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St. Petersburg State University
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LAPPEENRANTA UNIVERSITY OF TECHNOLOGY
School of Business
Master in International Technology and Innovation Management

Daniil Muravskiy

THE DIGITAL BOOK AS A DISRUPTIVE INNOVATION

1st Supervisor/Examiner: Professor Sergey Yablonskiy
2nd Supervisor/Examiner: Professor Olli Kuivalainen

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ABSTRACT

Author: Muravskiy Daniil

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Whether digital book will become the dominant design of books and be a widely accepted format for reading is a question that is currently asked by every e-publisher, publishing industry worker and many book consumers.

This study is the first to holistically approach Christensen's disruptive innovation theory for an instrument of measuring the phenomenon of the digital book.

The disruptiveness of an innovation could be measured by it's disruptive potential and the disruption process it passes. The empirical part of the thesis is designed so to investigate the digital book's features as an innovation for disruptive potential and then the current digital book market, monitoring it for disruption processes.

Proving that the digital book is a disruptive innovation may allow understanding it's prospects and even help in making a pattern of the innovation's market infiltration in the future.

The framework created for answering the research question could also be used in a similar way to analyze other E-publishing products (e.g. e-newspapers, e-magazines).

АННОТАЦИЯ

Автор: Муравский Даниил Владимирович

Тема: Цифровая Книга как Прорывная Инновация

Факультет: Высшая Школа Менеджмента (СПбГУ, Россия)
Бизнес Администрирования (Леппеенрантский Технологический Университет, Финляндия)

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Экзаменаторы: Яблонский Сергей Александрович, проф. (ВШМ)
Олли Куйвалайнен, проф. (ЛУТ)

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Станет ли цифровая книга доминирующем дизайном книг и признанным форматом для чтения – это вопрос, который сегодня волнует всех “электронных” издателей, работников традиционных издательств и простых потребителей.

Данное исследование является первой работой, объясняющей феномен цифровой книги с помощью теории прорывных инноваций Кристенсена.

Прорывная способность инновации может быть измерена через ее прорывной потенциал, а также сам процесс «прорыва» рынка, который она проходит. Практическая часть диссертации структурирована таким образом, чтобы исследовать сначала характеристики цифровой книги как инновации на наличие прорывного потенциала, а затем существующий рынок цифровых книг на степень прорывной активности.

Успешное доказательство того, что цифровая книга является прорывной инновацией позволит понять сущность и перспективы инновации, а также способно помочь в создании шаблона поведения инновации на рынке в будущем.

Созданная теоретическая база может быть использована в дальнейшем для анализа других продуктов электронного издательского дела.

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Abbreviations

AAP =	American Association of Publishers
AD =	Years after the start of this epoch
B2B =	Business-to-Business
B2C =	Business-to-Consumer
BISG =	Book Industry Study Group
CD =	Compact Disk
CENTRIM =	Centre for Research in Innovation Management
CSS =	Cascading Style Sheets
DTP =	Desktop Publishing
DVD =	Digital Video Disk
e-book=	electronic book
e-content =	electronic content
e-commerce =	electronic commerce
e-diary =	electronic diary
e.g. =	for example
e-ink =	electronic ink
e-journal =	electronic journal
e-mail =	electronic mail
e-newspaper =	electronic newspaper
e-paper =	electronic paper
e-publication =	electronic publication
E-publishing =	Electronic publishing
e-publisher =	electronic publisher
e-reader =	electronic reader
e-tail =	electronic retail
et al. =	and elsewhere
etc. =	and so on
e-textbook =	electronic textbook
IDPF =	International Digital Publishing Forum
HTML =	Hypertext Markup Language
i.e. =	that is
IMF =	International Monetary Fund
OCF =	OEBPS Container Format
OEBF =	Open eBook Forum
OPF =	Open Packaging Format
OPS =	Open Publication Structure
PC =	Personal Computer
PDA =	Personal Digital Assistant
PDF =	Portable Document Format
U.S. =	United States
vs. =	opposed
XHTML =	Extensible Hypertext Markup Language
XML =	Extensible Markup Language

1 Introduction

Whether the digital book is an innovation that will lead to the replacement of the book as we know it by overturning the market and drastically changing consumer behavior – is a question that is highly discussed nowadays by authors, publishing industry workers and simple readers. Yet nobody still can say for sure and give a confident forecast about the life and future of the digital book because of the absence of a framework to apply to the study of the new medium.

Book is more that just a product. It constitutes a major format of information processing – reading. Thus a change in the essential features of this five centuries old good is so much more than just an upgrade. The fact that the current book format has practically stayed the same throughout this long period of time could serve as a proof to that.

Digital books from the one hand is a book format born nearly 40 years ago, but from the other – so new, that there is still no agreed upon definition of the term. It's differences with the traditional book format are so numerous, that it may even seem that it is not a book at all, but a different product and information medium. Yet it's major reforming influence on the whole Publishing industry is undeniable and constantly growing.

This work is the first one to holistically approach Christensen's disruptive innovation theory for an instrument of measuring the phenomenon of the digital book.

In order to answer the research question of "how the digital book can be a disruptive innovation and whether it will become such in practice" a literature overview of works explaining E-publishing ecology and disruptive innovations is conducted.

By disruptive innovations such innovations in the (product or process) technology or in the business model are understood, which change the bases of competition by changing the performance metrics along which firms compete (Danneels 2004). When introduced, they either create a new market among non-consumers or target a niche of customers who do not value the extra features and high performance of the existing product or simply cannot afford it (Bower and Christensen 1995). It is considered by the disruptive innovation theory that once customer perceived value of a disruptive innovation increases, that innovation gets the chance to gradually diffuse and grow into the market until it takes over and disrupts the mainstream market of the old product (Christensen 2003).

The disruptiveness of an innovation could be measured by it's disruptive potential and the disruption process it passes (Lindqvist and Ghazi 2005). The empirical part of the study is designed so to investigate the digital book's features as an innovation for disruptive potential and then the current digital book market monitoring it for disruption processes.

In the empirical research along secondary data, information from primary sources is used. In the context of the work two empirical studies were conducted among Russian book consumers, a qualitative and a quantitative, which aim was to define and support crucial points in the research of digital books' new value proposition and reader experience cycle improvement capabilities.

Proving that the digital book is a disruptive innovation does not necessarily result in issuing a death sentence to the paper book any time soon just as cinema had not killed theater and television – the cinema in it's own turn. But what it could say for certain – is that the whole publishing industry as well as our reading habits and leisure time spending are going to change drastically in a very short notice, promising new business opportunities to some and a giant threat to the established business of others.

The importance of the topic is aggravated by constant discussions on the future, essence and opportunities of E-publishing. Also such a review of current issues in the Publishing industry may be relevant to organizations from other industries operating in markets, which rely heavily on e-contents.

1.1 Background

The paper constitutes the last two semesters of studies at Graduate School of Management in St. Petersburg and School of Business of Lappeenranta University of Technology. It is carried out as a Master's thesis for the "Master in International Technology and Innovation Management" degree.

What will become of the Publishing industry in the 21st century will most likely be evident as soon as this decade, but now few could tell for sure what the book will look like after the ongoing industry revolution. Though the topic itself is highly discussed, there is still no single adjusted framework to apply to the study of the digital book. Hence, no one can give a confident explanation and forecast about the life and future of the digital book.

This study applies to the disruptive innovation model for an instrument to describe and evaluate the phenomenon. Christensen's theory of disruptive innovations is a powerful framework to analyze innovations and industry change (Hang and Kohlbacher 2007).

Applying to the disruptive innovation framework to analyze new products and industry changes is a growing trend nowadays. Today one can find articles and discussions on health care, education and even music, where Christensen's model is used (Kenagy 2001; McCrea 2010; Hecker 2009). And since the importance of innovating is now common knowledge for every big and small manager, this tendency is only going to grow, as the next important step for managers will be learning to distinguish a disruptive innovation from a sustaining one.

In a paper by Paul Miller (2006) the disruptive innovation theory was applied to in a discussion of a topic related to ours: "library 2.0: the challenge of disruptive innovation". The work analyzes the latest trends of the library domain to depict a new paradigm for all the stakeholders – including libraries themselves, their users, content authors, publishers and software vendors, which is in ways similar to the aims of our research, though the studies deal with different book publishing domains.

Showing that the digital book is a disruptive innovation may allow understanding it's potential and even help creating a pattern of the innovation's market infiltration in the future. The framework applied for answering the research question could also be used in a similar way to analyze other E-publishing products (e.g. e-newspapers, e-magazines).

1.2 The Objectives of the Research

1.2.1 Objectives

The objective of this study is using the disruptive innovation theory to develop a relevant framework for answering the question of whether the digital book can and is going to disrupt the Publishing market. This framework could be further applied in analogy for evaluating the disruptiveness of other E-publishing products.

1.2.2 Research Questions

To achieve the study objective the following research question needs to be answered:

How can the digital book be a disruptive innovation
and will it become such in practice?

For the absence of a tool that could provide the answer, this research suggests such an analytical framework, which is broken down into studying the following questions:

- **What is the digital book?**

In the beginning it is important to define the object of the study, the digital book, and set the limitations to what kinds of e-publications this study encompasses. The E-publishing ecology can be divided into three more specific sub-questions:

  - What types of books can be distinguished?
  - What is the standard for E-publishing?
  - How should the digital book be defined?

- **What is a disruptive innovation?**

Secondly, the problem of the study needs to be explained and therefore an overview of disruptive innovations theory is conducted. In order to address this, the second question is broken into the following sub-questions:

  - What types of innovations can be distinguished?
  - What are the characteristics of a disruptive innovation?
  - How should a disruptive innovation be defined?

- **How to prove that the digital book is a disruptive innovation?**

The third question concerns the methodology of the research and asks about the means to accomplish the research objective. An answer to that question should be a framework for reviewing digital book technology based on the disruptive innovations model.

1.3 Definitions and Delimitation

1.3.1 Digital Book Definition

The research is limited by the chosen definition of digital books, which according to it are opposed to digital periodicals and thus e-newspapers, e-magazines and other types of serial electronic publications are excluded from the main study. So are audiobooks.

Audiobook is a narrated recording of a book, whether an exact word for word (unabridged) or modified or shortened version of the original printed work (abridged).

Thirty years after the trade acceptance of this medium there is paradoxically little doubt about the rightfulness of referring to it as books.

Yet even unabridged audiobooks are just interpretations of written text, suggesting characters' voices, emotions, intonations and moods that most often differ from the impressions conceived from reading the original work (Wikipedia). Their physical appearance, navigation system and the vocabulary used to describe audiobook consumption also have very few in common with paper books. Nowadays a talking book may be completed with multiple readers playing various parts and enhanced with music and sound effects, in complexity and specificity becoming very similar to cinema productions and theater plays, which a priori are not in any way books.

For those considerations all forms of audiobooks except audio enhancements in digital books are excluded from the research to avoid controversy in terms and meanings.

1.3.2 Disruptive Innovations Theory Limitations

In a short time after the introduction of the original concept of disruptive technologies, Christensen started a thorough analysis of the question of whether a technology is inherently disruptive or if "disruptiveness" is a function of the perspective of the companies subject to it. In his further works he replaces "disruptive technology" with the term "disruptive innovation", recognizing that technologies are most often not intrinsically disruptive or sustaining in character (Christensen and Raynor 2003).

Markides (2006) argued that different kinds of disruptive innovations have different competitive effects and produce different kinds of markets and thus Christensen have made a mistake by generalizing disruptions, which originated in products, technologies and business models into a single term. He insisted on distinguishing *business-model innovations* and *radical product innovations* in opposition to *technological innovations*.

Yet in this study we tend to agree with the original author in that there is something bigger than the locus of the innovation that unites disruptive innovations originating from product, technology or business model improvements - that is how the changes to the product or service affect it's performance (i.e. whether the change introduces a new performance dimension or if it lowers the cost of the product).

Here it is also assumed that disruptiveness is both an intrinsic characteristic of an innovation and the derivative of the actual successful process of market disruption.

As Lindqvist and Ghazi (2004) have proposed *market* as a third and most important source of disruptive innovations among *technology* and *business model,* a clear consumer perspective on disruptive innovations opened up. We believe that taking a value-based view on the matter allows generalizing the disruptive innovation theory so to encompass the innovation locus variations mentioned by Markides.

Danneels (2004) has criticized Christensen for giving a rather unclear understanding of what constitutes disruptive innovation. It was mostly due to Christensen's defining disruptive innovations in terms of pricing peculiarities, which led to him admitting that there are multiple exceptions form the rule. In this study we apply to Druehl and Schmidt (2008) application of the encroachment framework on disruptive innovations concept to explain these exceptions, therefore introducing the terms *detached new-market disruption* and *fringe new-market disruption*.

Christensen (2003) also argues that a disruptive innovation can be disruptive to one company but not to another. That led to a distinguishing of *firm-level* investigation of disruptive technologies and their effects from *industry-level* studies (Puumalainen and Sainio 2007). However in the research of the digital book, we conduct an industry-level investigation and build the framework for evaluating disruptive innovations accordingly.

1.3.3 The Relationship between Value, Performance and Utility

Porter (1996) defined value as the amount buyers are willing to pay for what a firm provides. Thus the value of a product is the mental estimation a consumer makes of it. Formally it may be conceptualized as the relationship between the consumer's perceived benefits in relation to the perceived costs of receiving these benefits (Wikipedia). It is often expressed as the equation: *Value = Benefits / Cost.*

Though the terms "performance", "benefit" and "utility" are used randomly in literature it is possible to say that "benefit" is somewhat "bigger" than "utility" and that a product's performance encompasses all the benefits the product provides to the customer. Lindqvist and Ghazi (2005) claim that it is not the performance of the product that is important to customers, but the utility of the product. They also say that the performance of a product could be translated into factors that are important to the customer, i.e. customer utilities.

For the purpose of the research we use the terms in the following meanings:

Utility – is a product or service ability to be consciously used to perform a task.

Benefit – is the potential of extracting a certain utility in a way that would meet the user's needs.

Performance of a product – is the combination of all the benefits, which product usage is able to provide.

Performance dimension – is a set of benefits united by a perceived mutual nature (e.g. functional and socio-psychological performance dimensions).

1.3.4 Empirical Study Limitations

As already mentioned, the whole study is limited by the chosen definition of digital books, from which e-newspapers, e-journals and audio books are simply excluded. Yet as respondents were answering the questions they might have been thinking of these exceptions that they use and think of as books. The same problem is applicable to the authors of the secondary sources of data used in this study.

Another limitation is implied in the research process: the in-depth interviews were conducted by the researcher, which means that he influenced the direction of the conversation and may have affected the information-gathering process. Although the questions and sub-questions were standardized, situation-specific additional questions were made to gain deeper information on matters.

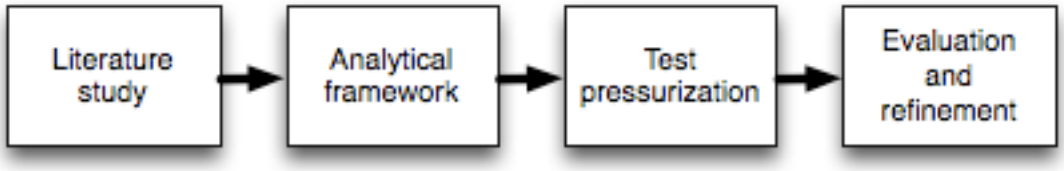
Also, the extent of the empirical material was relatively small. Yet, on the other hand, a large amount of empirical material does not directly imply credibility of results in qualitative studies, since extensive data are easily limited to superficial inspection (Puumalainen and Sainio 2007).

1.4 Organization of the Research

This thesis is organized in four stages (figure 1.1). The first stage of the work is to describe the object and purpose of the study by defining *digital books, disruptive innovations* and *how disruptive innovations can be identified*; this is done by a literature study. This literature study then leads to the development of an analytical framework.

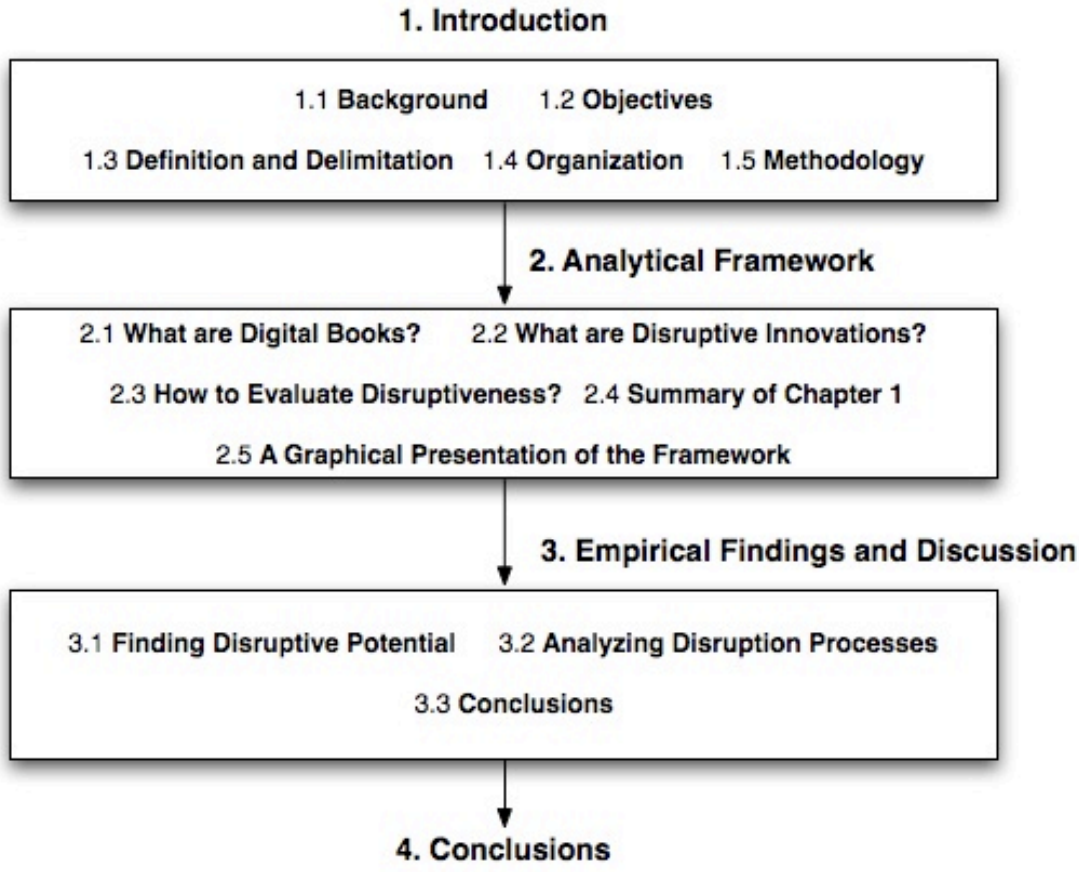
In the third stage the proposed framework for identifying disruptive innovations in E-publishing will be applied on digital book technology. As the framework is tested in practice it is followed by the fourth stage, in which the framework is evaluated and refined according to the previous results.

Figure 1.1 Schematic overview of the study



The outline of this work is graphically presented in figure 1.2 below.

Figure 1.2 Disposition



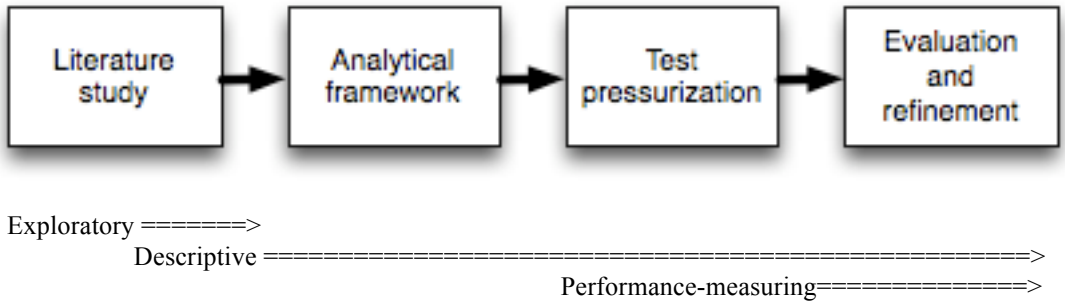
1.5 Research Methodology

1.5.1 Scientific Approach

During the first weeks of the study an exploratory approach is used. Information is gathered in order to get a better understanding of what the goal actually is and how it can be reached. When a better understanding of the goal is achieved the research questions of the study can be formulated, and the information necessary for answering them can be collected.

Since this thesis has four different stages, the approach is not the same for all of them. In order to answer the first two questions for building the analytical framework (what a disruptive innovation and digital book are), a descriptive (conclusive) approach is applied. A thorough literature study is performed. The main theories of innovation, works on E-publishing ecology and other information found in literature are then used to define what a disruptive innovation and digital book are considered to be in this study.

Figure 1.3 Schematic overview of the study and scientific approaches used



During the literature study theories that describe how the identification and evaluation of ideas can be performed are also found. Among the available tools in literature, the ones considered appropriate for our case are chosen to build the analytical framework.

The empirical part of the thesis serves not only to answer the main research question but also to test-pressurize the conducted framework. Therefore, a performance-monitoring approach is used after applying (or “test-pressurizing”) the framework. The work then progresses iteratively by applying the framework, evaluating the results and making changes.

1.5.2 Qualitative and Quantitative Techniques Used

While the aim of this study is evaluating digital books as a disruptive innovation, both qualitative and quantitative techniques are required. This contains studying academic literature and existing theories within the field of innovation as well as performing qualitative and quantitative interviews in order to test the viability of the conclusions.

The first research is a pilot testing – an attempt to explore the determinants of reader buying experience and the new value digital books offer. The research is exploratory and a *qualitative research design* was considered the most appropriate, given the nature of the information that was desired. As Woodruff and Gardial (1996) noted, "measuring customer value is rooted in the use of qualitative data-gathering techniques".

In-depth type of interviews was considered as the most appropriate method, since it was necessary to reveal the hidden motives, considerations and attitudes of the respondents towards a particular topic. 30 in-depth interviews were conducted in total.

The main research, on the other hand, aimed at measuring the level of reader dissatisfaction with the attributes of the traditional book required the use of *quantitative techniques*. The questions in the on-line survey, in which 100 participants took part, were conducted using Likert's scaling and the results were summed up to show the book attributes that caused a sufficient level of reader dissatisfaction. Likert's scaling was considered the most appropriate, because the participants were not asked to evaluate the whole product as such with competitors' products, but only to evaluate separate product features.

1.5.3 The Sources of Data Used in this Study

During the exploratory and descriptive phases of the work secondary sources are mainly used. These are books, scientific and other articles in journals, also articles and other information on the Internet. The credibility of these sources is generally high. The books and articles have either been recommended by the supervisors or collected using databases, e.g. Emerald Insight and EBSCO.

During the descriptive and evaluative phases of the work, use of primary sources has also been considered. The primary sources are mainly ordinary book consumers, not coming from or deliberately connected with Publishing, libraries and book retailing. The primary sources are used when the draft of the framework is applied on the digital

book. After the framework had been applied on digital books, the results enable an evaluation of the appropriateness of the framework. Required modifications are identified and a refined framework is proposed.

1.5.4 Quality of the Work

An important part of the thesis is to develop a framework suitable for analyzing e-publications through the disruptive innovations model. This framework has an *industry-side prospective* dealing more with consequences or possible consequences of the disruptive innovation, rather than with the question of where the disruptive idea has originated.

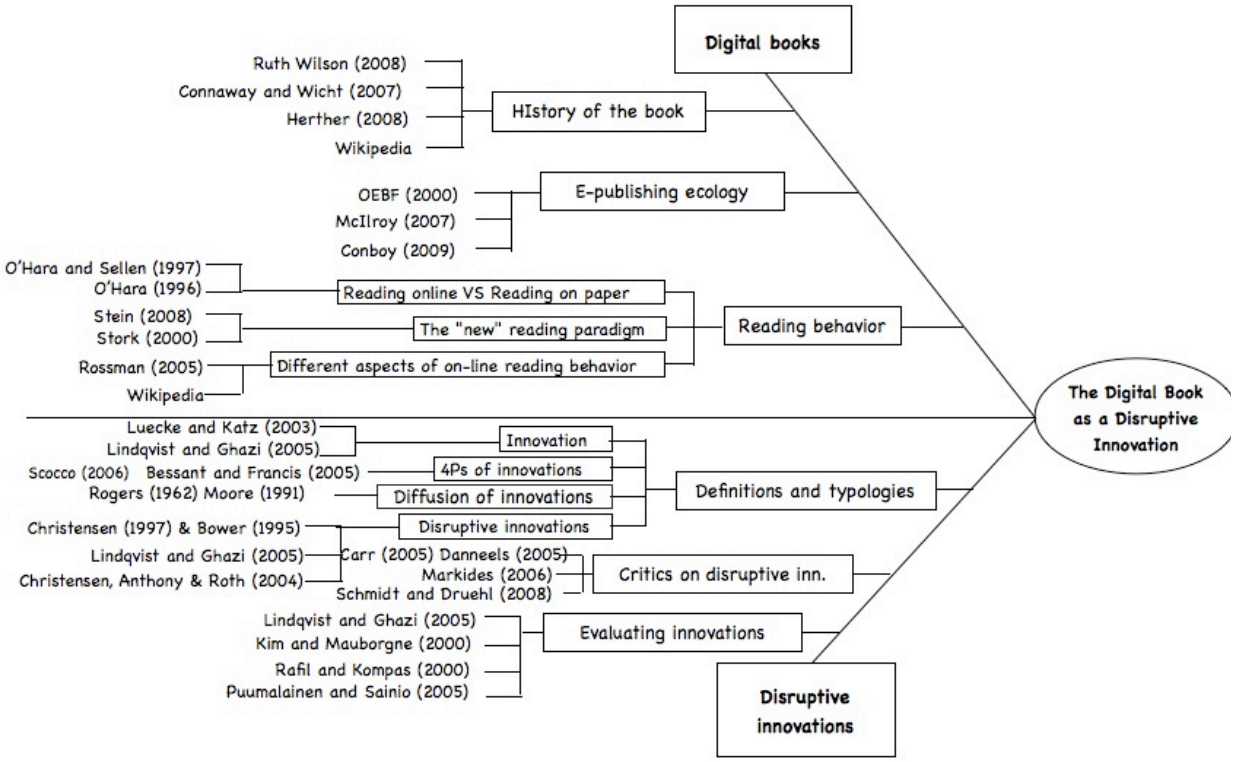
The evaluation logic illustrated via a block scheme (figure 2.19) presents a tool for distinguishing disruptive innovations and the types of disruptive potential. The classification of disruptive innovations might also prove helpful with analysis of any other product when working with Christensen's (2003) original model.

Since the framework have been specifically designed for evaluating the disruptiveness of digital books, it might prove convenient for analyzing other types of e-publications as well. We consider the outcome of this study to be valid and reliable. The analytical framework is based on a thorough literature study, where the opinions from various authors have been included and carefully examined.

2 Analytical framework

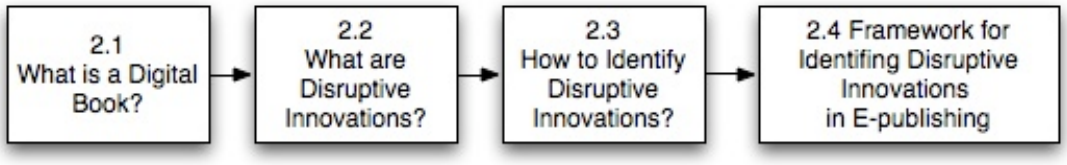
In this chapter the important theories relevant for achieving the purpose of this thesis are presented. The most important literature referred to in the theoretical and empirical parts is summarized in figure 2.1.

Figure 2.1 Literature used in the theoretical part



To reach the overall goal of the thesis three questions have been posed, answering which would allow creating the analytical framework necessary to identify a disruptive innovation in E-publishing.

Figure 2.2 Organization of the chapter



The first two sections of the chapter give the reader an introduction to the topics of disruptive innovations and E-publishing ecology. The third section offers a tool for evaluating disruptiveness of an innovation.

2.1 Defining Digital Book

2.1.1 Definitions in E-publishing

The Open eBook Forum, the trade and standards association for the digital publishing industry that in 2005 was renamed to International Digital Publishing Forum (IDPF), back in 2000 published a document, suggesting the framework for E-publishing ecology. The document embodies various deliverables (glossary, reference models, stakeholder profiles, etc.) that its' working group have produced for the Public Comment Draft.

The paper defines e-publications as follows:

Electronic Publication – is a Literary Work disseminated in the form of a Digital Object and accessed electronically, where...

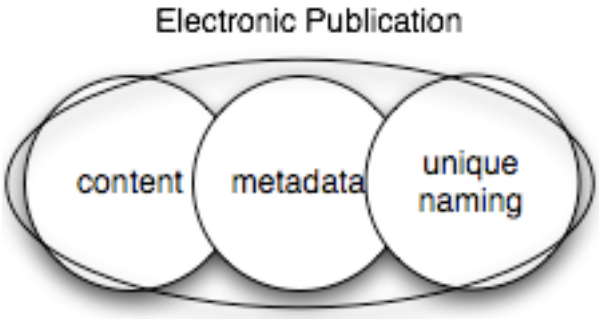
Digital Object – is a sequence of bits that incorporates unique naming, Metadata, and Content. It may be recursive, enabling management of objects at multiple levels of granularity (the whole document, a paragraph, graph, etc.) in any medium (text, audio, video, image, etc.) and…

Literary Works – are works, other than audiovisual works, expressed in words, numbers or other verbal or numerical symbols or indicia, regardless of the nature of the material objects, such as books, periodicals, manuscripts, phonorecords, film, tapes, disks, or cards, in which they are embodied (U.S. Copyright Act 1976, cited in OEBF 2000).

E-publishing is then defined as the act of disseminating Literary Works in digital form.

The fundamental unit of distribution and transaction within the OEBF's Framework for the E-publishing Ecology is the Digital Object, which consists of three layers: one or more *unique identifier*, *metadata* (data about data or processes) and *primary content*.

Figure 2.3 E-publication definition (adopted from OEBF 2000)



Sometimes E-publishing is restricted with a digital rights management system.

Digital Rights Management – is the definition, protection, or enforcement of rights pertaining to content produced, delivered or accessed electronically (OEBF 2000). Copyright holders need it for preventing unauthorized duplication of their work, maintaining artistic integrity or ensuring continued revenue streams.

E-publication could be read on hardware devices known as e-book readers.

E-book (digital book) Reader, also called an e-book device or e-reader – is an electronic device that could be used for reading digital books and periodicals. Any PC, laptop, cell phone or Personal Digital Assistant (PDA) capable of displaying text on a screen is also capable of being an e-book reader.

Dedicated E-readers – are devices designed primarily for the purpose of reading e-books. Most modern dedicated e-readers use e-ink technology to display content. The main advantages of these devices are portability, readability of their screens in bright sunlight, and long battery life.

2.1.2 Publishing Types and Multimedia books

Since the U.S. Copyright Act 1976 excludes audiovisual works from Literary Works' definition, questions arise about whether multimedia books (books with multimedia enhancements) should be considered as books.

In their turn, *audiovisual works* are defined as "works that consist of a series of related images which are intrinsically intended to be shown by the use of machines or devices such as projectors, viewers, or electronic equipment, together with accompanying sounds, if any, regardless of the nature of the material objects, such as films or tapes, in which the works are embodied" (OSU Glossary of Common Copyright Terms 2010).

In other words, TV shows, movies and video games are not considered as books. Yet according to the OEBF definition, a digital object can include both video and audio materials. That means that nobody says what extent of text consistence is actually required for calling a multimedia work a "book", rather than a video installation, video presentation or an audio play.

There are many kinds of book publishing and it is apparent that different multimedia enhancements would be desirable for each publishing type and the proportions of actual text in the book will differ accordingly. Most listings differ, but here is a representative sample of publishing types (McIlroy 2009):

1. *Trade publishing* (including books for children and religious books);

2. *Textbook publishing* (including ancillary texts, such as teacher or student guides);

3. *Reference publishing* (encyclopedias, directories and numerous others);

4. *Reports, studies* (by not-for-profit publishers, government agencies, etc).

Visual images, photos, video, film clips combined with music, speech and drama performances have already become the reality for books and yet book's multimedia content as a subject of intellectual rights and single industry standard agreement is in a very early stage of development. This possible confusion and uncertainty limits publishers views of the product they are selling and the business they are doing by that detaining progress.

A part from solving all the related legal issues, vast socio-cultural changes are required in order to facilitate the natural progress of multimedia books. The clearest evidence of that is the current absence of appropriate language and agreed upon terms that would define the "new" book formats and describe reading behavior so to distinguish watching a film or a theater play from "reading" a multimedia book.

2.1.3 E-publishing Standard

In September 2007 the International Digital Publishing Forum (IDPF, former OEBF) announced EPUB to be the official E-publishing standard, superseding the older Open eBook standard.

EPUB (also referred to as "e-pub") is free and open, and designed for reflowable e-publications, meaning that the text display can be optimized for the particular display device. It is composed of three open standards (Wikipedia):

- Open Publication Structure (OPS) 2.0, contains the formatting of its content;
- Open Packaging Format (OPF) 2.0, describes the structure of .epub file in XML;
- OEBPS Container Format (OCF) 1.0, collects all files as a ZIP archive.

XHTML or DTBook (an XML standard provided by the DAISY Consortium) are used to represent the text and structure of the content document, XML - for descriptions, a subset of CSS - to provide layout and formatting and a re-named “zip” file to hold it all in. Extension ".epub" is the file extension for EPUB reflowable e-publications.

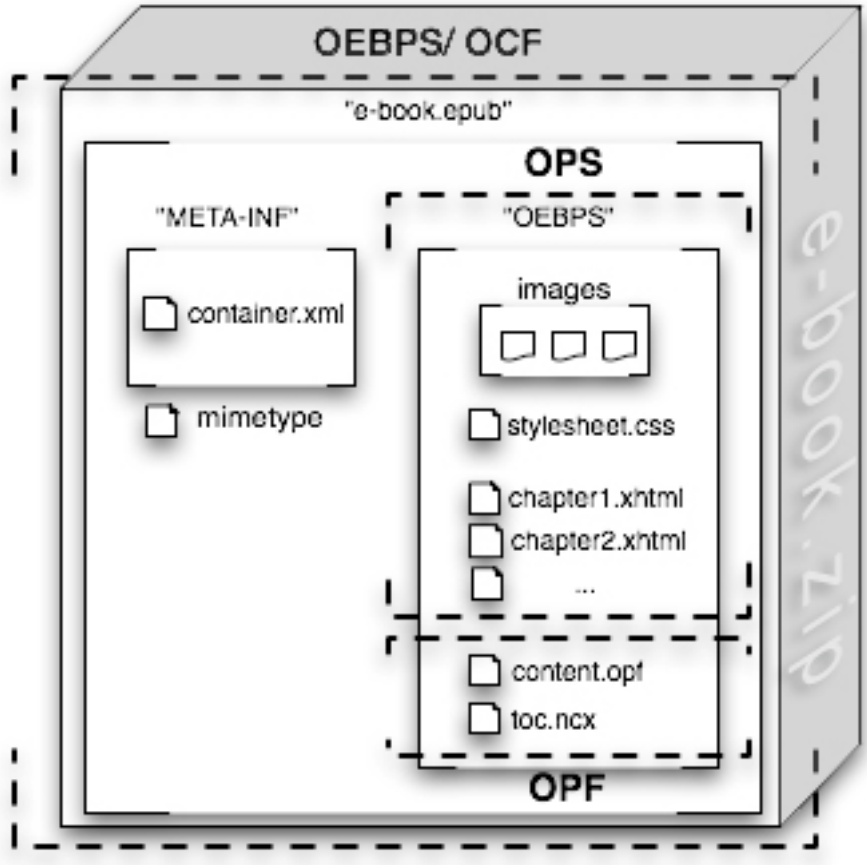
Figure 2.4 Required EPUB contents

The bare minimum of an .epub file are the following files/folders (figure 2.4):

- *mimetype* - tells a reader/operating system about the content;
- *META-INF* folder – folder that contains, at minimum, the container.xml file, which tells the reader software where in the container the book can be found;
- *OEBPS* folder – the recommended location for the books content. It contains:
    1. I*mages* folder – folder for placing images,
    2. *content.opf* - XML file that lists what the container holds in,
    3. *toc.ncx* - table of contents,
    4. *xhtml* files - The book's contents.

The format is meant to function as a single format so that publishers can produce and send a single e-publication file through distribution. EPUB also offers consumers interoperability between software/hardware for unencrypted reflowable digital books and other e-publications (Conboy 2009).

Figure 2.5 The relationship between OCF, OPS and OPF specifications



Unlike PDF, which is a print-oriented, fixed-layout format that makes it hard to change the layout of documents when, for example, changing the page size, but keeping the font size the same, EPUB is a display-oriented, reflowable format. Using the EPUB format makes it easy to produce a document, which would display well on different display sizes and with many various font sizes.

It is the first digital book format with actual industry support.

A reading system is such software that reads, and presumably displays, EPUB files.

An EPUB reading system is defined as:
"A combination of hardware and/or software that accepts OPS Publications and makes them available to consumers of content. Great variety is possible in the architecture of Reading Systems. A Reading System may be implemented entirely on one device, or it may be split among several computers..." (Conboy 2009).

According to Conboy, the long waited implementation of a digital book standard that is largely transparent for consumers should lead to increased title availability hopefully lower cost per unit.

2.1.4 Digital Book Definition and Categorization

Historically, digital book is the format that succeeded the scroll and, possibly, the codex book. E-publishing though still inferior to traditional publishing in terms of cultural and industrial acceptance and for that reason could not be directed as the dominant design today, is at least the second leading format of books nowadays.

If to investigate the etymology of the word “book” it would lead to the world "beech" and refer to the earliest Indo-European writings that may have been carved on beech wood (Wikipedia). Interestingly, that makes not only the term “digital book” but the “codex book”, the traditional object we associate with the word “book” a metaphor as well.

There is a certain unsolved problem about the term “digital book”, that makes it useless to bring up variants of concretization of its definitions. It does not matter if one defines the digital book by how the reader accesses the information or how the product itself fits together – there will still be a question of whether interactive or non-interactive databases, e-journals (Armstrong 2002, as cited in Stephens 2009) and certain web sites should be included in to the definition.

In terms of periodicity the OEBF classification (2000) opposes e-books to e-journals, which in its turn includes e-newspapers, e-diaries, what is relatively inconsistent with the consumer perspective of these terms interrelations.

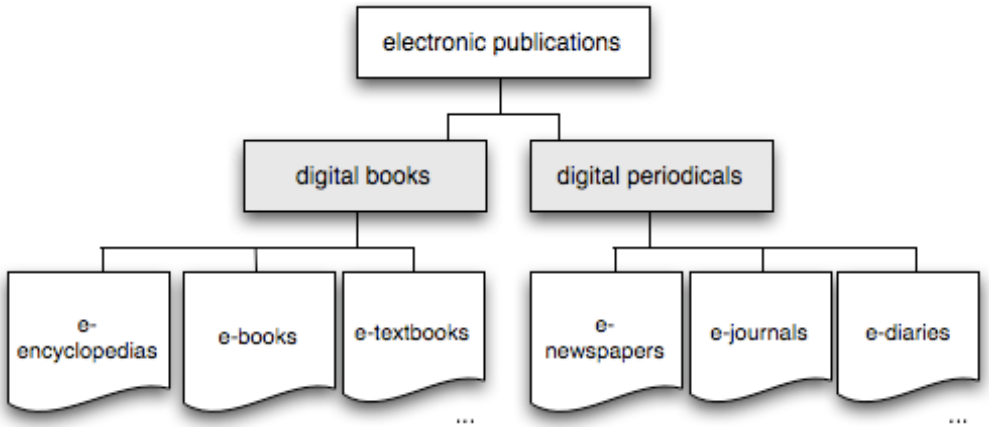
Also, though there should definitely be a distinguishing in terms between a digital book that is scanned codex book pages joined into a PDF file and a digital book that encompasses multimedia, hypertext or hypermedia systems and also the latest downloadable digital book that can be retrieved by a portable electronic reading device – they are all called e-books.

Additionally, there is the question of whether e-book is the same thing as digital book. Some argue that each expression has a different though overlapping set of associations: “there was certainly a tendency to use “ebooks” for materials available for license from external providers, and a tendency to use “digital books” for materials digitized from library collections”, says Dempsey (2009). But then others suggest that these are just librarians, who now face rapid digitalizing of libraries “trying to disassociate themselves from crass commercialism” (Jordan 2009).

We agree that the word “e-book” still carries *a commercial connotation* and may even be thought of as a fad-word, which will be dropped when electronic files are not considered so unique. And, in contrary to that, this study assumes that the key to answering whether the digital book could be a disruptive innovation - is *to abstract from the book physical form* in order to be able to formulate the essence of a book and understand what new could the digital book carry as a format.

That is why this study proposes the following classification of electronic publications:

Figure 2.6 Proposed relationship between the terms "digital books" and "e-books"



That makes the product of electronic publishing to be electronic publications (defined as in OEBF 2000), which according to the periodicity of the publication could be either a *digital book* or a *digital periodical*.

E-journal, e-newspaper and *e-diary* are given as several examples of digital periodicals that already exist on the Internet and each in its turn could be divided into subgroups by periodicity, content, multimedia possibilities, etc.

Opposed to *e-books* in the non-serial digital book category are *e-encyclopedias* (also e-dictionaries and other reference e-publications) and *e-textbooks*, which just like in traditional textbook market would not operate according to the same economic principles as a normal consumer market (dependence from Government policies).

If telling the digital book types apart according to their resemblance to the codex book and conceptual inheritance from it, this research distinguishes three major types of digital books*: digitalized books, multimedia books* and *hypertext books*.

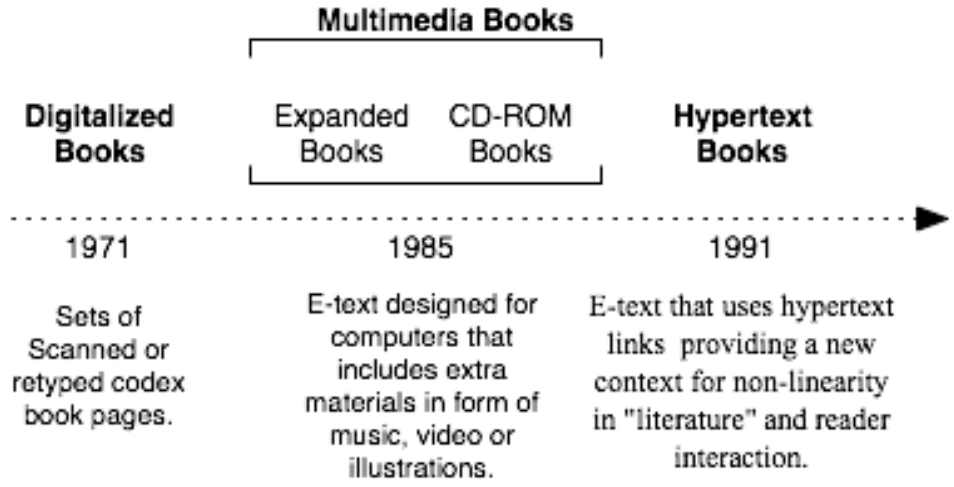
Digitalized books keep maximum resemblance with the structure of the codex book and offer little or no special possibilities that the computer system might provide to enhance reading experience. They are basically scanned pages of paper books.

Multimedia books, on the other hand, offer a range of extra material in a form of video or audio book reviews and book author's comments or relevant multimedia materials embedded in the reading process among electronic texts.

Finally, *hypertext books* that are also referred to as "interactive fiction" suggest a drastically different non-linear approach to both reading and writing books by offering major reader interaction with the content.

Hypertext fiction is a genre of electronic literature, characterized by the use of hypertext links which provides a new context for non-linearity in literature and reader interaction. The reader typically chooses links to move from one node of text to the next, and in this fashion arranges a story from a deeper pool of potential stories.

Figure 2.7 Classification of digital book types



Thus the term "*digital book*" will be later on used to describe a new format for reading that is the digital media equivalent of a conventional printed book. Moreover it will be also applied as a word to unite *digitalized, multimedia* and *hypertext* books.

"*E-book*", on the other hand, is used to refer to a product category (contrary to *e-newspapers* and *e-journals*) under the umbrella of non-periodical digital books.

Summary

The term "e-book" in current use encompasses various digital objects that resemble the "traditional" book, regardless of the presence of embedded multimedia content and the usage of digital marking languages. Ambiguous is also the differentiation of e-publications according to its periodicity and writing style.

The lack of a serious theoretical base is a result of an absence of single specified principles of E-publishing and willingness from the side of e-publishers to consider the unique innovation's possibilities and peculiarities.

A thorough review of digital book history, vast secondary data research through the Internet and official findings on E-publishing ecology published by OEBF allowed to come to the following classification:

- *E-publication is a literary work disseminated in the form of a digital object and accessed electronically via e-readers.*
- *Digital book is a non-serial e-publication.*
- *E-books is a category of non-serial e-publications that is the digital media equivalent of conventional printed trade books.*

E-publication could be read on hardware devices known as e-book (digital book) readers. Any PC, laptop, cell phone or Personal Digital Assistant (PDA) capable of displaying text on a screen is also capable of being an e-book reader.

Dedicated e-readers – are devices designed primarily for the purpose of reading e-books. Most modern dedicated e-readers use e-ink technology to display content.

In 2007 the International Digital Publishing Forum announced EPUB to be the official E-publishing standard - the first digital book format with real support from the industry. EPUB is a free and open format designed for reflowable e-publications and composed of three open standards: OPS, OPF and OCF.

2.2 Defining Disruptive Innovations

2.2.1 Innovation Theory

"*Innovation* . . . is generally understood as the successful introduction of a new thing or method . . . Innovation is the embodiment, combination, or synthesis of knowledge in original, relevant, valued new products, processes, or services". (Luecke and Katz 2003, cited in Wikipedia). *Innovating* can be described as the process of commercializing and extracting value from ideas (Lindqvist and Ghazi 2005).

Diffusion of innovations is the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers 1962).

Unlike most other theories (Rogers 1962, as cited in Robinson 2009) that assume that innovations make people change, Diffusion of Innovations approaches change as being primarily about the "reinvention" of products and behaviors so they become better fits for the needs of individuals and groups. The concept of *reinvention* suggests that no product or process will spread effectively without continuous improvement.

The theory proposes an explanation to why certain innovations spread faster, than others, naming the characteristics, which determine an innovation's rate of adoption:
relative advantage, compatibility, complexity, trialability, and observability.
In other words, the innovation that is perceived by individuals as better, than the idea it supersedes; more consistent with the existing values, past experiences and needs of potential adopters; less complex; offers higher trialability and observability will be adopted more rapidly than other innovations.

Rogers suggests that a population can be broken down into five different segments, based on their willingness to adopt a specific innovation. Each group has its own attitude toward a particular innovation:

1. *Innovators* make up 2.5% of all purchases of the product, purchase the product at the beginning of the life cycle. They are not afraid of trying new products that suit their lifestyle and will also pay a premium for that benefit.

2. *Early Adopters* make up 13.5% of purchases, they are usually opinion leaders and naturally adopt products after the innovators. This group of purchasers is crucial because adoption by them means the product becomes acceptable, spurring on later purchasers.

3. *Early Majority* make up 34% of purchases and have been spurred on by the early adopters. They wait to see if the product will be adopted by society and will purchase only when this has happened. They usually have some status in society.

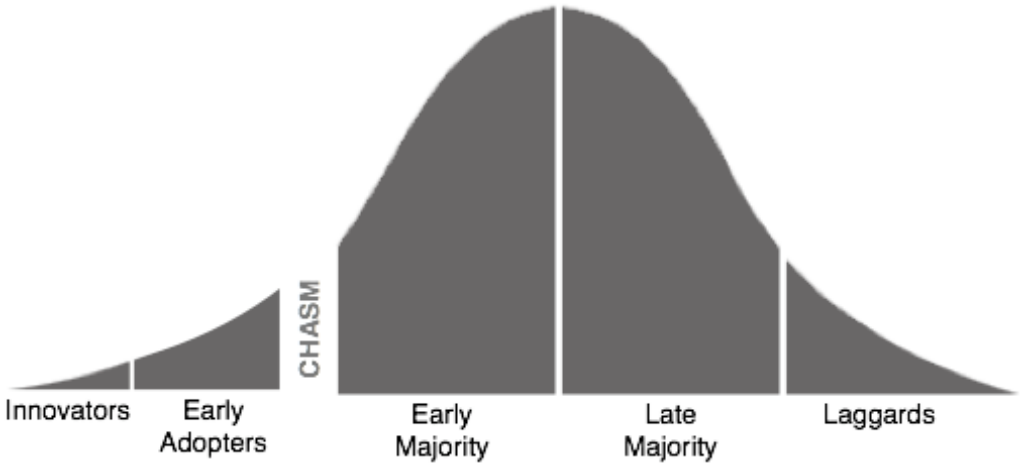
4. *Late Majority* make up another 34% of sales and usually purchase the product at the late stages of majority within the life cycle.

5. *Laggards* make up 16% of total sales and usually purchase the product near the end of its life. They wait to see if the product will get cheaper. Usually when they purchase the product a new version is already on the market.

When thinking about the groups, Rogers assumes that it is wrong to see the manager's task as to move people from one group to another. It is suggested to think of the groups as static and the innovations as those that change to meet the needs of successive segments in order to spread.

Geoffrey A. Moore in "Crossing the Chasm" (1991) argues with Everett Rogers that there is a "chasm" between the enthusiastic visionary early adopters and the pragmatic majorities. He believes visionaries and pragmatists have very different expectations and the chasm explains why many products are initially popular with early adopters but crash before reaching mass markets.

Figure 2.8 The revised technology adoption process (adopted from Moore 1991)



Moore attempts to explore those differences and suggest ways to cross the "chasm," which include *choosing a target market, understanding the whole product concept, positioning the product, building a marketing strategy, choosing the most appropriate distribution channel* and *pricing*.

2.2.2 Classification of Innovations

Since there is no single opinion on the typology of innovations, the terminology by different researches may sometimes overlap. Usually innovations are categorized by *place of occurrence* and by the *degree of novelty.*

Classification by place of occurrence – the 4Ps of innovation

Dave Francis, Ph.D. and Professor John Bessant (2005) at CENTRIM have identified four targets for innovation. The 4Ps of innovation are: *product, process, position and paradigm innovation*.

The changes are distinguished by where they take place: in the product itself, in the development, production and delivering of the product, in the context in which the product is introduced or in the underlying mental models of what the firm does.

Table 2.1 The 4Ps of innovation: examples from Publishing

Product innovation	Around 300 AD the codex (modern book format) appeared and started to replace scrolls. The format was more economical, as both sides of the writing material could be used; and it was more portable, searchable, and easier to conceal than scrolls.
Process innovation	In 1450s Johannes Gutenberg invented movable type in Europe along with innovations in casting the type based on a matrix and hand mould. This invention gradually made books less expensive to produce and more widely available.
Position innovation	The paperback revolution in the English-language book market by Penguin books in 1935. Allen Lane intended to produce cheap books ("pocket books"). He bought paperback rights from publishers, ordered huge print runs (e.g., 20,000 copies) to keep unit prices low and looked to non-traditional book-selling retail locations.
Paradigm innovation	In 1971 Michael S. Hart launched the Gutenberg Project with the digitization of the United States Declaration of Independence. Hart believed that computers would one day be accessible to the general public and decided to make works of literature available in electronic form for free.

Classification by degree of novelty – Incremental and Radical

Most common is the classification of innovations to incremental and radical. They are also referred to as evolutionary and revolutionary innovations (Christensen 2003).

Table 2.2 Comparison of incremental and radical innovations (adopted from Scocco 2006)

	Incremental innovations	**Radical innovations**
Resources in the bases	Build upon existing knowledge and resources within a certain company (competence-enhancing)	Require completely new knowledge and/or resources (competence-destroying)
Technological changes	Exploit existing technologies	Involve large technological advancements
Impact upon the competitiveness	The market remains competitive	Render the existing products non-competitive and obsolete
Example	Intel's Pentium IV/ Intel's Pentium III	Digital photography / instant photography

Porter has illustrated a similar concept called *continuous* and *discontinuous* technological changes, which are often used as synonyms for incremental and radical innovations (1996). Tushman and Anderson (1986) defined *incremental* opposed to *breakthrough* innovations. Though trying to highlight the same thing, it must be mentioned that different authors had slightly different perceptions and definitions of the required degree of novelty for radical innovations (Lindqvist and Ghazi 2005).

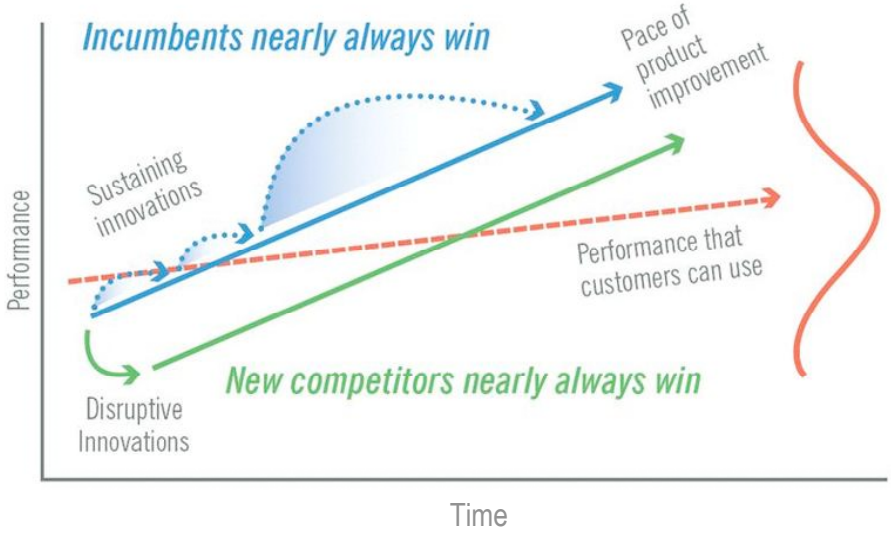
Within industries both incremental and radical innovations take place and go hand in hand. The incremental innovations are more frequent, but sometimes they are followed by a radical innovation (Lindqvist and Ghazi 2005). The Incremental-radical dichotomy helps to explain some innovation patterns, but practice shows that the model is a not a most reliable one. Many cases exist, where new entrants managed to displace incumbents with incremental innovations and other cases where incumbents kept their leadership exploiting a radical innovation. One can look for instance at the computer industry, where IBM was able to maintain its dominant position, when there was a shift from vacuum tubes to integrated circuits – a radical innovation (Scocco 2006).

2.2.3 Disruptive Innovations

The concept of disruptive technology aims at identifying radical technical change in the study of innovation by economists, and developing tools for its management. The term disruptive technology was first introduced by Clayton M. Christensen together with Joseph Bower in their 1995 article "Disruptive Technologies: Catching the Wave" and described further in "The Innovator's Dilemma" (Christensen 2003), "The Innovators Solution" (Christensen and Raynor 2003), "Seeing What's Next" (Christensen, Anthony and Roth 2004) and other works.

Under the disruptive innovation framework Christensen differentiates sustaining innovations and disruptive innovations based on technological performance and market segmentation. *Sustaining innovation* – is an innovation, developed to help the company's growth in the existing or established market place to ensure market growth and domination. Sustaining innovations "tend to maintain a rate of improvement; that is, they give customers something more or better in the attributes they already value" (Bower and Christensen 1995, p.45).

Figure 2.9 Disruptive innovations (Raynor and Christensen 2003)



Disruptive innovation could be defined as an innovation that changes the bases of competition by changing the performance metrics along which firms compete (Danneels 2004). Disruptive innovations "introduce a very different package of attributes from the one mainstream customers historically value and they often perform far worse along one or two dimensions that are particularly important to those customers. As a rule, mainstream customers are unwilling to use a disruptive product in applications they know and understand" (Bower and Christensen 1995, p.45).

Disruptive innovations can be of radical or breakthrough nature, but they do not have to be. The disruptive innovation when introduced typically underperforms with regard to the established products that are most appreciated by the mainstream customers. But since these technologies are usually cheaper, simpler and frequently more convenient in usage, the new product is created at the low-end or entrepreneurial firms may open up a new market and perform better there. Then over time the disruptive innovation improves toward meeting the performance requirement of mainstream customers that initially ignored it.
As soon as the mainstream customers switch from the existing products, such innovation would disrupt the established players and create a new dominant design.

According to Christensen (2003) sustaining innovations are usually taken to market by the market leader, which therefore strengthen its position, while disruptive innovations are introduced by newcomers, which threaten the position of the established firm and lead to its failure.

Most other definitions of innovations deal with the product itself and not with the market to which it is supplied, while for disruptive/sustaining innovations the focus is on how the changes to the product or service affect it's performance (i.e. whether the change introduces a new performance dimension or if it lowers the cost of the product) and on the effect on the market, giving no matter to what the actual change is (Lindqvist and Ghazi 2005).

The initial work that presented the theory received large popularity among managers listed by Harvard Business School Publishing as one of the most popular articles for executive education (Druehl and Schmidt 2008). Christensen's message was that it is critical for managers to focus on creating a disruptive innovation when thinking of the firms long-term prospective and be able to recognize a disruptive innovation from a sustaining when they see one in order not to underestimate the risks and opportunities for their organization.

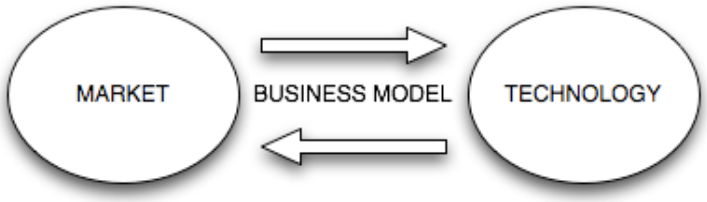
2.2.4 Sources of Disruptive Innovations

The signals for a disruptive opportunity can come from three main sources: *market, technology* and *business model* (Lindqvist and Ghazi 2005).

1. The most important source for disruptive opportunities is the market. Unmet marketplace needs and an underserved market with willing early adopters are the catalysts and sometimes the requirements for most disruptive innovations.
2. A new technology, or an existing technology used by another industry, can provide innovative opportunities and become the innovation engine of the disruption.
3. New business models are required to bridge the technology and the market, when current or conventional business model cannot fully exploit the value of new opportunities.

Xerox's copy machines are an example, where the business model had been the source of a new opportunity. Xerox's new generation copy machine had useful features and better performance than those popular in the market, but companies were reluctant to shift to the more expensive new Xerox model. Then Xerox offered the ability to lease its new copy machines, which lowered the investment costs and the risks for the potential customers and helped to rapidly diffuse the product into the market.

Figure 2.10 Sources of innovation (adopted from Lindqvist and Ghazi 2005)



Govindarajan and Gupta (2001 cited in Lindqvist and Ghazi 2005) have identified three areas where the business model can be reinvented in order to disrupt the market:

- Dramatic redesign of the end-to-end value chain architecture;
- Transformation of the value customers receive by providing a comprehensive customer solution; and
- Redefinition of the customer base by serving previously hidden customer segments.

Off course, sometimes a successful innovation is the result of a good combination of all three sources. It means that an opportunity provided by a new technology may not bring significant value unless a relevant market segment is identified for it, and it is implemented based on an appropriate business model (Lindqvist and Ghazi 2005).

Amazon is mentioned as an example of such case. Exploiting the *technological opportunity* Amazon uses the Internet to enable customers to conveniently buy books at a lower price (*market opportunity*), with a *new business model* of distribution to the customer's home in a lower price compared to bookshops.

From the innovation sources named, a new business model or a new technology are the actual innovations, while the third one, the market, is where the need for the new innovation can be found. However, only by knowing what the sources of innovation are it is impossible to identify the disruptive idea (Lindqvist and Ghazi 2005).

2.2.5 Classification of Disruptive Innovations

To successfully disrupt the market the value delivered by the innovation should be higher than the value delivered by existing products and services (Lindqvist and Ghazi 2005). Disruptive innovations introduce a new value preposition as they either create new markets or reshape existing markets and are distinguished as "low-end" or "new-market" disruptive innovations (Bower and Christensen 1995).

The *new-market disruptive innovation* usually brings consumption to "non-consumers" by targeting new consumers and proposing new contexts of use. These innovations usually offer good enough performance for a lower price (e-mail vs. postal service, mobile phones vs. fixed phones).

The *low-end disruptive innovation* can occur when existing products or services are "too good" and hence overpriced relative to the value existing customers can use. (Dell computers, Ryan Air, discount stores).

The definition of a disruptive innovation by Lindqvist and Ghazi (2005) includes that differentiation, emphasizing the new value proposition as a feature of disruptiveness:

Disruptive innovation is an innovation in the technology, or in the business model that increases customer perceived value in at least one of the following ways:

1. By introducing a new performance dimension to the product and therefore creating a new market among non-consumers.
2. By providing a less expensive solution – often in trade off for reduced performance – targeting customers who do not value the extra features/high performance of the existing product or simply cannot afford it.

2.2.6 Detached and Fringe New-Market Disruptive Innovations

In a recent article Glen M. Schmidt and Cheryl T. Druehl (2008) argue that not every innovation that dramatically disrupts the current market is necessarily a disruptive innovation as Clayton Christensen defines this term.

Focusing on the diffusion pattern of the new product they offer a complementary terminology to Christensen's work. Illustrating their idea by using the encroachment framework, they show that low price is not really a constant indicator of a disruptive innovation, naming cell phones and digital cameras as examples, but *low-end encroachment* is.

Low-end and high-end encroachment

Low-end encroachment takes place when the new product first displaces the old one in the low end of the old product market and then diffuses upward.

High-end encroachment takes place when the new product first displaces the old product at the high end, followed later by diffusion down toward the low end. The low-end customers are the last to adopt the new product.

In case, when the entrant introduces a new product that encroaches from the *high end*, the incumbent tends to defend it's market quickly and vigorously, because the incumbent is losing its best customers (those with highest willingness to pay). Thus, the incumbent may be more likely to introduce its own new product to encroach from the high end, even if it means cannibalizing its own product as Intel does with a new generation of microprocessor.

Glen M. Schmidt and Cheryl T. Druehl (2008) clame that though some innovations tend to look disruptive, if that new product first encroaches on the high end of the existing market diffusing downwards and the impact on the current market is immediate and striking – it is a mere indicator of a sustaining innovation that had just cannibalized another sustaining innovation that was before it.

It is said that both new-market and low-end disruptions result in low-end encroachment diffusion process. The only difference is whether the encroachment starts immediately (as in the case of a low-end disruption) or after the new product has opened up a new market and subsequently improved enough to become attractive to the low-end customers of the older product (as in the case of a new-market disruption).

Table 2.3 Mapping of the type of innovation to the type of diffusion (Druehl and Schmidt 2008)

Type of Innovation	Type of Diffusion to which It Maps	Description
Sustaining Innovation	High-end encroachment	The new product first encroaches on the high end of the existing market and then diffuses downward.
Disruptive Innovation	Low-end encroachment	The new product first encroaches on the low end of the existing market and then diffuses upward. Low-end encroachment begins immediately upon introduction of the new product.
New-Market Disruption	Fringe-market low-end encroachment	Before encroachment begins, the new product opens up a fringe market (where customer needs are incrementally different from those of current low-end customers).
	Detached-market low-end encroachment	Before encroachment begins, the new product opens up a detached market (where customer needs are dramatically different from those of current low-end customers).

Classification of new-market disruptive innovations

Christensen in his original work (2003) mentioned that a product can sometimes take sales away from the old product (encroach) from the low end even if it starts up as expensive (cell phones relative to land line). Back then he called those situations as exceptions from the rule.

Nicholas Carr (2005) as well spoke of such disruptive innovations that outperform existing products, when they are introduced and sell for a premium price, rather than at a discount (CD relative to vinyl disk). These innovations are typically very costly to produce. The new expensive product is first purchased only by a small group of "power users", who is able to justify their purchase. To be able to reach a mass market, these disruptions are dependent on economies of scale to lower the production costs and the prices. As suppliers get experience and scale and the prices of underling technologies drop, the production costs tend to go down. Meanwhile, the broader market becomes aware of the benefits of the new product and increasingly open to embracing it.

Cheryl T. Druehl and Glen M. Schmidt (2008) managed to explain this phenomenon by distinguishing two ways of new-market disruption.

In the case that was spoken about above before encroachment began, the new products opened up a *detached market*, where customer needs were dramatically different from

those of current low-end customers (cell phone relative to land line, FedEx relative to U.S. Postal service). “Preferences in this new market are so divergent (detached) from the current market that reducing the price of the current product a bit would not have enticed the detached market to buy it” (p.350).

Alternately, a disruptive innovation can opens up a new market on *the fringe of the old market*. “A new market is defined to be on the fringe of the old market if buyers in this new market would have bought the current (old) product if only the old product were a little less expensive. In other words, the preferences of the new fringe market are only incrementally different from those on the low end of the current market” (p.351).

Druehl and Schmidt (2008) stress that the point is not that high-end encroachment is necessarily a bad strategy and low-end encroachment a good strategy, but rather that both incumbents and entrants must be aware of and make use of the strategy that offer maximum benefit.

Summary

Innovation is the introduction of a new idea into a marketplace in a form of a new product or service, an improvement in organization or process or a sufficient change of product or business positioning.

Innovations are often categorized by the degree of novelty:

- *Incremental innovations build upon existing knowledge and usually don’t have a drastic effect on the competitive market.*
- *Radical innovations, on the other hand, require completely new knowledge or resources from an entrant, involve large technological advancements and eventually render the existing products non-competitive and obsolete.*

Yet practice shows that this model is not a most reliable one.

Christensen differentiates sustaining innovations and disruptive innovations based instead on market performance:

- *Sustaining innovations give customers something more or better in the attributes they already value. They are usually taken to market by the market leader to strengthen his position.*

- *Disruptive innovation could be defined as an innovation that changes the bases of competition by changing the performance metrics along which firms compete (Danneels 2004). They are introduced by newcomers, which threaten the position of the established firm and lead to its failure.*

The disruptive innovation when introduced typically underperforms with regard to the established products, but since these technologies are usually cheaper, simpler and frequently more convenient in usage, over time the mainstream customers switch from the existing products and the innovation creates a new dominant design (Bower and Christensen 1995).

Disruptive innovations introduce a new value preposition as they either create new markets by introducing a new performance dimension or reshape existing markets by offering a trade-of between performance and cost. They are accordingly distinguished as "new-market" and "low-end" disruptive innovations.

The example of cell phones and digital cameras shows that disruptive innovations can take sales away from the old product from the low end even if they start up as expensive. Referred to as detached new-market disruptive innovations, they often depend on economics-of-scale and open a detached new market, where consumer needs are different (Druehl and Schmidt 2008).

Opposed to detached new-market disruptive innovations are fringe new-market disruptive innovations, where new market's needs are only incrementally different from those on the low end of the current market (Druehl and Schmidt 2008).

Table 2.4 Classification of innovations

<table>
<tr><td colspan="6">Classification by:</td></tr>
<tr><td>Place of occurrence</td><td>Product Innovation</td><td>Process Innovation</td><td>Position Innovation</td><td>Paradigm Innovation</td><td>(Francis& Bessant 2005)</td></tr>
<tr><td rowspan="4">Degree of novelty</td><td colspan="2">Incremental Inn.</td><td colspan="2">Radical Inn.</td><td></td></tr>
<tr><td colspan="2">Evolutionary Inn.</td><td colspan="2">Revolutionary Inn.</td><td>(Christensen 2003)</td></tr>
<tr><td colspan="2">Incremental Inn.</td><td colspan="2">Breakthrough Inn.</td><td>(Tushman&Anderson 1986)</td></tr>
<tr><td colspan="2">Continuous Inn.</td><td colspan="2">Discontinuous Inn.</td><td>(Porter 1996)</td></tr>
<tr><td rowspan="3">Performance in the market</td><td>Sustaining Innovation</td><td colspan="4">Disruptive Innovation (Bower and Christensen 1995)</td></tr>
<tr><td rowspan="2"></td><td colspan="2">Low-end disruptive Inn.</td><td colspan="2">New-market disruptive Innovation</td></tr>
<tr><td colspan="2"></td><td>Fringe new-market Innovation</td><td>Detached new-market Innovation</td></tr>
</table>

2.3 Evaluating Disruptiveness

From the literature analysis it is possible to say that for the digital book to be able to enter and overturn the publishing market, the following conditions must be satisfied:

- *There must be market segments suitable for disruption.*

Usually disruptive innovations emerge from market segments that are different from traditional and mainstream market customers may not be interested in the new idea (Christensen 2003).

- *The disruptive innovation must be able to be deployed in a way that meets the disruptable market segment.*

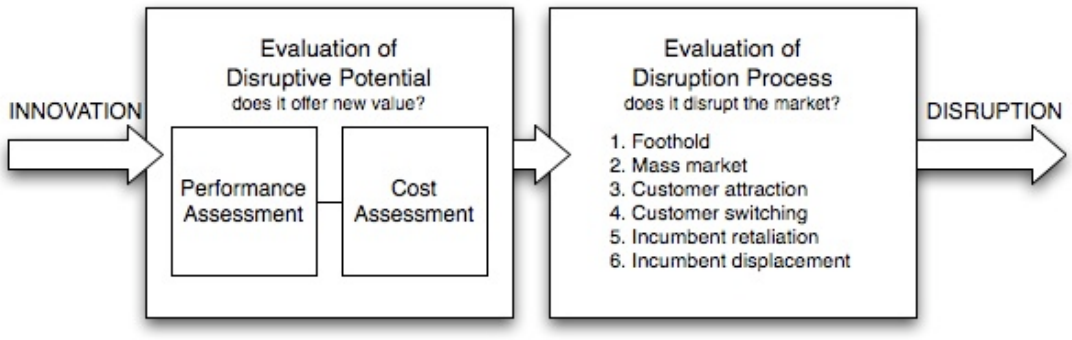
Depending on the customers it targets, the innovation needs different characteristics (Anthony et al 2004, cited in Lindqvist and Ghazi 2005). But no matter who are the customers, the innovation has to deliver value to them (Lindqvist and Ghazi 2005).

Yet Christensen does not establish exact criteria for determining whether or not a given innovation is considered a "disruptive innovation" and the question of whether an innovation is disruptive only once it displaces incumbents that built their business on the prior technology or business model still stays open.

Here this study agrees with Lindqvist and Ghazi (2005), who generalize that the disruptiveness of an innovation depends both on it's *disruptive potential*, which is an intrinsic quality and on the actual capabilities and choices the firm and its competitors make – the *disruption process of that innovation*.

In this section we suggest a framework for identifying the disruptiveness of an idea.

Figure 2.11 The evaluation of the disruptiveness of an innovation



2.3.1 How Can We Identify Disruptive Potential?

Since it is impossible ex ante to determine a disruptive technology, only it's disruptive potential can be evaluated. Studies of disruptive potential concentrate on the ex ante approach in an attempt to provide a scenario of future development of the innovation (Puumalainen and Sainio 2007).

The innovation's ability to disrupt a chosen market is it's *disruptive potential*.

For the digital book to have disruptive potential, there must be an underserved market with willing early adopters and for that to happen the value delivered by the digital book should be perceived higher, than the value delivered by existing competitors' products. According to the disruptive innovation definition, this could be established either by *offering brand new performance dimension* or *a reduced traditional performance for a more attractable price*.

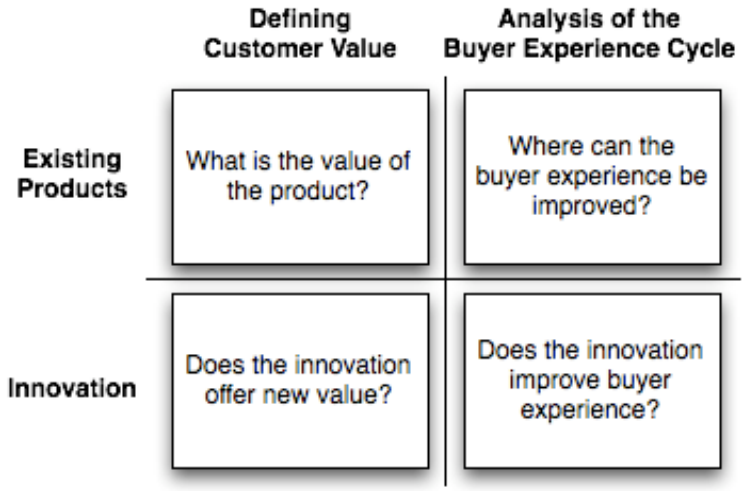
Thus the value delivered by the digital book needs to be evaluated in two ways:

1. The performance of the digital book is investigated.
2. The cost of the digital book is compared with that of existing products.

Performance assessment

This assessment aims at investigating what performance-related benefits the digital book has to offer. Disruptive innovations change the bases of competition because they introduce a dimension of performance along which products did not compete previously (Danneels 2004). These new dimensions of performance would attract the market segments from where the digital book will start disrupting the publishing market.

Figure 2.12 The performance assessment



1. Traditional performance assessment

By identifying what for the customer will actually value the product the foothold for the innovation can be identified (Christensen 2003).

Sheth, Newman and Gross (1991) in the theory of Consumption Values and Market Choices argue that they have identified five values that drive all market choice. These five values — *functional value, social value, emotional value, epistemic value, and conditional value* — are categorized in order to distinguish between the functional dimensions and socio-psychological dimensions of value.

- *Functional value* could be defined as the perceived utility acquired from a product's capacity for functional, utilitarian or physical performance (Sheth, Newman and Gross 1991, p.161).
- *Emotional Value* is the perceived utility acquired from the ability of the product or service to arouse feelings or affective states (p.161).
- *Social Value* is the perceived utility acquired from product's association with one or more specific social groups (p.161).
- *Epistemic Value* is the perceived utility acquired from the product's ability to arouse curiosity, provide novelty and/or satisfy a desire for knowledge (p.162).
- *Conditional* Value could be defined as the perceived utility acquired by the presence of extreme physical or social situations when the customer choice is made, in which the functional or social value of the good is emphasized (p.162).

Any or all of the five consumption values, depending on the situation, may influence a consumption experience. Yet the market choice is a function of multiple consumption values and these consumption values are independent and make differential contributions in any given choice situation (Sheth Newman and Gross 1991).

Since customer value is measured, a qualitative research design is considered the most appropriate given the nature of the information that is desired (Woodruff and Gardial 1996). It is important that all of the possible value types are taken into consideration.

As it is evident what is that the reader expects to receive and values in reading books, it becomes possible to say whether the digital book is inferior in terms of traditional value offering and if it actually offers anything new. If it turns out that it is inferior in terms of traditional performance, but offers valued performance of a new dimension, underserved customers and former non-consumers are likely to form a new market for the digital book.

2. Analysis of the buyer experience cycle

Once it is known what readers value, the next step is to investigate where and how they receive that value.

According to the buyer experience cycle model, a customer's experience when buying a product is not only the result of using the product – there are normally five other stages: *purchase, delivery, supplements, maintenance and disposal* (Kim and Mauborgne 2000). Each stage encompasses a wide variety of specific experiences.

In order to understand if the proposed innovation exploits the potential for performance improvement in the different stages, the appropriate questions should be answered (Kim and Mauborgne 2000).

1. **Purchase** – how easy it is to find the needed book, how attractive and accessible is the store, what is the level of comfort and speed of making the purchase.
2. **Delivery** – how fast and convenient is book delivery.
3. **Use** – what training or expert assistance is required while using a book, how effective are the product's features and functions.
4. **Supplements** – what are other accessories that need to be used with the book.
5. **Maintenance** – how easy it is to maintain books.
6. **Disposal** – whether the use of the product creates waste items and how easy it ease to dispose of a book.

Figure 2.13 Buyer experience cycle (adopted from Kim and Mauborgne 2000)

There are six different ways for innovating and creating value in these stages, which are defined by levers of utility (Kim and Mauborgne 2000). Those are the ways in which companies unlock utility for their customers.

1. **Customer productivity** – the innovation helps customers do things better, faster or in a different way.
2. **Simplicity** – the innovation offers enhanced ease-of-use.
3. **Convenience** – the innovation makes a desired activity easier to perform.
4. **Risks** – the innovation minimizes customers' financial or physical risks.
5. **Fun and image** – the innovation delights customers.

6. **Environment friendliness** – the innovation facilitates recycling and other environmentally sensitive practices.

The benefits and drawbacks of the digital book can be evaluated by using the utility map (Kim and Mauborgne 2000).

Figure 2.14 The utility map (adopted from Kim and Mauborgne 2000)

	Purchase	Delivery	Use	Supplements	Maintenance	Disposal
Customer Productivity						
Simplicity						
Convenience						
Risk						
Fun and Image						
Environmental Friendliness						

Filling in an innovation utility map makes it possible to observe what utility levers the digital book involves in and if it actually improves buyer experience. An innovation has the potential to become a new-market innovation if it introduces a new benefit in the same stage of buyer experience cycle or introduces a new benefit in a new stage.

Product value determinants that should have been discovered beforehand through the pilot testing are to be used in a quantitative research aimed at measuring the level of reader dissatisfaction with the attributes of the current product. A high level of dissatisfaction in a buyer experience cycle stage would indicate where there is currently a room for innovations. Thus filling the utility map would show whether the innovation improves experience that needs to be improved or, in merely overserves the customers.

Yet it is important to know innovations in which experience stage the buyer will value more, since it is clear that in different cases different stages might be of greater importance than others. So by additionally measuring the perceived importance of each stage it would be possible to say innovation is which stage would lead to a more efficient increase in perceived value.

3. Studying perceived importance of new utility

A new utility only increases value if the customer appreciates this utility. So in order to measure the value contribution more correctly it is necessary to estimate the need in innovations in each buyer experience stage by:

1. Estimating reader dissatisfaction with factors that affect utility in each stage.
2. Measuring the relative perceived importance of each stage to the reader.
3. Finding out an increase of what utility is likely to generate the most value.

Bower and Christensen (1996) pointed out that established firms are held captive by their customers and therefore miss the disruptive technologies. Danneels (2004) interprets Christensen's findings saying that this happens because those firms are focused narrowly on serving current customers and should not allocate all their resources to serving just them.

Since the focus of disruptive innovations is on non-consumers and less active consumers in the low end of the market and the studied object does not feat to traditional performance expectations, estimating customers' willingness to go for an innovation is a challenge.

This study proposes to try to feel for a need for an innovation in the market by measuring the level of reader dissatisfaction with the attributes of the current product. From changing the question from "where the buyer experience can be improved?" to "where *it needs* to be improved?" it would be possible to say innovation is which stage would lead to a more efficient increase in perceived value.

That way a single utility improvement that the customer perceives as important would lead to a more efficient increase in a new product's value than multiple improvements in utility that is valued less.

If it turns out that the innovation drastically improves utility that is most valued and used, underserved consumers and former non-consumers are likely to form a new market for the innovation.

In a situation where there are no unsatisfied needs, which the innovation could focus on to stimulate a new market isolation and if the innovation only offers new utility levers, that are not really valued or used, there is a small chance for the innovation to disrupt the market. In that case we say that the innovation has no disruptive potential.

Cost assessment

A customer perceived cost of a product is decreased either by reducing the price of the product via innovations in the industry supply chain or by reducing the customer cost of using the product via offering enhanced simplicity, convenience, productivity, smaller risks, etc. The second case is equivalent to innovation's proposing of a new utility lever and thus is instead reviewed in the context of performance assessment.

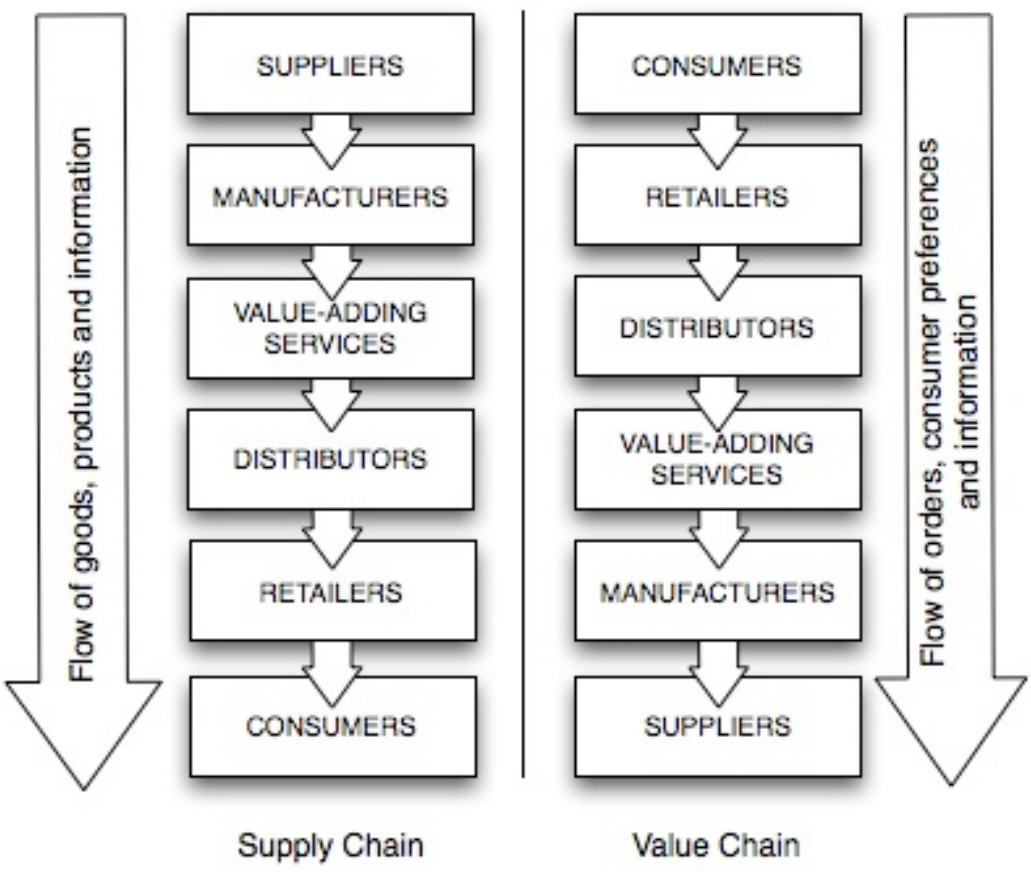
Value has also a meaning in the context of trading relationships. Since value is derived from customer needs, those activities that do not contribute to meeting these needs are "non-value-added" waste, or "muda" in the language of lean thinking (Feller, Shunk and Callarman 2006). By streamlining the processes that generate the goods and services that customers value, fewer resources need to be expended, and thus the margin between customer value and the cost of delivery increases, providing opportunities for price reduction (Feller, Shunk and Callarman 2006).
Our focus in this section is to understand how the various participants in publishing industry's supply chain add value and affect the final price of the product.

Supply chain is a term "now commonly used internationally – to encompass every effort involved in producing and delivering a final product or service, from the supplier's supplier to the customer's customer" (Supply-Chain Council 2005). The primary focus in supply chains is on the costs and efficiencies of supply, and the flow of materials from their various sources to their final destinations (Feller, Shunk and Callarman 2006). Efficient supply chains reduce costs.

Each member in the supply chain receives "input" from the previous member, "adds value" to this input through its internal activities/processes and passes on the "output" to the next member in the chain (Feller, Shunk and Callarman 2006). This process is often depicted via value chains.

Value chains link raw material suppliers, manufacturers to distribution channels and end customers by defining the locus of value creating process. They generally include three or more of the following actors: producers, processors, distributors, wholesalers, retailers and consumers, who work together to identify objectives, share risks and benefits and invest time, energy and resources to make the relationship work (Powazek).

Figure 2.15 Typical supply chain/ value chain



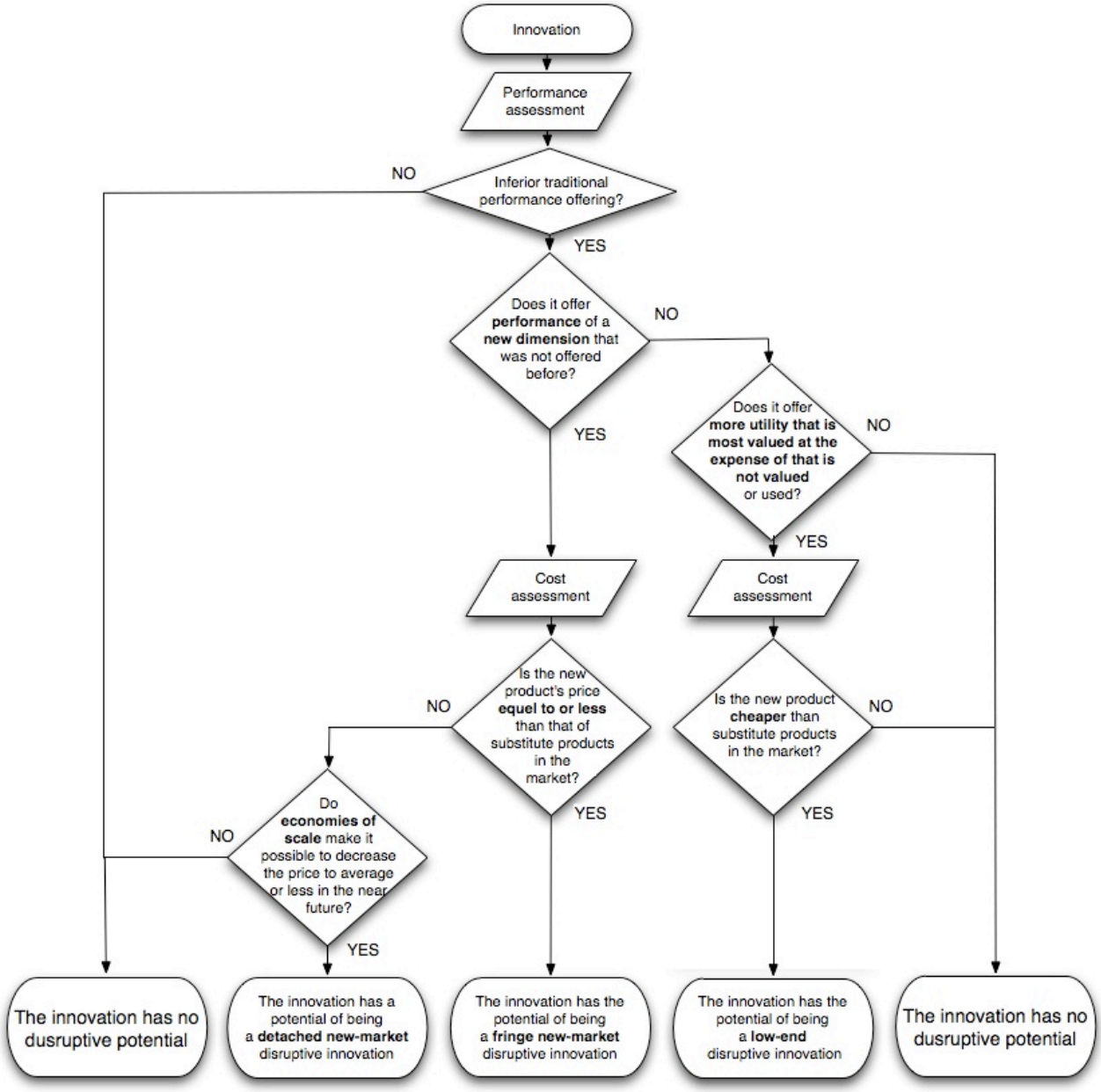
A consideration of the tasks and functions that occur in the Publishing industry is needed to uncover whether digital book reduces or eliminates considerable muda via process improvement activities. This could be done by:

1. Defining the value contributions of the actors of a value chain before and after the potentially disruptive innovation.
2. Finding the changes in value contribution in the trading process.
3. Finding how the value offerings in a value chain affect the price of a book.

While a sustaining innovation improves or maintains profit margins by exploiting existing processes, disruptive innovations often involve changing the business model (Lindqvist and Ghazi 2005). *Low-end disruptive innovations* require a new financial or operational model that would help earn attractive returns at low prices and *new-market disruptive innovations* are built on new business models often with lower price points, new revenue model and new distribution channels.

Figure 2.16 illustrates the graphical representation for evaluating the disruptive potential of an innovation, based on the definitions, classifications and analysis logic described above.

Figure 2.16 Evaluating disruptive potential



2.3.2 Disruption Process Analysis

Even though the digital book might prove to posses a disruptive potential, the actual capabilities and the choices of the firm and its competitors are what defines the market success of the disruptive innovation (Lindqvist and Ghazi 2005). To be successful with launching a disruptive innovation the entrant needs to be able to complete a successful market entry and to outcompete the competitors (Rafi and Kampas 2002, cited in Lindqvist and Ghazi 2005).

Table 2.5 Forces affecting each step in the process of disruption (Rafi and Kampas 2002, cited in Lindqvist and Ghazi 2005)

Stage	Forces enabling disruption	Forces disabling disruption
Foothold market entry	Attractive foothold market(s)	Unattractive foothold market(s)
Main market entry	Low barriers to entry	High barriers to entry
Customer attraction	High value added	Low value added
Customer switching	Low cost of switching	High cost of switching
Incumbent retaliation	High barriers to retaliation	Low barriers to retaliation
Incumbent displacement	High revenue displacement	Low revenue displacement

A disruption of a market can be divided into six stages (Rafi and Kampas 2002, cited in Lindqvist and Ghazi 2005):

1. The insurgent enters a foothold market.

The entrant steps in to the market through underserved low-end segments that could have been previously considered unprofitable. Else, the innovation opens a fringe or a detached new market, which could have very similar or rather differing consumer needs.

2. The insurgent enters the main market.

Protected with patents the entrant tries to access suppliers and distribution channels that would allow him to penetrate the mass market.

3. The insurgent begins attracting customers.

The entrant starts improving the traditional performance characteristics of the product

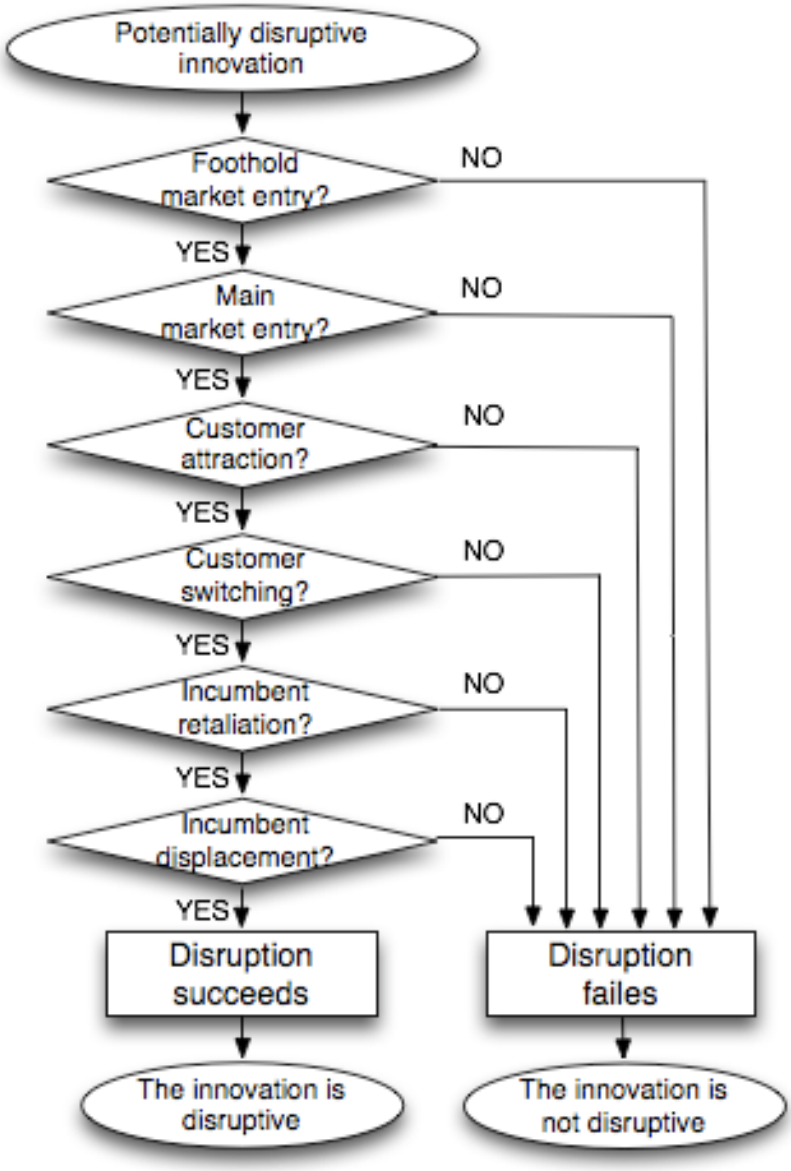
(price, openness, standards, ease of installation and use, reliability, downtime, support complexity, availability etc.), making it suitable for the mass market to adopt.

4. The customers begin changing suppliers (if the switching costs are low enough).

5. The established firm will retaliate.

6. The established firm's product is displaced.

Figure 2.17 Evaluating the disruption process (adopted from Rafi and Kampas 2002)

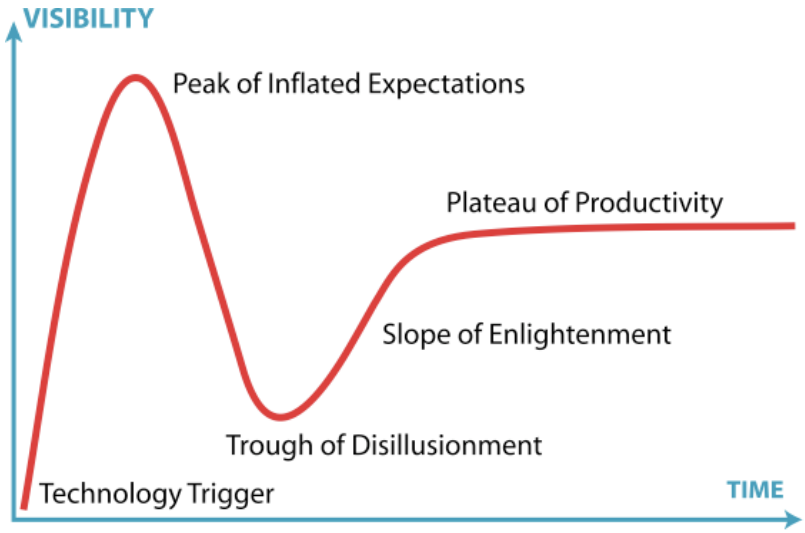


The tool proposed by Rafi and Kampas uses the results from the disruptive potential evaluation as an input, but also considers barriers of entry to the mass market, switching costs for the customers, and the barriers of retaliation for the established competitor.

In case the study is not ex post and the disruption has not happened yet, the innovation may not have reached the next disruption stage at the time, when the research is processing. Then the work would require a forecast that would provide a cross-industry perspective on the technologies and trends.

The hype cycle can be used to describe the introduction of new technology into the market place. Industry research firm Gartner Group use a graph to try to represent the maturity, adoption and business application of specific technologies. They show how *and when* technologies move beyond the hype, offer practical benefits and become widely accepted (Wikipedia).

Figure 2.18 Graphical representation of Gartner's hype cycle (Wikipedia)



As new technologies emerge they start on the left hand side of the graph and typically travel from left to right (Carpenter 2009):

1. "Technology Trigger"

In the first phase the product launch or other event that generates significant press and interest.

2. "Peak of Inflated Expectations"

Then, a frenzy of publicity typically generates over-enthusiasm and unrealistic expectations. There may be some successful applications of a technology, but there are typically more failures.

3. "Trough of Disillusionment"

In the next phase, technologies enter the "trough of disillusionment" because they fail to meet expectations and quickly become unfashionable. Consequently, the press usually abandons the topic and the technology.

4. "Slope of Enlightenment"

Although the press may have stopped covering the technology, some businesses continue through the "slope of enlightenment" and experiment to understand the benefits and practical application of the technology.

5. "Plateau of Productivity"

A technology reaches the "plateau of productivity" as the benefits of it become widely demonstrated and accepted. The technology becomes increasingly stable and evolves in second and third generations. The final height of the plateau varies according to whether the technology is broadly applicable or benefits only a niche market.

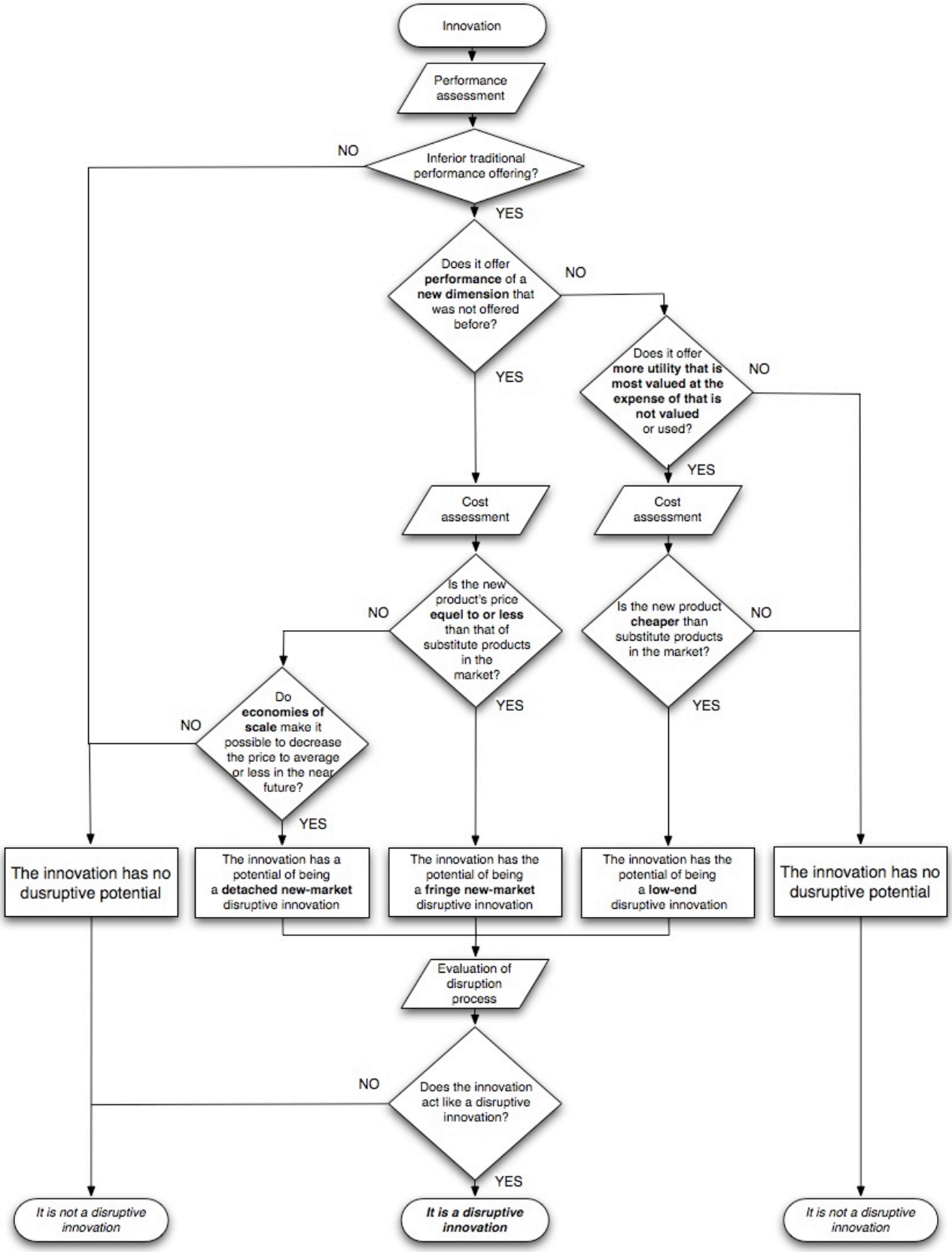
Several additional things to remember about the hype cycle are (Murphy 2005):

1. Not everything travels the full cycle; some new technologies simply reach their peak and then disappear without trace;
2. The cycle is not sequential - some new technologies move along the cycle faster than others;
3. Some technologies may remain at a given level forever.

If the analysis of the disruption process of the potentially disruptive innovation shows negative results, that would mean that the disruptive potential was probably estimated wrong, or some new previously unknown factors had appeared in the market, that require reevaluation.

The other possibility is that the innovation have met unexpected or underestimated barriers in the disruption process and no matter if the new product offered supreme value, the wrong strategy or a badly executed marketing campaign did not allow the innovation to reach the consumer and hence the disruption process have not been accomplished.

Figure 2.19 Graphical representation of the analytical framework



3 Empirical Findings and Discussion

In this chapter, the empirical findings based on the analytical framework are introduced. These findings include an evaluation of the disruptiveness of the digital book in the book publishing market.

3.1 Performance Assessment

The performance assessment aims at investigating what performance-related benefits the digital book has to offer. New performance dimensions suggested by the new book format may attract former non-consumers and facilitate the formation of a new market. The offering of a better price for the cost of inferior performance, on the other hand, if reconsidered so to best satisfy the needs of an existing reader, may attract a low-end segment from where the digital book would start disrupting the market.

First the reader perceived value of the book is determined: what types they are, at what stages of consumption each value is accumulated and what are some of the peculiarities of the consumer perceived value when it comes to books. A qualitative research conducted from 30 respondents, who are book consumers is made to support these findings.

Then, a formulation of new market needs is presented and the digital book is reviewed in terms of capability to satisfy these needs.

Then based on a quantitative research of 100 book consumers the dissatisfaction with different product performances in each reader experience stage is measured and a utility map summarizes whether digital books improve reader experience in a way that could be valued by the market.

3.1.1 Traditional Performance Assessment

According to the Sheth-Newman-Gross model of consumer behavior (1991), there are five components of consumer values that drive choice and are of significant strategic value: *functional, emotional, social, epistemic, and conditional*.

I. **The functional value** of a book refers to the book's information media capabilities. The more readable and preservable the book is, the higher it's functional value is.

Readability of a book depends on print and paper quality: the pages' background should contrast the text and the printed text and pictures are to be sharp. In poor quality print the paper is gray and transparent showing through text from the back of the page and the text and pictures are blurry, causing tension to the eyes, when read.

Preservability of a book depends from the time and frequency of using the book: as the book grows older, the easier it gets to accidentally tear a page and the more dirt and stains the book gathers if often used, making rereading the text more difficult.

II. **The emotional value** of a book is the value that is created through associating the book with special feelings and memories. The higher is the book's capability to arouse feelings and affective reactions in the reader, the higher the emotional value of the book is.

III. **The social value of** a book is the perceived association of a book with a certain social group or groups. Books generate social value when they are associated with positive or negative stereotypes of demographic (age, sex, religion), socioeconomic (income, occupation), cultural/ethnic (race, lifestyle), or political, ideological segments of society.

When the information about books one reads and have read is available for others to see, allowing to associate the reader with a certain social group, the book could be said to generate social value. This happens when, for instance, a reader puts a list of his favorite authors and titles on his web profile of a social network or even just by reading a book in a place where others can identify the title or genre of the book, or also the mere fact of a book being read.

This also works the other way around, when not the associated social community is aware of the reader, but the reader is aware of that community. In this case the reader relating himself to this community via reading generates the social value of the book.

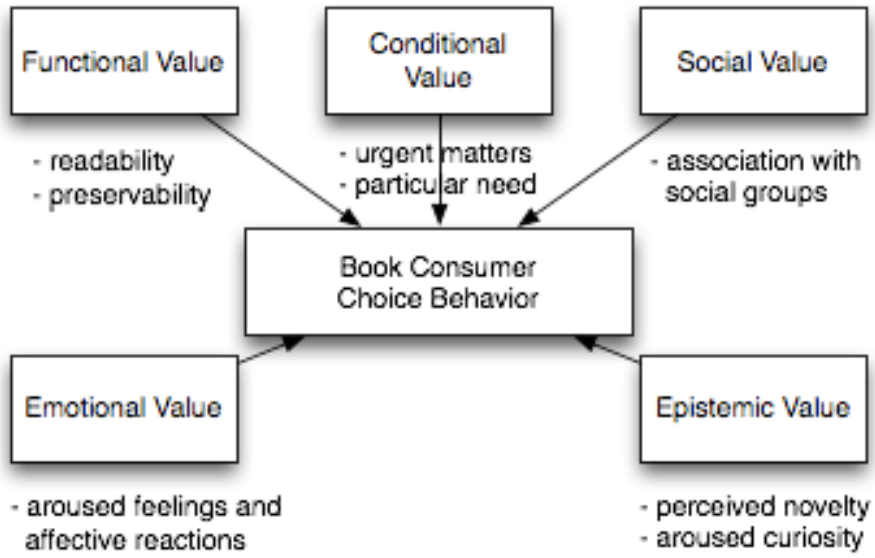
IV. **The epistemic value** of a book is it's ability to arouse curiosity, create novelty or satisfy an aspiration for knowledge. A book generates epistemic value when is is capable to supply something new or different from what is already known.

Novels when reread usually do not provide as much epistemic value as the first time when they were read, since its end and plot turns are known in advance.

V. **The conditional value** of a book is the value that is determined by the conditions of the specific situation, in which the reader makes a buying choice. A book generates conditional value when there are urgent matters, that accentuate the functional or social value of that book.

For example a book from an obligatory class reading list could posses a huge conditional value for a student during the exams session, while have possessed none a few years earlier.

Figure 3.1 The five values influencing book consumer choice (adopted from Sheth, Newman and Gross 1991)



In a book, dedicated to the peculiarities of the digital book Stork (2000) notices that the sets of advances in technology are not yet mature and some of the advantages brought their own inherent problems: resistance to change, font issues, lack of a standard format, digital rights management, reproduction of graphics and reader hardware.

Table 3.1 The disadvantages of digital books (adopted from Stork 2000)

Challenge/ Definition	
Resistance to change	Change reluctance in core habits: readers can see and feel paper based books, digital books have no physical representation
Font issues	Fonts on a computer screen at sizes equal to those used in printed materials are not as easy on the eyes. Allowing text to be reformatted to fit the physical dimensions of the digital book reader may lead to a loss of a part of the message of the book

Lack of a standard format	No agreement on how to put the words on a page.
Digital rights management	When copying is as easy as duplicating a file, piracy becomes a major problem. Documents encrypted to be read on one device can not be copied to another device
Reproduction of graphics	Full color graphics, complex tables, and figures are not easily reproducible on small screens
Reader hardware	High price of readers and the variety of incompatible hardware, software, and formats

In a report by O'Hara (O'Hara and Sellen 1997) dedicated to the comparison of reading paper and on-line documents the authors conduct a laboratory study in order to give an understanding of why economists at the IMF always mark up and review their colleagues' documents on paper and choose to read important documents from paper rather than computer screens.

The research pointed out the following observations (O'Hara and Sellen 1997):

I. It was found that the ability to annotate while reading was important in enforcing an understanding of the source document, and helped in planning for writing.

Table 3.2 Study observations on reading behavior I (adopted from O'Hara and Sellen 1997)

I. Annotating behavior	**Reading on Paper**	**Reading from a Screen**
Integration of annotating with reading	Smoothly integrated	Cumbersome and detracted
Source document annotation	Supports annotation of the source document itself which many subjects felt was important	Does not provide enough flexibility. The marks are perceptually distinct from the original document
Annotation on separate documents.	Frequent and interleaved with reading	Interspersed with long periods of editing, or note-taking is done after reading with little reference back to the source document

II. It was found that movement through documents was important for information organization, for reference, and for checking understanding.

Table 3.3 Study observations on reading behavior II (adopted from O'Hara and Sellen 1997)

II. Navigation behavior	**Reading on Paper**	**Reading from a Screen**
Integration of navigation with reading	Quick, automatic, and interwoven with reading	Slow and poorly interwoven with reading
Overlapping navigation with other activities	Two handed movement through paper allows to interleave and overlap navigation with other activities, and allows temporary commitment to interim activities	Requires breaking away from ongoing activity and committing to navigation activities because it is: one-handed, not always accompanied by immediate feedback, and spatially constrained to active areas on the screen
Support of tactile qualities	Uses its tactile qualities to support navigation and to implicitly assess document length	Fails to make use of explicit cues such as page length to assess document length
Support of incidental memory	The fixity of information with respect to physical paper pages supports incidental memory for where things were, which in turn supports search and rereading activities	The inability to see a complete page undermines the use of this feature on-line, but it appears pictures were used as anchor points

III. Laying out pages in space was found important for gaining an overall sense of the structure of a document, for referring to other documents, and for integrating reading with writing.

Table 3.4 Study observations on reading behavior III (adopted from O'Hara and Sellen 1997)

III. Spatial layout	Reading on Paper	Reading from a Screen
Integration of annotating with reading	Laying out paper in space allowed the visualization of a great deal of information, and provided a holding space for quick reference to other documents	The restrictions on field of view for on-line documents led either to lost resolution through shrinking the documents, or the usage of overlapping windows
Dynamic layout	Flexible and dynamic, providing quick access for cross-referencing, and supporting the juxtaposition of documents for reading and writing	Forcing to plan in advance how to position and size the windows in anticipation of future requirements
Independent reading and writing spaces	Supported the use of independent reading and writing spaces which could be accessed concurrently and manipulated independently	Because only one window could accept input at a time, subjects in the on-line condition experienced difficulties integrating reading and writing

Concluding, the aspects that a consumer traditionally values in books were defined and arranged according to Sheth-Newman-Gross's classification (1991). Secondary data collected from researches on reading behavior and digital book traits illustrates, that digital books clearly loose in terms of traditional performance to paper books:

- *Switching to digital books requires changing core habits, since they have no physical representation;*
- *The lack of a standard format and the digital text being reflowable lead to the loss of the massage put in the page design and text positioning of the book;*
- *Digital books offer small flexibility and control over spatial layout;*
- *Full color graphics, complex tables and figures are not easily reproducible on small screens;*
- *Annotation in digital books seizes to be an integral part of reading;*
- *Slow book navigation techniques require additional efforts form the user;*
- *Digital books require expensive hardware, which is not always compatible with every digital book format.*

3.1.2 New Performance Assessment

Even taking into consideration the disadvantages of the digital book Stork (2000) mentioned, he demonstrates absolute confidence in that digital books are here to stay and would be a major part of the Publishing industry in the new millennium. He broke the advantages of digital book publishing into six characteristics: *readability, usability, changeability, portability, multimedia capability, and availability*.

Table 3.5 The advantages of digital books (adopted from Stork 2000)

Characteristic/ Definition	
Readability	Scalable font sizes are perfectly suited for reading by the vision impaired and digital book based Braille Reader offers hope for those who are completely blind
Usability	Hypertext cross-reference links both within the book and to the Internet, full text search and dictionary integration.
Changeability	Making marginal comments or highlighting and instant publishing revisions possibilities
Portability	Physical portability and light weight of e-book devices and the infinite amount of content inside
Multimedia capability	Embedded songs, poems, dramatic quotes, videos etc.
Availability	Once a digital book has been created, it can be downloaded once or a million times with no change in the cost or storage requirements

Robert Stein, founder of the first commercial multimedia CD-ROM publisher and director of the Institute for the Future of the Book, has been exploring the potential of "new media" for nearly thirty years. One of this Institute's stated principal activities - building high-end tools for making complex electronic documents (www.futureofthebook.org 2006) – is of big importance for this study. Of particular interest is the 2008 peace, in which Bob summarized his views in a conceptual model he called "a unified field theory of publishing in the networked era".

Stein in the unified field theory of publishing in the networked era (2008) accuses the Publishing industry to have turned a blind eye on the fact that reading and writing have always been social activities. Publishers, retailers and even authors tend to forget about

the active reader by not caring to interact with or support the communities of readers - the relationship which may benefit both parties: extending reading experience for the consumers and receiving useful feedback and suggestion for the producer.

Today social interaction comes forward transforming the image of the reader and reading as such from a solitary experience to a social activity: you take a book, go to a forum, read messages, leave massages, leave comments on the book at the online shop and google the questions that rise up while reading (Stein 2008).

In the Institute for the Future of the Book (www.futureofthebook.org, 2006) they discovered that used books in libraries sometimes have very interesting marks in the margins: thoughts, remarks and even readers' conversations. Realizing the value of such practice for the reader experience they started experimenting on efficient ways to include it in a book, the way readers could use the maximum from it. Experimentation on writer's blogs, CommentPress platform and via Sophie software proved that there is a great potential and need in including user-generated content into books.

Speaking on the same topic, but in the context of textbooks Parker Rossman (2005) presents a similar opinion, saying that the Electronic Learning Tutorial Instrument System of the future should become a teacher-guided technology tailored to the individual via an automated tutor and incorporate other media and technologies, including the feature of commenting and online discussions.

He also stresses the importance of personification of the reading experience of a textbook consumer, meaning that the same e-textbook through special software should be able to change the pace of reading and regulate the difficulty of the study materials according to the reader's needs or offer further readings for those who are interested in the subject in a deeper level. The feature of customization might prove as useful also in the electronic trade book market, helping to create a personalized citations library.

Another clear trend of digital media and high-tech leisure products is applying interactiveness and user customization possibilities wherever it is possible. Literaly letting the reader lead the reading process by allowing him to customize the way he wants the read it or even letting him to engage in the plot, if we talk about fiction, choosing variants to solve quests or performing an action in the story. With the author laying "Easter eggs" across the story, just as there are often "hidden tracks" on CDs and

bonuses and deleted scenes on DVDs, the reading process could be so much more involving and personalized – the trait the book seemed to loose as other medium have appeared.

3.1.3 Analysis of Reader Experience Cycle

According to Kim and Mauborgne (2000) the perceived value of "consuming" a book would not be something the readers get at once as they finish the book, but something they would receive peace by peace during the whole process of book consumption that can be divided to the following steps:

1. Buying the book *(from searching for the needed book to the act of purchasing),*
2. Delivering the book *(from the act of purchasing to the act of using the book),*
3. Reading the book *(from preparing for reading to the reading process itself),*
4. Keeping the book *(from after the book had been read).*

The more convenient is every step of the consumption process, the less costs they suffer and the higher the value of the product is.

In-depth interviews with 30 book consumers of different ages and backgrounds allowed formulating the following generalization: an average reader values a book more…

(I. Buying the book)

…the higher the availability of the book is;

…the reachable the place of purchasing is;

…the faster the buying transaction is;

…the more secure the transaction is;

(II. Delivering the book)

…the faster the delivery of the book is;

…the lighter the book's weight is;

(III. Reading the book)

…the less efforts it requires to read the font;

…the simpler the navigation in the content is;

(IV. Keeping the book)

…the less accommodations for keeping the book requires;

…the less maintenance efforts keeping the book requires;

…the more preservable the book is.

In the qualitative research 30 people were asked about the things that could decrease the cost of reading and buying a paper book in each stage of the buyer experience cycle. Specific sub-questions were formulated in advance to be able to enhance the understanding of the questions by the respondents (see appendix 2).

In order not to loose any essential information about consumer behavior that is closely dependent on the age of the respondent, the study used stratified sampling by age. There were 10 age groups and each consisted of three respondents with an age difference of maximum 4 years, with the oldest respondent being 65 years old and the youngest - 15 years old – all consider themselves book consumers. About one third of the respondents were men.

Table 3.6 Demographic characteristics of respondents for the pilot testing

Age group	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65
Males	1	2	1	2	1	1	2	1	0	1
Females	2	1	2	1	2	2	1	2	3	2

The purpose of the pilot testing was to collect information about value at all stages of a book consumption experience as in-depth interviews are very useful at uncovering hidden issues and in providing with very rich depth of information (Wikipedia). The results of the study are also used in the development of the quantitative survey items.

Finding the right book

During the initial interview every respondent argued that the main determinant of a book's value is its relevance to the buyer expectations of the product prior to using: whether the book was in practice what it was expected to be in theory.

The received answers allowed summarizing the perceived indicators of the product relevance to the readers' needs:

1. Book's cover design,
2. Quotes from media containing recommendations and short reviews on the cover,
3. Annotation inside and on the back of the book,
4. Books location in a place for certain book category in the bookshop/e-bookshop/ library,
5. Recommendation from the shop assistant/ librarian,

6. Automatically generated recommendation on e-bookshops,
7. Buyers' comments on e-bookshop website,
8. Printed reviews,
9. TV reviews and advertising,
10. Outdoor advertising,
11. Internet media reviews and advertising,
12. Book reviews on blogs, forums and personal websites,
13. Online reference databases,
14. Printed reference books.

All of the respondents said that when possible they apply to several such indicators before buying a book and that the more sources are used in the process of decision making, the better is the result.

Its possible to say that in a market overflowed with products finding the right book becomes a big challenge and introduces new costs for the book consumer. And for that reason new mechanisms for determining the relevance of a book to ones needs become of great value for the book consumer.

Book disposal barriers

There is yet another issue related to the perceived reader value that is less obvious – the attitude towards a book that the buyer doesn't need anymore. The respondents' answers to the question "what do you do with books you don't need anymore?" showed that the mere thought of throwing away a book triggers barriers of various characters, that could be classified as: *emotional, functional and social* (table 3.7).

Table 3.7 Common book disposal psychological barriers

Emotional barrier	*... A good book is like a friend. I will feel bad to throw it away.* *... It would be insensible to through away something that describes me and reminds me of my life path.*
Functional barrier	*... At some point in the future I might want to reread it.* *... It is not reasonable to throw away what someone else can still use.* *... It is wrong to throw away something that could last for a 100 year.*
Social barrier	*... Throwing away books is a socially irresponsible deed.* *... Throwing away books is an eco-hostile action.*

The *emotional barrier* appears from treating books as friends and memorabilia, what stimulates maximally long book maintaining. The longer such a book is kept, the more emotional value it generates and the harder it is to part with the book.

The *functional barrier*, in contrary, rises in response to looking at books as paid for goods, that can still generate value somewhere in the future or be reused by others. That leads to selling, lending or bequeathing used books.

Last, the *social barrier* reminds the book consumers of their responsibility towards nature and society, which often makes them want to recycle or donate the book to a library.

These barriers constitute that the perceived consumer value of the book generated in the process of "using" the product does not disappear as the book had been read. The mere act of consideration of a book disposal leads to reconsidering and, sometimes, the increase of the perceived value of the book at the moment the decision needs to be made whether to keep it or throw away.

It could be concluded from the observation that as the epistemic and conditional values are no longer relevant, the barriers generated by the perceived emotional, functional and social values push the consumer to pay extra costs for book keeping or facilitate a new consumption chain for the used book:

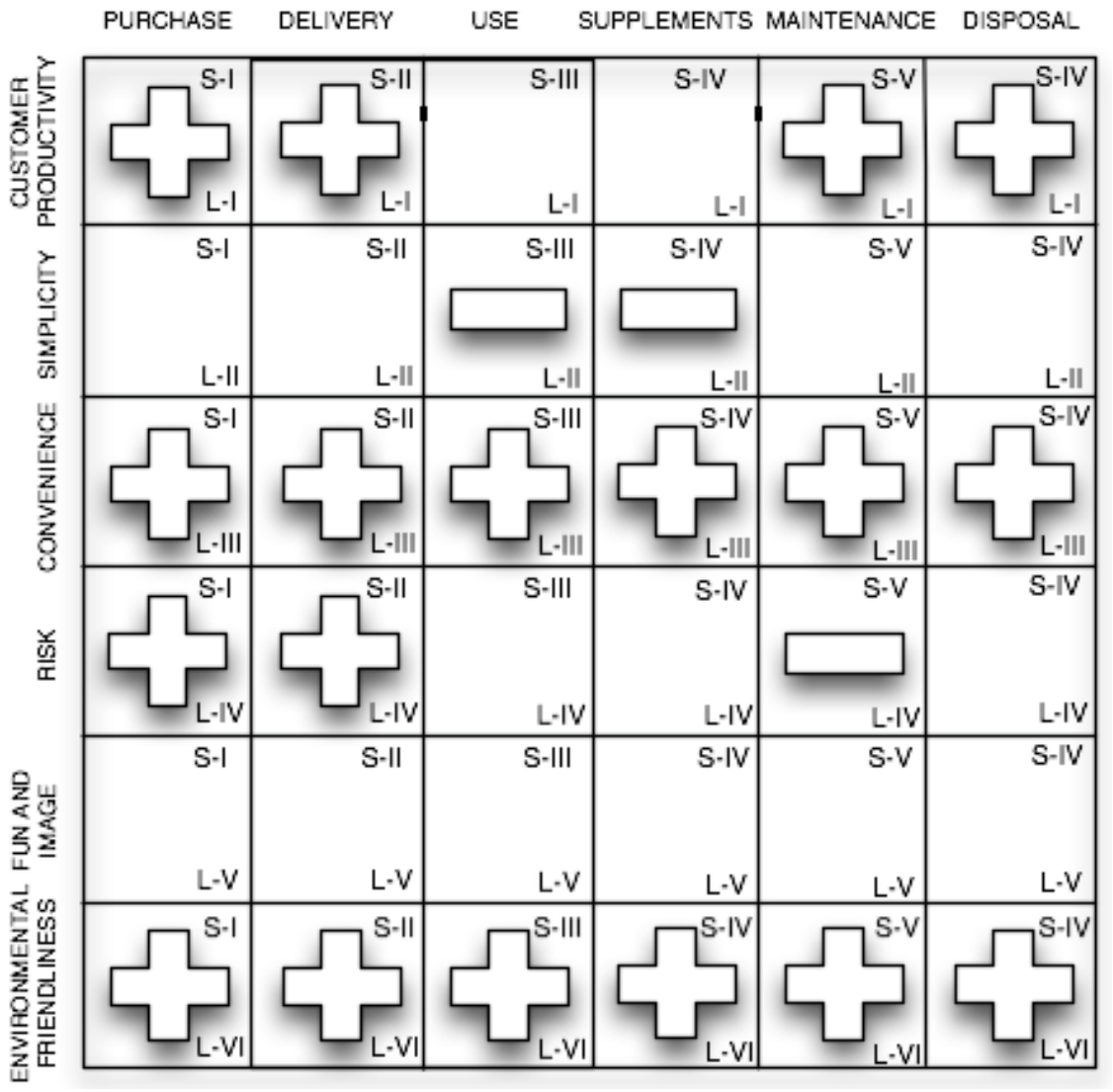
1. Due to a strong emotional attachment, the time of a single book preservation is significantly extended, what leads in time to a limited increase of the emotional perceived value at the expense of decreasing functional, conditional and epistemic value and high cost of keeping and maintaining the book.
2. Reselling, lending and bequeathing of books lead to a loss in epistemic and conditional perceived value of the book (as the book wares out and the content does not get upgraded by new editions) and causes the weakening of producer's control over the product, lost revenues and eventually – higher price of books.
3. Recycling and donating books boosts the perceived social value of the consumption by engaging the book into a new consumption chain if the used book is qualified for such purposes or, in the opposite case, delegating the act of disposal to the library or the recycling company. It should be mentioned that in each case the consumer suffers a cost of preparing and delivering the book to the transfer.

That way the definition of the reader perceived value could be formulated is *the relationship between the reader's perceived functional, emotional, social, epistemic and conditional value of the book consumption and the inconveniences associated with buying, delivering, keeping, reading and disposing of that book.*

3.1.4 Utility Map Analysis

There are six different ways of innovating and creating value in each buyer experience chain: increasing *customer productivity*, *simplicity* and *convenience* of the product or service, lowering *risk* and providing *fun and image* lever or *friendliness towards the environment* map (Kim and Mauborgne 2000).

Figure 3.2 The buyer utility map for digital books



Stages of the Buyer Experience Cycle

S-I. The digital book allows fast and secure book purchasing in any time of the day and night with an infinite amount of copies available from the seller, limited only by an Internet access or a receiving range of a wireless network.

S-II. The delivery period is reduced to seconds or minutes, depending on the device Internet speed or to the time of information transfer through a USB drive to the reading device. The book consumer does nor require the physical delivery of the purchase and the delivery capacity is not limited to the books sizes anymore, but just to the storage space of the device used.

S-III. The technology allows readability, text search, cross-referencing and integration of dictionaries to seize to be an important issue due to the usage of hyper-text and CSS programming languages, that allow total customizing and effective full-text search.

Yet digital books make reading less intuitive (turning pages, navigating), reducing the perceived simplicity of the product.

S-IV. Light and sight enhancement requirements are needed at a minimum extant, since most reading devices posses build in screen illuminating features and electronic ink technology that simulates reading from paper books and is not tiring for the eyes.

Due to a design standard that supports flexibility, fonts could be enlarged without a decrease in quality. External text marking and page marking tools are also replaced by relevant reading device applications.

Yet the requirements to always have a reading device nearby to read a book drastically reduced perceived simplicity of he product.

S-V. An digital book reading device can hold hundreds of books at once. No bookshelves or extensive book closets are needed for book storage and no dusting and cleaning works are necessary for the maintenance of a digital library.

Yet if loosing or breaking a reading device, where all the books are stored – all books are inevitable lost at once.

S-VI. Disposal of electronic books does not create any accompanied costs of book physical transfer to a library or a recycling plant. The emotional and functional disposal barriers no longer lead to redundant book maintenance and do not disturb publishers' control of the product.

Utility Levers

L-I. The digital book enhances consumer productivity by offering a faster and more secure way of purchasing directly from the publisher. The new technology offers the reader to reconsider book maintenance and disposal by suggesting a cost free efficient way for book keeping that diminishes the need to ever dispose of the product.

L-II. Until now, digital book readers' focus was rather on convenience, that on simplicity. Reading a digital book in comparison with reading a paper book is different, yet it does not offer enhanced ease-of-use.

L-III. The main advantage of digital books is that they make each desired consumption activity easier to perform.

L-IV. The innovation minimizes customers' financial risk of being cheated or underserved by allowing buying the exact same copy of a digital book that everybody else is purchasing and do it directly from the publisher or reading device retailer, skipping chains of intermediaries.

L-V. Perhaps because digital book publishers and reading device manufacturing do not know how or perhaps do not find this important there still had been no successful attempt to position digital book reading as a fun, fashionable and entertaining activity.

L-VI. The most definite new utility offered by the digital book is environmental friendliness. This utility lever appears in every stage of consumer experience and currently is one the main focuses of the product positioning.

3.1.5 Studying Perceived Importance of New Utility

It is important that the book consumer appreciates the new utility that is offered by the innovation or else it may prove to be almost of no value to him at all. In order to measure the value contribution more correctly it is necessary to estimate the need in innovations in each buyer experience stage by:

1. Estimating reader dissatisfaction with factors that affect utility in each stage.
2. Measuring the relative perceived importance of each stage to the reader.
3. Finding out an increase of which utility is likely to generate the most value.

Measuring the dissatisfaction in each stage of the chain is aimed at giving an answer to the question: where does the reader experience need to be improved?

According the findings from the pilot testing, 3 main factors that might negatively affect a book's value were summarized for each buyer experience cycle stage. The questions about each were formulated so that respondents would evaluate their dissatisfaction with each book consumption feature. All of them were formulated with a negative connotation (e.g. "book delivery takes much time", "large sizes of a book affect your choice of not buying a book").

One might disagree that some of the factors mentioned in the survey actually cause dissatisfaction, since many people enjoy lending books or having vast bookshelves and book closets in their homes. Yet in this research we assume that everything that creates *additional costs* is a source of dissatisfaction

100 book consumers of various age and gender, all living in St. Petersburg, Russia, were asked to complete an on-line survey, distributed by e-mail that consisted of 19 questions (see appendix 4). The responses were measured by Likert's scaling, which is a bipolar scaling method, measuring either positive or negative response to a statement. When responding to a Likert questionnaire item, respondents specify their level of agreement to a statement (Wikipedia).

After the questionnaire was completed, instead of each item being analyzed separately, the responses were summed to create a score for a 6 groups of items. The group with the highest score, according to the proposed framework showed the biggest locus of dissatisfaction and thus it is the buyer experience cycle stage, where the need in innovations is the highest.

To illustrate the findings, the points for each answer about dissatisfaction with factors of every buyer experience cycle were multiplied according to the degree of dissatisfaction (*-2 for “strongly disagree”, *-1 for “disagree”, *0 for “”neither agree nor disagree”, *1 for “agree”, *2 for “completely agree”) and then summarized to form a single measurement for each stage. The maximum score is thus 600 (100*3*2) and the minimum is -600 (100*3*(-2)). That way 0 indicates indifference and negative numbers – the fact that for the reader those factors are actually a source of additional satisfaction when consuming books, rather than a factor of dissatisfaction.

The results summarized in figure 3.3 demonstrate the stages of the buyer’s experience cycle that are the main origins of dissatisfaction with the performance of book products and features of the business models commonly used in the market.

Figure 3.3 Where can the buyer experience be improved

The numbers in the diagram show that the peak of dissatisfaction was with “Use” factors and it reached only 160 points from the possible 600. That means that the respondents do not consider the mentioned factors as major sources of dissatisfaction, yet the results indicate that in all of the cases (with “supplement” factor in a minor extent) the participants agree that there is room for efficient improvement in every stage of the buyer experience cycle.

If to take 0 points as the point of indifference, every score that is bigger – as an indicator of respondent’s general dissatisfaction with the traditional book product and every score that is lower than zero as an indicator of respondent’s general satisfaction

with the traditional book, it is possible to say that most of the respondents were generally satisfied with the book (62%).

Disruptive innovations target niches and low end of markets, since the majority being used to the traditional product, usually do not see the necessity of improvement or changes. So was the majority of respondents interviewed.

Still taking into consideration that the sampling was random, 38% respondents generally dissatisfied in the traditional product is a rather high number.

Measuring the level of dissatisfaction of the product performance requires also distinguishing which factors the reader finds most important. For that purpose the respondents were asked to evaluate each stage in terms of perceived importance.

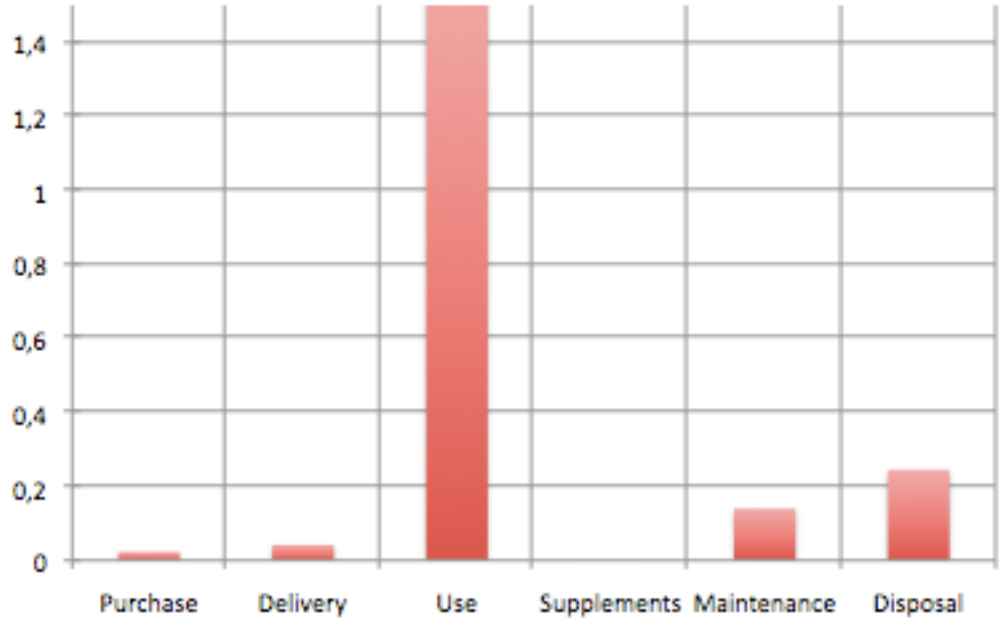
After the six groups of questions had been answered, the respondent is asked to rate the buyer experience stages according to his perceived importance of each one. Though the formulation of the question appeared vague at first, all of the respondents eventually were able to understand it and give an answer, according to their opinion.
Scoring of those results followed logic similar to the previous one. Each answer have been multiplied by the number of it's place in the perceived hierarchy: the most important stage was multiplied by 1 and the least – by 6. The higher was the score of a stage, the less important it had been perceived in total.

Figure 3.4 Relative perceived importance of buyer experience stages

Buyer experience cycle stages	Place	Points
Book purchase	2	215
Book delivery	5	481
Reading process	1	100
Using supplements	4	419
Book maintenance	3	285
Book disposal	6	600

The relative importance of the stages of the buyer experience cycle is then confronted against the size of the dissatisfaction associated with those stages to determine where the biggest need for innovation exists. The points from the first set of questions are divided to the points that represented the importance.

Figure 3.5 Where does the buyer experience need to be improved



The group of factors with the highest score, according to the proposed framework showed the biggest locus of dissatisfaction and thus «use» is the buyer experience cycle stage where the need in innovations is the highest.

The results of the performance analysis show that:

- *Digital books loose in terms of traditional performance to paper books since they have no physical representation, offer small flexibility and control in spatial layout and require expensive hardware, which is not always compatible with every digital book format;*
- *Digital books offer brand new value, which is effective book search by tags and interests, customization, interactiveness and networking features. This new proposed value could be able to attract former non-consumers with needs different from traditional and eventually open up a detached new market;*
- *The digital book offers sufficient utility increase in the purchase and delivery stages, which are valued enough to allow digital book to differentiate among competitors and opening of a fringe new market;*
- *Use is the buyer experience cycle stage, where innovations are valued the most in the traditional market. While digital books decrease simplicity and increase costs of using supplements, they will probably not be able to penetrate the mass market. A successful penetration might be achieved by a support of quicker,*

more effortless navigation techniques and flexibility and control in spatial layout (O'Hara and Sellen 1997);

- *The innovation also offers an increase of utility in book maintenance and disposal stages, which are valued much less by the traditional market, but are valued still. In combination with low price for the product this might suit for opening a low-end market that would target, for instance, libraries or consumers that do not like to keep books;*
- *Digital books introduce a new utility lever to every consumption stage, which is environmental friendliness that could also be used to differentiate from competitors and in creating a new market.*

3.2 Cost Assessment

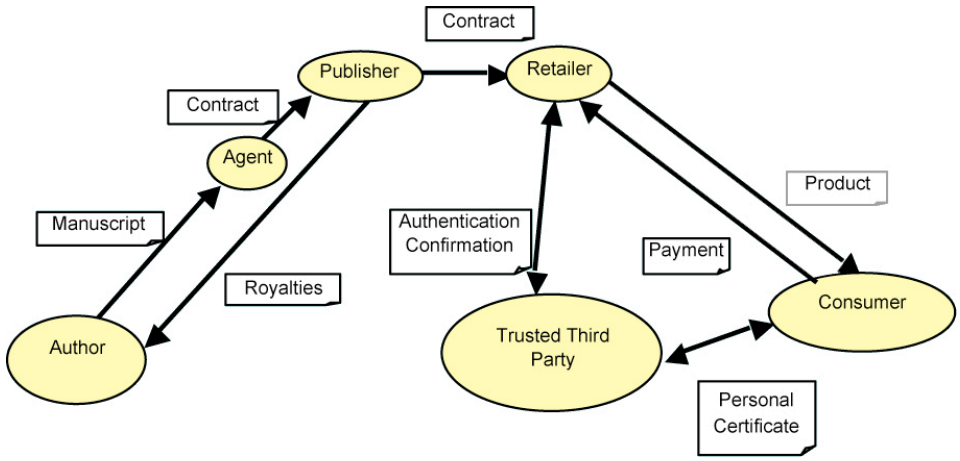
3.2.1 Roles and objects in Publishing

OEBF (2000) defines the roles and objects in electronic publishing the following way:

1. **Originators** (e.g., authors, anthologists, word processors), who generate publications. Could be one or more.
2. **Intermediaries** (e.g., editors, publishers, and agents), who facilitate the flow of content and payments from Originators to End-Users (see below). There may be many intermediaries, or there may be none. When there are multiple intermediaries (e.g., when there is an agent, an editor, *and* a publisher) these may interact with each other.
3. **End-Users** (e.g., consumers, readers, library patrons), who purchase and consume publications.

Objects, which flow between players of Roles, are divided into: Rights Objects, Event Records, Products, Services, Monetary Objects, Personal Data, and Enablers.

Figure 3.6 Illustrative transaction (adopted from OEBF 2000)



Eight categories of value network components could be distinguished with a financial, economic or moral interest in a publication or the performance of one or more functions in the publishing ecology, also referred to as stakeholders:

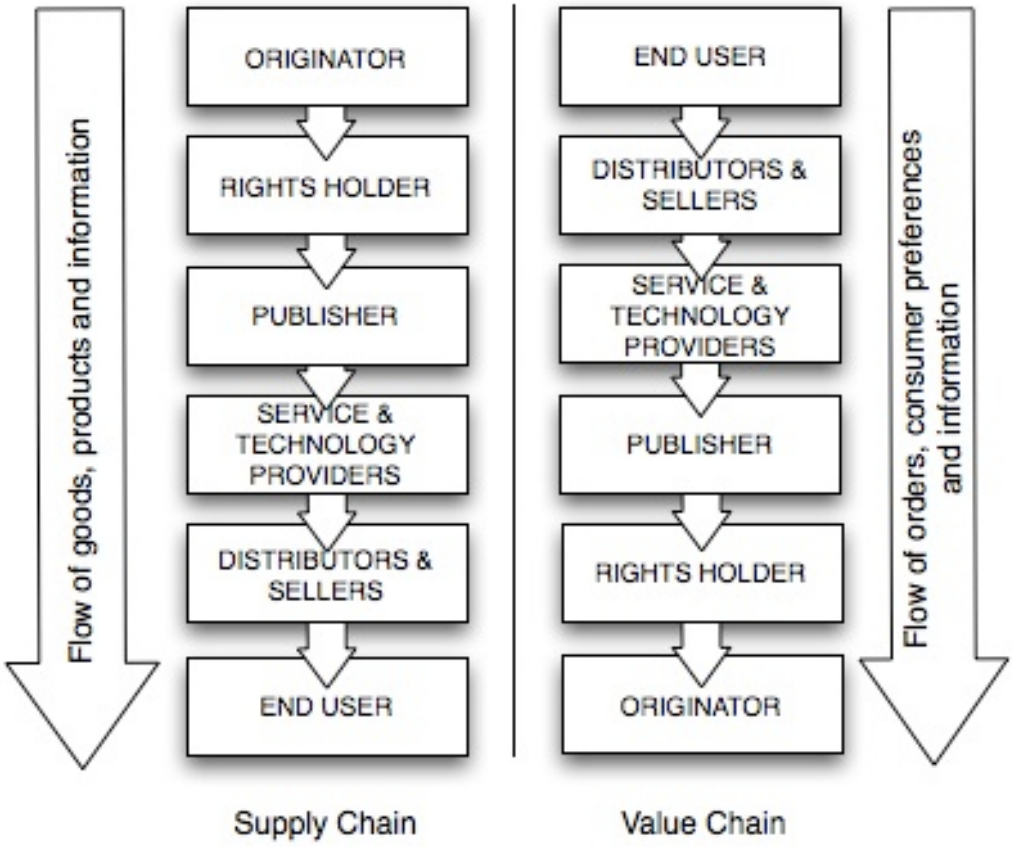
Table 3.8 Publishing stakeholder categorization (adopted from OEBF 2000)

	Core activities	Value providers
Originator	an entity that conceives, creates or brings into being the content of a publication	Authors, translators, illustrators

Rights Holder	an entity that owns or has been licensed the rights in or to a Literary Work	Authors, publishers, translators, book clubs, schools, foundations, museums
Publisher	an entity that elicits the creation of Literary Works and prepares, promotes, and distributes them to wholesalers, retailers, or end users	Trade/ text book/ self/ reference/ periodical/ legal/ medical publishers/ newspapers and journals
Service Provider	an entity that provides an ancillary service such as assisting in the creation, distribution or protection of publications or the collection and distribution of consumer information	Editors, agents, artists and illustrators, consultants/integrators, transaction services, financial clearinghouses, rights clearinghouses, consumer information databases, customer service providers, industry organizations
Technology provider	an entity that provides software or hardware that enables to operate and secure distribution of content	Printing houses, software developers of digital rights management trusted platforms, file formats, usage rights languages, media viewers
Seller	an entity that attracts end-users, enables them to browse and search books and ultimately sells the publication to the end user	Retailers (brick and mortar), book clubs, individual consumers, industry organizations, government agencies, schools, businesses, publishers, newspapers and journals
Distributor	an entity that provides the publication directly to an end user or another distributor through a protected transaction	Publishers, newspapers and journals, retailers (brick and mortar), private and public key managers, library (on-line or physical; granting usage to an end user for a limited period of time
End User	an entity for whom a publication is produced. Usually someone who buys or borrows and reads a publication	Individuals, students, teachers, businesses, schools, libraries, government agencies, consumers with disabilities, industry organizations, agencies

Thus, the supply/ value chain of E-publishing could be illustrated the following way:

Figure 3.7 Publishing supply and value chain



3.2.2 Distribution of Costs across the Publishing Supply Chain

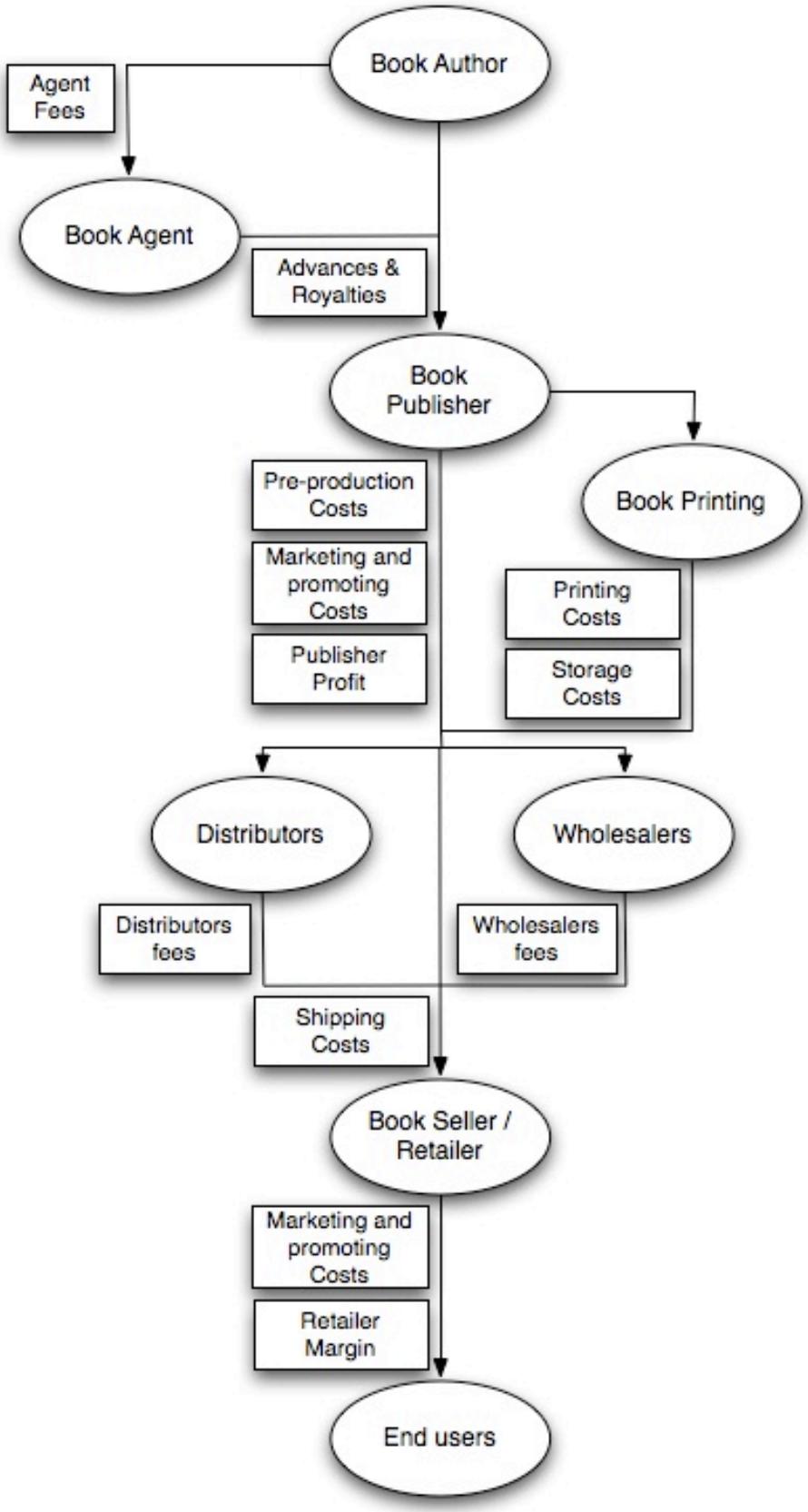
The cost of producing a book has many different components; some are constant and others vary, according to the choice of supply chain structure (see figure 3.8):

I. In most cases the originator in the value chain is the author, who wrote a peace of literature that he assumes other people would find interesting to read. Once the author has the ready manuscript, he searches a publisher willing to buy it. Sometimes authors start looking for interested publishers when the manuscript is not yet finished or even is on a very early stage of writing. Often the search is done manually by the author's sending a part of the manuscript to various Publishing houses and afterwards appointing meetings with those editors, who liked the peace. In some situations the author might apply to the services of an agent, who does that work for him. In this case the costs of hiring an agent might or might not inflict the royalties, the author would expect to receive for his work.

   Royalties - are usage-based payments made by the publisher to the rights holder for ongoing use of book contents and ideas, protected by intellectual property (IP) right. Royalties are usually a percentage of gross or net sales derived from use of an asset or a fixed price per unit sold of an item (Wikipedia). Typically, the publisher dictates an author's royalty rate. In most cases, the publisher advances an amount (part of the royalty), which can constitute the bulk of the author's total income (Wikipedia).

II. Pre-production costs include the costs of writing, editing and reviewing manuscripts. The editor, who is in charge of a particular manuscript is assigned to work with it's author on corrections and editing. In most cases, editors, who bend and change the original manuscripts so to fit the Publishing house profile and expectations have a large influence on the book seen in result. Those costs also include the cost of maintaining a staff of editors, proofreaders, book designers, publicists, sales representatives and so on.

Figure 3.8 Distribution of costs across the Publishing/ E-publishing industry supply chain



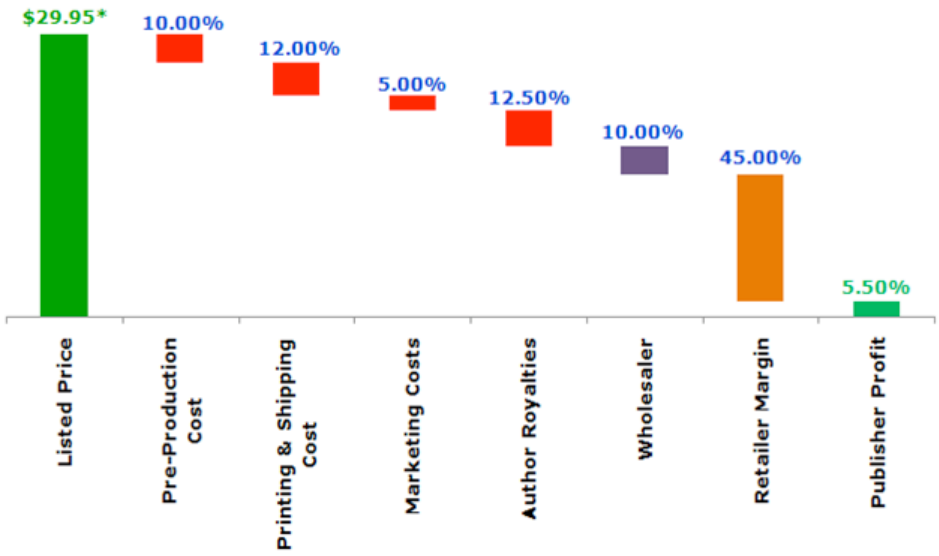
III. Marketing and promoting the book is sometimes done by the retailer, but most often is accomplished at the expense of the publisher. Bringing a book to the market may include costs for printing catalogs, media and print campaigns, sending out review copies to critics, arranging a promotion tour with the author and trade promotions for retailers.

IV. Printing is mostly done in typographies. The printing costs include the cost of physical paper, artwork and binding the book and varies depending on book size, number of pages, and illustrations used (Hubli 2010). Printing costs per book are the smaller, the bigger is the number of printed copies. This often leads to the need of renting vast storage spaces to keep the produced books until they are sold, which creates considerable storage expanses.

V. Distributors and wholesalers add their fee to the final cost, which will highly depend the expanses on shipping the products and for retailers there is additional cost of operating and staffing the store, allocating shelf space, stocking the book, maintaining inventory and servicing customers (Hubli 2010).

The price components of a typical book sold in the US is illustrated in figure 3.9.

Figure 3.9 Book price components (Hubli 2010) *



* The figure assumes a hardcover book with a retail selling price of $29.95 (Hubli 2010).

3.2.3 Distribution of Value across the Publishing Value Chain

A review of the value-adding activities and value contributions that occur in the Publishing industry value chain is needed to uncover whether the digital book reduces costs and introduces process improvement (table 3.9).

Table 3.9 Distribution of value across the Publishing value chain

Value chain component	Core value-adding activities/ competencies	Value contrubution
Book Author	Supplies the manuscript, owns the rights for the Intellectual property;	Intelectual property;
Book Agent	Searches for publishers ready to take up the manuscript; exploites personal contacts with publishers and reputation to promote the manuscript; supplies expert knowledge about the publishers market;	Access to mass publishers base; marketing expertise; efficient network/ infrastructure; relationship with facilitators;
Book Publisher	Support/ enhance the operations and marketing of the book; exploites personal contacts with retailers and it's reputation among book consumers, distributors and wholesalers to promote the book; suppliers expert knowledge about the consumer market;	Consumer knowledge; brand management expertise; cost management; access to distributors; reputation; Technology know-how; creative use of information;
Book Printing	Manufactoring the book from ready components;	Technology know-how. Access to mass suppliers base;
Distributors, Wholsalers and Retailers	Provide infrastructure and/ or manage access to/ delivery of the book;	Access to mass consumer base; seamless, efficient network/ infrastructure; relationship with facilitators;
End Users	Forms the demand for the product and performance, quality, price expectations;	Orders and requirements.

3.2.4 The E-publishing Value chain

Bob Stein in his unified field theory (2008) tries to explain the role of and the relationship between the publisher, the author, the reader and the editor in the digital book era.

He does notgive exact solutions to the problems that he raises. Instead he proposes new dimensions and ways to view those questions, which could be summarized as the following:

1. *The access to source documents must become more extensive free of the size, space and copyright constraints.*

2. *The text should be constantly evolving, through constant updates or «conversations in the margins».*

3. *The role of an author of such networked book should be thought of as of a leader of a group effort, similar in many respects to the role of a professor in a seminar.*

4. *A new formulation of publisher and editor roles should be defined. It might be that publishers and editors contribute to building a community that involves an author and a group of readers who are exploring a subject.*

5. *Once there are roles for author/reader/editor/publisher, it is possible to begin to assess who adds what kind of value, and when. From there a business model can begin to be developed.*

That way, with the new reading paradigm the role of end users in the value chains is going to drastically increase and book consumers are going to find themselves involved in the process of book producing, that will keep evolving and gain in value the more consumers it is able to attract.

The publisher role would change also, as the focus will move from providing technical value to core competencies, which are consumer knowledge, brand management etc.

The most powerful group, who stands to lose the most with any disruption in the status quo are the book retailers. The contribution of wholesalers, distributors and retailers, which is the highest share of the book total price, will stop be needed in the value chain.

To their place such e-retailers like Amazon will come, offering much more attractive and muda-eliminating solutions.
In fact, this year (2010) Amazon announced details of a new program in which it provides a new 70% royalty option for the Kindle e-reader, meaning authors and publishers can earn more royalties from every Kindle book that is sold. Under this new option, authors would get 70% of the list price, net of delivery costs.
Before that was the option of the DTP standard, when authors often receive royalties in the range of 7 to 15 percent of the list price that publishers set for their physical books, or 25 percent of the net that publishers receive from retailers for their digital books.
So publishers and authors, who chose the standard royalty option would only make about US$3.15 from every sale of an digital book that sells for US$8.99. Now, with the 70% option, these publishers would make US$6.25 (Crum 2010).

What concerns the price of the digital book, currently large debates are ongoing between major e-retailers (Apple and Amazon) about how much a digital book should cost. At this moment digital book at a very big price range can be found: from US$9.99, to the average US$12-20 and over US$20, what makes it possible to conclude that digital books are not sufficiently cheaper than paper books. So the price of digital books is still an open question.
Another major issue in the digital book cost assessment is it's close correlation with the market of e-readers. The necessity for acquiring a hardware device at the average price of US$200 if the consumer is mobile and needs his books constantly available also negatively affects the digital book market and drastically increases perceived cost of using the new product.

The results of the cost analysis show:

- *The price of digital books is formally smaller than that of competitors. Yet constant reading of digital books would require an e-book reader applied with e-ink technology. That creates high switching costs for the traditional book consumer. As the digital book will develop to being more sophisticated and multimedia enhanced, its price will grow;*

- *Book retailers create the largest part of total book price. When it comes to digital books, the traditional retailers', distributors' and wholesalers' contribution is not valued any longer;*

- *The main value contributors in the new value chain are publishers and authors. Unlike the traditional one, the new business model allows to distribute the profits equivalently to the actual value offering. In the future major reconsideration of their roles is required (Stein 2008);*

- *The questions on the optimal price on digital books and the look of the new business model are still open and discussed by major market players.*

3.3 Disruption Process Analysis

It is not necessarily that the innovation with the most promising disruptive potential will disrupt the market in practice. According to Lindqvist and Ghazi (2005) the actual capabilities and the choices of the firm and its competitors are what defines the market success of the disruptive innovation, meaning that the entrant needs to be able to complete a successful market entry and to outcompete the competitors.
The analysis will start by calling the main events that formed the digital book market the way it currently looks and then evaluate today's digital book-e-readers market through the framework proposed in the research.

3.3.1 History of the Digital Book

The information about how modern books were established is collected from Wikipedia, the online encyclopedia, and added using the materials from the history of the portable e-book by Ruth Wilson (2001), Connaway's and Wicht's paper dedicated to academic publishing (2007), the work of Herther (2008) and others.

1945 - the concept of Memex (or memory extender) was described by Vannevar Bush as a computer device linked to a library archive and able to display books (and multimedia), enabling users to link to other works or ideas as they went through materials. The Memex idea greatly influenced generations of technologists in the development of hypertext and intellect augmenting computer systems (Wikipedia).

1968 - The idea of a laptop and e-reader prototype was formulated by Alan Kay, who saw it as "a book-sized computer that the user, especially children, could use in place of paper" (Sellers 2001). Later in 1972 at Xerox PARC, Kay inspired other PARC engineers to develop the "Dynabook", which lead to the development of the laptop computer. Though the hardware required to create a Dynabook exists today, Alan Kay still thinks that the Dynabook has not been invented yet, because key software and educational curriculum are missing (Wikipedia).

1971 - Michael S. Hart with the digitization of the United States Declaration of Independence launched the Gutenberg Project. Hart believed that computers would one day be accessible to the general public and decided to make works of literature available in electronic form for free (Wikipedia).

All of the text was entered manually by volunteers up until 1989 when image scanners and optical character recognition software improved and became more widely available. The development of the project web site and later the Project online Catalog was started in the middle of the 90s and since then gained enormous popularity. Now the project has claimed over 30,000 items in its collection, with an average of over fifty new e-books being added each week (Project Gutenberg 2009). Project Gutenberg is considered the first conscious attempt at creating digital books.

Such notable initiatives as the Gutenberg Project ultimately made digitized public domain texts freely available via the Internet and helped propel e-books into the public eye (Connaway and Wicht 2007).

1973 – Mind Eye ePublishing created by Ken Jenks allowed people to read a page of a novel before buying it.

1981 – Osbourne I, the first portable computer was released, weighing in at 22 pounds with a 3.4″ x 2.6″ screen and a price of $1,800.

1985 – Robert Stein started Voyager Company Expanded Books and books on CD-ROMs.

The Voyager Company was a pioneer in CD-ROM production in the 1980s and early 1990s. The multimedia industry of that time was built around CD-ROMs and worked on products that would both entertain and educate users (often called "edutainment"

products) (Herther 2008). The Expanded Books focused on booklike materials with pictures, audio, games, maps and offered various search methods and navigation tools (e.g. a chapter menu that dropped down from chapter headings), a margin area on each page for writing notes, and interactive annotations.

In 1992 Voyager created The Expanded Books Toolkit, which allowed authors to create their own Expanded Books. Voyager themselves went on to produce over 60 books as Expanded Books, and the underlying software was also used in CD-ROMs such as A Hard Day's Night, Salt of the Earth, and Macbeth (Wikipedia).

1986 – Franklin entered the market with a handheld device containing an electronic dictionary, but capable of displaying only one line at a time.

1990s – Sony developed the Data Discman, otherwise known as the Electronic Book Player, which played both audio CDs and books on CD-ROM via a 3,4“ display unit. The Sony Data Discman was oriented on students and travelers, so it was bundled with Compton’s Concise Encyclopaedia, Wellness Encyclopaedia, Passport’s World Travel Translator and cost $550.

1991 – Franklin introduced an electronic Bible, this time with a four line screen and keyboard.

Franklin held on a niche market for single purpose electronic reading devices, which except the mentioned dictionaries and Bibles also included such titles as medical, legal, and financial reference works, enciclopidias and other types of entartainment and educational publications (Herther 2008).

1991 - The first hypertext fiction was published using software such as Storyspace and Hypercard. Michael Joyce's Afternoon, a story, published by Eastgate Systems, is generally considered one of the first hypertext fictions (Wikipedia).

As use of the Internet became widespread publishers and vendors began thinking about hosting and selling digital books. But since the process of making books available online usually involved keying in or scanning published print books, proofreading them, and converting them to an online format, commonly HTML, the creation of early digital book collections was a time consuming and expensive manual work (Connaway and Wicht 2007).

1992 – Charles Stack's Book Stacks Unlimited began selling new physical books online as a dial-up bulletin board located in Cleveland. It moved to the Internet as Books.com, eventually attracting a half million visitors each month (Wikipedia).

1993 – BiblioBytes that is considered to be the oldest commercial e-publisher, created the first internet-based financial exchange system to sell digital books over the internet.

– The first PDA (Personal Digital Assistant) is released by Apple.

1995 – Amazon starts to sell physical books via Internet.

1996 – Bobby Rabyd published the World Wide Web's first interactive novel, Sunshine 69, with navigable maps of settings, a nonlinear calendar of scenes, and a character "suitcase" enabling readers to try on nine different points of view (Wikipedia).

– The Internet Archive, a non-profit organization intended to preserve Web pages and other content in order to prevent the Internet from “disappearing into the past” have been founded by Brewster Kahle. The Internet Archive’s collections include the texts of Project Gutenberg and the Million Book Project,as well as other freely available collections of e-texts (Connaway and Wicht 2007).

1998 – Launch of the first hand-held e-book Readers: Rocket eBook and SoftBook.

The Rocket eBook was a paperback-size device that held 10 books (4,000 pages of text and graphics), weighed one pound and cost around $270. It had a 4-by-3-inch high contrast screen with high resolution, a number of font sizes could be selected, and it could be customised for left- and right-handed use. The battery lasted for about 20 hours when backlit, and 45 hours without being backlit. The device had a search facility and a bookmarking function. The Rocketcane with a PalmPilot-like cradle that connected to a serial port; titles were ordered online, downloaded to a PC and finally transferred to the reader (Wilson 2001).

Unlike the Rocket, SoftBook was completely independent from the PC: content was loaded in an HTML-based proprietary format and downloaded directly to the reader via an internal modem (Wilson 2001).

1999 – iBooks is the first trade publisher to release titles in both digital book and print formats.

– The first viable industry association, the Open EBook Forum, is created and the Open eBook Publication Structure (OEBPS) 1.0 is released.

The Open eBook Publication Structure (OEBPS) is a legacy digital book format "based primarily on technology developed by SoftBook Press" (Judge 1999, cited in Wikipedia) and on XML.

– BlackBerry is released and redefines the industry by merging PDAs and cell phones into one unit, providing wireless access to email, corporate data, phone, web, and organizer features.

BlackBerry is a line of wireless mobile devices developed by Canadian company Research In Motion (RIM). The first BlackBerry device was introduced in 1999 as a two-way pager, but later gained also telephone applications. BlackBerry is primarily known for its ability to send and receive e-mail wherever it can access a wireless network of certain cellular phone carriers. The ability to read e-mail that is received in real time, anywhere, has made the BlackBerry devices infamously addictive (Wikipedia).

– The launch of NetLibrary, which led to more than 2,000 e-books becoming commercially available to libraries.

During this experimental period, some product and marketing trends began to emerge for e-books. Those first library e-book collections contained many computer, business, and reference titles, reflecting the strengths of providers' collections.

2000 – Stephen King's novel, Riding the Bullet, is initially published exclusively on the net, for $2.50 to read on a computer or personal organizer.

Simon & Schuster, with technology by SoftLock, first published Riding the Bullet as the world's first mass-market electronic book. During the first 24 hours, over 400,000 copies of "Riding the Bullet" were downloaded, jamming SoftLock's server with Some Stephen King fans waiting hours for the download (De Abrew 2000, cited in Wikipedia). It is considered that by that digital book release Stephen King paved the way of the publishing future.

– Questia, a new e-book provider has entered the marketplace.

Questia sold weekly, monthly, and yearly subscriptions marketed to individuals. Anyone could search the collection for free, but only subscribers could view or customize documents. Today Questia markets its service directly to students as a research service.

2001 – iPod, portable music player, is released by Apple.

The Apple iPod was no longer just a music playing device, but an icon of modern and popular culture. More important, Apple made the whole world willing to pay for downloadable content and overturned the music industry, forcing reconsidering of music as a product that from CD albums started to gain the form of separate downloadable tracks.

– Ebrary, an e-book providers has entered the marketplace with different access model.

Both Questia and ebrary experimented with marketing their services directly to end users and promoting institutional accounts to librarians. Ebrary and NetLibrary now sell e-books exclusively to libraries (Connaway and Wiched 2007).

– Wikipedia, the free internet encyclopedia based on volunteer contributors, is formed.

The emergence of Wikipedia led to a logistic growth in the number of electronic articles, gaining the status as a general reference website since its inception in 2001.

2004 – Google Print Library Project, a cooperative venture with major international libraries, is formed to bring scanned books to the masses; it is later renamed Google Book Search.

The initiative has been hailed for its potential to offer unprecedented access to what may become the largest online corpus of human knowledge and promoting the democratization of knowledge(Pace 2006, Bergquist 2006, cited in Wikipedia).

– Two new e-book providers, Ebook Library (EBL) and MyiLibrary, were founded.

Both of them aimed to improve upon available e-book products and services by offering flexible and innovative pricing and access models (Connaway and Wiched 2007).

“During this time, various publishers began developing in-house e-book publishing initiatives that enabled them to host and sell e-books directly to libraries. The publishers include Elsevier, Oxford University Press, Springer, and Taylor & Francis, plus a host of others. Most of these publishers also sell some or all of the e-book collections from the e-book pioneers like EBL and NetLibrary”.

2005 – The Open eBook Forum changes its name to the International Digital Publishing Forum (IDPF), remaining the "trade and standards organization dedicated to the development and promotion of electronic publishing" (Connaway and Wiched 2007).

2006 – Sony released the Sony Reader. The first e-book reader, where e-ink technology had been used.

The e-reader is viewable in direct sunlight and requires no power to maintain a static image, and also is usable in portrait or landscape orientation. It uses an iTunes Store-like interface to purchase books from Sony Connect eBook store (currently US and Canada only) and can display Adobe PDFs, ePub format, personal documents, blogs, RSS newsfeeds, JPEGs, and Sony's proprietary BBeB ("BroadBand eBook") format. The Reader can play MP3 and unencrypted AAC audio files (Wikipedia).
According to th eregulations of the digital rights management of the Reader, any purchased e-book is allowed to be read on up to six devices, at least one of which must be a personal computer running Windows or Mac OS X.

– iRex iLiad was ready for the consumer market. Consumers could initially read e-Books in PDF and HTML formats.

One of the advanced features of the iLiad is the ability to add notes to existing documents via the integrated Wacom tablet and stylus and the notes will remain on that document whenever it is viewed on the iLiad. Sesktop software allows to merge those notes into the original document. This provided an important feature of physical books that is missing from most ebook products, allowing users to annotate, highlight, and personalize the text (Wikipedia).

2007 – Amazon Kindle is released in the U.S. as a stand-alone reader or with computers for $399.

It uses an electronic paper display and a proprietary, DRM-restricted format. Amazon prepared a stock of 88,000 titles available for downloading using its Whispernet (Sprint) network. Weighing 10.3 ounces, Kindle measures 5.3″x7.5″x0.7″ (Wikipedia).

– Apple introduced its long-rumored iPhone, an internet-enabled, multimedia cell phone with reported sales of 3.71 million units in the U.S. in 2007 (Herther 2008).

2008 – The Association of American Publishers (AAP) announced its backing for the use of .epub as an e-book file type for reflowable texts from which any ebook delivery format can be rendered and hoped that publishers could transition to the standard by 2008.

3.3.2 Digital book-E-readers market analysis

Rafi and Kampas divide the process of disruption into six stages (2002, cited in Lindqvist and Ghazi 2005):

1. The insurgent enters a foothold market. ✓

2007 – 2009. Kindle started as a niche device that only attracted a small number of book-loving early adopters. Eventually consumers fell in love with the Kindle's one-step shopping system and the immediate gratification of buying books in the Kindle store. It is stressed that since transferring paper books into an electronic medium is a lot harder than, for instance, “ripping” CDs and copy them onto their MP3 players, consumers were more likely to prefer a vendor that can provide an Apple-like integration between the hardware reader and the book store (Lardinois 2009).

2. The insurgent enters the main market. ✓

2009-2011. The Association of American Publishers says that book sales in USA in 2008 have declined by 2,8% and were in total US$24,5billion ($25 billion in 2007). The biggest fall was of audio book - 21,0% and the largest growth – that of digital books - 68,4% with a market volume of $113,2 million or 0,5% from the market's total (Association of American Publishers, Inc. 2008).

Study results show that digital books is the brightest spot in the industry, with the AAP reporting a 131% jump in digital book sales in 2009. Bowker's PubTrack Consumer

survey of book-buying behavior found that in the first quarter of 2009, digital book purchases represented 2.4% of all book purchases, up from only 0.6% for all of 2008 (Bowker 2009).

According to BISG new report Trade digital book sales were expected to increase by just under 10% in 2009. As part of its channel analysis, BISG forecast that sales over the Internet will increase 7.7% in 2009, to US$1.09 billion, while bookstore sales will stay flat at US$3.63 billion. Publishers, Watson Healy said, "all expect online to continue to grow"(Millot 2009).

Digital books are less then 5 percent of total book sales, but they are the fastest-growing part of the industry, and there is no telling just how big they will become and how they might affect profits and reading habits in the future (Global Industry Analysts, Inc. 2008).

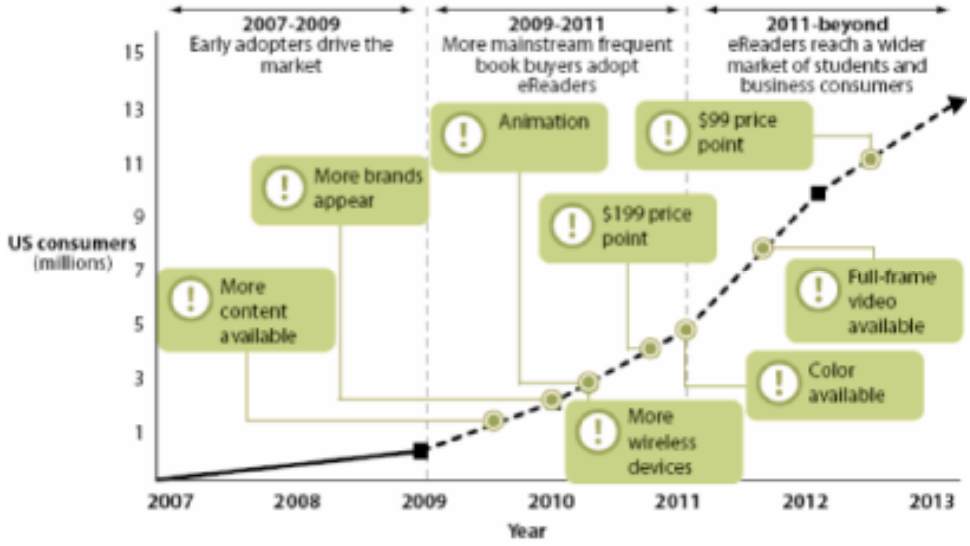
According to a report from Forrester, the digital book and e-reader market has a hit a point where it is ready to break out of its niche and become a mainstream phenomenon. Commenting the Rocket eBook and the Softbook in 1998 failures it is argued in the report that while early readers failed to garner a large enough audience, today's consumers are more likely to buy electronic goods than ever before, since they have embraced mobile, on-the-go media consumption thanks to the prevalence of MP3 players and handheld video games (Lardinois 2009).

3. The insurgent begins attracting customers.

The new Kindle DX will be geared towards the textbook market, though Forrester warns that universities will be slow to adopt the technology: “textbook publishers will look at the adoption of the Kindle in schools and are unlikely to invest heavily in this technology unless they see a growing market for their content, while students are unlikely to show interest in eReaders unless all of their textbooks are available in this format” (Lardinois 2009).

Once e-Ink technology becomes mature and allows color the report also predicts that the e-reader market will soon expand beyond books (figure 3.10). It is expected that newspapers, magazines, comic books, and business and personal documents will also soon become more important, especially as other vendors besides Amazon start to produce more compelling devices and user experiences (Lardinois 2009).

Figure 3.10 Drivers of growth for e-readers and digital books (Forrester Inc. 2009)



4. The customers begin changing suppliers (if the switching costs are low enough).

5. The established firm will retaliate.

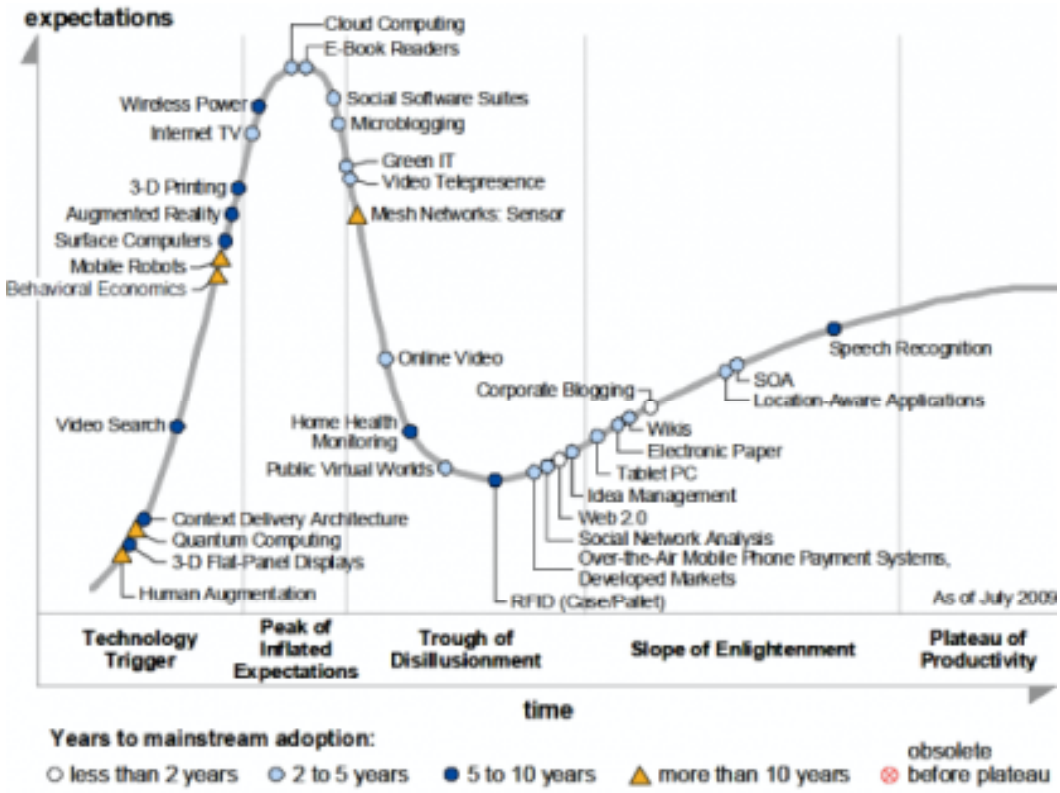
"Forrester thinks that other players like Apple, RIM, Borders, and Barnes & Noble might try to enter this market either with hardware products or by offering distribution platforms. Epps, however, argues that while traditional chain booksellers will try to enter the eBook market, their real estate holdings will weigh them down and make it hard, or even impossible, for them to compete with Amazon" (Lardinois 2009).

6. The established firm's product is displaced.

Digital book adoption may accelerate depending on the use of marketing mix elements, availability of digital book titles and how competition unfolds in the coming years all of which can significantly alter the adoption process (Hubli 2010).

The 2009 Hype Cycle for Emerging Technologies report also confirms the optimistic perspectives for the market. Gartner puts digital book readers at the top of the Peak of Inflated Expectations meaning that there is a great market for them. According to Forrester, the availability of animation, color and full-frame video for e-readers at the price of $99 will be the main catalyst and indicator of e-readers reaching that peak and driving the same hype cycle position of digital books (Forrester Research, Inc, cited in Lardinois 2009).

Figure 3.11 Hype cycle for emerging technologies (Carpenter 2009)



Summary

It is possible to say with confidence that digital books act like a disruptive innovation that had entered first the foothold around 2007 and now is in the mass market.

Though the first versions of current digital books were introduced about 40 years ago, only with the emergence of the market of portable computers, mobile phones, Blackberries, PDAs and later - dedicated electronic reading devices, digital book were able to find their early adopters.

Though it wasn't the first e-reader made, Amazon's Kindle could be considered a pioneer in the market that is likely to buy electronic goods than ever before. The wide spreading of Internet, on-line retailing, e-ink technology, digital libraries initiatives and a 10 years long business model experiments have formed such a market.

Studies agree that digital books are on their peak of Inflated Expectations and soon enough major traditional market players will try to catch that innovation wave.

In the nearest future it is expected that book consumers are going to switch to digital books and e-readers alike as the entrants manage to attract new consumers, penetrating the e-textbook and serial digital publications markets.

3.4 Conclusions

3.4.1 Results of the analysis

The analysis of reader's perceived value of various stages of a book consumption process shows that the consumer is underserved: the general level of dissatisfaction is relatively high and includes almost all stages of the buyer experience cycle. According to the conducted interviews, those factors with the highest dissatisfaction indicators were of the biggest relevance to the reader (with exception of disposal). It could be concluded that the inconveniences and complexity associated with "use" in the studied respondents group created high consumption costs and led to smaller book consumption rates.

Moreover, it was found that in the market there are needs ignored by the current product, which are convenient book relevance determination mechanism and a platform for social interaction integrated with book consumption process. Digital books have the capacity to provide that value in a most efficient way.

The results of the performance analysis showed that the digital book offers sufficient utility increase in the purchase and delivery stages, which are valued enough to allow digital book to differentiate among competitors and open a fringe new market.

At the same time digital books still loose in the most valued stage of buyer experience cycle - use. The innovation decreases simplicity and has high switching costs for the mass and "power" readers, because reading digital books would require e-readers. Until these issues are solved, digital books will not be able to take over the mass market.

Taking all of this into consideration it is possible to say that digital books have the competency for becoming any of the two new-market disruptive innovation types: detached and fringe new-market innovation.

At the moment the price of digital books is smaller or equal to its competitors and thus a fringe new-market innovation's diffusion pattern is best to describe the technology. In the future, however as digital books start exploiting the new performance potential of it's technology the pricing model might change to look more like that of detached new-market innovations.

The analysis of the disruption process shows that digital books have recently started disrupting the market. At the moment of writing this research more and more famous researchers finally feel free to admit that digital books do have a future and that future is massive.

In the nearest future it is expected that book consumers are going to switch to digital books and e-readers alike as the entrants manage to attract new consumers, penetrating the e-textbook and serial digital publications markets.

3.4.2 Observations during the work

According to the traditional disruptive innovations theory point of view an innovation is closely dependent on the way it is implemented in the market: whether the early adopters are non-consumers or low-end consumers. This consideration leads to a variety of contradicting definitions and prospective of disruptive innovations that are based on pricing policies and exact penetration patterns.

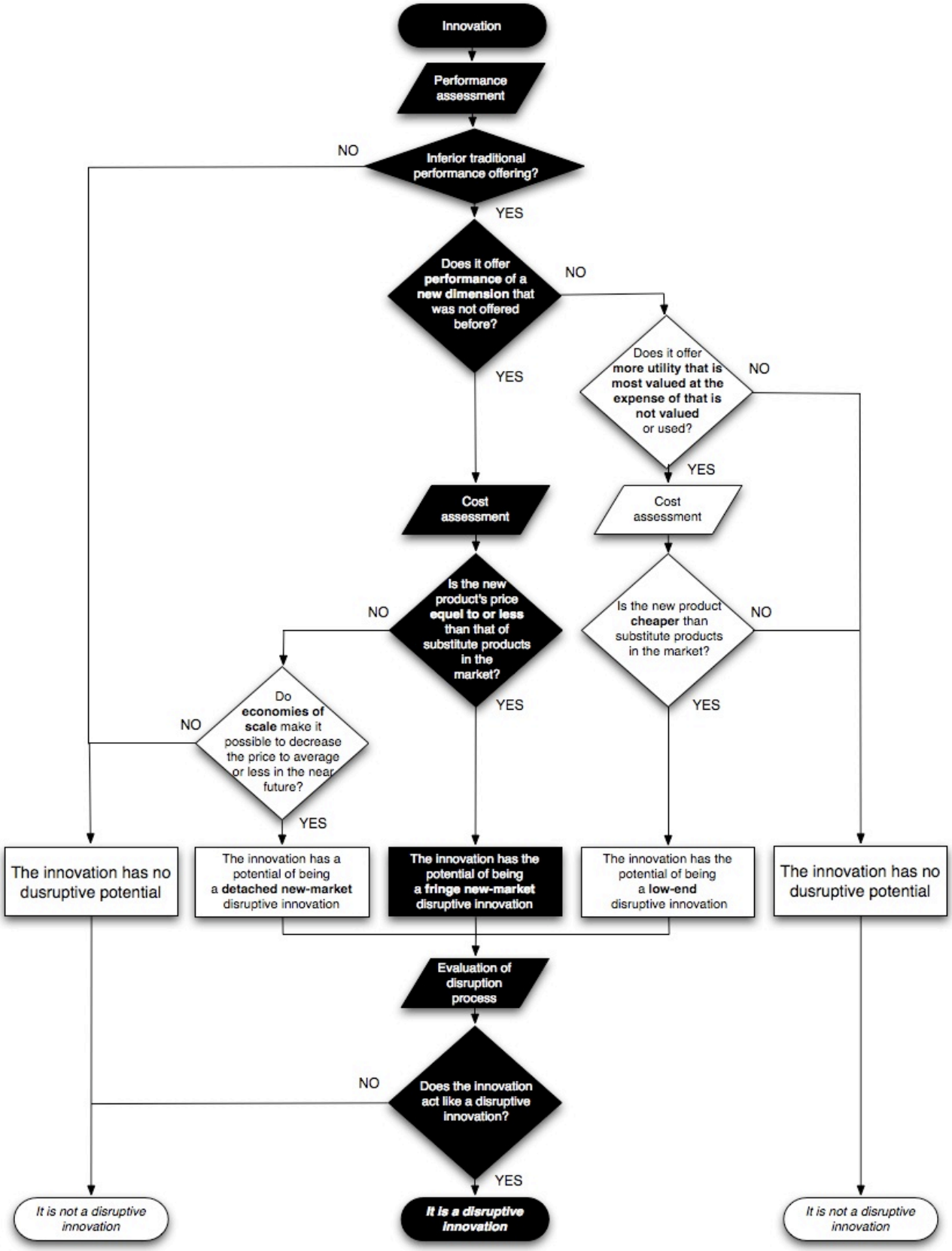
The example of digital books shows that some innovations posses very high disruptive potential by having capability to offer new performance dimensions, decrease price by reconsidering traditional utility perceived and drastically improve industry business models. The performance and costs analysis of the innovation proved that digital books can disrupt the market from all sides: detached new-market disruption and fringe new-market disruption – depending on the strategy the industry as a whole is going to chose.

The third possibility – low-end disruption is also possible if E-publishing decides to go a step back and offer low priced digitalized versions of paper books that will not offer any new dimensions of value.

The existence of such industry-level “super” disruptive innovations means that there is much room for improvements in the classification of disruptive innovations and that the framework for identifying disruptive innovations must offer more flexibility.

Another issue is measuring disruptiveness. Today they are no techniques to find the relative disruptiveness of an innovation. Yet to fully understand the pattern of market behavior of a disruptive innovation there should be a tool to distinguish such “super” disruptive innovations.

Figure 3.12 Conclusions on the digital book as a disruptive innovation



Conclusions

The digital books as a disruptive innovation

In the end of the study the following answer to the research question could be given:

In order for the digital book to become a disruptive innovation it must introduce a new performance dimension or lower the cost of the book by a cost-performance trade off.

The trade-off should offer enough traditional performance to be valued by at least some of the consumers and occupy a low-end segment of a market consisted of the least demanding consumers. Otherwise, the new dimension of performance should be appreciated enough to form a new market on the edge of the old one, where consumer needs are different from mass consumer's and many of which have been previously non-consumers in regard to the main market.

As the digital book reinvents itself to become good feat for the mass market in terms of price and content availability, the innovation spreads from early adopters upward, disrupting through competitors.

Innovation's performance assessment showed that the new performance dimension proposed by the digital book could involve:

- *Convenient book relevance determination mechanism,*
- *Platform for social interaction integrated with reading,*
- *Convenient book purchase, delivery and maintenance,*
- *And environmental friendliness.*

Innovation's cost assessment showed that *efficient performance-cost trade-off is possible through eliminating "muda" from the value network. Suspending the profit share of retailers and distributors leads to smaller cost-margins for Publishing, attractive royalties for authors and consequently more digital book content available.*

Aside form smaller book prices and larger digital content availability it have been discovered that the price and performance characteristics of electronic reading devices also affected the disruption process.
Disruption process analysis showed that currently price consensuses are forming and various other possibilities are considered for attracting both suppliers (authors) and consumers (reader) from the mass market.

It is predicted (figure 3.10) that as 99$ price point for e-readers is reached along with the availability of color, animation and full-frame video, it will push digital books to the peak of inflated expectations (figure 3.11), where the digital book is going to stay for years to come, destroying old competencies and forming the new reading paradigm.

Currently the digital book as a disruptive innovation acts like a fringe-market innovation. But as the Industry comes to a consensus about the price and also the definitions and terminology of the new book format, it will determine the way the book performance is going to evolve in the nearest future.

If the book's definition will extend to include various multimedia enhancements and interactive possibilities – all supported and protected by digital rights management or/ and the price of the digital book will be as high or higher than of the paper book – the innovation will follow the path of a detached new-market disruption.

If due to market players' price damping the digital book is going to cost sufficiently less then the paper book and the limited book perception will lead to the digital book not offering any value of new dimension, the innovation will follow the path of a low-end market disruption.

Framework for evaluating disruptiveness

As stated in the study objective, the other part of the thesis was to develop a framework suitable for analyzing e-publications through the disruptive innovations model.

The classification of digital books have been conducted in the analytical framework and is in a way a contribution by itself, since this have been an original attempt to organize an E-publishing ecology from different works and perceptions, based on book history and vast secondary data.

The viewpoint on innovations and, more precisely, the classification of new-market disruptive innovations, inspired by Druehl and Schmidt (2008) and Carr (2005) might also prove helpful when working with Christensen's (2003) original model. It allows to explain why disruptive innovations sometimes start more expensive, than competitors' products and how this feats to the disruptive innovation concept.

The framework itself is based on Lindqvist and Ghazi work on the topic of evaluating disruptive innovation (2005). Yet the frameworks differ much, since the original authors bared a firm-side prospective in mind and concentrated rather on how a firm can come up with a disruptive idea and understand that it is good.

The evaluation logic, illustrated via a block scheme (figure 2.19) presents a tool for identifying disruptive innovations and distinguishing the types of disruptive potential.

Since the framework have been specifically designed for evaluating the disruptiveness of digital books, it might prove convenient for analyzing other types on e-publications.

Test-pressurization of the framework illustrated that there is much room for further discussion. Techniques of measuring relative disruptiveness are needed to create a more correct pattern of innovation's market behavior. The digital book analysis shows that current disruptive innovations classifications are rather narrow and lack flexibility. Also, perhaps, a new term is needed to describe such "super" innovations that have at the same time the disruptive potential of becoming both a low-end and a new-market innovation.

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Appendices

Appendix 1 Pilot testing survey (Russian)

Анкета: # ____	**Возраст: ____** Пол: **М☐ Ж☐**
QQ#1	
1. Что способно облегчить процесс покупки и чтения бумажной книги?	
a) Что способно облегчить процесс покупки книги? (Покупка)	
b) Как влияет формат книги и способ доставки книги на Ваше решение о покупке? (Доставка)	
c) Как влияет качество печати и используемых материалов на Ваше решение о покупке? (Использование)	
d) Что помимо книги Вам может потребоваться для чтения? (Дополнения)	
e) Как Вы следите за книгами и храните их? (Хранение)	
2. Как вы определяете книгу, подходящую к Вашим интересам?	
3. Как вы поступаете с книгами, которые Вам больше не нужны? (Избавление)	

Appendix 2 Pilot testing survey (English)

Questionnaire: # _____	**Age: _____** Sex: **M** ☐ **F** ☐
QQ#1	
1. What could decrease the cost of reading and buying a paper book in each occasion?	
a) What could make the process of buying a book easier? (Purchase)	
b) How do the sizes of a book and book delivery features affect your decision of buying a book? (Delivery)	
c) How does the print, paper and cover quality of the book affect your decision of buying it? (Use)	
d) What products/ equipment/ conditions you might need except books in order to engage in the process of reading? (Supplements)	
e) How do you keep and take care of your books? (Maintenance)	
2. How do you determine a book relevant to your needs?	
3. What do you do with books you don't require anymore?	

Appendix 3 Quantitative survey (Russian)

Анкета: # ____ **QQ#2** **Возраст: ____** Пол: **М** ☐ **Ж** ☐

1. Оцените по 5-бальной шкале Ваше согласие со следующими утверждениями, где

-2 абсолютно не согласен, **-1** не согласен, **0** - затрудняюсь ответить, **1** - согласен, **2** - полностью согласен

A) Процесс покупки книги					
Вам трудно найти, где можно купить желаемую книгу	-2	-1	0	1	2
Процесс покупки занимает много времени (e.g. очереди, работа кассира)	-2	-1	0	1	2
Нужные книги часто поставляются в магазин в недостаточном кол-ве	-2	-1	0	1	2

B) Доставка книги из магазина					
Доставка книг часто занимает много времени (магазин находится далеко)	-2	-1	0	1	2
Большие физические размеры книги часто отталкивают от ее покупки	-2	-1	0	1	2
Большой вес книги часто отталкивает от ее покупки	-2	-1	0	1	2

C) Процесс чтения					
Плохой контраст бумаги и печати часто отталкивает от покупки книги	-2	-1	0	1	2
Тонкая обложка и хрупкие страницы часто отталкивают от покупки кн,	-2	-1	0	1	2
Неудобная система указателей, структуры и оглавления часто отталкивает от покупки книги	-2	-1	0	1	2

D) Использование дополнений					
Плохое освещение часто мешает Вашему желанию почитать книгу	-2	-1	0	1	2
Необходимость одевать очки (линзы) мешает желанию почитать книгу	-2	-1	0	1	2
Необходимость иметь рядом карандаш, маркер или закладки часто мешает желанию почитать книгу	-2	-1	0	1	2

E) Хранение прочтеной книги					
Книги занимают много места у вас дома и/или на работе	-2	-1	0	1	2
Постоянно приходится следить, чтобы Ваши книги не запылились	-2	-1	0	1	2
Быстрое устаревание информации в книгах отталкивает от их покупки	-2	-1	0	1	2

F) Избавление от ненужной книги					
Вы не можете выбросить ненужные книги, потому что к ним привязываетесь	-2	-1	0	1	2
Вы можете выбросить ненужные книги, потому что их еще можно читать	-2	-1	0	1	2
... ненужные книги, потому что их можно подарить или одолжить кому-то	-2	-1	0	1	2

2. Оцените стадии использования книги по важности/злободневности начиная с "1", заканчивая "6"

процесс покупки книги	☐
доставка книги из магазина	☐
процесс чтения	☐
использование дополнений (свет, очки, маркеры, закладки)	☐
хранение прочтеной книги	☐
избавление от ненужной книги	☐

Appendix 4 Quantitative survey (English)

1. Measuring your either positive or negative response to the following statements using 5-points scale:

-2- Strongly disagree, **-1** - Disagree, **0** - Neither agree nor disagree, **1** - Agree, **2** - Strongly agree

A) Book purchase					
It is difficult to find where to buy a book you need	-2	-1	0	1	2
The process of purchasing takes much time (e.g. in lines, at the cash desk)	-2	-1	0	1	2
The books you need are not available	-2	-1	0	1	2

B) Book Delivery					
Book delivery takes much time	-2	-1	0	1	2
Large sizes of a book affect your choice of not buying a book	-2	-1	0	1	2
Heavy weight of a book affect your choice of not buying a book	-2	-1	0	1	2

C) Reading process					
Poor quality paper and print affect your choice of not reading a book	-2	-1	0	1	2
Thin cover and fragile paper affect your choice of not reading a book	-2	-1	0	1	2
Bad navigation and referencing affect the choice of not reading a book	-2	-1	0	1	2

D) Using supplements					
Bad illumination affects your choice of not reading a book	-2	-1	0	1	2
It's hard to read books without glasses or contact lenses	-2	-1	0	1	2
You often need marking tools (markers, pencils, bookmarks) when reading	-2	-1	0	1	2

E) Book maintenance					
Books occupy much space in your place of leaving (e.g. shelves, closets)	-2	-1	0	1	2
Books require much efforts to maintain (e.g. dusting)	-2	-1	0	1	2
The rapid invalidation of book content (by new editions) makes you buy less	-2	-1	0	1	2

F) Book disposal					
You can't get rid of books you don't need because you feel attached to them	-2	-1	0	1	2
You cant get rid of books you don't need because they could be "used" again	-2	-1	0	1	2
You cant get rid of books …because you can give it away, donate or lend	-2	-1	0	1	2

2. Order the stages of involvement so that the "1" is the most important (affects the product value the strongest) and "6" is the least important for you personally.

Book purchase	☐
Book delivery	☐
Reading process	☐
Using supplements	☐
Book maintenance	☐
Book disposal	☐