creation and delivery of user value was the primary motive for identifying and developing new business ideas, the value attributes of ParnasSys users are important.

The model that was designed has proven to be very effective. The definition of an opportunity, and the determination of how business opportunities can be identified when actively searching for them brings a new chapter to scientific literature.

5.1.1 Value attributes

From the results of this research can be concluded that ease of use and the quality of education are the most important value attributes for ParnasSys users. The desires of the users to be able to use simple products, and to make products and processes simpler than they currently are is noticeable in many different aspects of the job of a school employee. One aspect that returned in many of the interviews was the enormous amounts of usernames and passwords that a ParnasSys user has to remember to be able to do his job. Another was the simple adjustments that users want to make to ParnasSys to make a simple task a tiny bit easier, like the arrangement of choices in drop down menus.

To a large extent, this value attribute is underestimated within Topicus. There is a considerable “gap” between what Topicus intends to offers to their users, and how ParnasSys users perceive this offering. Within Topicus, the focus is on developing new services, expanding to new markets, developing new products that can do even more than the previous ones, etc. This research is the perfect representation of that.

Meanwhile many ParnasSys users, both the school and the school board employees, struggle to keep up with the new developments, and in many cases don’t use the system as it is intended. For example, although there is a function in ParnasSys to report absentees directly when they are missed, many employees write down absentees, and fill it into ParnasSys once a week, or once a month. This is suboptimal because it takes more time, it creates the risk of losing the paper on which absentees are noted, and the risk of making errors in typing the information into ParnasSys, yet the employees still do it this way.

The reasons for this “gap” are beyond the scope of this research, but it is briefly discussed in the discussion in section 5.3. The fact that employees struggle with IT does not mean that the development of new systems is useless or that innovation is a bad thing in the educational sector. However, the problems that are created because of this “gap” may well be of more importance to ParnasSys users than adding new possibilities into the system.

The quality of education is the second value attribute that presented itself in this research. Business opportunities that are addressed in order to achieve a higher quality of education range from developing digital study materials to using a 5-point scale to measure the achievements of students. This value attribute was important to all user groups, however the products and services that can be developed to deliver this value differs between these groups. For example, the parents can receive information that their child is performing poorly on a certain course, but cannot do anything about that without the appropriate tools to help their child with this. The quality of education on school board level is measured completely different from the quality of the education on the school level, therefore different services can be developed to offer the same value attribute to different user groups.

This indicates that although the distinction between schools, school boards and parents is safeguarded in the ParnasSys structure, the business opportunities that can be developed to deliver value to user groups should not necessarily be bounded by this structure.

5.1.2 Single Sign-On System

From the entire list of business opportunities that were identified, two of them stand out because they offer high (intended) value in the attributes that proved to be of importance to ParnasSys users. These are the Single Sign On system, and the error analysis (with future possibilities to offer additional practice materials based on results.)

The single sign on system is intended to provide an easier way to deal with usernames and passwords. The users that were interviewed indicated that they need to use many different systems in their day to day job, and therefore have to keep track of many usernames and passwords. Some of these users experience this as a burden and would like to see something done about that.

The SSO system is relatively easy to build, the first estimate of the hours required to build this system was 16 hours. The maintenance on the system, once installed, was negligible. If chosen for a more elaborate system with deeplinks, the maintenance on the system would be higher, but still not require substantial efforts to maintain.

There are currently three ways in which links are made to external systems. These are:

- 1: Exporting a file with data, and importing it in other systems. ((SCOL) through EDEX).
- 2: Semi-automatic: Direct XML link with real-time data exchange between the systems. (Bron)
- 3: Full integration of a system within ParnasSys. (Zien!)

The SSO system links ParnasSys to other systems without exchanging any data with the linked partner. Therefore, this would create an extra layer of couplings in ParnasSys. This relatively simple layer can provide tremendous benefits for customers, simply because their hardship with the passwords is solved for them. The details of this business opportunity is further explored in the business model of this business opportunity in Appendix A.

5.1.3 Cito Error Analysis

The error analysis system is the second business opportunity that is expected to offer great value to ParnasSys users, both because of its face value, and because of the future possibilities this system provides. Cito is currently the only provider of an error analysis system for Cito tests.

Cito tests are important to schools, because they test students on topics that have been taught over a longer period of time. It also presents a good frame of reference, because more than 5000 schools in The Netherlands use Cito tests.

ParnasSys is able to store the results of the tests, but only the grade that a student has earned. The Cito LoVS stores the answers on each question and can conclude findings because of this. For example: If a student answers questions one through five wrong, this means he has difficulty with the jump over the 10's, or he may be bad at distinguishing *ei* or *y*, *d* or *dt*, *ch* or *g*, etc.

This analysis on the question-level is currently not possible in ParnasSys. This causes some schools to not abandon Cito's LoVS, or use two LVS systems parallel to each other. Cito cannot store the test results that are studymethod-related, ParnasSys cannot process the detailed results of the Cito tests. Therefore, both systems provide a partial image of the student. Users of Cito's LoVS generally agree that the Cito system is far from optimal, but the error analysis is considered to be so important that they aren't willing to give it up. Especially when certain disabilities or handicaps are affecting the student's performance at tests.

Implementing the analysis of Cito tests into ParnasSys is very difficult. Storing the data will not lead to problems, that is simply saving the answer a child gave on each question of a test. The difficulty in this is that every test has its own unique structure, and a separate form should be developed for each test. Moreover, ParnasSys will have to devise a way to draw conclusions from certain errors. Since Cito isn't willing to provide this information, ParnasSys should deduce this from each test, which is not only a huge load of work, but also very sensitive to errors. Only the slightest difference in valuations of a question may lead to two different outcomes of one test when inserted into these systems.

Next to the direct benefits that result from this system, some interesting new business opportunities arise from this system. When the ParnasSys system can analyze tests and detect where the student has difficulties, it's a small step to also provide solutions to these problems. The possibilities of offering small packages of study material for a student to practice with is in development within ParnasSys already. These packages can be taught independently from the study method that is used in schools. This means that it is the ideal way to practice at home with extra materials on the topics in which the student needs extra practice. This business opportunity is further explored and developed into a business model that can be found in appendix B.

With these two opportunities and the business models that adhere to them, the main goal of this research is achieved. These systems SSO system and the EAS system can best be developed in order to create user value for ParnasSys users. The business models about these opportunities are attached in the appendix. It is worth mentioning that these systems both provide value because of their connection to ParnasSys. The bundling of services like these systems with ParnasSys is a major element in the value that is delivered.

5.1.4 Scientific implications

This research differs from other research because a new definition of an opportunity is given, and that definition is implemented in a model that can be used to identify, develop and evaluate business opportunities. Moreover, this research uses a customer value determination analysis as a basis for

the business opportunity development and evaluation process, in order to determine which services can be developed to create and deliver user value.

The method that is developed and used in this research has proven to be quite effective in acquiring data that can be used in the process of value determination and opportunity development. Although this research has an extensive amount of data for a Master's thesis, the data gathering process that is conducted is divided over three user groups, thus limiting the external validity of the results of each individual group. With hindsight, it would have been better to focus on one individual user group as the results would be more valid.

This research has the advantage of having access to detailed user information, several data sources, and the willingness of users to cooperate with this research. It can be expected that not all researchers that struggle with customer value determination will experience these benefits. If a limited amount of data is available, drawing conclusions about value attributes of the user base becomes more difficult, and it can be expected that any gap that exists between what users perceive of value, and what is intended by the supplier is more difficult to close.

Assuming that the availability of data is no problem, researchers should be aware that the data that is acquired through this method is quite unstructured, thus a proper qualitative analysis of the data is required. The coding of data into value attributes is relatively easy when the proper terms are used. From the interviews, the outlines of the value attributes take shape, and this can be complemented by other data sources to present a general view of the value attributes of a certain user group.

The identification of business opportunities from this data is more difficult. The analysis should not only focus on the un(der)used resources or the market needs, but it should also pick up on business opportunities that are already identified by respondents, and they can therefore be in any stage of their development.

Then, scoring the identified business opportunities on the value attributes that have been discovered results in a sequence of importance for these business opportunities. This scoring process is quite subjective. The amount of value intended, differs from the amount of value perceived by the customer, and the number of customers that are likely to use this system is difficult to estimate.

Therefore, it is not possible to conclude that the business opportunity that provides the most value has been identified, nor can the success of the developed business opportunities be guaranteed. Uncertainty and risk is inherent to the process of entrepreneurship. Knowledge about the user base can decrease the uncertainty and thus the risk of developing these services. The smaller the gap between what users perceive of value, and what is intended by the supplier, the smaller the chance that the new service will fail.

In conclusion, this method is an effective method, since it provides the results required to determine user's value attributes, and identify and develop business opportunities, provided that sufficient data sources are available to acquire the data.

5.2 Recommendations

From the conclusions that were drawn from this research in section 5.1, the following recommendations can be made for Topicus. They are sorted per theme.

Ease of use

- ✓ Develop a system that allows users to enter usernames and passwords to other web applications so that they will always have access to these systems.
- ✓ Make efforts to reduce the “gap” that exists between the search for what is possible by the developers and the desire for usability of ParnasSys users, for example by sitting next to users when they work in ParnasSys, or by checking the Delphi system to create an understanding of the problems that the users have.
- ✓ Develop protocols for the ranking of options in drop-down menus.
- ✓ Check the Delphi system for suggestions that can be implemented without requiring a formal request from Delphi, and develop these suggestions in the new releases.

Error analysis system

- ✓ Develop a value offering to Cito for their knowledge about error analysis that offers more value to them than their current LoVS system.
- ✓ In case Cito refuses to cooperate, attempt find other partners with which this system can be developed. The potential threat to the Cito LoVS system may motivate Cito to accept the initial offer made to them.
- ✓ Another way of acquiring the knowledge may be through the ministry of education or the NMa. The monopolistic position of Cito is disrupting competition and forcing customers to work with inferior products. This is prohibited by law and can therefore be dealt with through the official channels. In the case Cito doesn't want to cooperate, try to find methods of forcing them to cooperate.
- ✓ Collaborate with publishers to develop web applications that can be used to solve the problems that students have and offer these web applications through the parent portal.

5.3: Discussion

Although the respondents of the interviews were happy with the interests ParnasSys shows in the problems and desires the users have, in six interviews respondents literally replied: Let the cobbler stick to his last. The fear amongst users exists that deviating from the core business of LAS/LVS will reduce the quality of the system. In their opinion, the efforts of Topicus should primarily go to improving ParnasSys LVS. Adding additional possibilities to the system is a nice extra, but not as important as the core business.

This response is in line with the aversion that the educational sector seems to have against change in general. The ParnasSys users are employees at schools, which are mostly female employees with a relatively high age on average. There is a high resistance to change within schools, especially when it comes to IT. The IT capabilities of the average employee that works with ParnasSys are considered to be not that high. This can be seen when looking at some of the questions that arrive at the helpdesk, ranging from how to backup ParnasSys to searching for files on the local C-drive when working in ParnasSys.

As stated in the conclusion in section 5.1, there is a significant gap on the ease of use between what Topicus wants to offer to its users, and how ParnasSys users perceive this offering. In my opinion, the explanation for this “gap” is relatively simple. While the ParnasSys users generally dislike IT changes, the team that concern themselves with ParnasSys within Topicus are mostly IT-experts. The CEO has had several functions in IT-companies before he started at Topicus, and up to the start of the Delphi users society, the development of the ParnasSys system was primarily done by IT experts. Moreover, Topicus describes itself as an innovative IT service provider. These are all signs that innovation is the primary motive behind the development of ParnasSys. Employees tend to seek the limits of what is technically possible.

The focus of ParnasSys employees on what is technically possible should be matched to include the moderate IT skills of the average user of the ParnasSys system. The password system is an example of this, where a system that is shot down within ParnasSys because it is expected to provide hardly any value due to its simplicity, can offer tremendous benefits in the eyes of the users.

The parent module is barely used at this time. Within Topicus, the estimate is that teachers don’t want to share too much information with parents, because these parents will then confront teachers with the information and demand a solution for this. Just communicating problems is already done by report cards and parent evenings. Communicating this real-time to parents doesn’t create any advantage, but it does present problems for the teacher.

The possibilities that the error analysis module presents mean that the parents can not only be informed that there is a problem with their child’s performance, but can also be handed software packages to deal with this problem. Giving parents the tools to help their child with these problems without troubling the school with this may solve the problem that schools have to adopt the parent module. Moreover, with an active element in which parents can contribute to the education of their child may boost the child’s performance.

It can be expected that the error analysis on Cito tests is a difficult service to develop. Not only is it hard to acquire the knowledge necessary to develop the system, each new test needs to be decompiled and rebuilt in ParnasSys. This requires considerable efforts and resources to develop the system, maintaining it will require nothing less. Moreover, when the analysis system is designed without Cito’s aid, the system may differ, which means that a test score that is analyzed may present a different picture in ParnasSys than when it’s entered into the Cito system.

Therefore, the ideal way of developing this system would be with the help of Cito, which may be difficult to attain. It may be possible to force Cito to cooperate by competing with the LoVS system, or by forcing them to cooperate by taking legal action.

When none of this convinces Cito, it may be possible to develop the system without Cito. In that case, it’s important to be able to warranty the quality of the analysis, for example by certifying the system or by attracting the experts that can develop the right analysis tools. It’s clear that without Cito’s help, considerable more efforts may be required to create and maintain this system. However, the threat of competition may be enough to motivate Cito to collaborate, providing ParnasSys with a huge competitive advantage over direct competitors.

5.4 Suggestions for further research

This research presents some important findings regarding new opportunities for ParnasSys to create value for their users. Although some elements that are important for these opportunities are beyond the scope of this research, they may be of critical importance to the success of these opportunities. Further research can be done to enhance the chances of success of these opportunities and to increase the value creation and delivery of these options.

The model that has been created is new in several areas. The definition of a business opportunity is new, and the application of this model to identify, develop and evaluate business opportunities is performed for the first time.

5.4.1 Bundling or stand alone

This research assumes that the opportunities that are suggested will be offered through the ParnasSys system, and thus only be available for ParnasSys users. Since ParnasSys currently has a market share of just under 40%, these services are unavailable for over 60% of the market, unless these users switch to ParnasSys.

The coupling of the opportunities to ParnasSys may have positive and negative effects. The positive effect is achieved when these extra services are regarded as a competitive advantage by users of other LVS-systems, and customers of the competition are interested to switch to ParnasSys in order to be able to use these systems. The negative effect is achieved when customers of competitors are interested in the new opportunities, and would be willing to purchase a license for it, but are unable or unwilling to switch to another LVS system for that.

Whether the coupling of these services leads to a larger market share for ParnasSys, or to an underexploited opportunity is beyond the scope of this research, but it is relevant enough to do research into these options.

5.4.2 Parent portal usage

Another important element within ParnasSys that needs to be explored in more detail is the parent portal. This research has offered some opportunities for this portal, but the system is used by a mere 4% of all ParnasSys schools. Therefore, although the value created through developing these opportunities in the parent portal may be substantial, its total value will be close to negligible due to the limited use of the portal. Offering parents the opportunity to not only get access to performance figures, but also be able to improve these figures by practicing with their child may be one way of doing this.

This research has presented the important value attributes for parents, but the parents are just the users of ParnasSys, not the customers. The schools or school boards decide whether they will adopt the parent portal as a means to communicate with the parents of their students. The parents are only in charge of using the system, provided it is offered to them by the schools. Either the schools currently perceive too little value in using the parent portal or they perceive barriers that make them hesitant to use the portal. Research is required in order to improve the use of the portal.

5.4.3 Business opportunity identification

This research has started with a new definition of an opportunity. It entails the separation between possibilities on the one hand, and opportunities and threats on the other, and it includes an idea for a business, which makes opportunity creation possible. This research proves that this model can be applied and function as a sound definition of an opportunity. My suggestion would be to use this definition in further research, and to create a commonly accepted definition of the word opportunity in literature. In order to do that, the definition of an opportunity has to withstand more, than the application of it in one Master's thesis.

The falsification of this definition, and this model would be the best method of determining its value. When attempting to explain the failure of business startups, this definition of an opportunity should be used to identify what was good, and what was poor about what the entrepreneur thought about the market, the available resources and the idea he had to do something with that possibility. Furthermore, using the development and evaluation phases of this model to test the business opportunity that has failed may present reasons why the entrepreneur should not have continued with his/her idea.

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Appendix A: Single-Sign-On Module

A.1 Introduction

There are many companies and institutions involved with the different processes in schools and school boards. Many of these have web based systems, which require identification processes in order to access and modify data and information. Examples of this are HRM, Finance, CFI, Bron, Several purchasing combinations, board-logins, etc.

The research made clear that the ease of use of IT systems in general is an important value attribute to ParnasSys users. The integration of systems that are used by schools and school boards takes many forms. In my opinion, the student administration system is the centerpiece of this integrated network of systems, because all elements of this network involve the student in some way (financing is done based on student data, rosters are made based on student data, employees are attracted based on it, etc.).

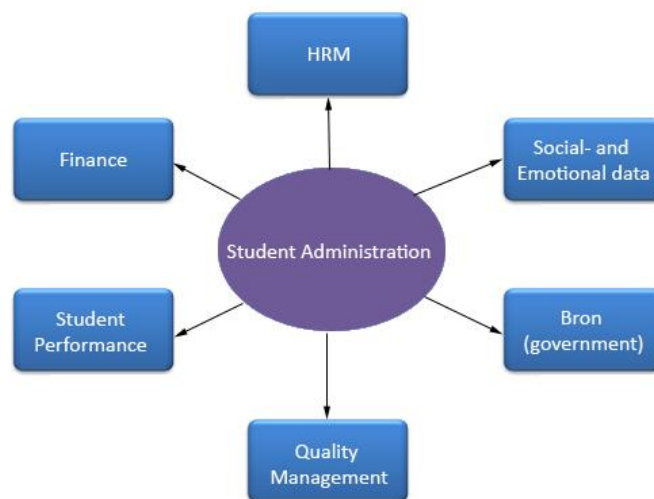


Figure A.1: Student administration

The exchange of data from ParnasSys to external systems, and to its own performance system is arranged in three ways.

- 1: Export/import of data through standardized formats in files
- 2: Real-time exchange of data between systems
- 3: complete integration of systems

The connection between systems without the exchange of data is not broadly supported as a useful system within Topicus. However, there exists a source of great discomfort amongst users about the usernames and passwords that have to be entered to log in to different systems.

In the interviews I saw several lists of usernames and passwords, some as many as four pages long. Many users experience discomfort with the login processes at the different systems. It has become one of the symbols on online IT systems, and there is a general aversion against these systems, because the IT capabilities of many of the ParnasSys users as relatively low.

The reasons why SaaS is important for the safety and security of data are applicable to usernames and passwords as well, because the access to these systems is arranged by the usernames and passwords, which are mostly stored locally in excel files or on printed lists. If these files are lost, or fall into the wrong hands, the safety and security of the data in the systems are compromised.

These irritations exist in many companies and institutions, but they are especially present in the educational sector, because of the fact that many employees have an aversion against IT, and because this sector is aging. Connecting ParnasSys to other systems by a Single Sign On system can offer great value to ParnasSys users.

A.2: The business model

A.2.1 The service concept

The business opportunity that is developed in this business model entails the coupling of external systems to ParnasSys. There are different possibilities to develop this system. Because of the value attributes that have been discovered, it is expected that the best way of doing this is by making the system as easy to use as possible. This version that is developed in this business model is an example, details may deviate if programmers or users find that to be better in any way.

This system allows the user to enter his username and password for all the systems that he or she uses, therefore making the list of passwords that users currently have redundant. There are a lot of organizations and systems that are used by many schools. For these systems, a standard login script can be written so that the user only has to enter his username and password. For additional systems that are used less frequently, users enter some more data. This allows the user to enter all his or her login data in ParnasSys, thus giving him access to all the relevant systems for this user.

Different aspects of this system will be explained in the technology concept. This system can also be developed in a stand-alone version, in which access to ParnasSys can be given in the same way as other systems are accessed. This business model will explain the SSO within ParnasSys.

In any case, the goal of this system is to include the accounts of all systems in ParnasSys, so it is possible to provide access to all systems through one single page. In a further integration of the services of those organizations and ParnasSys, it may be possible to exchange data if that is relevant, but that is outside the scope of this business model. With this, ParnasSys creates one additional layer of integrating the IT systems into one platform, which should increase the usability for the users.

The most important aspect of this is trust. Users should trust ParnasSys with the passwords and know that they are safe and will not be used in any way by ParnasSys. Moreover, the protection of this information should be arranged properly and communicated to the users accordingly.

The involved actors in this business model are the schools and school boards (especially the people that experience problems with IT systems), ParnasSys, and indirectly the companies and institutions of which the username and passwords are stored. The schools and school boards benefit from this system because they can use this to make the login process easier. Because the interviews have shown that this is experienced as a problem, they can benefit from this system. For ParnasSys, this can be used as a competitive advantage, and it can generate revenue if Topicus chooses to offer this

system on a license. The companies and institutions of which the login data is stored achieve lower barriers for entry to the system. Although this is a small benefit, the system doesn't require any effort or costs from these suppliers.

The price of this service can be set in two ways. The first possibility is offering this system within the license fee that is currently charged, thus not charging separately for this system. Since this system doesn't require a lot of maintenance or initial investments, therefore this system doesn't require the generation of additional revenue.

Another way of dealing with the price is asking a small fee for this system. This may discourage some people to use this system, but it also clarifies any ambiguity about the reasons for ParnasSys to develop this system. Users may be hesitant to use this system if they do not understand Topicus's motivations for developing a system in which users enter very sensitive data. Offering this system without charging for it may give users the idea that these passwords are used for other goals than usability. Moreover, the value creation and delivery to the users is expected to be substantial, therefore it should be possible to generate revenue from this system.

The bundling of this service in ParnasSys presents an advantage over developing this as a standalone system. ParnasSys currently has around 2800 schools as customer, and has gained trust with many of its users. Since trust is an important aspect for the success of this system, this may be of great importance in attracting users for this system. This makes the combination of these systems a perfect fit.

The market segment that is targeted exists of employees of schools and school boards that require an easy way of handling usernames and passwords. It can be expected that schools and school boards that make use of systems like Microsoft SharePoint will not benefit from this, and neither will the IT-capable employees. The segment that is targeted is therefore quite a large one.

The effort that has to be done to develop this system is initially reasonably large. Topicus has to acquire the knowledge about which other systems are commonly used by ParnasSys users, develop a storage system that is safe and easy to use, and collect usernames and passwords from the users. Then, for all the systems that are commonly used, a standardized login script has to be developed that logs the users in automatically. When this is done, the maintenance of these systems will be negligible. Only when external systems change, the login scripts may have to be altered. The systems that aren't used that often are easier to make, with a system that is depicted below.

Wilma Aalders (intern begeleider, leerkracht)

Wilma Aalders

[Wijzig uw data](#) | [Voeg nieuwe Single Sign On accounts toe](#)



Raet HRM Systeem
 Wilma Aalders
<https://secure.raet.com/hrm-nonprofit>



Dienst Uitvoering Onderwijs
 Ministerie van Onderwijs, Cultuur en
 Wetenschap

Dienst uitvoering Onderwijs
 W.aalders
<http://www.ib-groep.nl/particulieren/inloggen.asp>



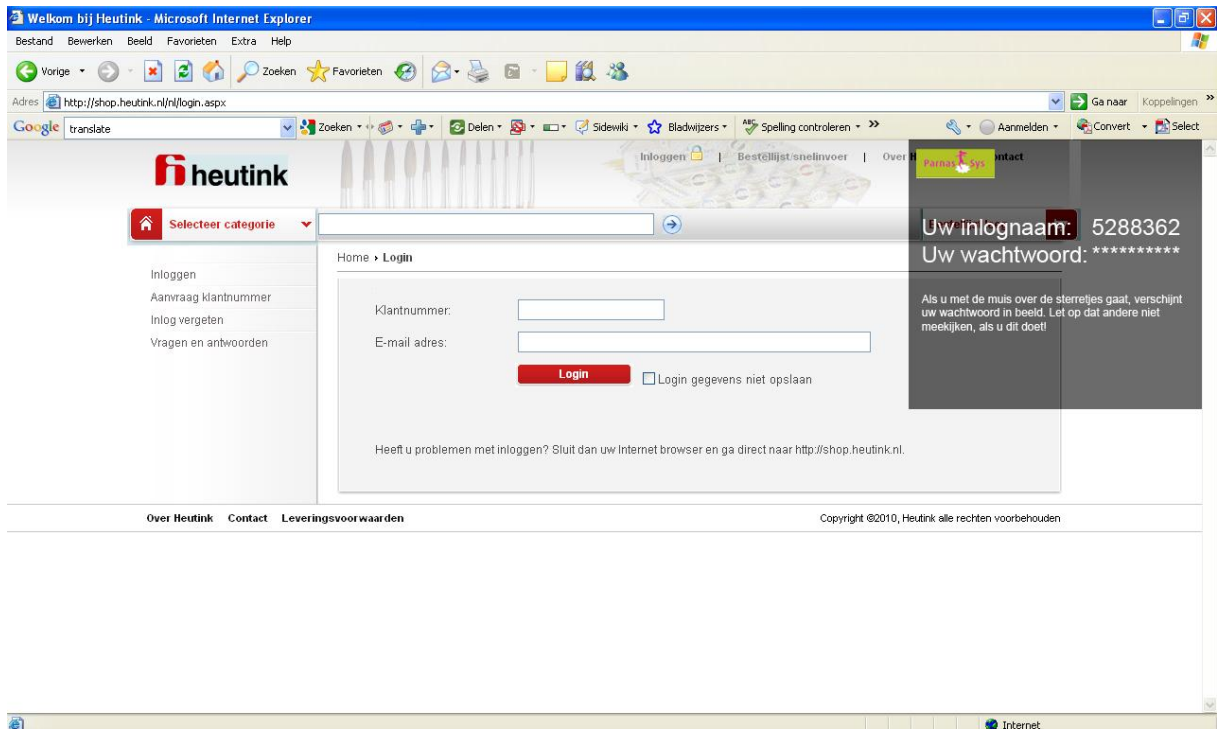
Heutink Studiematerialen
 ParnasSys-demoschool
<http://www.heutink.nl/webshop/>

Wilma Aalders (intern begeleider, leerkracht)

Wilma Aalders

Nieuwe Single Sign On account toevoegen

Naam	<input type="text" value="GSMpunt.nl"/>	
Website	<input type="text" value="http://www.gsmpunt.nl"/>	
Inlognaam	<input type="text" value="ParnasSys"/>	
Wachtwoord	<input type="text" value="Demoschool"/>	
Afbeelding	<input type="text" value="c:/afbeeldingen/gsmpunt.jpg"/>	<input type="button" value="Bladeren..."/>



The pages that are shown above are usable for every system, regardless of how often it is used. The standardized login scripts will be more elaborate technically, but they will not be that different for the user. They will resemble the login script that is currently developed for the “Kijk” system.

A.2.2 The Technological concept

Standardized scripts

For the systems that are used often, a “Post” script, or a Macro can be designed to log the user in. Designing standardized scripts, and offering the user the option to select the system and entering his login data will initially take some time, but the resources required to develop this system are available within Topicus.

Individual additions

The systems that are used infrequently shouldn’t be used to develop standardized login scripts, because that will take too much time. Rather, the system displayed above should be used. This can be standardized as well to make the maintenance of the total system very easy.

In both cases, the password that now allows users to enter ParnasSys then allows entrance to all systems of which the login data is entered in the ParnasSys account. The importance of privacy and safety of this data is of course a major issue. Not only should ParnasSys do everything to minimize the chances of abuse or unauthorized access to the account, ParnasSys should also communicate the importance of keeping the login data private so that nobody can access this system without authorization.

The safety of data should be clearly communicated to ParnasSys users to increase the trust in the system. Even if they do not understand specific details about data protection, it is advisable to indicate the effort that is taken to protect and safeguard the data of the user.

Moreover, it is important to think about the combination of schools and school boards in this system. Some accounts that are used will be individual per employee, other accounts will be shared amongst many employees of one school, or even of multiple schools under one school board. It may be interesting to allow administrators to create accounts for all employees in this system.

The exact details of this system can be left to the programmers of ParnasSys. The specifics are irrelevant for the understanding of the business model, but they are vital to its eventual success.

A.2.3 The organizational concept

The organizational aspect of this business model takes little effort. Since no external parties are required to develop this system, no agreements have to be made. The login data can come from the user, therefore the interference of the company or institution that developed that system is not necessary. Since ParnasSys doesn't require the authorization of external parties, no contact is necessary (although access to the login system would make the development of login scripts easier).

A.2.4 The financial concept

Several revenue models for this system have been discussed in writing this business model. The system itself may be too small to be charged for separately from all other systems. The system takes no significant data flows, nor does it take up much of the developer's time. Despite its simplicity, it may be of great value to ParnasSys users.

Offering the system free may create some ambiguity about Topicus's motives for this system. Why should I enter my passwords in ParnasSys? What do they want to do with this? This ambiguity would be clarified by charging for this system. In that case, it is clear that ParnasSys generates revenue with this system. The magnitude of the ambiguity when offering this system free of charge is unclear to me at this time. Since the "Kijk" coupling already exists, and users don't seem to mind entering their login data for this, my expectation is that this will not pose a big problem.

ParnasSys is perceived as an expensive system. Although competition charges for things as hosting, updates, number of users that can access the system, etc. and comparing is difficult, several users have indicated that ParnasSys was the most expensive system in the market, when the total cost of "ownership" for a school is calculated. Therefore, offering additional services in the license fee for the standard system may be perceived as development, or keeping the lead over competition. Another way of reasoning is that without this development, ParnasSys could lower its license fees. Offering additional services for the standard license fee prevents pressure on the margins.

When the option of charging for the SSO system is explored, the access to the system will be restricted to those schools and school boards that have paid for it. This requires some additional entrance barriers that the programmers need to take into account. Two ways of charging are mentioned below.

1: € 1,00 per teacher per year. An average school has somewhere between 10 and 20 employees, which means that this is no large expense for schools. However, with over 50.000 accounts in the system, this may amount to a considerable revenue stream.

2: A package of additional possibilities like the SSO system and some others (backup, task manager, etc.) offered like an upgrade package, a ParnasSys Plus Package. This total package could be sold for example for € 0,50 per student per year. With over 500.000 students in the system, the total annual revenue of this package could amount to € 250.000,-. In order to achieve this, additional options should be developed and combined into one bundle of options. In which way this is a load on the programmers, the system or the helpdesk depends on the options that are selected.

A.3 Business opportunity evaluation

A.3.1 Feasibility analysis

The feasibility of this service is easily explained. There are many users of ParnasSys that wrestle with the password dilemma. The service is not unique but it does provide value within ParnasSys. Especially when the system is offered within the context of ParnasSys, which is familiar to users and stored safely online so that these passwords are available on any computer with an internet connection. Building a system like this doesn't require an extensive amount of resources, nor does it require any resources that are hard to achieve. Therefore, it can be said that this system is easily feasible.

A.3.2 Viability analysis

The viability of this business opportunity is very much dependent on the criteria that it should meet. Since the service is very small, it may be difficult to charge separately for the system. ParnasSys regularly is updated with new functions, that aren't charged separately. It can be regarded as an update to the system to keep ahead of the competition. If ParnasSys chooses to not charge for the system, it is clear that the system has to be cheap to build, and even cheaper to maintain.

If ParnasSys does charge for the system, the revenues should be larger than the costs of the system. A gross estimate of the development costs amounted to € 1600 euro's in development costs. At 1 euro per teacher per year, and around 58,000 accounts in ParnasSys, this seems like a viable opportunity. Because of the large value creation and the minimal development costs, the return on investment is not that important, if it increases the usability and customer satisfaction. Therefore, even when the system itself doesn't generate any / enough revenue, it is still a viable opportunity because of the value that is created and delivered to users.

A.3.3 New Venture Template

If the business opportunity is regarded as the combination between ParnasSys and the Single-Sign-On system, the new venture template provides no hold up for, except for the questions about margins. In this opportunity, it is accepted that there are no margins, if the costs can be kept low. This seems possible, so the New Venture Template offers no problems for continuing this opportunity. With that said, this is a business opportunity that can really offer great value to a lot of users.

Appendix B: Error Analysis system

B.1 Introduction

This research has indicated that users value the quality of the education that is provided by the schools. Moreover, some users have indicated the need for in depth analysis of test results, and complained about this option lacking in ParnasSys. This appendix addresses this business opportunity, and a business model for it is presented in B.2.

Children at Primary schools are tested on a regular basis to see how well they perform at different topics of education. These tests are either method-related or non-method-related. Method related tests are taken regularly on small subjects that were explained to the children prior to that test. These tests are part of the method that publishers have developed for primary schools.

Non-method related tests are tests that are unrelated to any specific method or publisher. These tests are used to see how the development of the child is progressing in general, they involve topics that were taught over a longer period of time. These tests are certified by the national government, and they are a good way to compare children to their peers, and to benchmark schools and score their performance. Although no exact data is available to me, Cito claims that 5000 schools use their LoVS system (Cito, 2010), which is approximately 66,7% of the total market.

This EAS involves non-method related tests. ParnasSys typically requires two parameters of a test. How many questions were there? And How many questions were answered correctly? With these parameters, the overall score of a child's test can be computed, and with a weight added to the score, the weighted average of the child's performance can be calculated and printed on the report cards. This is essentially the core business of ParnasSys.

However, by tracking only the percentage of questions answered correctly, no detailed picture can be drawn about the student's problems or flaws. By scoring a "3" on a non-method related test, it is clear that the child has a considerable arrearage, but the underlying problems remain hidden. By tracking the answer to every question and analyzing the results, it may become apparent that a child is dyslectic, can't multiply or has problems with d's or t's, ei's or ij's, etc.

This tracking is done by a competitor's system, Cito's LoVS. This system is often criticized for lacking possibilities like tracking method-related tests, student administration possibilities or the local storage of data. It is clear that this system is in no way a replacement for ParnasSys, but many schools use both systems for tracking student's performance. ParnasSys for calculating the averages, keeping track of the scores of all the tests, etc. and LoVS for analyzing the results of the non-method related tests. This means that ParnasSys users have to enter data twice, which leads to irritation and, even worse, different outcomes of test results (for example by rounding off).

This Error Analysis System (EAS) is important for two reasons. First of all, it offers value to ParnasSys users in the way that it helps improve the quality of the education provided, it offers better data management, and it increases the ease of use of ParnasSys users that use both ParnasSys and LoVS. This will be addressed in the business model of this opportunity in section B.2. Second, it creates

many possibilities to identify and develop new business opportunities, based on the analysis of this system. Some of these opportunities will be explored in section B.4.

B.2 The Business model

B.2.1 The service concept

The EAS that is proposed here is designed to analyze the scores of non-method related tests developed by Cito. Every test that is used by Cito should be analyzed, and an analysis tool should be built for the results of every test that Cito has. The end goal of this system is to be able to draw conclusions based on errors on individual questions and clusters of questions that students make.

These conclusions can be used to better understand where the student has problems, and what to do about it. The more elaborate information about the individual needs of the student helps in creating a higher quality of education for the child.

For developing this system, two sources of data are required. The first is the answers of the student on each question of the test. Every answer should be tracked and stored in the system, allowing the system to conclude which questions were answered correctly and which ones were answered incorrectly. The ways of acquiring this data is discussed in the technology concept. Second, the data about what it means when a student answers questions incorrectly should be acquired. This data is a lot more difficult to acquire. The methods of acquiring this data that are available will be discussed in depth in the organizational concept.

When both the answers to each question and the knowledge about what these answers mean about the performance of the child are available, an analysis can be executed on these results, and conclusions can be drawn on the performance of a child. Automatically drawing conclusions and making these conclusions available for the user of ParnasSys that has access to this student is the essence of this business model. This information can be used to individualize the education and offer additional assistance on the topics in which the child has an arrearage. Improving the quality of the education is one possibility, but there are other opportunities that can be created from this service. More about these new opportunities is discussed in section B.4.

This service can be used by teachers en other school employees to increase the quality of education. For school boards, this system provides additional information with which structural problems can be identified.

The market segment that will benefit from this, is the segment of schools that both uses ParnasSys and Cito tests. The data that is acquired by this service can be of relevance to all these school, but it is especially important in SBO (special primary education) schools, as these children are more likely to have problems that this system can identify. Since about 66,7% of all schools use Cito, and about 40% of schools use ParnasSys, and since there is no correlation to be expected between Cito and ParnasSys, it can be expected that the total market size for this system is around 2000 schools.

When the schools that currently do not use ParnasSys consider this service to be a reason to switch to ParnasSys for their student administration and tracking services, this number will most likely increase to a maximum of 5000 schools that can benefit from this EAS service.

The context of ParnasSys is ideal for offering this service. ParnasSys already requires some parameters of the test results. Bundling these services would decrease the workload of using an error analysis system tremendously, and it would also reduce the risk of errors and rounding off differences. Moreover, the analysis of test results is so close to the tracking of test results that it is a logical step in the development of new services for ParnasSys.

Since there is a lot of maintenance to this system, and a lot of initial development and resource gathering to be done, this system will be expensive to make. The value creation of this opportunity is estimated to be substantial enough to provide access based on a license fee. The exact price depends on the method of acquiring the test results (see technology concept) and the analysis data (see organizational concept) that it is difficult to make an estimate of the price required to create a positive result for ParnasSys.

Some variables are available to make a rough estimate of what would be acceptable to customers. Cito offers its LOVS system (version 4.3) at a price of € 449,95 (excl. VAT.) (Webwinkel Cito Primair onderwijs, 2010). Since the average school has approximately 210 students attending, the EAS in ParnasSys replaces Cito's LOVS, and the bundling of services in ParnasSys delivers more value to users than when these systems are separated, it stands to reason that € 2,14 (excl. VAT) is a reasonable price for this service, and that the additional value created and delivered by the bundling of services can be used to validate an increase of this license fee.

The effort that is required from users is important. The amount of time it takes to input the test results depends on the method of input (see technology concept), and the time it takes to actually use the conclusions that this system presents is difficult to estimate. However, since 5000 schools use this system already (assuming that Cito isn't exaggerating its number of customers), the input and the use of the conclusions are already done. The advantages of adding the system to ParnasSys should reduce the effort that is required to use any EAS system, and increase the usability of it.

B.2.2 The Technological concept

For this system, as well as all other systems, strict access and security policies are required. Assuming that the developers of ParnasSys do not require any advice on this front, I will focus this concept on the arrangement of the system itself, namely the input and output of data and information.

The system requires the input of student data, process the results with the knowledge about error analysis, and calculate the conclusions that are possible, based on these results. The input of data can be done in at least three ways.

- Manually by entering the results of each question in a form field in ParnasSys.
- Scanning the test results page.
- Having the student make the test on the computer.

The manual entry of each answer into ParnasSys is very time consuming and creates high risks of user errors. Although this may be the easiest way of development, its unfriendly nature to users and their demand for usable systems make it likely to assume that this is not the best method of processing the results.

Scanning the test results requires a standardized form that requires a strict policy to fill in the test. It is questionable if this can be expected from six year old children. For older children (the age limit is arbitrary), this method may be the suited. This is the method currently used by Cito.

Having the student make the test on a computer seems the most user-friendly method for the input of data. The test can be developed to comply with the capabilities of the student, i.e. by using pictures, sounds or spoken explanations and flashing buttons. This method is the most user-friendly and requires the least effort of the teacher, but it does influence the way the test is held. This would require the assistance and approval of Cito, since their tests are copyrighted and this would be an infringement of copyrights without their approval. Moreover, it would require considerable IT-resources in the school, which is not always present.

Based on these facts, the standardized test results are the input method that seems the easiest to develop and use without the assistance of Cito. With the assistance of Cito, the option of making tests on computers is realistic, provided that schools have the IT capabilities to do so.

Analyzing the results with the knowledge about errors is done by converting the knowledge about error analysis into functions or restrictions, these details are outside the scope of this business model, and better left in the hands of the developers at Topicus.

The output of the results and conclusions of the test have to be usable to actually improve the quality of the education. The lay-out of the summarized student results can be in line with the current lay-outs used in ParnasSys, but some way of presenting in-depth conclusions should be developed, as there is no current lay-out available.

Since the learning points are standardized by Dutch law, it is possible to break down “counting” into the sub domains that make up this course (jump over 10, adding with 3, multiplication tables, divisions, etc.). It seems logical that the lay out should comply with this. The details of this system are left to experts on education and the problems with it.

B.2.3 The organizational concept

The arrangements that have to be made in the organizational concept for this service make it difficult to realize. Since it analyzes Cito tests, which are developed by Cito’s experts, and Cito has its own analysis system, cooperation of Cito is not to be expected. Moreover, since 66,7% of the market uses this system, it’s expected that Cito doesn’t want any changes in this market. This is in fact the case, since attempts to get around the table with them have failed because of lack of interest by Cito in anything ParnasSys has to offer. However, the cooperation of Cito is preferred over developing this system alone, since their knowledge is difficult to obtain.

It is apparent that Cito’s tracking capabilities in the LOVS are low, and ParnasSys is better at this. Moreover, the technical capabilities of Cito are relatively low, and development is a slow and costly process for them. The use of local storage, purchased cd’s instead of licenses and limited room for specialization and customization leaves room for improvement that Topicus can provide.

From the above, it’s clear that there are both advantages and disadvantages for Cito to cooperate with Topicus to develop this EAS. Due to the considerable value creation and delivery possibilities

and the fact that re-creation is possible (Wentink, 2010), there are still possibilities to develop this system. Therefore, I suggest a three step development process to maximize the chances of Cito's cooperation.

1: ParnasSys presents propositions to Cito with regard to this system. In it, it should emphasize the value creation that is attainable by cooperation, and show the benefits of cooperation in the long term with regard to market share, combined sales and revenue generation.

2: When Cito disregards these propositions (and they most likely will), Topicus should create plans to develop a credible alternative for Cito, for example by collaborating with competitors to develop such a system. This credible competition for Cito's LOVS can be used to persuade Cito to cooperate anyway, for example by convincing them that not collaborating will be more dangerous to them than to collaborate with ParnasSys.

3: If Cito still refuses to collaborate with ParnasSys, the system should be developed without the help of Cito. The system will be more difficult to design and to maintain, and its development and maintenance costs will increase. However, the revenue generated doesn't have to be shared with other parties, therefore, the revenue generated from this system is fully usable for covering these costs. The difficulties that arise here require a viability analysis, which can be found in section B.3.

B.2.4 The Financial concept

The revenue model of this service should be the same as most other models within ParnasSys. Since the system requires maintenance, and it resembles other aspects of ParnasSys currently sold through licenses, it is advisable to generate revenue from this system through licenses as well.

The two methods of developing this system, either with or without Cito, have an influence on the sharing of the generated revenue. Without Cito, ParnasSys attains 100% of the generated revenue from this system. When Cito will be on board, their knowledge is unique and difficult to replace. The technical aspects of the system remain stable to a large extent. It is therefore expected that Cito will receive the greater part of the revenue that is generated. Though slightly arbitrary, I estimate that a 70/30 division of revenues is a fair spread. The exact details of this division is of course negotiable.

The risks that are undertaken in this system is the risk of not generating enough revenue to make up for the initial investment or to cover the costs of the maintenance of the system. With Cito on board, the investments can remain small, so this risk is manageable. Without Cito, this risk is considerably larger, since considerable effort and investments are required.

B.3. Business opportunity evaluation

B.3.1 Feasibility analysis

The feasibility analysis of this opportunity presents a problem. The knowledge required to draw conclusions based on the errors that are made by students is not available within Topicus, so this should be acquired externally. This seems to be difficult, since this knowledge is available only at Cito. Acquiring this knowledge will not be easy, as mentioned in the business model.

However, difficult is not the same as impossible. In one of the interviews, an expert in education replied that this knowledge could be recreated. In the market, there is a dire need of this system combined with the ParnasSys system. The separate systems require teachers to store a lot of information doubled, leading to chances of errors, and a suboptimal set of possibilities. Therefore, this business model can be regarded as feasible, with the remark that acquiring the knowledge to develop the error analysis is difficult to obtain.

B.3.2 Viability analysis

When Cito decides not to cooperate with the development of this service, it becomes difficult to develop it and create and deliver value to ParnasSys users. Therefore, a feasibility analysis is done to provide some details on the possibilities of successfully creating this system without Cito.

B.3.1 Assumptions

Some estimates have to be done, which is dangerous since these provide no certainty about the accuracy. The first is that there is no correlation between Cito tests and ParnasSys usage. If a school uses Cito tests, this does not say anything about the use of ParnasSys and vice versa. Second, the claim by Cito that 5000 out of 7500 schools use their LOVS is assumed to be correct. Third, a price of € 2,00 is used as the license fee for the Error analysis system, which was estimated to be a fair price for it.

B.3.2 Viability

Topicus had a revenue of just under € 20.000.000, with around 190 employees. Therefore, the revenue per employee for Topicus is around € 100.000,-. Within ParnasSys, this number is considerably higher, which creates an additional buffer that can be used for new developments.

The percentage of schools that use Cito is 66,7%,
The percentage of schools that use ParnasSys is 40%
The average school has 210 students

The total market size for an EAS in ParnasSys is $66,7\% * 40\% = 26,7\%$ or 2000 schools.
2000 schools with each 210 students means 420.000 students, generating an annual revenue of € 840.000,-, based on € 2,00 per student per year.

Based on the average revenue per employee, this means that a maximum of eight employees can be attracted to maintain the system. The development is generally not paid from the license fees, as development is done prior to any sale of licenses. These costs are difficult to estimate, but these are fixed and one-off, so can be ignored in this feasibility analysis, provided that these costs do not cross the boundaries of reasonability. There is no reason to assume they will.

The workload of this system can be estimated by looking at the Cito tests. There are six topics in which children are tested:

- Counting/math
- Reading and technique (technisch lezen)
- Reading and Understanding (begrijpend lezen)
- Vocabulary
- Spelling
- Study skills

Most topics are tested on semi-annual intervals, therefore Cito has an M (middle year) test and an E (end year) test. The number behind the letter stands for the school year the student is in. Although not all tests are started in the third grade, I assume that there are 6(topics) x 6 (study years) x 2 (tests per year) = 72 Cito tests that are taken every year.

Assuming that Cito will develop new tests every year (to keep sales of material going) and to assume the most negative workload, this is the number of tests that will have to be implemented in the EAS.

All questions in Cito tests refer to basic skills that a child should be capable of at a certain age. These skills are predetermined by the ministry of education, and are standardized so that every school has to comply with these skills.

The 72 tests that are developed by Cito have to be deconstructed and every question has to be coupled to a certain skill or combination of skills. This has to be done by employees that possess the required knowledge about test questions. However, these tests are primarily built up of short and simple questions, and deducting the information behind the test should not be that difficult, especially for the tests for the lower grades.

Assuming that an expert will require 30 minutes per question (which seems rather long) and an average test is 50 questions, it would take an expert about 3 days to analyze a test. Given 200 working days per person per year, the analysis of these tests is one full time job, and a part timer on the side. However, since many of these tests are either held in January or in June, the spread of the development of the analysis tool is not as favorable as described here. Therefore, the development of this is perhaps best done by attracting several experts for one or two months, depending on the time between the availability of the test, and the time the test is made by students.

Based on the maximal revenue generated from this system, 8 employees can be attracted. However, based on a pessimistic calculation of the workload, only 1,5 are required to maintain the system and have them ready for new tests. Based on a license fee of € 2,00, the system should be purchased by a 375 schools to generate the same revenue per employee as the rest of Topicus's activities, which, according to the interviews, is a very low number for a service like this.

B.3.3 Sensitivity

The pressure of time limits is applicable here. The semiannual testing periods will result in busy periods and slow periods, and since experts are required to perform these tasks, they are most likely to be expensive, especially when no job security can be given. In all likelihood, these employees will be expensive, and the cost of maintenance will rise. When assumed that the profit margins should remain constant, there is a linear connection between the costs of the employees and the number of schools required to make the system generate the desired revenue. Therefore, assuming that the personnel costs increase by 100 percent, the number of schools also increases by 100 percent to 750 schools.

B.3.4 New Venture Template

The business model that was designed to develop a Cito error analysis system is successful on every point in the new venture template, except for the availability of resources. As stated in the viability and feasibility analysis, it's important to find a way to create the required knowledge, which will be time consuming when Cito is unwilling to cooperate. But even without the help of Cito, these resources are available, by designing the required knowledge with experts that know of these tests. Whether Cito is willing to cooperate or not, it is most definitely possible to develop this system.

Therefore, when developing this business model into a service, the first thing that needs to be ensured is how the required knowledge will be acquired. If that is done, there is no reason why this business model should fail, and taking into account the major amounts of people that are helped by this, it is definitely worth investing the time and money to create this service. Moreover, with the additional possibilities that this system brings to ParnasSys, it can be the starting point of the next growth spurt.

Appendix C: Additional study materials

C.1 Reasons for this business model.

The Dutch government has indicated to have the intention to involve parents more in the education of their child. The intention is to increase the quality of the education. Schools and school boards have not really picked up on this. Topicus has built the module for parents, which can be used to bridge the gap between the schools and the parents, and to communicate with each other, but up till today, the schools haven't used this system in any way to significantly increase the performance of the child, although possibilities are present.

The quality of education is improved when children receive additional attention on areas where they perform weak. This business model should provide parents with the opportunity of helping their child with study materials to increase their performance. At this point, schools do not have the time to communicate the performance information real-time. The report cards that are distributed only gives a broad overview of the performance, it doesn't provide the means to influence the performance. The only option parents have is to talk to the teacher about this problem, and let the teacher deal with it. Since they do not have time, the circle is complete, and no action will be taken. ParnasSys can help to break this cycle and help increase the performance of the child.

With the Cito error analysis system that has been developed in another business model in this research, Topicus has the possibility of acquiring the information about poor performance down to the detailed topic level. This means that when a child is bad at counting over 10 ($5 + 7$, $8 + 3$, etc.), the Cito error analysis system can detect this. If this information can also be accessible in the parental portal, parents will know where children need additional attention.

C.2 The idea

C.2.1 When is additional help required

To organize additional measures to increase the performance of the child, we first need to know when a child performs poor on a certain area. We need to take into account that there are differences in the performance of children in primary schools, so a 5 is not necessarily cause for problems.

Children that score an average of 6 on all courses, and a 5 on English grammar cannot be called weak at English. The level of that particular child is not that high, and the difference between English and other courses is but small. A child would probably not really benefit from additional study materials, it may even have a negative effect, when the child is made aware of his arrearage. Children that score a 3 on English grammar, and a 6 on other courses can be helped with additional attention. Even though the child doesn't perform spectacular on other courses, there is a significant problem with the grammar, which possibly can be helped.

Children that score a 6 on English grammar, and an 8 on average on other courses may benefit from additional study materials. The child performs pretty well, but scores relatively bad on English grammar. Additional attention may increase performance on this topic, and erase any arrearage that may hold the child back in later years. Of course, the choice of taking additional measures is made by the parents.

Performing bad is therefore a relative score, based on the score of the child on average, and the difference with his/her poorest performance. If this difference is bigger than, say, 1,5 point, the child may benefit from additional attention, and an advice can be given, based on standard calculating

models. My estimate of 1,5 points is an arbitrary one, this should be confirmed / altered by experts.

C.2.2 The advice

If a child performs poor on a certain topic, an advice can be given to work on this at home to erase the arrearage, or to make the child better in that topic. The interviews have shown that at least part of the parents and schools are prepared to work with this system, if the reasons for additional work and its goals are clear, and the costs of this remain within certain boundaries. The ParnasSys already keeps track of the child's performance. No other company or institute has that much information about the child's performance, and ParnasSys is therefore the ideal company to develop this system that allows for additional attention. In order to do this, three aspects need to be clear:

- 1: The current level of performance of the child
- 2: the desired level of performance of the child
- 3: What has to be done to remove the difference between points 1 and 2.

The current level is tracked in the LVS. Through Cito and DLE norms can be determined what the desired level for that child is. Points 1 and 2 can be acquired within ParnasSys. What can/has to be done differs in every situation, but it's clear that this system should deal with the problems on topic level, not on course level. For example, when a child performs poorly on English, this system cannot help the child. However, when the child performs badly on irregular verbs, the system can help. Problems in those small topics are relatively easy to detect and, with the right system, dealt with. Below are some possible options to help the child.

ParnasSys Demoschool test Parnas Sys

Start Ronald Janice Gezin School Account Uitloggen oog voor de gebruiker

Leerlingkaart **Personaal** Ronald: (Geen resultaat) Facturen Groep Rooster Absentie Toetsen Methodetoetsen Rapport Hulplan Notities Adviezen

Adviezen voor Ronald

Uit een analyse van de behaalde resultaten van het afgelopen jaar kan gesteld worden dat Ronald gemiddeld een 6,8 scoort. Binnen dit gemiddelde scoort Ronald het minst goed op Engels, namelijk een 5,0. De verwachting is dat enige hulp bij Engels ervoor kan zorgen dat dit probleem wordt opgelost. Om deze hulp te realiseren staan hieronder een aantal opties die u zou kunnen overwegen.

First Steps into English
Methodeboek Engels
Groep 4
€ 29,95 [Meer info →](#)

Bijles Engels
Hulp bij thuisstudie vanaf (p/u)
€ 10,00 [Meer info →](#)

Take it easy
Online oefenen Jaarlicentie
€ 49,95 [Meer info →](#)

For each of these ideas, different actors are involved, therefore different models of revenue have to be used, and different value delivery will be possible. Paragraph C.3 will deal with the sale of materials. C.4 will deal with tutors, and C.5 will deal with online tools for practicing at home.

C.3 Sale of additional materials

The business model

C.3.1 The service concept.

If an arrearage has been detected, parents can purchase materials to do something about this. A webshop can be designed in which products can be bought like books, cd's, dvd's, or software, that the children and their parents can use to improve their skills in a certain area. It is important to develop a good advice so that the products that are purchase connect with the problems that have been detected.

This business models involves four actors. These are the supplier of study materials, ParnasSys as an intermediary, running the webshop and determining the suited offering, the parents that purchase the materials, en the children that use these materials. It's important to see that this system can work completely separate from the school. It is up to experts to determine if it is wise to involve the school in some way, but they aren't required for this business model to function.

The parents perform an active role. They will first have to learn about the arrearage, decide to purchase products to erase that arrearage and work with their children to reach the goals that they have set for themselves. The parents decide if the child has made enough progress, or that additional help is required.

The market consists of all the parents of children that perform relatively poor on a certain topic, and want to do something about that. Parents will probably be more inclined to act when that topic has an insufficient grade than when that topic is lower then other topics, but still sufficient. It's up to the parents to decide whether or not to act on this.

The context of this idea suits ParnasSys very well. The implementation of a webshop, and a logistical process behind it is less fitting, but coupling the detection of performance problems and providing solutions may be the competitive advantage with which ParnasSys can continue its growth rate.

Studymaterials are generally not cheap. With shipping costs and administration fees, the sale of products for study will be quite expensive. However, in my opinion the purpose of these study materials are worth spending money for. The effort that parents will have to take is also considerable. Again, the purpose it serves will be worth investing both time and money, as long as it is effective, therefore I think that this will not form a major problem, but it may mean that other methods are more effective.

The bundling of this service with ParnasSys is the ideal package. It creates an additional dimension: ParnasSys develops from an information system to a decision support system for parents, this service would not be possible without the bundling of these services. On the product level, bundling can be done by advising to buy method 5 when method 4 is required, so that parents can create an advantage instead of an arrearaga by practicing with their children.

C.3.2. The technology concept

Technologically, there will not be any limitations that cause this system to fail. The development of a webshop wouldn't be a problem. The system that advises the required products to solve the problems that exist is a matter of entering the right variables, and as long as the problem definitions are precise and detailed, the advice can be as well. The protection and maintenance of user information is already been done by ParnasSys, so there are no real obstacles that prevent this system from succeeding, when the problems with children are tracked in detail.

C.3.3 The organizational concept

In order to deliver the products that can help increase children's performance, Topicus will need to make agreements with publishers of study materials. Topicus wants to remain independent of the publishers, and never guarantee exclusivity for companies. This can perfectly be arranged through a webshop system, where customers can decide what they buy, and Topicus can decide which products from which supplier to offer. It's important to realize that this may create ambiguity with parents as to the correct solution for their problem. It's easier for them when it's communicated like: This is the problem: This is your solution. This is clearer than: This is your problem, one of these 14 products is your solution.

It's important to agree with the suppliers on things like warranty, aftersales, etc. It is advisable to place these problems with the supplier, or to find another party that can deal with the logistic processes that are created in this business model. Since the supplier will do most of the work, and has to be compensated for the purchasing price, it is to be expected that most of the revenue of the product will go to the supplier. Since ParnasSys will only help in the sales process, this process looks like affiliate marketing. Normally, the fee for a sale in affiliate marketing is between 10 and 20 percent of revenue, depending on the profit margins of the products.

The data that is required to give advice on which products to buy for which problems is available. Some problems arise with the accessibility, since ParnasSys does not have authorisation to do anything with that data. Schools will have to agree on running this system and using the data that is stored by them. Since the system is designed to increase the quality of the education, this is in the best interest of the school, so if the system is sound and effective, it can be expected that many schools will use this system.

Which data to use is something to think about. It may be sensible to draw conclusions based on the results over the past half year, instead of on the last test result. The child may have been sick, tired, or have other reasons why they've performed badly, without requiring tutoring of any kind.

C.3.4 The financial concept

There are different ways to organize the revenue model of this system. The best option would be that ParnasSys arranges the payment, and orders the supplier to send a product to a customer. Then, the supplier will charge their expenses with ParnasSys, so that they receive their fair share of the revenue. This way, the customer is left out of the revenue division, which is easier for customers. Although trust is always important, this system allows both parties to check invoices, and ensure that the partners behave honest and fair to each other.

C.4 Network of tutors

C.4.1 Het Service concept

The idea for the second business model is that there will be a network of tutors set up. When clicked, this system will show the tutors that are available within a certain area, for a certain course. The parent can contact the tutor and make agreements with him/her about helping the child with additional attention. The tutors pay an annual fee to be listed in this system. For 1 course: € 39,95; for 2 courses: € 69,95, and for 3 courses: € 89,95.

The advantages of this are the same for parents and children. To ParnasSys, this system will provide the same customer value as the previous model, all be it in a slightly different way. With fairly little in maintenance costs, a system like this can be profitable quite rapidly. The tutors can be listed in a network where parents with “problem children” can get access to, and visit a tutor to see if he/she can help the child to improve his/her skills in some area. Since parents pay the tutor by the hour, and this will take dozens of hours to complete the additional lessons, this can generate a lot of revenue for tutors. 1 customer a year for any tutor can be enough to let him profit from this system.

The beauty of a network like this is that there will never be too many tutors listed in the system, which means that there is no need to actively manage the network. When there are too many teachers in the system, it will no longer be profitable for many of the tutors, which means that some of them will exit from the network. This will reinstate the balance and allow the remaining teachers to profit from the system again (in theory).

The actors involved in this business model are the tutors (suppliers), ParnasSys (intermediary), the parents (customers) and the children (end users). The suppliers generate revenue from helping the children with their arrearage. ParnasSys receives money from the tutors that are listed. Parents and children share a common value perception, which is the improvement of the quality of education.

In my opinion, tutoring is only applicable when there are serious problems with the child that require a structural solution. Parents of children that perform well, except for one course will probably not undertake this effort. Not only is it expensive, it also consumes a lot of time, therefore it will work when there are serious problems which cannot be solved without the help of professional tutors.

The context of this service fits within ParnasSys. Listing and showing a list of tutors that can be contacted will not look strange in ParnasSys. It fits perfectly within the parent module, since this is dedicated to involving the parent in the process of education of their child.

As stated, this service requires a lot of effort and money from parents, which therefore is only useful when there are real problems. The revenue that is generated from listing the tutors can be kept low, in comparison to the possible benefits for tutors. The success of this service is dependent on the availability of tutors, so there is a reason to make the system beneficial to them. Moreover, the creation of a list of teachers is not that expensive to set up, which allows for promotional measures like giving the listing away for the first year. The bundling of services with other systems in ParnasSys creates a total package with which ParnasSys not only stores data, but also provides conclusions based on this data, that can help improve the performances of the child.

C.4.2 The technology concept.

There are hardly any changes that have to be made to ParnasSys to develop this system. 1 database of tutors is all that is required to start this service. The transactions between the parents and the tutors will not be handled by ParnasSys, that is between the parents and the tutors, they will have to arrange that themselves. Maybe the number of clicks should be tracked, and some reviews of tutors, but that's about it. Additional issues are mainly involved in concluding the performance of the child. This has been addressed in the error analysis business model, and in the introduction of this model.

C.4.3 The organizational concept

To develop this system, ParnasSys needs to contact tutors in different courses, in different areas of the country. This is a time-consuming job, because it will involve many tutors. When a national network seems to arise, the system can be started, and efforts can be done to reduce gaps where no teachers are available. The contracts that are signed with tutors will have to be standardized so that no problems occur between ParnasSys and teachers.

C.4.4 The financial concept

The annual fee allows tutors access to this network. This can be charged in advance, making it impossible to not pay for the service (no payment means no listing). This is fair to all parties, and reduces the need for administrative work. Since the only payment required is charged for the access to the network, the number of clicks is not relevant for the amount that has to be paid, therefore, tutors will probably not mind if they live in Amsterdam, and get contacted by someone from Groningen. Unsuccessful prospects will not generate any additional costs.

Parents pay the tutors for the hours they will make. Any risk of losses is with the tutors, no children helped means no revenue. ParnasSys doesn't take any risk in this system, and no large investments need to be done.

C.5 Online Practicing Software

C.5.1 Het service concept

In this business model, children can address the same problems they have as in the previous versions, but now from behind the pc, when parents have purchased access to a piece of software. This is typically a small piece of software, designed to address one or two specific topics, not the entire course. € 49,95 is an example, but it can be expected that those small pieces of software can be developed a lot cheaper. A simple software application dedicated to one problem can be sold for just a couple of euros.

Publishers and other software developers can develop this system in collaboration with ParnasSys to make these materials available online. The parents will have almost no work with this, but can put the child behind the pc to practice with the software one, twice or three times a week.

In the coupling with the LVS, the progress of the child can be tracked, and determined what the level of the child's performance is. That can be compared to the desired performance, and communicated with the parents, to show that no additional measures are required, and that the problem has been solved.

The publisher is the supplier, ParnasSys serves as an intermediary, the parents are the customers and the children are the end users. In some cases, it may be interesting for ParnasSys to try to own the software packages so that the revenues generated by this system will not have to be shared. Suppliers will be paid for the content of the system, and are responsible for updates and changes. ParnasSys receives a share of the revenues, and is responsible for the technical arrangements of the system and the invoices. Parents and children benefit from the additional possibilities they are handed to solve any problems.

This system seems especially suited for solving small problems by offering some additional practicing methods. When the child really doesn't understand certain items, a face-to-face approach may be more effective, but when the child should develop a feeling with a certain topic, practicing is ideal. The efforts and price required for this are small. Additional practicing is not always the answer, but if it doesn't work, it doesn't harm. The system fits perfectly within ParnasSys, like the other systems mentioned above.

The price that is charged will depend on the topic and the software that is purchased, but that will be at most a couple of euros. The effort for parents is also minimal, only the purchasing and the logging in will have to be done. This forms no barriers for the success of this service.

The bundling of these services presents a Total package with which parents can find information about their child's performance, and find solutions for problems that may arise.

C.5.2 The technological aspect

At this time, Topicus tries to develop the English method online so that children can practice with this. This possibility can be adapted to suite the home environment from the parent portal. Coupled to the LVS of ParnasSys, the system can determine which at which level the child should exercise, and how much has to be done to fix the problem (the price can be adapted to take this into account. Allowing access and managing user data is important in this situation. There are no problems to be expected with this.

C.5.3 The Organizational aspect

This system may present some problems on the organizational aspect. The distribution of study materials is a rigid market that flows through companies like Heutink, Koks Gesto, etc. Since publishers are still dependent on these organizations, they cannot completely stop this contact. The online development of systems passes these companies, which will not make them happy. The dependence of these companies may make publishers hesitant to pass them.

Agreements will have to be made regarding updates and maintenance, although since the material that is taught in primary schools hardly ever changes, these systems will require little work. The functioning of the technical systems will be the responsibility of Topicus.

C.5.4 The Financial concept.

The processing of payments can be done by adding a payment module in the parent portal (iDeal, PayPal, etc.) Parents will pay Topicus, and Topicus will handle the division of revenue between the involved actors. Parents receive a license to use (part of) a method for home study.

The division of revenue has to be agreed upon between publishers and Topicus. Since most of the costs are in setting the system up, and maintenance will be minimal, a 50/50 division seems fair. The development of these systems will require investments, which creates the risk of not creating a return on this investment. However, since the general trend is that study materials will digitize more and more, the development of a system like this seems very interesting. An alternative to this version may be to involve companies like bijlesned.nl that are specialized in this.

C.6 Business Opportunity Evaluation

C.6.1 Feasibility Analysis

The feasibility analysis provides no problems regarding the possible developments of this system. It's important to develop small sized software packages that are developed to tackle one problem specifically. These software packages should be designed to fit the error analysis, so that when this problem is detected, this solution can be applied. The determination of errors can be done by a Cito error analysis system, or it can be based on method-based tests, depending on what experts say is desired. Acquiring this knowledge is the tricky part of this business model. The rest is easily performed after that.

A similar system that analyses errors, and gives advice on what to do to solve problems is not present in the market at this time. ParnasSys would be the first. Parents have indicated that they would be willing to pay for additional materials if they were told their child experiences problems at a certain area, and schools have indicated that, if the systems were qualitatively in order, they were prepared to accept this help from home. Moreover, the government stimulates the involvement of parents in the education of their child.

There are three options to do this, all aimed at different segments of the market. The network of tutors seems the most difficult to achieve, since a lot of tutors need to be added in the system to have national coverage. The other two systems do not provide any substantial difficulty that would make ParnasSys dependent on some third party. Therefore, these business models seem very feasible.

C.6.2 Viability analysis

The three options that have been addressed in this business opportunity are different from each other, and have different criteria to which they should meet. The webshop concept in which study materials are sold and sent to the customer requires some significant investments on the part of Topicus. When the webshop has been developed, the assortment has been gathered and added to the website and the site is launched, at the very least, Topicus has invested € 10.000,- in this idea.

When the launch actually takes place, Topicus will find itself in a competitive market with companies like Bruna, Bol.com and the local bookstores. Since Dutch legislation is very strict regarding the prices of products, it is probably difficult to compete on price. Even when the combination of a problem definition and a solution in the form of books or cd's catches on, the margins that can be made are too low to sell books individually. It seems that this idea would also not fit the core business of Topicus, therefore it seems that this is not a real viable business model.

The second business model gathers the contact data of tutors, and lists them in a system that parents are linked to when trying to find solutions to problems with their children. As stated in the business model, this requires quite a lot of money and effort from the parents, so it can be expected that this would be seen as a last resort.

One might wonder if parents that are looking for a last resort option like this require a system to tell them that their child is performing poorly in some topic. Moreover, the solution that is given as a last resort may not be the desired solution. First of all, many parents simply don't have the money to pay for additional tutoring. The people that do have money to pay for this can be helped by this system, but this is but a small group. People that have taken on an active role in the education of their child may already know of someone who can help their child, without this system.

All in all, the fact that it is a last-resort measure, in combination with a new defined problem, and the fact that it requires parents to both make a lot of effort, and pay a lot of money, are all threats to the success of this system for the tutors. Although no tutors have been asked, it may seem interesting for them to be listed in a high-regarded system like ParnasSys. To my knowledge, no other institute that is this close to children with learning difficulties, offers the space for tutors to present themselves.

Since there are barely any costs involved in setting up the system, and the number of tutors that can be reached is a one-time job, it makes the investments for ParnasSys small. This means that the system has a good chance of being valuable for ParnasSys, but for it to be valuable for tutors seems less likely. Since business model literature prescribes a clear positive value delivery to all actors, for a business model to be successful, it can be concluded that this is not a viable business model.

Finally, the sale of online software packages that are directed towards solving a single problem that has been detected in previous tests seems not to be affected by the problems that occur in the other business models. There is no competition in online software packages, and having the opportunity for parents to pay a small fee for a software package and letting their child practice with that piece of software two minutes later, opens up a big market for small to medium-sized problems.

Moreover, the efforts parents have to make, and the money they have to spend is very little. Children can practice until the system says their level is sufficiently increased on that topic, and the child can stop practicing with that topic. There is hardly any competition, the software is reproduced very cheaply, and the threshold for parents to use this is very low. Since some parents have indicated to be prepared to spend additional money on the education of their child if that would help them, it seems that this last idea is a very viable one.

C.6.3 New Venture Template

The last idea of the online software sold by Topicus passes all the questions in the New Venture Template. There is a market, it is unique and inimitable on the short term, there is a positive value delivery to all actors, and it is part of the core business of Topicus. Therefore, this is a business model that can help children improve their skills on a certain topic, and it passes all the evaluation tests that it has been subjected to.

Appendix D: Data Backup Possibility

D.1 Reasons for this business model

One of the most important features of ParnasSys is that schools no longer have to manage the student data. ParnasSys protects this data from fires, pc crashes or software problems. No harm can be done to the data, since this is professionally stored externally, mirrored, and backedup in its entirety for safety reasons. The partners with which ParnasSys arranges this almost completely safeguard that data that is stored.

The only concrete risk of loss or compromise of data is with the user. If teachers make errors implementing, changing or deleting data, this may lead to large problems for the schools, since this information has to be available at all times. When regarding the relatively poor knowledge of IT systems, the ParnasSys helpdesk regularly receives calls from someone that has made huge errors in deleting data, etc. There is no proper protection of user errors within ParnasSys right now.

D.2 The idea

To protect data from user errors, a number of options can be relevant. The start is prompting the user about strange delete queries (are you sure you want to delete this class? This group cannot be deleted because there are still tests connected to it), but if errors are made after this prompt, they cannot be undone in the current system.

Probably, the most ideal version for the user would be to have an undo-button, as it exists in many windows applications. How far to go back with the undo button is arbitrary, but when working in a file, the number of changes you make accumulate very fast (1000's of changes). It requires a lot of data to store all the changes that are made in the last period of time, which may compromise the speed of the system.

An easier way of doing this is to make a backup per school. A complete backup of the database is made every morning, but this cannot be used to restore items from one school. This only serves a purpose when the complete database is lost. This backup is unsuitable to restore data for one school because of the many couplings between tables in the database.

The data should be stored per school and per day. This can be done at night, so that users don't experience problems, or that changes are made during the backup process. If the last 7 days are stored, users can choose which database they want to have put back. The storage data required for this is minimal. A random school had a total database size of 616kb, meaning that 7500 schools would use up 4GB per day if 616kb is a good estimate of the average database size. Even when the average size is 10x the 616kb, the total service would fit just 1 hard disk, meaning no significant costs to develop this system.

The restoring of data from a day ago may help a teacher that has made an error, but this may delete changes that are made by other teachers since the backup. This means that other teachers will be affected by the problems of the one that made the error. Therefore, it may be wise to not overwrite the current files with the backup, but to allow access to the backup as if it were the current ParnasSys system. Then, the teacher that has made the error has access to the data that he/she

deleted, and he can reenter this in the database. This causes some manual labor, but this is acceptable since the user has made errors. If the user has to make an effort to restore that error, that doesn't seem like a problem.

D.3 The Business model (outline)

D.3.1 The service concept

This business model doesn't require a supplier. It can be developed within Topicus as an addition to ParnasSys. Both ways of offering this service require a minimal set up investment. Allowing access to backup-databases means copying all ParnasSys files to a /backup location, and making them access the backup databases. This will give some problems during updates since the backup system will also have to be updated. This will probably only require an alert team, and not be a whole lot of work.

The development of the system will form the largest expense. Maintenance is simply updating the backup system as is done with the normal system. Storage of 300GB of data doesn't cost that much. Amazon charges just € 0,15 per year per GB, and the personnel hours are minimal, so a service like this would not cost that much.

If the total costs of this system comes to € 2000,00 per year, and the service is offered to schools for € 0,25 per student per year (on average around € 50,00 per school per year) this means that around 8.000 students, or 2% of the total should use this system to be cost neutral. This investment then protects the data to all threats, including user errors.

ParnasSys benefits from this system in three ways. First of all, revenue is generated. Second, it offers even more protection of data, which can be used as a Sales argument for new customers. Finally, irritation on the helpdesk is prevented. When a user calls to ask if his errors can be undone, the helpdesk has to say no, which leaves customers with problems, and thus unhappy. This can be solved with this system.

The market for this idea is probably quite large. Losing data is a recognizable problem, which can be prevented relatively cheaply. Since schools are obligated to keep this data available for inspection, and other institutions, this service will be useful for all schools. As more data is stored in ParnasSys, and the system is used more intensively, the backup system will be of more value to users.

The concept of data protection fits ParnasSys perfectly, as this is one of the main reasons to work with SaaS systems. Offering an additional protection on this data seems to fit very naturally. The importance of proper data management is clear, and this service improves this management. Therefore, this system fits in ParnasSys's context perfectly.

The price that has to be charged is relatively low. The effort that users have to take is even smaller, since the system runs, and backups all data anyway. The backup can be restored, whether the customer pays for this service or not. If he doesn't pay, after the first use of the backup system, this can be charged annually, so that the data safety is guaranteed for all users.

This service is but a small point in the ParnasSys system. Although it may prove very valuable to schools, it may also be estimated that this service is too small to create a separate revenue stream.

To solve this, this system could be included in the standard license fee, which is slightly raised because of it, or ParnasSys could develop a ParnasSys PLUS version, in which some user friendly tools similar to the backup system are collected. This plus package should provide enough value to charge separate.

D.3.2 The Technology concept

In this concept, some investments will be done to get this system working, and some changes to the current ParnasSys system will have to be made. Either the backup should be stored per school, or the total backup database should be made accessible.

The storage of backups has to be arranged in a way that doesn't affect the functioning of the normal ParnasSys system. Different storage locations will have to be used, and things like data security and redundancy. Finally, a system will have to be made to restore data from old databases, or an account system should be developed to provide access to users to older databases. These will all be small changes, so no problems are expected with this. The only important problem that may occur is that the implementation of backups into the current ParnasSys database will be done in the daytime (otherwise, the user that requests the backup, and the total school where that user works, cannot work in ParnasSys that day).

D.3.3 The Organizational concept

For the users, some organizational aspects are important. When a customer has made a mistake, the customer should realize that overwriting the current files with a backup from several days ago will result in the loss of all changes that have been made after that backup. Since the loss of data may provide problems, the user should be aware of this, and provide a written authorization to do this, so that no problems can occur afterwards.

When the backups that are currently made are made accessible to customers so that they can read the information that they require, no variable costs exist when another user wants to make use of this system. Therefore, the backups will be made whether the customer wants to use it or not. When the user makes use of this system, the annual fee is charged for this system, the user should be aware of this before allowing ParnasSys to provide access.

D.3.4 Het Financial concept

The choice of revenue model can differ, depending on the system that is designed. Either the service is offered to customers on a license, and thus annually charged. In my estimate, a price of somewhere between € 0,20 and € 0,25 is reasonable for this service.

Charging the system when schools require the service is in my opinion would be expensive to schools, but it may put up a barrier for its use to ensure that people are careful with the data, but in case of emergency, it can be recalled. This may be a good idea, but the price for this cannot be too high, making it difficult to create a viable business model from this financial concept. The license fee can be seen as a sort of insurance, which makes it a small price to pay, for the availability of the service. When the service is only charged for use, it may cost hundreds of euro's, making the user hesitant to make use of the system, or giving him the idea that he is ripped off, and cannot even reach his own backups.

D.4 Business model evaluation

D.4.1 Feasibility analysis

The internal analysis for this business model shows that every requirement or resource needed to develop this system is available. Especially the option that allows users to login to a backup database to copy the information that has been lost, seems very easy to arrange. The current files of ParnasSys can be stripped of all insert, update and remove queries, so that users can only read information, not alter it in the database. The information can then be reinserted in the current database by the user, and to his or her error can be undone.

When looking at the problems that occur when users have made an error of large magnitude, a system like this may be of great value to users. As with all insurances, if you need to make use of it, you're incredibly happy that it exists. The feasibility on both the market side and the resource side seems not to form a problem, and it can be said that this business model is feasible.

D.4.2 Viability analysis

Whether this idea is viable or not, depends on how it is implemented. If the insurance model is implemented, it is a bit strange that schools don't have to pay anything up to the moment that something goes wrong. However, not allowing customers access to a system that exists, and is able to solve the user's problem without costing any additional money to ParnasSys seems unnecessarily cruel and very customer-unfriendly.

In my opinion, customers that are allowed access to this system, for an additional annual payment of € 50,00 per average school, will not hesitate to agree, if that allows them access to the data that they've deleted. However, if the system is offered to customers, regardless of whether they pay their "insurance" fee makes it very easy for schools to say: we'll pay that when we need it, thus making the system difficult to be profitable.

When this service is regarded as a step that should actually be part of the basic ParnasSys system, it can be included in the standard license fee. In this case, there is nothing to say about viability because the entire ParnasSys system should then be analyzed. The entire system has proven to be very viable. The investments that have to be done to develop this relatively small system will not affect that viability.

Since you want users to be careful in ParnasSys, and not delete anything that they find weird and have it put back two minutes later from the backup, it would be good to put up a threshold before being able to use this system. Although the system may not be very profitable this way, it does present a functioning system without weird properties like the insurance fee, where both the schools that pay for it and the schools that don't are protected by this system. Profitability is clearly not the central goal for this business model. The users that have made use of this backup are probably very satisfied with ParnasSys, which is also important. Therefore, the business model with a payment for each time the system is used seems to be the most effective way of protecting the data from user errors, although this is not a very profitable one.

D.4.3 New Venture Template

The new venture template presents some problems with this business model regarding the margins. It is unclear to me at this time what ParnasSys users are willing to pay for a service like this, the fact that both customers that would pay a fee for this service as the customers that don't pay this fee are protected feels unnatural. If a system is this cheap and easy to maintain, why charge for it, when there are already that many options that require payment? But not paying anything would reduce the alertness of users, when they think that they can easily repair anything that they have thrown away.

It is clear that this service can be of tremendous value to users that have just made errors with their data. I'm convinced that the payment of some fee to get the data to be put back is not a problem in itself. However, is the user that calls the helpdesk to have data put back authorized to make payment decisions like this? If not, how is the payment of this service arranged? The problems that arise with this indicate that more research should be performed before implementing this service. However, the face value of the service to customers is clearly present, so the possibility of securing data against user errors is definitely something that should be looked at, and integrated into ParnasSys.

Appendix E: Digital study materials

E.1 Reasons for this business model

There are some major benefits to the digitalization of the primary education. It reduces the costs of study materials, and there are possibilities to provide education on an individual level, and tracking results can be done a lot easier than is currently the case. Looking at the cutbacks that the primary educational sector has to endure, and will endure in the near future, the reduction of costs may be the most important reason to start digitizing study materials.

Distribution of current (printed) study materials is a major expense. The intermediary that operates between schools and publishers charges considerable margins for “shoving boxes”, which makes this part of the education a very cost intensive one. Publishers have made several attempts to digitize study materials, but have failed every time because of different reasons.

The switch to digitalization requires a partner that both has the skills to realize the technical aspects of digital study materials as the market share to let the offering compete with current offline versions of study materials. Topicus is one of the few companies that can realize this, with the ParnasSys system.

E.2 The idea

Although the technology behind digital study materials is very complicated, the idea itself is quite simple. Topicus is already talking with several publishers to develop a system to offer digital study materials. The first steps have been taken to develop the English method “take it easy” from ThiemeMeulenhof to ParnasSys schools. The technological specifications and agreements take more and more shape because of this. There is no long term vision, or any business models to profit from digital study materials.

The idea of this business model is that the study materials are listed in an electronic study environment where teachers can login, and prepare the system for the children. That child can practice, get explanations through videos or make tests. Since the partners and the technological requirements are known already, the emphasis will be on the financial aspect of this business model.

E.3 The business model

E.3.1 Het service concept

This idea includes several actors. The first party are the publishers of the materials, that have developed the study methods. Second, Topicus is the technological partner that has to develop the system that allows schools to make use of the study methods. Then there are the schools that purchase the methods, and finally the students that use the system. The value chain is presented in figure E.1.:

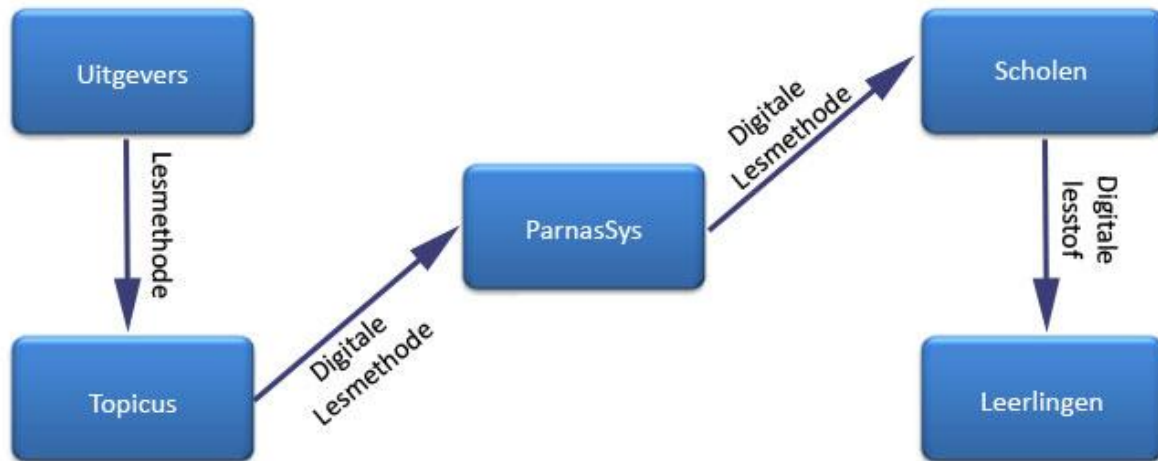


Figure E.1: Value chain with involved actors.

It is important to see that Topicus both has a role in the creation of the digital system, and the distribution to the schools. These roles will be dealt with separately.

Publishers will want to create revenue from this system. Since the general consensus is that these systems will be used more and more in the future, the publishers will not want to be left behind. An advantage of this system is that the reproduction of digitized information costs virtually nothing, whereas the paper versions are very expensive, especially when you include the distribution.

The development of the technology will result in costs for Topicus. Those costs will be charged internally to ParnasSys, who can in turn charge this to the schools. The value creation to schools is very important to ensure the success of ParnasSys's efforts to build this system. Schools and students benefit from this system because the digital versions of study materials can be altered when errors are discovered, improved where necessary, and updated to stay relevant. This in contrast with study materials on paper, that age and have no possibility of updates. This system may reduce costs by so much, that schools will spend less money on the digital study materials than is currently done on paper versions.

Within ParnasSys, a system should be designed that allows for practicing and making tests. The coupling between this system and the LVS from ParnasSys makes it very easy to store performance, and test results, making ParnasSys the ideal company to develop this system.

It is to be expected that not every school will switch to digital study materials at the first glance of it. Schools understand that this is the future, but the switch to digital systems for all schools will take several years at the very least. Since schools currently are in possession of study materials, and these have not been fully depreciated, they will continue to use them for the years that these were planned to be used. After the period of depreciation, schools have to rethink the options, and will then be in the position to make a decision about switching to digital study materials. Assuming that an average book lasts for five years, every year, about 20 percent of schools will have to decide whether to switch to digital study materials.

The early adopters will see this as a chance for improvement. The less ICT-oriented schools will be hesitant to switch to digital study methods, and maybe not switch at the first opportunity they get. How schools think about this, is beyond the scope of this research, but it is important to realize that when digital study materials reach 100% market share, only 20% will switch every year, and a minimal timeframe of five years will be required to offer digital study methods to every school.

The schools that do not switch to digital study methods may benefit from offering offline versions of the methods through ParnasSys. This bundling may convince publishers to start with this, because the digital study method will damage their distribution partners. Making publishers less dependent on these partners may increase their willingness to cooperate.

E.3.2 The Technological concept

Op technologisch vlak heeft het digitale lesmethode systeem nogal wat voeten in de aarde. Er zullen beoordelingssystemen ontwikkeld moeten worden, en de lesstof zal interactief moeten zijn met de leerling, zodat de leerling de lesstof krijgt die bij zijn niveau hoort. De beveiliging zal belangrijk zijn, zodat de leerlingen niet in elkaars systemen kunnen komen, of de resultaten kunnen frauderen. Tot slot moet er gekeken worden naar een manier om een systeem te vergrendelen, zodat toetsen digitaal afgenomen kunnen worden, zonder dat er gebruik gemaakt kan worden van applicaties of informatiebronnen die niet toegestaan zijn bij de toets.

Daarnaast zullen de uitgevers een heel aantal eisen aan de technologie hebben. In een verdere uitwerking van het business model zullen deze eisen in kaart gebracht moeten worden. Om dit te realiseren zal intensief overleg tussen de uitgevers, de programmeurs binnen Topicus, en ParnasSys nodig zijn. Daarnaast is het wellicht verstandig om (een aantal) scholen te vragen of zij willen helpen bij het ontwikkelen en verbeteren van het systeem door gebruikersdata terug te koppelen.

E.3.3 The Organizational concept

The actors in this business model are already talking about realizing this system. Before schools can be involved, agreements will have to be made about the revenue division that has to be made for this system, and about the responsibilities that the actors have to keep the system functioning. Because large amounts of money are involved here, it's important to draw up contracts to safeguard the agreements that are made.

It's also important to understand the influence that distribution partners currently have in the market of offline study materials. There will be a period where offline and online study methods will exist parallel to each other. It's possible that the offline materials will never completely disappear.

Because distribution partners have a large interest in offline methods, and are not involved in the business model for online methods, can be expected that they will not be happy with the development of the online methods. Therefore, resistance can be expected from these companies. That resistance may be so big that they decide to stop selling products of publishers that develop online methods, which would result in a significant drop in revenue for publishers. This drop can to a small extent be compensated with the online methods, but that growth will not develop that fast.

A bundling of the sale of online and offline methods can therefore be a way to prevent the drop in revenue for the publishers. ParnasSys can start selling these products through some sort of ordering

system. To compete with other methods, the prices will have to be competitive, but not so competitive that schools will decide to purchase only the offline methods, and not the digital study methods, because the difference in price is too large. An optimal pricing strategy should be developed if the sale of offline methods is done through ParnasSys.

E.3.4 The Financial concept

There are different revenue models possible for this business model. Pay per view, pay per license for a method, or pay for a license to use all the methods. This last method will optimally make use of the possibilities of the negligible reproduction costs that online study methods provide. Different revenue models will have different implications on the technological implementation of this business model. I have chosen to offer this system to customers on an annual fee for the system, and not for the individual method. This allows users to access all methods, and select the optimal method for the topic that is taught to the students. The use of each method in comparison to the total use of all methods can be used to decide the optimal split in revenue.

The use of digital study methods can be charged on an annual fee per student per year for every course that is taught with this system. Schools pay a certain price per year, based on the number of students in that school. The system offers all available methods, and the teacher can choose which methods are used. Based on the use (80% method 1, 20% method 2) the revenues can be divided. (€ 600 for publisher 1, € 150 for publisher 2, € 250 for Topicus, offering the system.

Advantages:

- Schools get the opportunity to use different methods. This way, they can teach the children in the way the teacher thinks is best, making use of the professional judgment of the teacher.
- The teacher can develop methods for himself, because the schools are not committed to one method. This doesn't have to be a complete method, it can be a single topic on which he has a lot of experience in teaching it.
- The switching costs of using another method become zero. This forces publishers to provide excellent material. Because of the digital nature of the system, changes can be made very quickly, so errors can be removed, and inefficient pieces of a model can be updated to function better. The market will indicate which method is good, and which is bad. When a chapter 4 of a method is barely used, this means that there are other systems that do this better. If the system keeps track of this, the publishers can use this information to improve methods. Not only will the publishers be forced to improve the methods where possible, the students are not affected by a poorly designed method. Making changes can easily be done, so this system offers the possibility to increase the quality of every individual topic, thus improving the quality of education in general.
- Teachers gain more control over the classes they give, and are less committed to the choices that publishers have made. Moreover, if some of his students don't understand a topic with method 1, he can choose to use method 2 for those students, allowing a more individual method of teaching, without generating additional costs.
- Because the use of the system is not charged, schools can login as often as they please. This means they have the freedom to use the methods they have paid for to its fullest. Moreover, schools will not attempt to cut costs by putting more children behind one pc.

Disadvantages:

- Schools will not own the method, and publishers no longer sell methods. The switch of the revenue model may be a bridge too far for schools and publishers. The negative attitude towards change by schools or publishers may be more important than the possibilities this system creates.
- Publishers can bind customers less easily to their methods. This forces the publishers to put even more attention to the materials they create.

Conclusion:

Offering digital study materials through an open system that offers access to all publishers seems to be the best method of doing this. Schools know what the costs are prior to the use of methods, and can combine all materials into the optimal education for the children attending that school. Schools have even more freedom to choose methods, and aren't committed to one method for a prolonged period of time, so publishers are forced to always try to improve their methods. This leads to an increase in the quality of the education

The step that has to be taken from traditional study materials is quite large. The changes are considerable, which may result in resistance from customers and publishers. Publishers will want to limit the number of players on the market, since every additional player will get a piece of the cake, and the size of the cake doesn't change by adding additional methods to the system.

However, if the prices that are charged remain comparable to the traditional methods, it can be expected that the market shares will not change dramatically through this model. The margins that are now spent on distribution is the margin that Topicus can charge for the system. If Topicus requires a smaller margin, the total price can be lowered, resulting in an increased incentive to use this online system. This makes this system very valuable to all actors.

E.3.5 Division of revenue

Regardless of the revenue model that is used, the transaction will probably be performed by Topicus. Schools pay ParnasSys for the method, and ParnasSys arranges the distribution of revenue over the publishers that have offered their materials.

It is important to note that publishers don't have complete possibility to charge anything they want for their method. Since ParnasSys offers the system as a license based system, there is one price, and the use is distributed based on the total use of each system. If there are different prices to the use of different methods, then a scoring model should be used to determine what the division of revenues should be. ParnasSys should charge rates that create value to all actors, but it can be expected that there is little to no room for negotiation with individual publishers. The agreements that are made with 1 publisher should be made with all publishers, to safeguard the independence of ParnasSys.

The payment can be charged in front, as it is now with the current models (the payment is made after receiving the materials, but the use of the materials is to a large part done after the payment.

E.4 Business Model Evaluation

E.4.1 Feasibility analysis

The feasibility of this business model is important to determine, as there are great investments to be done before a system like this can succeed. In recent history, Publishers have attempted to design a system with digital study materials, but have failed, either because of the lack of technological resources or the lack of a market share. Topicus has these fundamental criteria with ParnasSys, but that doesn't automatically guarantee its success.

It's clear that for this business model to succeed, a fundamental discussion about how the primary education sector can be improved in the future. The business model that is sketched here doesn't have impossible resource requirements or require immense amounts of money to succeed. However, it does require both the publishers, the schools, and an intermediary like ParnasSys to work together and agree on the future of study materials. This agreement requires several of the important publishers of study materials, which are essentially competitors, to work together and to release the grip they have on their own sales price.

Although this may eventually be the best way to organize the study material market for primary education, it may be a bit overambitious to want to get there from scratch. It may require a step in between where schools can purchase a license of a certain digital study method that is accessed through the ParnasSys system. This will probably be easier to accept for publishers. Then, when the digital study materials have become commonplace, the step towards total freedom of method choice can be taken. The actual feasibility of both suggestions remains unclear until agreements are made with publishers. The major breaking point of this business opportunity is the desire to cooperate from publishers.

E.4.2 Viability analysis

In recent research has been concluded that schools spend around € 150,00 on study materials and ICT per child per year, where lumpsum advises schools to spend around € 200,00. With over 500.000 students in the ParnasSys database, that market for ParnasSys is € 75.000.000 in size every year. When the printing and distribution of the study materials is no longer required, a lot of the expenses that have to be made can be reduced. I have no precise data on the amount of money that is spent on printing and distribution, but it will be a fair share of this € 75.000.000. In a conversation with one of the owners of Topicus, I've picked up that Topicus has invested ParnasSys € 2.000.000 in ParnasSys to make it the way it is now. In my estimate, the design and creation of a system that allows digital study materials to be used is a lot of work, but it's not as large as the complete ParnasSys system.

I therefore think that the investments that are required to design a system that can be used to run the digital study materials are not excessively large. If eventually half of all the study materials will be digitized (estimates are that almost everything will be digital) we're talking about a market of € 37.500.000, with lots of room to spare because distribution and printing costs are eliminated. Since both the school and the publishers are aware of a move towards digitizing study materials, my estimate is that this system is very viable. The question of feasibility, of getting all the heads together and moving towards the same goal, is the most difficult part of this business model.

E.4.3 New venture template

Most of the new venture template doesn't present any problems. The only elements that are troublesome are the uncertainty and ambiguity. The dependence on both publishers and schools to make this a success leaves a lot of ambiguity in the market, that cannot really be cleared until the actual service is created. The value offering to all actors is clear, and missing the boat on digital study methods is something that all publishers want to prevent. However, there is no way of telling how much these publishers are willing to invest in this idea, and how much of their business they want to open up to competitors.

There is only one way of reducing this ambiguity, and that is to start talks with the publishers and schools to determine what they want. I've been told that these conversations are already taking place, and that these are very constructive talks, but I have no detailed information about the readiness of schools to jump into a digital study method or about publishers that want to develop and test complete digital study methods. This ambiguity has to be cleared before large investments can be made.

Appendix F: Financial analysis

Vrije school Utrecht 2008/2009

Number of students:		222	
Number of schools:		1	
Total income:		€ 1.007.835	
Personeel		€ 820.301	82,20%
Afschrijving		€ 6.587	0,66%
Huisvestingslasten		€ 82.804	8,30%
Overige lasten		€ 88.301	8,85%
Total expenses		€ 997.981	100,00%
Total income per student	€	€ 4.540	
Total expenses per student	€	€ 4.495	

PCBO Amersfoort 2007

Number of students:		3597	
Number of schools:		12	(of which 1 SO)
Total income:		€ 15.327.628	
Personeel		€ 12.461.884	86,04%
Afschrijving		€ 235.839	1,63%
Huisvestingslasten		€ 940.514	6,49%
Overige lasten		€ 453.098	3,13%
Leermiddelen		€ 392.111	2,71%
Total expenses		€ 14.483.447	100,00%
Total income per student		€ 4.261	
Total expenses per student		€ 4.027	

VPCBO Oost Groningen 2008

Number of students:		2151	
Number of schools:		18	
Total income:		€ 8.871.491	
Personeel		€ 7.140.550	84,66%
Afschrijving		€ 111.325	1,32%
Huisvesting		€ 363.405	4,31%
Overige lasten		€ 818.794	9,71%
Total expenses		€ 8.434.074	100,00%
Total income per student		€ 4.124	
Total expenses per student		€ 3.921	

Average income per student € 4.222
Average Expenses per student € 4.006

Expenditures on	Total	Aver. per school	Aver. Per student	percentage
Personnel	€ 20.422.735	€ 658.798	€ 3.421	85,40%
Depreciation	€ 353.751	€ 11.411	€ 59	1,48%
Housing	€ 1.386.723	€ 44.733	€ 232	5,80%
Miscellaneous	€ 1.360.193	€ 43.877	€ 228	5,69%
Study materials	€ 392.111	€ 12.649	€ 66	1,64%
	€ 23.915.513	€ 771.468	€ 4.006	100,00%

Appendix G: Delphi suggestions and complaints

The numbers behind the desire correspond with the value attributes of schools in chapter 4.

Wens titel	Stemmen					Som	Attribute
	--	-	/	+	++		
groepsoverzicht inbouwen	0	0	0	2	56	114	1,2
resultaten niet-methodetoetsen toevoegen aan rapport	0	0	0	6	21	48	1,2
Mededelingen plaatsen in Mijn Parnassys!!	0	1	1	13	18	48	1
Layout: kleuren + lettertype	0	0	0	5	18	41	3
School logo invoeren in rapport	0	0	0	1	19	39	3
Cijferoverzicht	0	0	0	5	16	37	3
5 punts schaal	0	0	1	3	17	37	2
kennisgeving in-en uitschrijvingen op naam	0	1	1	4	17	37	1
verschillende lettertypes in notitie	0	0	0	6	15	36	1
Analyse maken van de toetsen	1	1	0	5	16	34	2
methodetoetsen	0	0	1	10	11	32	1
Leerlingenaantal op tabblad groep	0	0	0	8	12	32	1
sociogram	0	0	0	6	12	30	3
Automatisch alarmering naar leerkracht(en) bij aanmaken notitie.	0	1	0	5	13	30	1
terugkoppeling over ingediende wensen	0	0	1	3	13	29	interne delphi melding
school: tabblad map toevoegen	0	1	2	8	11	29	1
overzichten ten behoeve van LWOO	0	0	3	5	11	27	1
Bekwaamheidsdossier	1	1	0	9	10	26	1
Layout Hulpplannen	0	0	0	3	11	25	1
Lay-out aanpassen	0	0	0	1	12	25	1
lijst jongsten aanmaken	0	1	2	5	10	24	2
Actueel schooljaar met de overzichten	0	0	0	0	12	24	1
Beoordeling ruim voldoende (kunnen) toevoegen	0	1	2	4	10	23	2
Schoollogo afdrukken op de lijsten	0	0	0	1	11	23	1
Overzichten	0	1	0	2	11	23	1
Overzicht doublures	0	0	1	2	10	22	2
het aanmaken en bewaren van lijsten	0	0	2	4	9	22	1
Methodetoetsen verwijderen	0	0	0	4	9	22	1
onderstrepen en vetdrukken	0	0	0	1	10	21	1
layout van digitaal rapport	0	0	0	3	9	21	1
emailadres bij relaties	0	0	1	7	7	21	1
Absentie-invoerlijst graag duidelijker	0	1	1	2	10	21	1
handtekening onder digitaal rapport	0	0	0	6	7	20	3
bank/giro nummer ouders	1	2	3	2	11	20	1
Nieuwe Cito toetsen	0	0	1	1	9	19	3
Medisch	0	0	1	7	6	19	3
lay-out / pagina indeling digitaal rapport	0	0	0	1	9	19	1
lay out	0	1	1	4	8	19	1
Voornamen ouders	4	2	7	8	10	18	3
Separate uitreikmomenten rapport	0	1	1	3	8	18	3

Urgente mededelingen op inlogblad leerling	0	1	1	5	7	18	1,2
Melding komst nieuwe leerling	1	1	0	3	9	18	1
Groepsplannen HGW	0	0	0	0	9	18	1
leerlingen medisch	0	0	3	7	5	17	1
Lay-out digitaal rapport	0	0	0	7	5	17	1
Volgsysteem 'Kijk' in Parnassys	1	2	3	2	9	16	1
Groepsoverzichten per vakgebied	0	0	0	2	7	16	1
Leerling kan zelf vragenlijsten m.b.t. welbevinden invullen	0	0	0	3	6	15	2
etiketten	1	1	2	6	6	15	1
kleine aanpassing overzicht kennisgeving in- en uitschrijving	0	0	0	2	6	14	1
Verjaardagslijst.	0	3	1	7	5	14	1
Beschikking tbv de SO-WEC scholen	0	0	0	4	5	14	1
hulpplannen en notities delen	0	1	1	4	5	13	2
Digitale methodetoetsen	0	0	0	5	4	13	1,2
Onderdeel Uitvoering van hulpplan niet zichtbaar in DOD	0	0	3	3	5	13	1
OKR	0	0	1	3	5	13	1
Leesbaarheid rapportage toetsen	0	0	0	3	5	13	1
weergave absentie	0	0	0	6	3	12	1
toevoeging map-functie bij school	0	0	0	0	6	12	1
overzicht splitsen op leerjaar	0	0	0	0	6	12	1
Titels toetsonderdelen vastzetten	0	0	0	2	5	12	1
Meer opmaak-functionaliteit	1	0	0	2	6	12	1
Koppelingsmogelijkheid Zien! aan rapport	0	1	1	3	5	12	1
Herinnering afloopdatum hulpplannen/ groepsplannen	0	0	0	2	5	12	1
Groepsanalyseformulier	0	0	0	6	3	12	1
De inhoud van een DOD kan vollediger	0	0	0	4	4	12	1
Bewerk knoppen invoeren absentie	0	0	1	2	5	12	1
hulpplannen	0	0	0	5	3	11	2
Mobiele telefoonnummers ouders in ouderportal	0	0	0	1	5	11	1,2
Leerlingenadministratie SO/WEC scholen/ Beschikkingen	0	0	0	3	4	11	1,2
lesuren berekening a.d.h.v. lesrooster en werktijdfactor	0	1	2	4	4	11	1
groepsvermelding op factuur	0	0	0	3	4	11	1
directe link naar helpdesk	2	1	1	6	5	11	1
Wijzigingen aangevraagd door ouders	0	0	1	3	4	11	1
Overzicht absenties vereenvoudigen	0	0	0	3	4	11	1
Invoeren absenties omslachtig	0	0	1	3	4	11	1
Aanhef brieven gespreksavonden	0	0	0	3	4	11	1
Module om zelf meerkeuzetoetsen te maken	0	1	2	3	4	10	2
Meerdere e-mailgroepen tegelijk mailen	0	0	0	2	4	10	1
Gespreksavonden wijzigen	0	0	0	0	5	10	1
Brinnr AB school	0	0	0	4	3	10	1
Alle telefoonnummers ouders in leerlingexport	0	0	1	4	3	10	1

Appendix H: Intermediation

The new business opportunities that will be investigated may require a company to offer products and services of third parties. In that case, the company fulfills an intermediary role between at one side the user base, and on the other side the companies and institutions that want to reach these customers in order to sell their products or services. This chapter will examine the literature on this topic in order to enable the company to exploit this role successfully.

H.1 Basic concepts and functions

Intermediaries can be found in different functions and in different markets, all with different implications to the definition of the word intermediary. Rose defines an intermediary as an independent, profit maximizing economic agent mediating between two market sides in presence of market imperfections (Rose, 1999).

Intermediation creates value by overcoming market imperfections. However, intermediation also causes one extra step of transactions in the value chain, thus causing additional transaction costs. Intermediation is therefore only desired when the increase of value added through intermediation overcompensates the transaction costs additionally incurred (Rose, 1999). This will be further explored in section 2.4.2.

According to Gumbel, the intermediary's independence is the foundation of efficiency increasing effects from intermediation. This independence implies that intermediaries perform their activities with the aim of making profit (Rose, 1999).

H.2 Market imperfections vs. Transaction costs

The definition of the intermediary prescribes that an intermediary functions in presence of market imperfections. Market imperfections can be anything that deviates from perfect competition (Suranovic, 2001), i.e. information asymmetry or spatial or temporal differences, etc.

Market imperfections affect virtually every transaction in some way, generating costs which interfere with trades that rational individuals make, or would make in the absence of the imperfection (DeGennaro, 2005). In the absence of these imperfections, there are no benefits from intermediation, hence the additional transaction costs make it uninteresting for intermediaries to provide intermediation services and for the market sides to make use of these services.

The existence of intermediaries makes sense because of the market imperfections. Although an intermediary can provide a multitude of value adding services closely connected to their basic activities, the basic activities - and therefore their major value offerings - remain overcoming market imperfections and increasing market efficiency (Rose, 1999).

The benefits that are experienced by overcoming market inefficiencies have to outweigh the additional transaction costs for the intermediary to be of value to its two market sides, provided that no other services are offered. This can mathematically be described as follows:

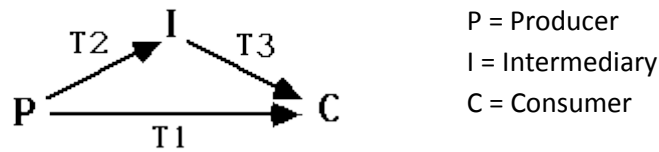


Figure 2.7: Involvement of intermediaries (Sarkar, Butler, & Steinfeld, 1995).

The services of the intermediary are valuable if, and only if, $T2+T3 < T1$ (Sarkar, Butler, & Steinfeld, 1995). If the intermediary provides additional services, they can be valued separately. The extent of the value offered by intermediation is the difference between the savings in market inefficiency costs and the intermediary costs incurred. The gains of intermediaries are the savings of economic resources resulting from the coordination of economic agents (Rose, 1999), or in mathematical terms: The gains of an intermediary is $(T2+T3) - T1$.

H.3 Market Makers

As described above, Rose defines the value addition of intermediaries in monetary terms. The reduction of intermediary value addition to the savings of economic resources is challenged. Security and trust, for instance, are major concerns in Internet based e-commerce. Hence, it is possible to invent a value proposition with this theme (Mahadevan, 2000).

Mahadevan states that Portals engage in building a community of consumers of information about products and services. Market makers play a similar role as portals, but differ in several ways. Firstly, market makers invariably participate in a variety of ways to facilitate the business transactions that take place between the buyer and the supplier. Therefore it is

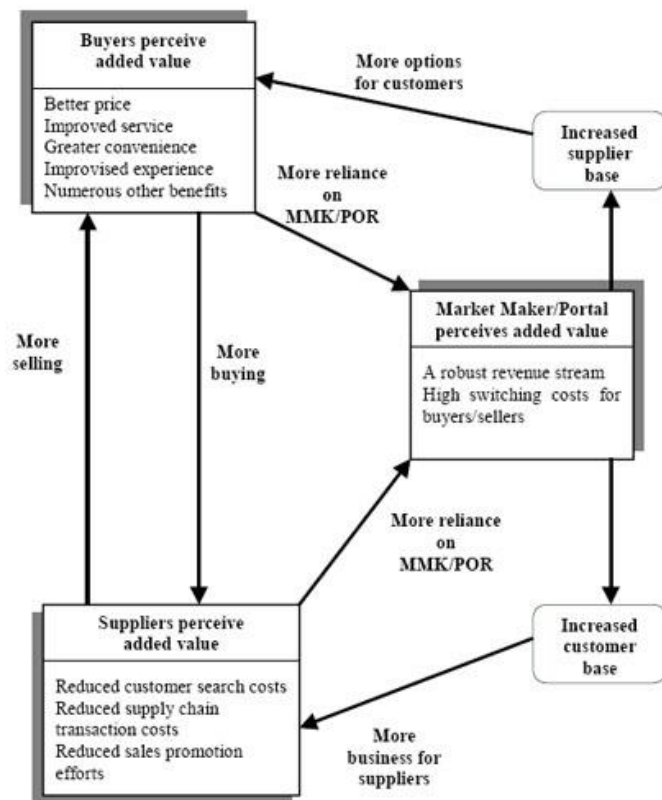


Figure 2.8: Value streams in Internet based business (Mahadevan, 2000).

expected that the market maker is expected to have a high degree of domain knowledge. Lastly, a market maker endeavors to provide value to suppliers and customers through a system of implicit or explicit guarantee of security and trust in the business transaction.

The value addition of market makers consists of the perceived value of buyers, sellers, and the market maker itself. Buyers perceive value from reduced product search costs and transaction costs.

Moreover, the benefits of the richness and reach of the internet provides an improvised shopping experience and convenience. Suppliers perceive value out of reduction in customer search costs, cost of product promotion, business transaction costs and lead time for business transactions. These value offerings are depicted in Figure 2.4.

H.4 Baligh-Richartz effect

Gümbel has categorized three effects that isolate and formalize structural principles of transactions which can be exploited by intermediaries to realize cost reductions. Volume of transactions and frequency of transactions can be optimized to reduce these costs. However, since Topicus doesn't want to keep inventory or redistribute goods or services from suppliers to customers, the results of these optimizations will at best be minimal.

The third source of cost reductions is known as the "Baligh-Richartz effect". It entails the reduction in the number of contacts necessary between all suppliers and consumers in a market, hence a reduction in search costs for both sides of users. This is depicted in figure 2.4.

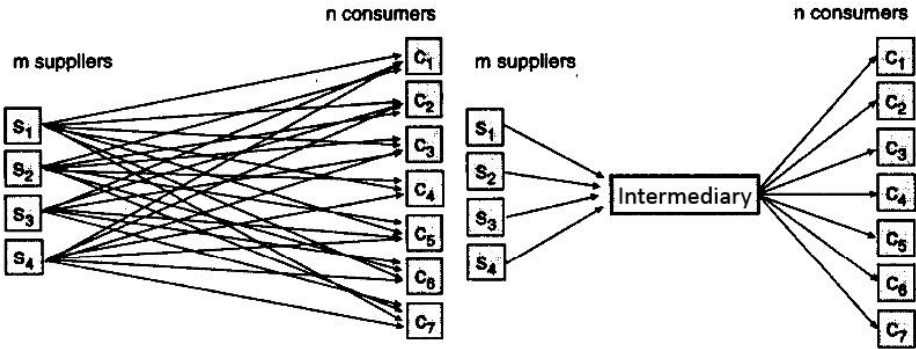


Figure 2.9: Baligh-Richartz effect (Rose, 1999).

Without the interference of an intermediary, the number of connections between all suppliers (m) and all customers (n) can be calculated by $(n \cdot m)$. With the help of the intermediary, this number is reduced to $(n + m)$. The interference of the intermediary is advantageous when the number of contacts reduces: $(n + m) < (n \cdot m)$. This is valid when $(n + m) \geq 3$, but the larger $(n + m)$, the bigger the advantage of the intermediary. This gives rise to the notion of the value of adding more contacts to the network. Moreover, the larger the networks are the higher is the probability for successful matches through the intermediary (Rose, 1999).

Appendix I: New Venture Template (How to Evaluate Your Venture, 2010)

"Is It a Business?"

The first eight questions drive market strategy and ultimately answer the question, "Is it a Business?"

A. Innovation

Question #1: *Is it a New Combination?*

This question hinges on the degree to which new entrepreneurial discovery has taken place in order to take advantage of excess supply or excess demand. Entrepreneurial discovery occurs when an imperfection in the market can be identified and exploited. There are four ways in which a new combination can be discovered. These discoveries come in at least five categories or types. In new venture technology, the ultimate measure of the degree or strength of a new combination is as follows:

Low	If the discovery is new for us, but not for other companies
Medium	If the discovery provides a definite improvement over existing supply for present demand, or demand for present supply
High	If the discovery is a real breakthrough

Question #2: *Is there a Product-Market Match?*

In the world of venturing (as opposed to the world of invention) a new combination does not in itself determine that a product is innovative. For true innovation to occur, someone has to be willing to buy the product created in the new combination. Therefore, this question seeks to identify the degree to which customers, or potential customers, will commit to purchase the product. The question of product-market match is a key in the world of venturing and the allocation of investment funds. The higher the capital requirement for market entry, the more scrutiny this question must be given. In new venture technology, the ultimate measure of the degree or strength of a product-market match is as follows:

Low	If there are no purchase orders
Medium	Offers added features to the market (<i>e.g. convenience</i>) such that some orders or sales exist
High	Matches a market want or need so well that sales backlogs or large quantity purchase orders exist

B. Value

Question #3: *Is there a Net Buyer Benefit?*

This question of net buyer benefit centers on the drivers of customer demand for the product, and the relative relationship of perceived price and perceived product differentiation (i.e. is the product "worth the money" or "a rip-off"?) Generally, is the value-added of the product to the customer such that they would rather have the product, than money in their pocket? In new venture technology, the strength of net buyer benefit is measured as follows:

Low	If there is price discount pressure
Medium	If there is price stability
High	If there are "stock-outs" and price premiums

Question #4: Are there Margins?

As net buyer benefit defines value to the customer, margins define value to the venture. For the purpose of new venture technology, the question of margins focuses on what level of margin-per-unit can be expected on a fully-absorbed cost basis. The key comparisons should be based on realistic industry performance and expectations. In new venture technology, the ultimate measure of the degree or strength of margins is as follows:

Low	If the expected margins for the venture are far below (<i>typically less than 15%</i>) documented industry averages and/or expectations
Medium	If the expected margins for the venture are in a similar range (<i>typically between 16% and 30%</i>) to documented industry averages and/or expectations
High	If the industry margins for the venture far exceed (<i>typically over 30%</i>) the documented industry averages and/or expectations

Question #5: Is Volume sufficient?

Just as product-market match is to innovation, volume is a critical test in the discussion of value. This question looks at the degree to which anticipated volume of the new venture achieves its expectations and goals. A comparison of venture objectives to absolute margin is often useful in this analysis. In new venture technology, the ultimate measure of the degree or strength of sufficient volume is as follows:

Low	If the expected volume is not sufficient to achieve venture objectives
Medium	If the expected volume should be sufficient to achieve venture objectives
High	If the expected volume far exceeds venture objectives

C. Persistence Over Time

Question #6: Is it Repetitive?

This question hinges on the degree to which the product will be needed regularly (or on an ongoing basis) or that other strategic practices that drive repetitive product sales are prevalent and acceptable in the industry and are part of the express strategy of the venture for this product. The evaluation of a product's placement on the need/alternative use model is often useful in determining the repetitiveness of an entrepreneurial discovery. In new venture technology, the ultimate measure of the degree or strength of repetitiveness is as follows:

Low	A "once-only" purchase, or extremely sporadic and unpredictable
Medium	Purchases are occasional
High	Purchases are frequent and reasonably predictable

Question #7: *Is there a Long-Term Need?*

The question of long-term need evaluates the extent to which the benefits of repetitiveness can be expected over time. This question hinges largely on an understanding of where the product (as a new combination) falls in the product lifecycle, and the relative speed of the lifecycle. This is often understood only through study of the lifecycle of similar innovations. Additionally, the ability to apply new venturing strategies to establish a clear two-way relationship with the customers is critical to long-term need. In new venture technology, the ultimate measure of the degree or strength of long-term need is as follows:

Low	If the new discovery (<i>product/service</i>) is a fad with limited future need
Medium	If the product/service need extends only over the short term
High	If there is a foreseeable long-term need for the product/service

Question #8: *Are Resources Sufficient?*

This question really looks at resources in financial, management, knowledge, and time sufficient to get the product to market. This view goes beyond short-term "start-up", to an evaluation of resource availability in the face of growth and other indicators of success unique to new venture formation and growth. The "Rule of 4" (it takes four times as long and costs four times as much as planned) plays into the evaluation of resources. In new venture technology, the general measure of the degree or strength of resource sufficiency is as follows:

Low	If resources are effectively non-existent or limited
Medium	If resources are few, or at risk if growth exceeds plans
High	If resources are plentiful and anticipated to be readily available in the future

"Can You Keep It?"

The next six questions drive competitive strategy and answer the question, "Can You Keep It?"

D. Preserving Economic Scarcity

Question #9: *Is it Non-Imitable?*

Once a venture has achieved a level of innovation, the question arises as to whether or not the innovation can be maintained. This question hinges on the degree to which new entrepreneurial discovery can be imitated by competitors. Imitators (as opposed to substitutes) would do essentially the same thing as the venture, and in the same way. Scarcity can be preserved by incorporating one or more of various types of isolating mechanisms into the venture, a key strategic skill employed by successful entrepreneurs. Maintaining non-imitability focuses on preventing new entrants from introducing additional supply to fill existing demand. In new venture technology, the ultimate measure of non-imitability of a new combination is as follows:

Low	Easily imitated, no isolating mechanisms in place
Medium	Partially protected by isolating mechanisms (<i>this is NOT a numerical count of the mechanisms, but rather is an assessment of the STRENGTH of whatever mechanisms are present--of course, the more the better</i>)
High	Isolating mechanisms are sufficiently strong so as to permit little or no imitation

Question #10: Is it Non-Substitutable?

This question explores the degree to which substitutes exist (or can be created by competitors) for a new entrepreneurial discovery. Substitutes reduce demand for a product by doing something in a clearly distinct and different way. The remedies to block substitutes are not the same as those that act as barriers to entry to imitators. In new venture technology, the ultimate measure of non-substitutability of a new combination is as follows:

Low	There are substitutes that directly reduce product demand
Medium	There are substitutes that in directly reduce product demand
High	There are no substitutes

E. Failure to Prevent the Appropriation of Created Value

Question #11: Is there No Slack?

The second way that value is appropriated is through slack. Slack is really inefficiency and waste in the product delivery process from the beginning to the end of the vertical supplier-customer chain. More generally, slack occurs whenever economic actors shrink the size of a venture's "pie" without ever discussing it with the venture. The key to reducing slack is appropriate structuring of incentives, a key skill of successful entrepreneurs. In new venture technology, the ultimate measure of the degree or strength of slack is as follows:

Low	There is a lot of waste and inefficiency
Medium	There is some waste and inefficiency
High	There is little or no waste and inefficiency

Question #12: Is There No Holdup?

Appropriation of value occurs in two different instances. The first is when economic players use one of the many types of available power to force a venture to give them part of its financial gains. This is called holdup and is best viewed as thieves or bandits taking advantage of the fact that the venture has been built with few or no economic bargaining options, called small numbers bargaining. In new venture technology, the ultimate measure of the degree or strength of the potential for holdup is as follows:

Low	There is a lot of small numbers bargaining power in suppliers or buyers
Medium	There is some small numbers bargaining power in suppliers and buyers
High	Suppliers or buyers have little or no economic power over the venture through small numbers bargaining

Failure to Maintain Flexibility

Question #13: *Is Uncertainty minimized?*

This question hinges on the preparation of the organization for things that we know will happen in the future to affect the venture; but we don't know when, or the magnitude of the event(s). Minimizing uncertainty in a venture revolves around forward planning and risk management processes. In new venture technology, uncertainty is evaluated as follows:

Low	There is no insurance on the key people or the business, no tax planning, current tax savings accounts, forward planning etc.
Medium	Some level of indirect risk management is present that will affect the venture
High	Risks are low because of planning, insurance, statistical control processes etc.

Question #14: *Is Ambiguity reduced?*

Ambiguity result when future events are unknown, meaning that the venture knows neither the nature, timing, nor magnitude of the event. In new ventures, the one certainty is that there will be a great deal of ambiguity. Because the market weeds out unfit ventures, understanding inertia, creating decision structures, and organizing to manage ambiguity are critical. In new venture technology, ambiguity is evaluated as follows:

Low	There is an absence of long-term planning and adaptation processes conducted in a heterogeneous group setting
Medium	Some planning and adaptability-preparedness is undertaken
High	A rich "mastermind alliance" (Napoleon Hill, <u>Think and Grow Rich</u>) is in operation directly relating to the venture

"Can You Do It?"

Question #15: *What is your level of Core Competence?*

Core competence obviously revolves around a venturing team's experience and specialization in the venture, as well as in venturing. These are two distinct sets of skills and abilities. Competence comes in the form of the ability to perform the key task required for the venture's success in whatever functional area that may be. In new venture technology, the measure of the degree or strength of core competence is as follows:

Low	If members of the venturing team posses little or no experience and specialization in the business
Medium	If the venturing team has some experience and unique knowledge in the business
High	If the venturing team is familiar with the industry and has worked for at least five years therein and can perform specialized tasks critical to the venture's success

Appendix J: Opportunity Identification

Single Sign on

The single sign on system is a system that allows users to enter the usernames and passwords of other systems that they use frequently. By creating a link that they can click on, they do not have to enter passwords anymore, which is really irritating to a lot of people in the user base. This system can reduce this problem for the users, and is easy and simple to make.

Digital study methods

It's expected that the new generation of study methods will be digital. ParnasSys can build a system in which all methods will be available, and users can choose which ones they use. If ParnasSys charges access to the system, and not to the method, schools can use all methods for selecting the best method of education for each topic, according to the preferences of the teacher.

Quality management system

The Interviews have shown that there is a need for a system that allows users to track the quality of the education, and related issues, provided by the schools. ParnasSys is already building a system that can track this, with more possibilities than competitive systems due to its coupling with the LAS/LVS system. Since ParnasSys already develops this system, it's nice to know that users confirm their interest in this system. The development of a business model is not that interesting for this research.

Arbo (Poortwachter law)

When employees report in sick, the Poortwachter law requires schools to perform many tasks at different times. A proper administrative systems that points out what has to be done at what time, in combination with the accounts that employees already use is an easy and effective way to report in sick, to report this to the proper authorities, and to know what has to be done at what point in time.

Data management/exchange

School boards are faced with a lot of data from the schools they command. Proper management of this data is vital to ensure the quality of education, and to make sure this is done efficiently. Different levels of management require different levels of data to acquire useful information. The School board system provides this for grades of schools, but the information is very detailed, limiting the users to generate overviews and summaries. The more possibilities there are to summarize data, the better it is for upper management. This was mentioned in several interviews. Also the exchange of data with other systems (financial, HRM, etc) allows for better data integrity and reliability.

Electronic Learning Environment

The use of computers in high schools, colleges and universities is commonly accepted, but in primary education this is not done that often. Using this to communicate with students, provide study materials, make homework and take tests. The use of these systems will not be as common as in higher education, but a similar system may provide methods of teaching that are beneficial to the children.

Data backup possibility

ParnasSys is a webbased system, with a single database that contains all the data. This database is protected against almost anything, except for user errors. When users delete results, they are gone. Since not everyone is as skilled when it comes to IT as the ParnasSys programmers, many errors occur, that cause a lot of work for ParnasSys users. Having a `trashcan` or a backup system that allows users to reset data that they've altered or deleted can protect the data from user errors.

Error analysis

ParnasSys allows users to score test results for Cito tests as the number of questions answered correctly. If the test answers are entered, and the system can analyse the answers, and draw conclusions based on these grades, and see that a child has certain problems. Teachers can be made aware of these problems, so they can work on this. This requires data from Cito, which may be difficult, but it offers a lot of benefits for ParnasSys users, as they no longer have to enter the data into two separate systems.

Product discounts

The interviews presented results for the parent portal that they may be interested in product discounts. Especially the poorer parents that have difficulties making ends meet. The collective use of this system may make it interesting for companies to offer discounts through the ParnasSys system to reach these parents, and offer them products for reduced prices. This may also make the parent portal more interesting, and thus more used.

Additional study materials

Classes are getting bigger and bigger, which means individual help for students that have difficulties with the stuff they should learn is difficult. Teachers may not have the time to notice these problems, let alone help the students with the problems they have. When ParnasSys provides parents with additional study materials through small software packages, this may help address these problems. The parents can choose to use this system and purchase this software (or books).