Markku Leino

Celia eLibrary

Process Improvement of eLibrary Services

Helsinki Metropolia University of Applied Sciences
Master's Degree in Industrial Management
Master's Thesis
6 May 2011
Instructor: Marja Blomqvist, Lic Sc (Tech)

PREFACE

'Everything we do today can be done better by concentrating on the process'.

(Harrington 1991, X)

Writing this Thesis has been both a pleasure and also a challenge. I have worked at the Celia library for years, and seen the change from the Braille library into an eLibrary. The challenge has been to be able to analyze improvement work objectively and professionally while at the same time managing the same work. The pleasure has been to see the improvements and the better services the library can offer its customers.

I hope that this project will benefit both Celia library and its customers. The best part of my job at the library has always been a privilege to work with nice and dedicated people who have an important mission.

I would like to thank all my teachers at Metropolia, especially my instructor Marja Blomqvist. Also many thanks to Marjatta Huhta and Zinaida Merezhinskaya, without their guidance this Thesis would not have been finished.

During this research I have learn a lot of that can help me further both in my studies and at work. For all that I am very grateful.

Helsinki, 6 May 2011

Markku Leino

Metropolia

Abstract

Author Title Number of Pages Date	Markku Leino Celia eLibrary – Process Improvement of eLibrary Services 77 pages + 8 appendices 6 May 2011
Degree	Master's degree
Degree Programme	Degree programme in Industrial Management
Instructor	Marja Blomqvist, Lic Sc (Tech)

The topic and the object of this Thesis is CELIA eLibrary, from the point of view of the process improvement of eLibrary services. Celia is a government owned special library for print disabled persons. The library lends and produces digital DAISY audio books, e-books and other materials. Celia wants to use Internet as a distribution and production platform and for this purpose the library must re-engineer and improve its processes. The challenge that the library meets, however, is that the working environment is in constant change, and the amount of customers is always growing. To achieve these goals, Celia must improve its processes to be able to serve these potential customers. The challenge for the library is therefore to improve its processes in order to create new services that will use the Internet as the distribution and service platform. Research materials for this Thesis were the plans that Celia made for the Ministry of Education and Culture, as well as the library's strategies, implemented documents and workshop materials from the development work. For the purposes of this Thesis the researcher interviewed the library employees and also analyzed the old library processes and IT-architechture.

The outcome of this research is the actual description of the proposed new processes as well as the metrics to measure them. The Thesis also proposes that Celia should use its current on-demand CD creation process as a model for future distribution processes. The use of standard user interfaces for the library's IT systems will make it easier to develop new e-service models and will increase its networking opportunities with other libraries both in Finland and abroad. Since the reason for library's existence is to serve its customers, the improved processes will help Celia to develop totally new services using the Internet as its distribution and service platform.

Key words	Digital library, eLibrary, Process improvement, Process re-engineering, Library services, Service models

Contents

List of Figures / Tables / Graphs

List of Abbreviations/Acronyms

ASCII	American Standard Code for Information Interchange
BPR	Business process re-engineering
BTMN	Business Modeling Notation
CRM	Customer Relation Management
DTD	Data type definition
ERP	Enterprise resource planning
ePUB	Open e-book standard maintained by IDPF
HP-UX	A variant of the Unix operating system
IDPF	International Digital Publishing Forum
IFLA	International Federation of Library Associations and Institutions
JHA152	Process modelling / JUHTA recommendation
KDK	Kansallinen digitaalinen kirjasto, National digital library
LTO	Linear Open Tape – digital tape system
PDF	Portable Document Format
Z39.50	A client–server protocol
XML	Extensible Markup Language

1 INTRODUCTION

Celia – the former Library for the Blind - is a government owned special library for print disabled persons. During the past ten years Celia's aim and strategy has been to build a real digital library – an eLibrary. Since 2003, the library main product has been a DAISY book (Daisy Consortium, 2011), which is a structured multimedia book, combining text, audio and pictures. The library has a digital archive and integrated IT systems, which make on-demand type lending possible. On-demand lending means that Celia burns audio books on CD's and sends them to patrons – as the customers are usually referred to the library sector - by mail. Since 2009, Celia has also allowed customers listen to DAISY books in a streaming audio format.

The organization structure of the library is a line organization. Celia has library services and production. Development and IT unit (R&D) maintains IT systems and offers both planning and consultancy to both departments. Celia differs from the other public libraries due to its nature as a producer. The library has digital recording studios, Braille printing works and has outsourced some of its production to India, together with other Nordic libraries and producers. This kind of co-operation can only be efficient, if the processes are in order, allowing the participants to automate the production as much as possible. The correctly planned processes also reduce the cost of production and lending. As a government owned library, Celia needs to think productivity and must keep the costs down.

The pace of the changes has been really fast during the last years. In many cases the processes have changed, and sometimes the management of these changes has not been sufficient. The library has some processes that have no unambiguously defined owners and also the objects might not be clear enough. The reason why the library exists is to serve its customers. Without properly planned, working and skillfully managed processes Celia cannot reach this goal.

The research question is:

How to improve the processes of Celia library for better customer service?

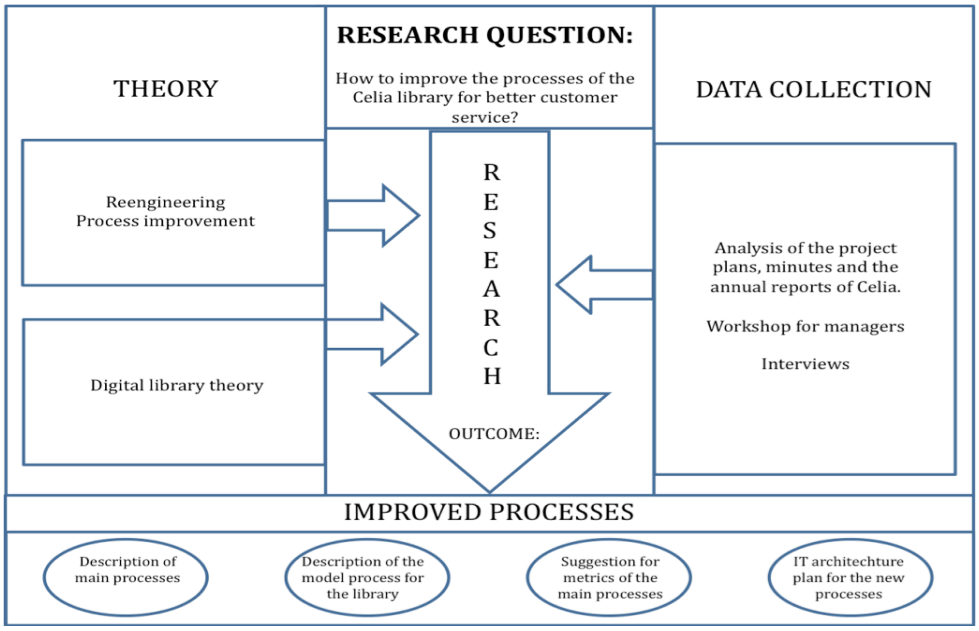


Figure 1. How the research was conducted.

In this study, the chosen research method is action research. Some of the present (2010-11) processes are analyzed and the improvements, plus metrics for measuring the new ones (2011-), are proposed. All the processes exist to provide services to customers. This Thesis proposes some ways to invent new services for coming digital age. In this age, a digital library will need processes that allow libraries to work together and network their functions across the organizational and even country borders.

Other important sources for the Thesis were the plans that Celia made for the Ministry of Education and Culture, as well as the library strategies and workshop materials from the development work. Since the researcher has access to all the library's archives, he was able to use all the materials made during the recent process planning projects. For the purposes of this Thesis, the employees, whose work involved process improvement, were also interviewed. Presently Celia is planning a project called eKirjasto (eLibrary), which among other action will improve the ability of the library to serve the customers. As head of IT and development, the researcher is directly responsible for making project plans. Documenting and improving processes is also an important part of this project, and the proposals for improvement and metrics for processes could be used in the coming years. This Thesis is a part of this long term project work.

2 eLIBRARY PROCESS IMPROVEMENT

Collins and Porras (2002: XIX) point out that they see little difference between for-profit companies and nonprofit visionary organizations. Both of them depend on a timeless set of core values and an enduring purpose beyond just making money. Both also need change in response to changing world, while at the same time preserving their core values and purpose. The structures, strategies, competitive dynamics and economics may vary, but the essence of what it takes to build a great institution stays the same. As a library with an important mission to help disabled people to lead a normal life, Celia's core values have not changed since 1890, when the library was founded. What has changed and is changing ever faster, is the society and the working environment of the library. Digitalization of materials and new distribution methods were a huge leap, which forced the library to think again what are the best ways to serve its customers.

This section will discuss the general approach behind the ongoing changes in Celia library. These theories were chosen particularly because they make it easier to understand what is happening at Celia and why. Two themes are discussed; the first one shows that process improvements can bring many benefits, if properly done and rightly managed. The second one describes how many public sector organizations are in the same situation as Celia. The difference between private companies and public sector working methods is not so obvious anymore.

2.1 Process Improvement and Re-engineering

One definition for the business process includes all services and processes that support production processes. A business process consist of a group or logistically related tasks that use the resources of the organization to provide defined results in support of the organization's objectives (Harrington 1991: 9).

The three major objectives of business process improvement are:

- Making processes effective – producing the desired results.
- Making processes efficient – minimizing the resources used.
- Making processes adaptable – being able to adapt to changing customer and business needs (Harrington 1991: 15).

Originally these processes and the improvement were developed for business. However, nowadays not-for-profit organizations use more and more of the same processes, and therefore, can benefit from the work done in the private sector. A library will reach these objectives only by really knowing its environment and shareholders, plus its customer needs. For Celia this used to be much easier when the customers were mostly blind and visually impaired persons. Presently Celia's services are meant for all print disabled persons, with the largest group being the dyslexic. To be able to serve the customers and make the processes effective, Celia must have better knowledge of its customer groups. Management has acknowledged this need, and there are plans to acquire more information on how the products can better serve the various customer needs.

Hannus (1993: 9) defines core process redesign to be something that questions the traditional functional way of thinking. Core processes start with the customer and end when the needs of the customers are met. Traditional thinking leads to narrowly defined job descriptions and bureaucracy. The aim of the core process redesign is to echance performance. Hannus points out that the new metrics measure both customer satisfaction and the employee content. Core processes have owners and each process has its own meters. These things are important for improvement at Celia, too.

The basic characteristics of business processes are:

- There is always a customer who receives the end-result. Customers can be internal or external.
- The processes go beyond organizational borders and usually they are independent of the organizational structures.
- The performance should only be measured by the point of view of customers (internal or external) (Hannus 1993: 34).

In the next sections, it is discussed how Celia can utilize these ideas. The library would not exist without the customers and the reason for Celia's existence is to produce added value to customers. As Hannus notice, the processes go beyond organizational borders. In the past some decisions on how to develop IT architechture and processes were made with outdated the organizational structure in mind and that has caused inefficiency.

"Re-engineering," properly, is the fundamental rethinking and radical re-

> design of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed (Hammer & Champy 2003: 35).

Michael Hammer, who coined the word "re-engineering" in the 80's, used to say that it was radical redesign of business processes for dramatic improvement. Afterwards, he changed his view and argued that the key word is the process. A process, according to Hannus, is a complete end-to-end set of activities that together create value for a customer (Hammer 1996: XII). Thus, most of the definitions emphasize the customer point of view. Therefore, questions like 'who are Celia's customers' and 'what kind of services do the customers of Celia need' should determine the kind of processes that the library is to develop.

According to Hammer and Champy, re-engineering also means doing more with less (Hammer & Champy 2003: 51). These days the public sector has to do the same cost-benefit analysis and try to use the tax assets as good as possible. In practice, it means that public sector organizations do not try to do everything by themselves. When an organization is outsourcing its business, it must be careful to maintain certain level of knowledge inside the company. Importantly, an organization cannot outsource strategic decisions. If the company does not have the know-how of what it is supposed to be doing, these strategic decisions will be made without the management realizing what it has been done. During the last years public sector has tried to imitate private business - sometimes producing good results, but occasionally also failing. Therefore, the questions that this Thesis tries to answer are: 'Why is it so difficult to use the same principals' and 'Is the working environment different for a library?'

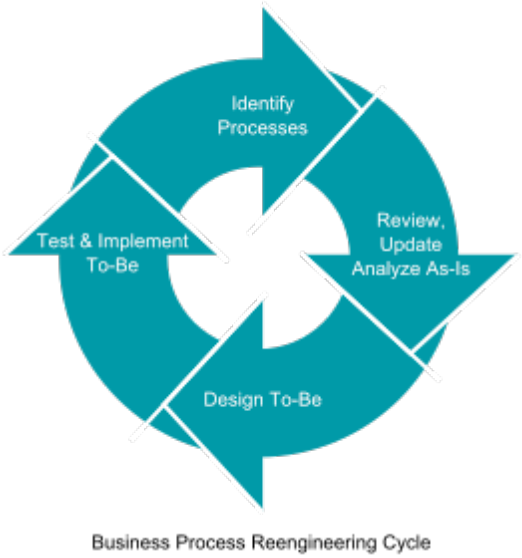


Figure 2. Business process re-engineering cycle. (Wikimedia Commons)

The above figure shows that re-engineering process is a never-ending task. The strategies, plus Action and Financing plans, define where the library expects to find itself in next five years, and what kind of services it wants to develop. To be able to plan all this, the library needs a systematic development attitude. The next sections will describe how this succeeded in some cases and will propose a way to do it better by using the metrics differently to what Celia has been used to.

> The key characteristics of process management are systems thinking, customer focus, goal orientation, focus on value-adding activities, effective use of feedback in modifying operations, and systematic and deliberate process development for performance improvement. Understanding and developing activities as processes is an effective way to implement strategy, achieve customer satisfaction, promote efficiency, and enhance cross-functional and gross-organizational cooperation. Process management is often associated with productivity improvement and elimination of non-value-adding activities. In addition, process management emphasizes the systematic use of tools, documentation and information systems that are integral to sharing good practices and standardizing and automatizing activities. Process modeling often involves the adaption of new information systems, too (Martinsuo & Blomqvist, 2010: 4).

The R&D (Development and IT-unit also called TK-unit in Celia) is mostly responsible for developing eLibrary concept of Celia. The unit also maintains the IT systems. Many of the changes are possible only if the people working in this unit either have the skills to develop systems or know where to buy this information. Thus the process improvement is also a learning experience for the library staff. Champy (1996: 31) defines re-engineering also in this way: re-engineering is a particular way of using our minds, of *minding* our business, of invention and reinvention, constantly checked by the realities and bottom line. Thus R&D should have enough time to investigate different possible solutions, study the options and use the combined skills of all professionals of the library. Managers are indeed responsible to make this happen. They have to create a working environment where people can be inventive, and they have to manage these processes.

New reengineered processes will also cause other fundamental changes. eLibrary is open 24 hours a day. The 24 Hour Society is mainly regarded in terms of shop opening hours. But it is far more than that. Eventually, it will lead to different construction of daily activities, freeing people from the restrains and deadlines imposed at present by the rigid adherence to the clock. We will break away from the thinking that there is a fixed number of hours per day for selected activities and move into a more flexible and free-wheeling approach, co-ordinating activities on the fly (Kreizman 1999: 156). This is a major change for the library services as well. It will affect how customers use the library systems and how the library staff arranges their work schedules. It will also impact the way R&D maintains the library software and hardware. In other words the processes will be totally different from the old model based on the fixed opening hours. In order to develop the necessary user interfaces, Celia has to have knowledge how different customer groups are using the services. Kotler et al. (2009: 243) point how understanding the customer behavior may often be complicated, since many different factors influence human behavior and since many different forms of behavior exist. Therefore several perspectives on consumer behavior should be considered. That is going to be a challenge for Celia because its customer groups are not alike. The question is how to develop processes that will suit all and will be designed to be accessible to all.

Hammer & Champy point that the objects of re-engineering are processes, not organi-

zations. Companies reengineer the work people do on different departments and units (Hammer & Champy 2003: 122). Celia has experimented different organization models during these years. They have changed as the times change. The organization model is not the end in itself. The right organization is the organization that gets the work done. Celia is going to make organizational changes 2011-12, and the aim is to be a real process organization. This is going to be a challenge in many ways. One thing is that the library works in the public sector. There are several important differences between the private and public sector organizations. The picture below describes some characteristics that might make it hard to implement new or reengineered process.

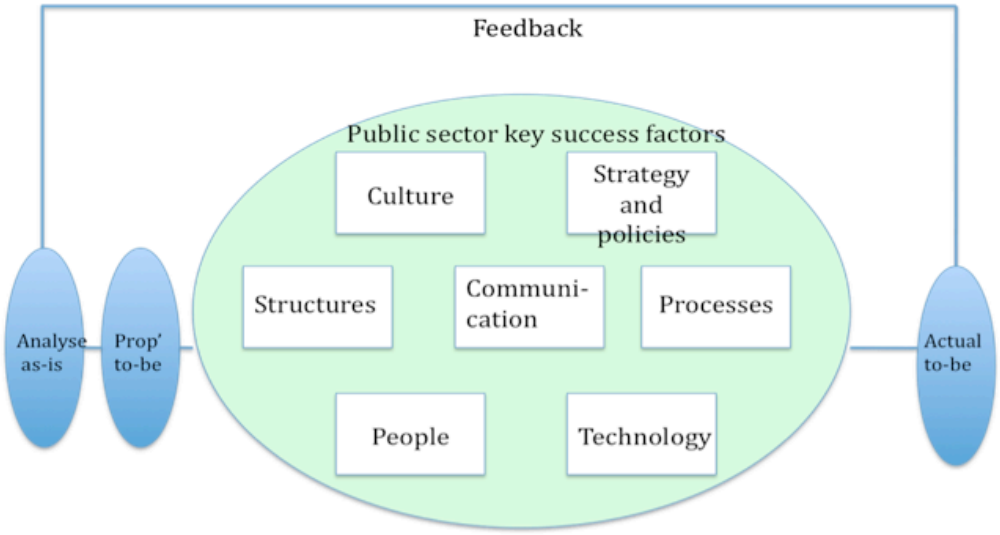


Figure 3. Postulated public sector BPR methodology (McAdam & Mitchell 1998: 162).

Hurton (1996) describes a number of characteristics in public sector organizations, which may have a bearing on BPR or change management implementations. These include: rigid hierarchies; culture; multiple shareholders for many processes; changes in policy and direction which can be sudden and dramatic; overlapping initiatives; a wide scope of activities; the staff. Many of these issues are people related or 'soft' issues rather than process or 'hard' issues. A recent study in a public sector agency, looking at the change management evaluation supported Hurton's findings, and enabled seven key success factors to be defined: people staff; culture; structures; processes; information; technology; strategy and policy; communication. These factors all have special implications

> within the public sector and cannot be generalized under private sector headings. In general, for example, the culture and people/staff factors will be affected more by issues about creativity and empowerment in the public sector than in the private sector. Strategy and policy will in many cases be imposed rather than developed locally. Thus, for each success factor, a plan must be developed which addresses the localized public sector rather than assuming generic private sector conditioning apply. (McAdam and Michell 1998: 164)

For many years the culture of the Celia library was a mix of old volunteer based welfare organization culture and newly adapted public sector thinking. During the last ten years, the library has tried to reengineer also these cultural thought models. Champy (1999, 35) explains how a company's culture cannot be proclaimed or easily manipulated. He assumes that the culture consists of deeply shared values and beliefs of its people, which show up in how the company and its people behave. Because Celia has such a long history, it also has a culture of its own. This is not entirely a bad thing and can be thought as an asset for the managers to use. Obviously the library is unique in Finland and has some advantages in this situation. It stands between the public and private sectors and could gain benefits from both sides.

Kai Laamanen (2010: 11) asks why process management does not succeed. According to him, four most important reasons are that the leadership of the organization has not take the ownership of the processes; the processes do not handle those things that are critical for the success of the organization; leadership has not drew attention to the change management when they created the process model; and finally, the organization does not measure processes and put goals to them. In case of Celia, this is partly caused by the library's history and culture. The idea of using business methods logic is still very new to the library sector. This does not mean that there is a lot of resistance, but rather that the thought is so new. Another difficulty is that there are few real digital libraries to follow their example. As a result, Celia does not have many models to copy or many chances for benchmarking. Therefore, as in many other cases, the library has to develop its own models and processes.

2.2 Digital Library

There are a many definitions for a digital library. Whatever definition one will choose, Celia fits into them. It can be argued that Celia is actually the only real digital library in Finland at the moment. No other library is a producer of media and audio materials at least on the same scale as Celia and Celia's digital archives plus distribution methods are unique.

> An informal definition of a digital library is managed collection of information, with associated services, where the information is stored in digital formats and accessible over a network. A crucial part of this definition is that the information is managed. A stream of data sent to earth from a satellite is not a library. The same data, when organized systematically, becames a digital library collection. (Arms 2001: 2)

> A library in which a significant proportion of the resources are available in machine-readable format (as opposed to print or microform), accessible by means of computers. The digital content may be locally held or accessed remotely via computer networks. In libraries, the process of digitalization began with catalog, moved to periodical indexes, and abstracting services, then to periodicals and large reference works, and finally to book publishing. (Kresh 2007: 2)

The purpose of digital libraries is to bring the efficient and effective search to the Internet. However, in a real digital library, searching is not enough.

> The concept of a digital library is not merely equivalent to a digitized collection with information management tools. It is rather an environment to bring together collections, services, and people in support of the full lifecycle of creation, dissemination, use, and preservation of data, information, and knowledge. There is no single definition for digital libraries. From the information management point of view, digital libraries are systems that combine the machinery of digital computing, storage and communication, the content, and software needed to reproduce, emulate, and extend the services of collecting, cataloguing, finding and disseminating information offered by traditional libraries based on paper and other materials. From the user point

> of view, digital libraries are systems that provide a community of users with coherent access to a large, organized repository of information and knowledge. (Gopal 2001: 1-2)

Almost all materials that Celia lends are in digital format. Usually, those libraries that call themselves 'digital' also lend traditional books and materials. Celia uses functional cataloguing which is a new way to catalog lending materials and is especially fit for digital materials. Cataloguing user interface within the PallasPro library system is functioning as a user interface to the digital archives. Nicholas Negroponte (1995) coined a phrase "from atoms to bits" in the 90's, meaning that everything that can be digitized will eventually exist in digital form. Celia is very close to that situation. A digital library will allow customers access the collection whenever they choose to do so. The services will be partly self-services and let the patrons use library at any time they want, and, as the services are in the Internet, they can access them from anywhere.

The key points for this Thesis from the literature referred can be summarized as follows:

- Private sector and public organizations have their differences. Company culture is a strong force and it can either help or slow down the improvements. Managers can also utilize the company culture when an organization is in the middle of changes.
- The library needs to know its customers and what kind of services they want.
- Process improvement need to be managed.
- Improving business processes means making them effective, efficient and adaptable.
- Process improving is a cycle. For Celia it means that the eLibrary is never complete.
- The use of information systems is important when improving the processes.

These conclusions are the basis for all developmental work at Celia and also the themes of this Thesis.

3 METHODS AND MATERIALS

This section describes the methods and materials of this Thesis. The research approach chosen to apply in this Thesis is action research.

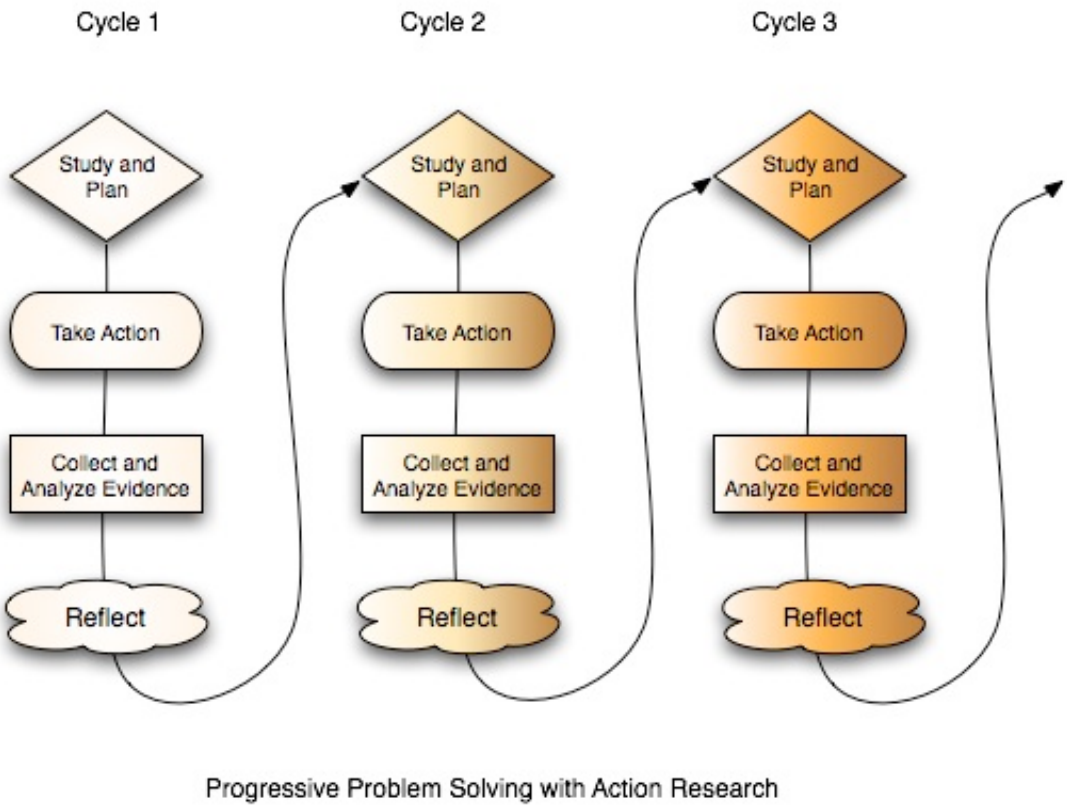


Figure 4. Action research spiral of change. (Wikimedia Commons)

As the above picture shows, the action research has cycles during which the researcher, first studies and plans the action; then, takes action; and finally, collects and analyzes the evidence. After that it is time to reflect before the next cycle starts. This research is the second cycle of process improvements of the Celia eLibrary. The first cycle happened in 2003-2008.

The development and IT unit of Celia did most of the work described in this Thesis during the years 2010-11. The researcher being a head of that unit, is responsible for managing this development work. Having access to all the library's archives, the researcher was able to use all the materials made during the last process planning pro-

jects, plus other materials available in the archives. An important part of the data sources are the library's strategy papers, plans made for the Ministry of Education and Culture as well as workshop materials from the development work.

In this study, three interviews were conducted: one with the project manager in charge of uniting the customer services and another with the person who is involved with the proposed model process. Throughout the writing process the researcher tried to utilize the assignments of the Metropolia and chose to write as much as possible on the subjects of this Thesis. This gave the researcher a chance to develop some thoughts and insights and him me get feedback from the instructors. The researcher also discussed these things with my colleagues at the library and received valuable background information and ideas.

As research material this study also uses the results of the workshop organized at Celia. R&D arranged a workshop 12.12.2010 to develop new ideas for the Internet services. This was also a part of the process improvement work. Most of Celia's managers and two project managers took part in this event. Workshop started with the presentation on library services in general and about library service models. After that the group went through an innovation exercise based on TEKES book 'The Future of Service Business Innovation' by Kaplan and Palmer. The idea of the workshop was to develop a common language between the managers and developer. Also this was a good opportunity for process developers to receive information about the customer wishes.

4 CELIA – FROM BRAILLE LIBRARY TO AN eLIBRARY

Section 4 describes how Celia is serving its customers. The library was founded in the nineteenth century and at that time it lent only Braille books. Nowadays, most materials of the library are digital. The Celia library works under the auspices of the Ministry of Education and Culture and has the staff of 60 people. Celia is the only library of its kind in Finland, which serves print disabled people and also produces some of the lending materials. Celia has more than 13.000 customers, and their number is constantly growing. At the moment, the library has a line organization with the library services and production. Development and IT unit (R&D) maintains the library IT systems and offers both planning and consultation to the library services. The library uses the services and programs of "The Finnish Government Shared Services Centre for Finance and HR (PALKEET)", which means that the processes associated with economic issues have to be arranged in such a way that the financial data can be transferred to the service center.

4.1 Digital Library Services

Celia offers various services to its different customer groups. This section starts with the description of the library's strategy, which defines what Celia is hoping to achieve by 2015 (Subsection 4.1.1). It is important because all process improvements are designed to support these goals. After that, Subsections 4.1.2-4.1.4 shortly introduce the main services of the library.

4.1.1 Strategy and Vision 2015 – Online Library

Celia has a Vision and Strategy document developed until the year 2015 (Celia kirjasto, Strategia ja visio vuoteen 2015). This document defines the library mission statement and tactical goals. The paper is a key for implements and re-engineering processes. The strategy emphasizes the use of the Internet and networking as a major foundation for Celia future. Hitt, Hoskisson & Ireland (2007: 26) describe strategic management process as a rational approach that companies can use to achieve strategic competitiveness and earn above-average returns. This rational approach is also the central

idea of Celia's management. During the last ten years, the library's strategy has been adapt to suit to the fast changing environment. As all the trends show that the Internet is considered to be the most important working environment in the future, the library also headed that way.

The library has formulated a special strategy for the Internet-based service models. The former strategy, written in 2003, has become outdated by now. Presently, Celia aims to engage the full potential of the Internet, such as various Internet-based services, new production models and networking the best possible way. The strategy acknowledges these factors that are critical to success (Koskela & Leino, 2010). R&D-unit wrote a proposal for strategy together with Celia's information officer. The management team approved the paper in November 2010. Many ideas suggested in the present Thesis, were included in the Strategy and Vision 2015 as directions for developments.

4.1.2 On-demand CD Lending

Celia has developed extensive international co-operation with different special libraries around the globe. In 2003-2004, Celia noticed that some of these libraries had changed their production and distribution processes of DAISY books to support the on-demand lending model. A group of Celia's managers visited the Netherlands to see how their production was arranged. After that tour, in 2005 Celia developed the distribution logic of its own and invested in the CD creation systems. During the years 2006-2010 Celia increased the number of the burning robots because of the growing demand for books. As a result, since 2006 Celia's patrons do not need to reserve and wait for the books. Normally, the libraries have a limited number of copies of the books, and if the book is very popular, customers have to make reservations and wait until the copy is returned. In Celia's case, the books are digital and stored within the digital archive. Each time someone wants to lend the copy, the library produces another one. Being a digital, book every copy is of as good quality as the original.

Kekäläinen (2006: 69) believes that efficiency of logistics operations is strongly based on the right distribution of work. This means increased outsourcing of logistics services. Also, more logistics functions and administration of those functions, and even the

entire processes, are outsources to service providers. At the moment, Celia has outsources the distribution of its CDs. The present solution is justified from the process improvement point of view, and the released resources can be used for other purposes.

4.1.3 Online DAISY Lending

At the moment, Celia has three different service models for online lending. Those patrons who are willing and can use the Internet may log into the library's Internet catalog and online service Celianet. These patrons can search for books and lend them. The process transfers the book files into the virtual bookshelf in the distribution server. After that the customers can stream the audio using either reading software, or from the beginning of 2011, a special Internet player. Usually, those persons who are able to use computers do not have Internet capable players; those devices are specially meant for elderly persons. These senior citizens can join the book clubs or use profile services, which mean that the library staff picks the books for these customers. The third service alternative is to call the library or send mail or e-mail. Altogether this means that nobody is left without service.

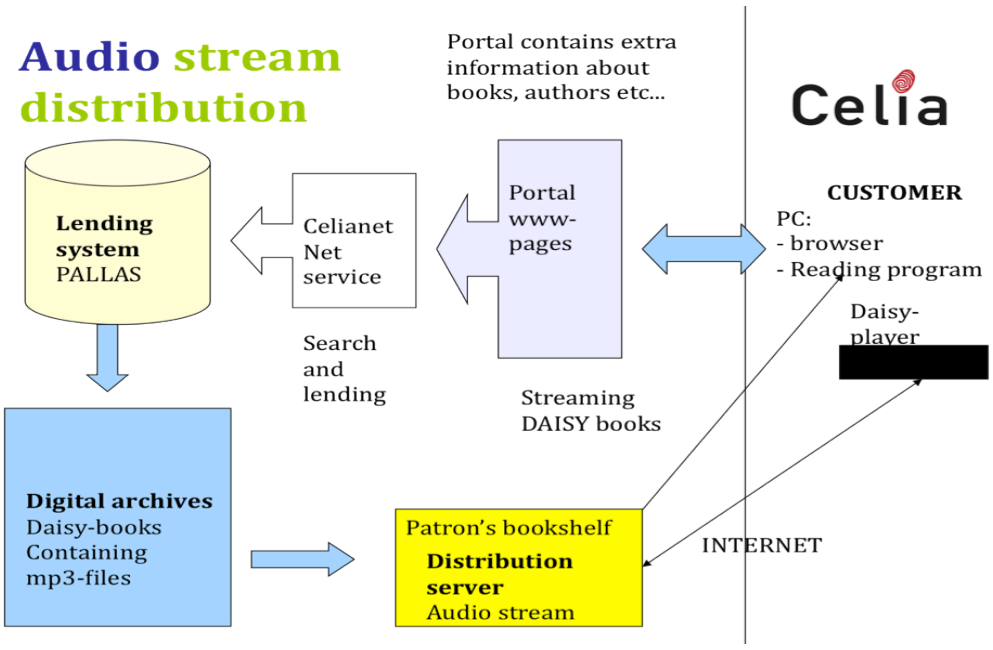


Figure 5. Online audio book distribution in Celia (2011).

Figure 5 illustrates how the online service will work in the autumn 2011. The next improvements will include downloading audio and other materials. Those customers who

use reading software and computers may search and lend book from Celianet. The lending system PallasPro saves the loan information and copies the audio book files from the server to the distribution server. The customer's reading software connects to the distribution server's virtual bookshelf, and the patron can start listening the book. If the patrons use the Internet players, the player connects to the virtual bookshelf automatically.

4.1.4 Production of Textbooks for Education and Leisure Reading

Celia does not only lend the books, but it also sells DAISY textbooks and tactile materials to schools. The distribution channel for this is the online-shop Oppari (Oppari, 2011). All other library services are free for the customers. When the Library for the Blind was founded in 1890 it lent only Braille books. Nowadays, Celia still has printing works for Braille textbooks and for tactile materials that the library produces. The Braille fiction and non-fiction books are printed on-demand; and Celia has outsourced this service to the Federation of Visually Impaired of Finland.

The production statistics show that the amount of leisure and nonfiction books made by the Celia production unit has grown steadily. The number of the textbooks has stayed relatively the same. One explanation for this is that, so far, the students who have been using the books are mostly blind or visually impaired. The size of this group has not changed much during these years.

Books produced and made at Celia 2005-2009

	2005	**2006**	**2007**	**2008**	**2009**
Leisure and non-fiction books	673	846	904	1031	1049
Textbooks	621	530	630	623	649
All together	1294	1323	1362	1416	1490

Table 1. Books produced and made at Celia 2005-2009. (Toimintakertomus 2009: 37)

Total book production 2005-2009

	2005	2006	2007	2008	2009
Leisure and nonfiction books	1356	1464	1378	1620	1582
Textbooks	621	530	630	622	649
All together	1977	1994	2008	2242	2231

Table 2. Total books production 2005-2009. (Toimintakertomus 2009: 37)

The lead time for book production processes differs. The textbooks have a priority, and the process improvement is always needed.

Now when the Celia library's overview is covered, the next step is to view the existing IT systems within Celia.

4.2 Core IT Systems

Public sector in Finland is going to have its IT-architecture models in the early 2011 (Valtiovarainministeriö, 2010). Many public organizations have developed their own systems, processes and databases. These systems do not necessary communicate well with each other. To correct this situation, the State Ministry has developed IT-architechture models. The idea is to use IT-architecture to join the technology and processes. This requires the use of standards in all solutions. As Celia is working under the Ministry of Education and Culture, the library has to follow these plans and guidelines. It is very likely that in the future the state wants its organizations to use service centers for most of the financial and IT-functions. If the organizations have already harmonized their processes and working methods, this change will be considerable easier.

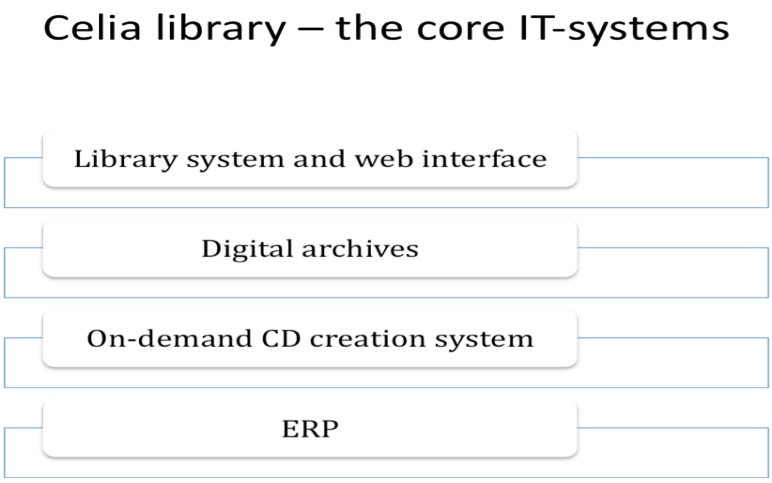


Figure 6. Core IT systems in Celia.

The four core IT systems at Celia are the library system (PallasPro), Digital archive (SAN-archive by SUN Microsystems, ERP-system (Jeeves) and on-demand CD-burning system (Rimage system, software made for Celia by Creanor Oy).

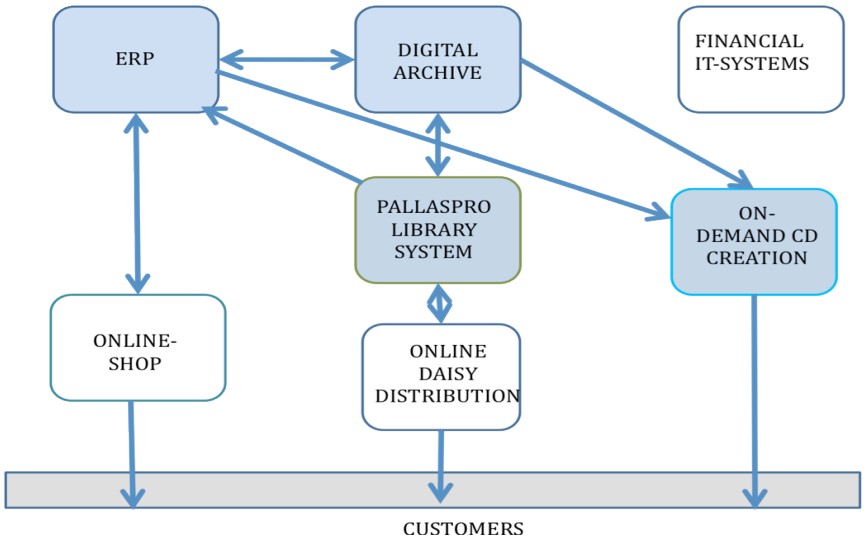


Figure 7. IT systems in Celia and the data-flows.

In the picture, the systems marked as white are outsourced, the blue ones are maintained in-house.

4.3 Statistics and Measuring the Library Productivity

This section describes different statistics, which show how the recent process changes have affected the results of the library. For the purposes of this Thesis, the chosen

statistics show how central the new lending model and distribution process was for the whole library productivity.

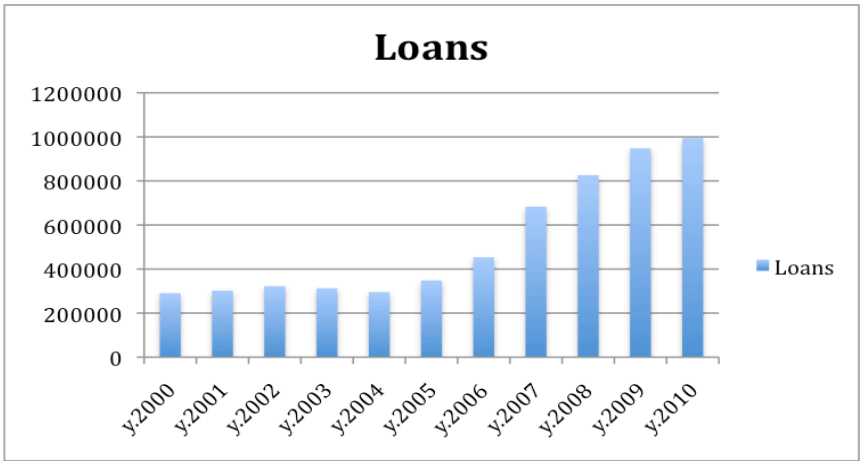
Index	**2005**	**2006**	**2007**	**2008**
Yield index	118,3	120,0	142,2	125,7
Contribution index	101,7	100,6	98,0	95,4
Total input index	100,3	94,8	102,6	123,4
Productivity	116,4	119,3	144,4	131,8
Total productivity	**118,0**	**126,6**	**138,6**	**101,9**
Index base year	**2 004**	**2 005**	**2 006**	**2 007**

Table 3. Indexes of Celia. (Toimintakertomus 2009: 11)

The growing productivity is mostly the result of the risen lending figures and the savings caused by the new lending model (Table 2), which is discussed in more details later.

All public sector organizations are expected to be productive these days. One of the most important metrics of the library is its total productivity.

Book loans 2000-2010



Graph 1. Development of loans 2000-2010.

The figures are adjusted to be comparable. The figures in Graph 1 are produced for the library by the Statistic Finland, which calculates the statistics for government agencies.

Loans 2005-2009

	2005	**2006**	**2007**	**2008**	**2009**
Leisure and nonfiction books	348227	453229	683400	825764	947945
Textbooks	3955	3668	4170	6250	9049

Table 4. Loans 2005-2009. (Toimintakertomus 2005: 4, Toimintakertomus 2006: 4, Toimintakertomus 2007: 4, Toimintakertomus 2008: 5, Toimintakertomus 2009: 5)

Graphs and table 2 show how much the on-demand lending model increased the total lending figures. The amount of books that Celia lent in 2009 is almost three times higher than that in 2005. Most of the customers now belong to different book clubs or order service-packages. The library calls the latter model *profile-services*. Patrons can choose what kind of books they like – of different genres – and after that they receive these books automatically. Obviously the customers can still contact the library and ask whatever books they want to lend, or use the self-service on the Internet. But because the customers do not return the CDs back to the library, Celia saves a lot of money that used to be spend on to postage and storage handling. In the past, the library used to pay the postage expenses for the customers. It is also worth noticing that the use of these services has grown faster than the number of customers (table 4). The lending in 2009 has increased 172 % compared to the year 2005. (Toimintakertomus 2009: 8)

Operating expenses and postage

	2005	**2006**	**2007**	**2008**	**2009**
Operating expenses (1000 €)	5715	5461	5913	7890	7870
Postage (1000 €)	1306	969	529	352	328
Postage % from operating expenses	10,8 %	-33 %	-45 %	-33 %	-7 %

Table 5. Operating expenses and postage. (Toimintakertomus 2005: 4, Toimintakertomus 2006: 4, Toimintakertomus 2007: 4, Toimintakertomus 2008: 5, Toimintakertomus 2009: 5)

This table shows how the postage expenses costs have decreased during 2006-2009. It was the on-demand process that made these savings possible.

Cost per unit €

	2005	**2006**	**2007**	**2008**	**2009**
The average price for book loans	13,37	9,45	6,62	6,80	5,97
The average price for textbooks	284,07	338,02	286,48	297,59	208,15

Table 6. Cost per unit. (Toimintakertomus 2005: 4, Toimintakertomus 2006: 4, Toimintakertomus 2007: 4, Toimintakertomus 2008: 5, Toimintakertomus 2009: 5)

The cost per unit for book loans has also decreased during the time period of 2005-2009. The average price for textbooks has decreased, nevertheless, it is still quite expensive to produce the textbooks.

Summing up, the on-demand process and the new lending model caused the rise in loans, thus making the productivity better and the cost per unit less. However, to keep the productivity at the same high level, the library needs to develop new services and constantly recruit new patrons. The next table describes lending processes and customer services.

Celia's customers

	2 006	**2 007**	**2008**	**2009**
Customers who have used their lending right	**8377**	**10190**	**11829**	**13204**
New customers during the year	1669	2399	2454	2471
Customers per material type				
- analog audiobooks	7379	4594	0	0
- digital audiobooks	5829	9266	11488	12870
- braille books and scores	328	348	348	326
- e-books	378	350	340	330
- children's material (audio, braille, tactile or read together -books)	1555	1532	1768	2076

Table 7. Celia's customers and loans per types of materials. (Toimintakertomus 2009)

The number of customers has grown during the last few years. It is notable that the number of the new customers per year is quite high, but as most patrons of the patrons are old, the time they use the library's services is not very long (See Appendix 1). The situation will be different, if the library can attract more dyslexic customers in future. The estimation is that 6-10 % (Celia, 2011) of population has some form of dyslexia. That would mean hundreds of thousands of potential customers that the library should reach and server. One requirement for the future processes is therefore, that the library should manage the old, new and potential customers more effectively.

Customers – textbook services / Customers 2009

	2006	**2007**	**2008**	**2009**
Customer who have bought materials *) (basic school level and secondary grade)	325	382	791	1546
Customers who have lent materials (university level)	38	50	48	44
Total amount	**363**	**432**	**839**	**1590**

Table 8. Customers / textbook services. (Toimintakertomus 2009: 31)

*) 90 % of the customers are educational institutions in 2009. Institutions can order books to several pupils, therefore the precise number of pupils who use the books is unclear.

In 2008, Celia outsourced some of their customer service's functions. Part of the textbook customer services were outsourced to the company running the online-shop Oppari that the library uses. This decision to outsource and to use the e-commerce solution took off some workload from the librarians working with the textbook services. Schools are buying more books each year, but the number of sold books is not very high.

Personnel

	2005	2006	2007	2008	2009
Employees All together (includes temporary staff)	65,4	65,8	64,83	61,81	57,82
Change from the last year	1,7 %	0,6 %	-1 %	-5 %	-6 %

Table 9. Personnel 2005-2009. (Toimintakertomus 2005: 4, Toimintakertomus 2006: 4, Toimintakertomus 2007: 4, Toimintakertomus 2008: 5, Toimintakertomus 2009: 5)

The above table shows how the number of personnel is decreasing as the amount of loans increases

The conclusions for all these developments are the following:

- Statistics show how much digital library concept can raise the productivity and save the costs. On-demand lending process has been the key process for this.
- Celia wants to engage the full potential of the Internet, like Internet-based services, new production models and networking in all possible ways. These factors are critical to success of the library.
- The amount of customers is growing and there are a lot of potential customers, the biggest group being the dyslexic. It is very unlikely that Celia can hire more permanent personnel because of the public sectors productivity programs. Therefore the improved processes should make self-service an easy and pleasant option for the customers.
- The on-demand CD lending has been raising the lending figures so far; however in future eLibrary distribution solution is propably mainly by online lending.
- On-demand production model is the production model of the eLibrary. Books are reproduced in digital format and will be transferred to the customer when needed.
- The production processes for the books always will need improvement. The shorter leadtime for the textbook is one of the requirement for process improvements.
- Customer service is an important part of the eLibrary. However self-service in the eLibrary does not mean that the human contact is not needed.

- The digital library collects and uses the data to offer services. The data are stored in the core IT-systems. The core IT-systems of the library are integrated.

This section described how the digital library processes can raise the productivity and showed the need for further development work.

5 PAST AND CURRENT PROCESSES OF CELIA

Section 5 describes briefly the original design and documentation of the past processes in 2004, illustrating how, in a few years, the library has transform into a digital library. The major renewal and process re-engineering took place in 2006, when the library started to use the on-demand lending.

5.1 Past Processes

The main processes in 2004 were:

1. Customer management
2. Production planning and production
3. Collection management
4. Distribution
5. Management, development and support service

(Oinonen, 2004)

When the processes were planned and mapped in 2004 the library had different organizational structure. At that time, Celia had library and production departments. When the organizational change took place in 2006, the processes were re-engineered. Hammer (1996: 78) points out that among the major motivations the companies have when they are moving to process centering is to get their processes in order by designing them properly and documenting them well. This is not a job for just one person, but the responsibility for it belongs to the process owner. Documentation can also be used for developing purposes. That is what Celia's R&D has tried to do for the last two years. There is a need for improvements for various reasons:

- Process documentation is outdated or partly missing.
- Some core system interfaces do not use standards.
- Customer information is stored in different databases, instead of being collected in just one core system.
- The processes were designed with the line organization in mind, which resulted in the situation where some processes are overlapping. The library is going to change its organization model in 2012. Before that the library needs process re-engineering.

- Service processes need improvements, so that the library can offer new kinds of services plus offer the self-service alternative to the customers. Section 7 proposes how all these things can be corrected.

In the summer 2010, R&D mapped the processes of on-demand lending as an exercise for the future process renewal. During the mapping, R&D realized that this process and the logic behind it might be the key to some important improvements of the library's systems. The on-demand lending process has been constantly fine-tuned during the past years, and it is working quite well now. This process can be used as a model for future distribution solutions. In eLibrary, the distribution process is central and important. For that reason, it is described in more details below.

5.2 Current On-demand Lending Process

There are several ways how the processes can be mapped and described. For the on-demand process, the library chose BPMN (Business Modeling Notation).

> The Advisory Committee on Information Management in Public Administration, JUHTA, has been set up at the Ministry of Finance to promote cooperation in information management between the State and the municipalities. The Committee plans cooperation in information management, makes reports and studies, and draws up recommendations for the public administration (JHS recommendations). (JUHTA 2010)

> JUHTA recommendation JHS152 suggest that governmental organizations should use BPMN – Business Modeling Notation when describing their processes. It is important to point out that JHS152 does not tell how to do this or how to re-engineer the processes. The material just describes the symbols to be used. (JHS152 2008)

As a government owned library, Celia follows the recommendations of JUHTA, and therefore, the library used BTMN to describe the chosen model process. The following section describes how the current on-demand process is working. After each figure (figures 9-14), there are the key points and ideas that could be used in the future. The

analysis of the ideas and the proposals are written down in sections 6 and 7.

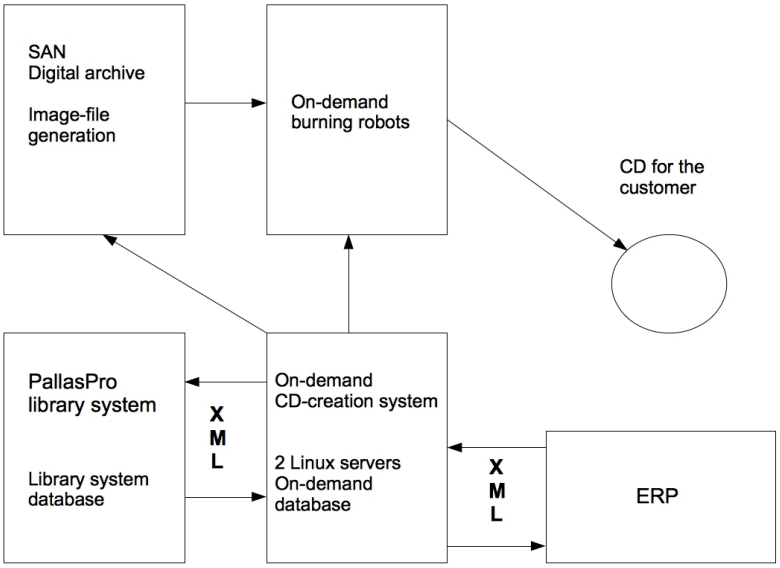


Figure 8. Library and its on-demand system, logic and data flows.

Figure 8 shows how the library system, ERP and the digital archive all take part in this process. Celia uses XML as its user interface between the systems. The library system produces XML-files, which include the lending information – name, address, title of the book, and the path to the audio files in the digital archives. Every morning the operator runs a script, which fetches the XML-files from the library system and imports the data to the database of Linux-server. Celia has special software suite written for managing the CD creation process. There are different kinds of burning sessions. When the books for the clubs or special services are created, the system needs only a few image files, as the same CD (image-file) is lend to a large number of customers. Daily loans have many different titles for smaller amount of customers. Each book – audio files – is stored in the archives, and every time the CD is created the system has, first, to produce an image file to be sent to the burning robot. An image file is an image of the files that will be burnt on the CD. If there are just a few book titles – the same title for many persons - the production is much faster compared to the daily loans when the system has first to produce many different image files. Presently it takes relatively long time to create an image file.

The main findings here are the successful use of the XML-messages between the different IT-systems. The data are moved from the core system to another system with the most important information stored in the database of the core system.

Process improvement can also be done in *one process at a time* with good results. In 2009, as the lending figures increased continuously, Celia noticed that it took ever more time to burn the daily loans. The burning session started in the morning and it lasted long in the afternoon. After burning the daily loans, the operator started book club sessions and left the system running as she left home. If there are no technical problems, the robots – seven of them – could in theory burn 2100 CDs per night. The maximum number of the blank CDs for each robot is 300. At the moment, the production software allows Celia to burn maximum of 1500 CDs per session. R&D suggested that the library should modify the process and burn the daily loans during the night, thus creating the book club CD's during the workday. At a daytime, when there are people monitoring the system, they can always fix the small problems in case of minor production stops. As the system had to make only a few image files, the overall production speed is much faster. If the robots run out of CDs during the night, there is nobody to fill them again. During the daytime this creates no problem and the process is much more efficient. This is a good example of the process improvement Celia has done in recent years. The renewal did not need any technical tricks or new hardware. R&D only analyzed the process and arranged the parts in a new way.

The key learnings are that the process improvement can also be done *one process at a time* with good results. As results, the on-demand process works well, and it allows the flexible use of hardware and the systems.

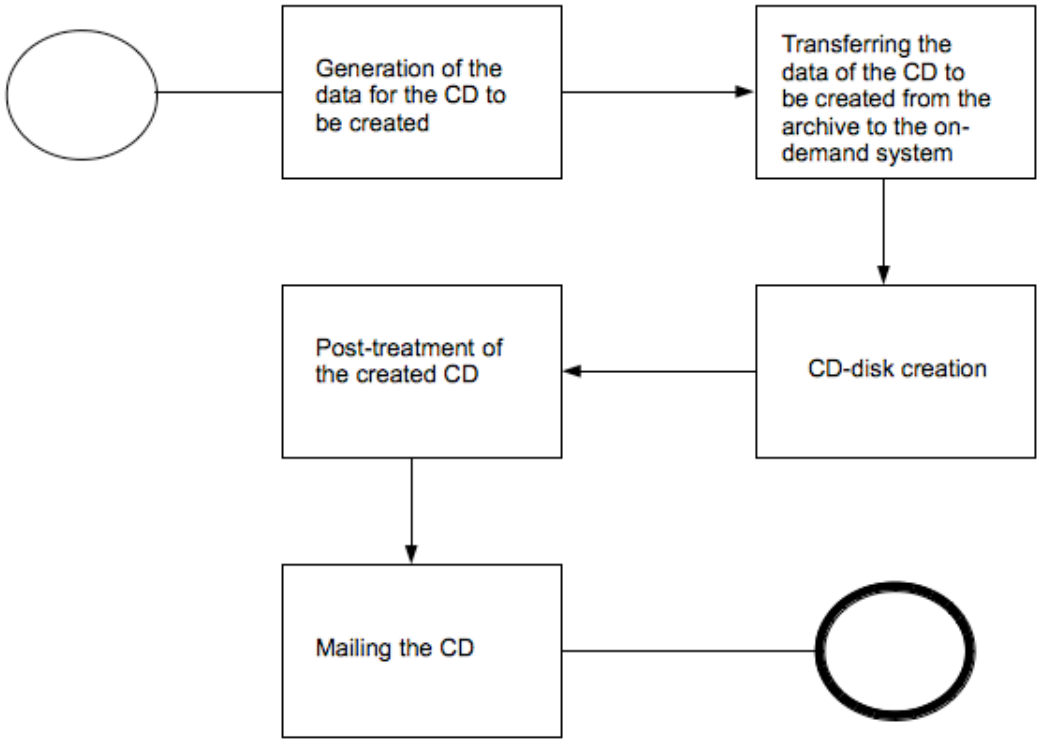


Figure 9. 0-level description of CD-disk creation and distribution.

When the library acquired its digital archives, there was a talk of saving the audio books as image files instead of storing them as mp3 files. However, at that time 2006-2007, saving image files was not a realistic option because the SAN archive was relatively expensive and there would not have been enough storage capacity for both file types. Each book or image file needs an average of 400 MB of storage room, and the amount of the titles was over 20.000 even at that time. Presently, the burning process uses digital archives as a platform to produce image files. This decision was made because the access speed of SAN archive hard disks is fast. The key point is that the digital archive, or distributed archives, are very important as Celia is developing processes for the Internet services or any other distribution solutions.

This process tries to distribute the load equally to all robots. This means that today the burnt disks cannot be sorted by the customer name – at least, quite accurately. As the books are created, the CDs are stored in plastic holders waiting to be mailed.

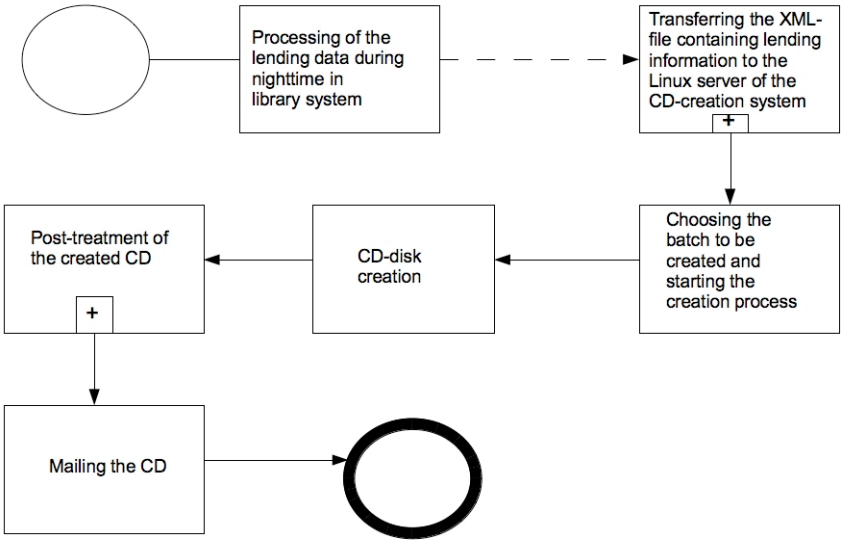


Figure 10. Book creation process / a loan.

The overall process is quite automatic, so if there are no technical problems, and the library does not need more than one person to operate the sessions. Celia produces about one million CDs per year (see Graph 1) and the system needs regular maintenance. The library buys this service from the import firm of CD-robots. The inspection and possible repairs are done once a month. R&D or the operator usually handles and corrects minor problems. The production sessions start each morning at 7:00 a.m. and the last session - with an operator - ends around 6:00 p.m. The last session of the day (daily loans) is run without the operator, during the night. Altogether this means that there are still some free hours to be used for the process if that is needed.

The key point is that the distribution process is a core process. If anything goes wrong with it, the customers will notice that immediately – in this case, the books do not arrive at all or the books are late. Therefore, the maintenance and support services are important and they must be arranged properly, so that the production stops are minimized.

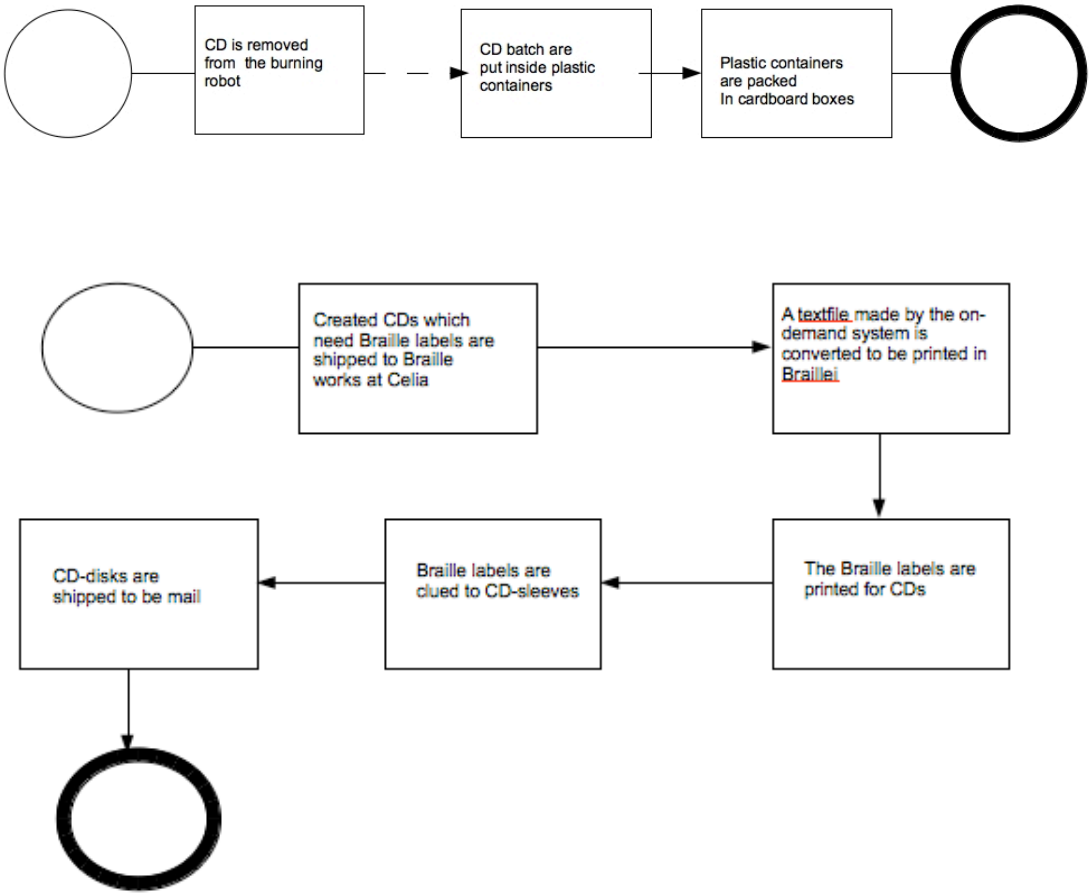


Figure 11. Post-treatment of the CDs, Braille-labels.

Some of the library customers are totally blind and they need Braille labels for their CDs. The system creates text files, which include the required information. These text files are converted into the Braille labels by the print works at Celia. This is an important part of the customer service. All services and products need to be accessible.

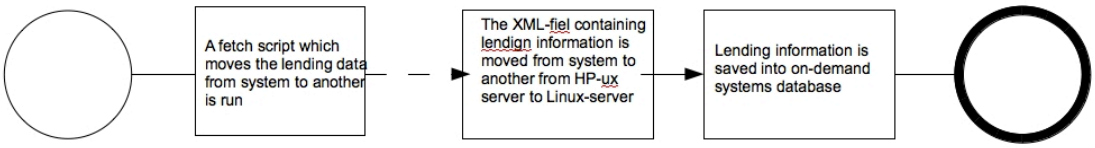


Figure 12. The transfer of XML-file to Linux-server / loans.

The key point is that all distribution processes of Celia – the on-demand lending, streaming and, in the future, downloading of the books – use the same logic. This model makes a distinction between the core systems and the distribution systems. The lending information is produced in core systems and this information – in some cases also the lending copy - is transferred to the distribution systems. The model allows Celia to concentrate developing its core systems and at the same time – if the need arises – to outsource the other systems.

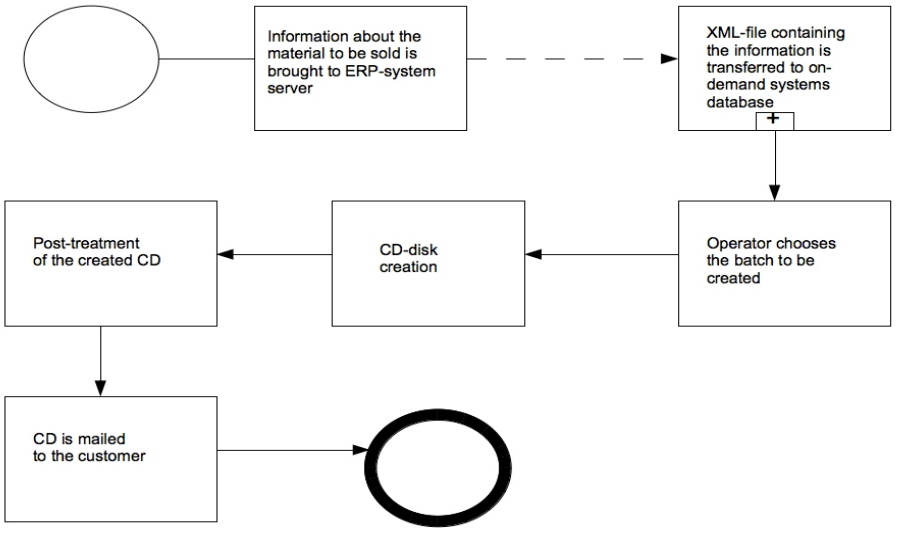


Figure 13. The transfer of XML-file to Linux-server / materials to be sold.

Celia sells textbooks mostly to schools but also to the individual students. The library has outsourced this function as well as the maintenance of the online-shop Oppari. The library ERP system can communicate with the maintainer's respective SAP software. All the sold book CDs are produced daily at Celia.

The important thing to notice here is that the process can get the data from several systems (ERP, the library system).

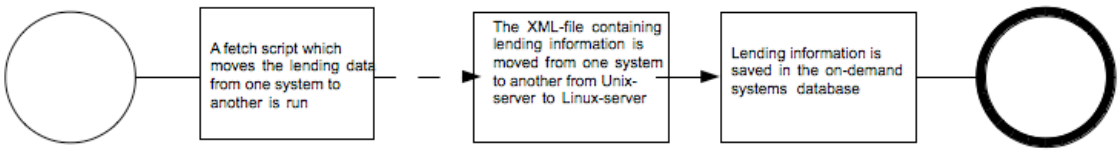


Figure 14. Old process to move the data from ERP via the lending system into the CD-creation system.

Until early 2010, this process was different and the EPR system routed the date through the library system. The process was too complicated and it is now re-engineered. Today, the library tries to keep every process as simple as possible. The lesson learnt is that the process must have a clear objective.

This section described how the processes need improvement and showed how the current on-demand creation process holds many ideas that can be used as models for further development.

6 PROCESS IMPROVEMENTS AND NEW SERVICE DEVELOPMENT

This section analyzes the process improvement of Celia and discusses the requirements for the new processes. The section starts with the discussion on the trends that affect the library.

6.1 Design and Development of New Processes

There are some major global and local trends that have also involved Celia and influenced its developing decisions. Aging population in the EU is one of them. People are living longer, which means that there will be more elderly citizens, who are the potential customers of Celia. By 2050, the number of people in the EU aged 65 and above is expected to grow by 70 % and the number of people aged 80 by 170 % (Health EU, 2011). Those people are well educated and used to getting good services. Moreover, they are IT-literate, so that the services can be built on different kinds of Internet-platforms and digital devices. This is an important point for all services and processes, because in the past it was very difficult to introduce anything related to computers to the patrons. Now the situation is changing. Automation of nearly all service and production processes is possible on a whole new scale. In recent years, many experts have raised a question of who is going to take care of the old people some twenty or thirty years from now. Fewer people are working and paying taxes, and thus supporting pensioners. (European Commission, 2010) Nobody seems to know exactly what is going to happen in spite of different scenarios. New kinds of self-service models for pensioners are likely to be suggested. Therefore, it is possible that a library like Celia could similarly capitalise on its products in the future, sold not directly to patrons, but to other service providers.

Besides elderly citizens, the other new growing customer groups will include, for example, immigrants and the dyslexic. The question is whether the library can design processes and services that would fit all, or should the library services be specified to serve smaller customer groups. This question is directly linked to the way the process improvement should be done. One thing is sure - the services must be of the highest quality, which means effective processes. A customer can be a private person, a library, an organization or an institution. Celia may potentially serve them all selling the

books or other materials. This is a new situation, which calls for new strategy and tactics.

Summing up, the requirements caused by this trend, which call for improvements in the processes of Celia, are as follows:

- Aging population, which will mean more customers. All service processes should be very efficient and should make the self-service possible. The processes also should allow the library to serve the large amounts of new customers.
- In the future, most of the elderly customers can and will use computers or various kinds of smart phones, or digital devices, and the Internet. These processes, therefore, should be designed for the Internet use.

The second important trend for Celia — as a producer of the digital lending materials — is that publishing sector is trying to find new business logic. The reason is that the digital publishing industry is facing considerable changes. E-books are finally making their break through, and the DAISY Consortium is in the middle of these happenings. As a full member of the DAISY Consortium, Celia finds itself in an interesting situation. One of the most used e-text format is ePub (International Digital Publishing Forum, 2011) and DAISY Consortium is the organization maintaining it. ePub is the first generation e-text format, which can only handle texts and pictures. The next generation of e-books will be enhanced books – see for example www.enhancedbooks.com - with rich media content. The DAISY format and standard can offer the tools for that purpose, as both DAISY and ePub standards are merged into one very soon. Therefore, in the long run, the future for DAISY, and the future for all those organizations using and developing DAISY format, might be very promising. DAISY Consortium can offer publishers the tools for creating the next generation enhanced e-books. If the publishers would change their production process and use the new DAISY/ePub format, Celia could buy files directly from publishers and lend them to the customers. This could be a true win-win situation. The publishers could then sell more books, and Celia would not need to produce the e-books — just lend the already accessible files to the patrons.

Summing up, the requirements caused by this trend, which call for improvements in the processes of Celia, are as follows:

- If Celia can get the book files from the publishers in ePub-format, the production model will further change. In some cases, Celia would not need to do any production at all, which would save a lot of money. The production process should be adaptable and flexible.
- Celia should maintain the expertise of DAISY production. This means that the production process should be effective, efficient and adaptable. The owner of the process should keep his workmanship up-to-date.

The third notable trend for the library is the possibility of the international co-operation - on a very practical level. The production processes, distribution and information exchange will need standardized processes and systems that can share information. The common denominator is the DAISY Consortium. The Consortium's most important task is to develop the DAISY standard, but apart from that Consortium is also a forum for discussion and sharing knowledge. Therefore, whatever process development Celia is applying, it most likely can obtain help from the other members of the Consortium.

Thus, the requirement caused by this trend, which call for improvements in the processes of Celia is, the development of international co-operation, which may require that Celia should adapt some new processes according to the selected standards or specifications.

The next section describes how the process re-engineering changed the customer service from the beginning of 2011. The section starts with background information about the organization model of Celia and then analyzes the customers, customer groups and services.

6.2 Customers and Customer Service

The on-going process improvement or re-engineering that is described in this Thesis was concreted with joining the two – library and textbook - customer services in January 2011. It was the first big concrete step towards the organization renewal that is going to take place in 2012. The goal of the all process re-engineering is to change Celia into the process organization. To do it, it is important to understand the background of how and why Celia ended up using the present line organizational model. The following information is based on the researcher's observation and analyses of the

current situation. About five years ago library divided its customers into two groups, which would require different kinds of services and products. The first group was the students and the other one consisted of the people lending leisure reading and non-fiction. To serve these two groups new organization model was designed, and at that time, it seemed like a good solution. However, this model meant that both lines and services required different kinds of IT systems to help them run their own processes. System integration was never fully completed and, as a result, there has been a lot of unnecessary maintenance work. The ownership of the processes is in some cases ambiguous, and these systems are difficult to develop because the common goals are not clear. It is now high time to renew both the organization and the processes.

The requirements for the processes of Celia can be defined as follows:

- All service processes should have their designated owners.
- Duplicate processes should be avoided, and the library should reduce the number of IT systems.

It can be argued that the two customer groups are not really so different. As the statistics mentioned earlier show, the schools do buy books but they mostly acquire them for the students. These students could also lend also other books from Celia. If we look at the library's statistics, Celia does not have a lot of customers in the age groups of 1-30 (Appendix 1). Therefore, it would be wise to direct market efforts to this group, and try to activate them as customers. The process re-engineering, which started by combining the customer services, will hopefully correct this and help the library in the long term to grow a new generation of patrons. It would require the management of the customer's life cycle as seen in Figure 15 below. If we think of how the library should develop both the processes and services, we could ask who is using the service at a certain point of the lifecycle. For example, when a blind child is receiving tactile books from the library, the persons who actually choose the books and lend them are usually his or her parents. In this case the services, processes and user interfaces should be made for parents, not for the child. As the child grows, he would want to read youth books. Then, the process and the service should be different, so that they suit his needs. As a middle-aged man, he would like to lend the books by himself, and therefore the library should offer him an opportunity to use self-service. When he gets old, he once again would like to have somebody to help him use the services. The proc-

esses behind the services should be organized such away as to support all these situations in order to serve the customers and enhance customer loyalty.

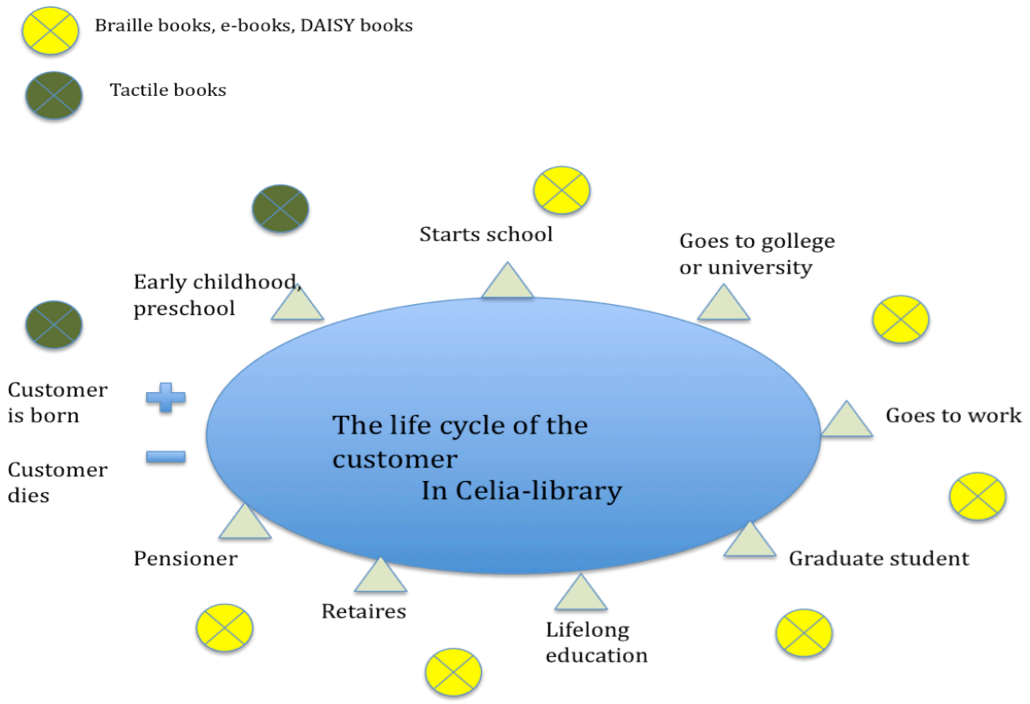


Figure 15. The life cycle of Celia's customer / services and products to offer at each stage.

This Thesis proposes that there are not two types of customers (see section 6.2), but only one, who needs different kind of services as he ages. The requirements for the processes of Celia is that the processes should be flexible enough to serve different customer groups

The library has made many predictions about the future of Celia's customer services. The commitment to DAISY-format and to the Internet, help the library to estimate how to develop the services and improve the processes. Since Celia's main product is the digital DAISY book, it is dependant on the DAISY standards. These standards are under constant development and the next version, DAISY 4.0, is also going to include or merge the ePub format (Daisy Consortium, 2011). When this standard is ready and the production software is updated, it is possible to produce books that are much more interesting for the customers. Furthermore, these textbooks can then handle, for instance, mathematical equations better, so that the students can write the answers inside their e-books. DAISY will also be able to include film and video, making it a real

multimedia product. This kind of multimedia products should be much better, for example for the dyslexic customers.

Another interesting thing is the question of how the customers will use the self-service model and the processes which Celia is now developing. In 24 Hour society, everything is always open and customers can use the systems whenever they choose. At the moment, the present online service of Celia is closed only between 2 am – 4 am, when the library system maintenance is done. That entails several things. First, the obvious thing is that there are no resources to offer any help-desk services 24 hours a day. Celia is a small organization and would need a lot of money to offer a service like that. Also, as the systems should run all the time, it is more difficult to do the necessary software or hardware maintenance or updates. This situation will put a lot of pressure on the R&D unit. Although this is normal for any IT unit, the Celia library this is a new situation. The maintenance processes should be planned carefully, so that R&D could provide good backup and emergency plans. In case of a system crash, R&D also had to have some tested recovery plans and processes. Because Celia has many different user groups, the user interfaces has to fit them all. Celia has always tried to design its web pages according to 'Design for All' principles. The idea is to make everything accessible and that way to serve everybody — no matter who they are and what kind of disabilities they might have. As the web services now include much more multimedia elements than before this is a challenge for accessibility.

The requirements for the processes of Celia are the following:

- The processes should make 24/7/365 services possible.
- The processes should allow the suitable maintenance and support.

In December 2010, Celia's R&D arranged a workshop to discuss new ideas for the library Internet services. This was also a part of the process improvement work. Process re-engineering can also be used to save manpower for Celia. The correctly improved processes save work and the resources can be directed to where they are most needed. At the same time, this trend once again highlights the need for skills to manage the processes.

6.3 Production of Library Materials

Celia library produces two three types of books: audio books, Braille books and e-books. The produced books can be either leisure reading books or textbooks for students. Textbook production is a challenge for the library. For many years Celia has tried to improve the processes of the textbook production. It has been a slow process for many reasons, which include several production steps. One major difficulty has been the lack of proper production software – in Celia's case the right tools for editing XML-files. Celia has a joint project with the other Scandinavian blind libraries (Sweden, Norway and Denmark) and this project has helped the library to outsource part of the XML-production to India. Celia gets most book files for the production from the Finnish publishers. These PDF-files are then sent to India, where several companies convert them into DAISY XML. The files are sent back to Finland and the editors in Celia do the final editing. All transactions use Internet as a distribution channel. The end result is usually an e-book or the Braille book. The XML-files can also be used for audio production. For example, university level books are often made by synthetic speech.

In addition, Celia produces DAISY books in library's own digital studios. Most of the books recorded at Celia are textbooks or university level books. Celia uses human narrators for leisure reading books, but most of the university level textbooks are made with the synthetic speech. The library also buys a lot of audio books from other contractor studios. In the long run this production process could have two aims. One subprocess could concentrate on processing the text files. If the files are not in the DAISY/ePub format, they have to be converted with all the modifications as automatic as possible. Another subprocess would handle the editing of the books, when such editing is needed. There will always be a need for human editors for textbooks because the work requires pedagogical skills: editors have to modify the visual contents in order to describe them to the visually impaired.

The requirements for the processes of Celia can be summarized as follows:

- Processes should allow data transfers from country to country, and in Finland between different organizations and producers.
- Production processes should be as automatic as possible.

To do all this job manually, it will be too expensive, slow and difficult to continue. In the near future, the library may have to produce different variants of the DAISY book for several digital players. If that is the situation, the distribution format should be made as automatic as possible. If possible, these distribution copies should also be deleted and not stored in the archives to avoid intermediate stages.

An eLibrary could use three kinds of production files described in Figure 16.

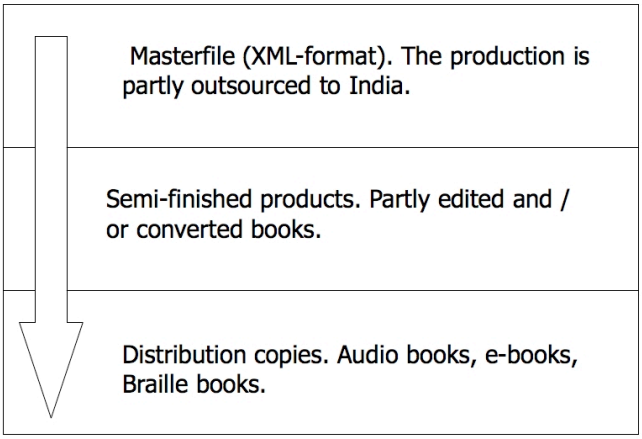


Figure 16. eLibrary production model.

This production model includes three kinds of book-files:

- Master files in XML format.
- Semi-finished files — books that are currently in production.
- Distribution copies of the books.

The aim of fully automatic production is that the master files are always stored in digital archives. Semi-finished books should never be stored in the archives and the distribution copies only if the process is not fully automatic. It will take a lot of work to reach this goal. It may be difficult or impossible to achieve this goal with the books, which need editing to be produced. However, this kind of process is still quite valid as a target for improvements.

The next challenge and a target for improvements are the multimedia books in the DAISY/ePub format. The library has relatively little knowledge how to make these kinds of books for the biggest potential customer group — the dyslexic. The processes for making textbooks have improved during the last two or three years, so that today the production has much better tools than it used to have before. Celia has now time to concentrate more on the pedagogical questions of editing in the future. It might be a good idea to consider co-operation with some organizations or associations representing this special group. It is even more important as the library is also selling these books. No doubt the processes will have to be improved once again, if the production includes more multimedia elements. One way to make the change period easier could be to outsource the library production. Once again, the library should have the proper processes and user interfaces ready for the file transfers and information change.

The requirements as for the processes of Celia concerning its production are the following:

- Production processes should also take into account specific pedagogical requirements. A production process of the DAISY book for the dyslexic might be totally different from the book for the blind. At the moment, Celia does not have enough information about the needs of the dyslexic to develop these new production methods.
- In the future, the production process should be as automatic as possible.

6.4 Distribution of Library Materials

Presently the distribution channels of the library are on-demand CD-creation, on-demand Braille lending, online DAISY lending and the Braille printing works. The user interface between most systems is XML. The four distribution channels should all be handled as one core process.

As mentioned earlier, the on-demand CD-creation process has become a model for the logic behind the new distribution processes and system architechture. There are several reasons for this. During the last five years, there have been only a few times when the process was halted because of some technical problems or other reason. Therefore, it can be said that the process works well for the library. The statistics confirm

this claim. The amount of the books that go through the process has almost tripled (see Graph 1). Also, the current process can work with different IT-systems (ERP, library system). The process is also well defined and well documented and the process owner is known (It is the head of the library services). Moreover the objective of the process is clear. Due to all these reasons this particular process has chosen as a model to streamline other processes.

Ms. Anne Laitiolampi is the operator of the CD creation system. An interview with her was conducted on 4 March 2011. To make sure that all the analyses in this Thesis are correct, from the point of the view of the operator, she was interviewed to discuss the process and its present state. According to Laitiolampi, process as a whole is working well and effectively.

Other two distribution processes, the present on-demand Braille lending and the online DAISY lending need further improvement, but these processes already work very much like the on-demand CD creation. Process improvement of the online lending will be one of the most important tasks of the library. At the moment the Braille printing works of Celia does mostly textbooks and its future role depends on the strategic decisions of the library. The proposed distribution process logic (in Section 7) is almost the same whether the customer uses on-demand services, listens the book online or downloads the files. There are several possibilities to arrange the future distribution process. One very likely model requires the library to use the lending system for recording the transactions, meaning that the customers can log into the system and lend the books using self-service model. If Celia maintains most of the IT hardware as it does, the library will face a situation when the amount of customers who use the streaming or download service will be too high for just one distribution center / point (Celia). For example, there might be as many as 20.000 customers who would listen to books online. Celia would need a lot of bandwidth and servers to make the service possible.

More likely the future model is to have several distribution archives located in different parts of the country. As soon as the customer has lent the book, the future systems may transfer his lending request to the nearest archive, and the book files will be lent from there. Those customers who use book clubs or profile services could also be linked to different archives around Finland. In this scenario, Celia would have one mas-

ter archive, where all the new books will be saved, when they arrive from the studios. This master archive could update other distribution archives daily, or at whatever intervals should be needed. The next requirement for the processes of Celia is, therefore, that the processes should allow to have the distribution archives outside Celia

Information about the customers is the most important data in the library, because it makes all services and customer profiling possible. The library system is a core system and it contains the customer data. Presently the distribution system is not integrated so tightly to the core systems. Most of the hardware of the IT systems could be outsourced. The proposed distribution model (described in Section 7) could also be a part of the bigger network — the global library and its processes. There could be other solutions — like the hypothetical idea of building a network of peer-to-peer computers, each holding the books. This would erase the need to have different archives, and for the customer it could work as well as any other distribution system.

Celia has estimated that if all development work proceeds as planned, the on-demand CD-loans will decrease from 2011 onwards, as the online lending will be increasing. It is been also estimated that the online lending figures will overtake the lending of the CD copies in 2015 (An estimation made by the R&D unit).

6.5 Integrated Digital Library Systems

One of the strategic goals of Celia is to work with other libraries in Finland and abroad. In the digital age this means that the IT-systems must be able to communicate with each other. To reach this goal, the libraries must use similar standards and processes.

Global library concept (Figure 17) was developed in 2008 by the IFLA's Special Library Group, which include libraries for the print disabled. This group also works very closely with the DAISY Consortium and Celia. Global library idea originated from the realization that there are many libraries which use DAISY format and are producing exactly the same book titles in different countries. If the book could be produced only once, with its copies distributed to different countries, it could save a lot of money and resources. Naturally, this idea would mostly benefit English and other global languages. However, English is fast becoming the *de facto* Esperanto of the present day, and there are a lot

of people who would like to listen to books in foreign languages. The biggest hindrances for implementing these ideas are the copyright issues. IFLA's Global Library Group has concentrated on solving these problems, and in 2009, they published a model for global distribution of the DAISY books. This work still continues on many arenas around the world. The global library concept is illustrated in Figure 17.

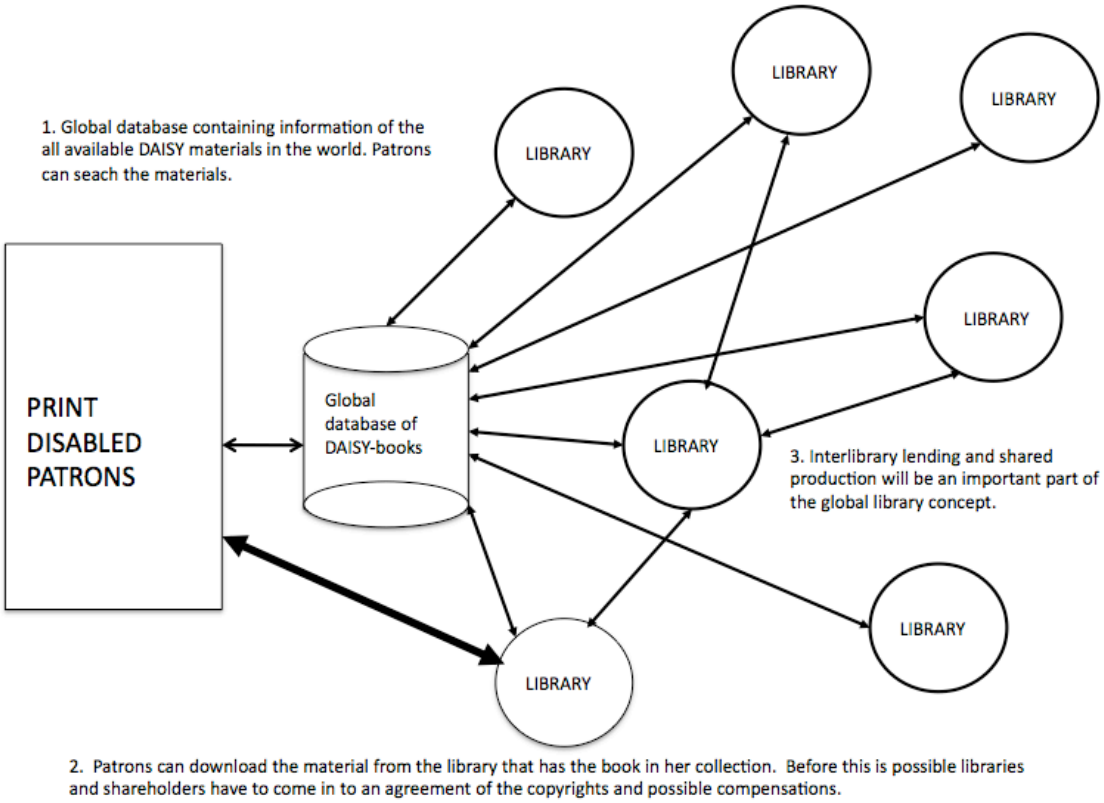


Figure 17. Global library concept.

The new processes — proposed in this Thesis — will suit into these new co-operation models. The future automated download processes could use the metadata for different purposes, such as helping the search engines to find the books wherever they are located in the world. After the customer has found the book, that she or he wants to read, the IT systems could either direct the customer to the nearest library or distribution center or perhaps allow them to download the files.

Another challenge for the integrated digital library of the future is the use of the unified standards. National Library in Finland has recently started the National digital library project. National Library has defined the user interfaces that are necessary if any library wants to be part of their project and share the databases. In the fall of 2010

National Library announced, that it had made a deal with Ab Axiell Kirjastot Oy, which is going to provide the raking interface and web services for National Library. (Kansalliskirjasto, 2010) As Axiell is also the provider of Celia's library system that should guarantee that the information change is going to work with small adjustments. If Celia wants to be a part of the National digital library (KDK / Kansallinen digitaalinen kirjasto) it might also have to have a raking interface for ERP system. The requirement for the processes and IT-systems of Celia is that Celia should use standards every time it is possible (IT standards, library standards developed by the National Library, DAISY standards)

Collections of the digital libraries are not the same as the book collections of the traditional libraries and should be treated differently. Whenever the digital libraries want to integrate their systems they are also at the same time building a global archive. Cataloguing systems and digital archives will be very central for eLibrary. Wired Magazines editor Chris Anderson (2004) wrote six years ago his famous article 'The Long Tail'. In this article – and later in his bestseller book – he describes how niche markets can be profitable. For example some books may not sell very many copies per year, but in the long run they can bring money to vendors. In case of the digital library it means that collections should be managed differently as the libraries normally do. The traditional library model tells to delete older books when the customers do not want to lend them anymore. New process model is different. As storing of the books do not cost much, the library should now have as much books as possible and manage their collections in a new way. IT-technology gives Celia the tools to dig deep inside the data and to profile customer needs. The processes should support this and help Celia to offer customers some books that he or she otherwise would not think to ask. Celia should gather all information it can about the customers and loans. Most likely the library can use the data later and offer new added value to customer. Also Celia should store all the books and articles and whatever products the library has. Celia may not use them now but the materials will be valuable in the future.

Another likely challenge for the library is the need to produce different kind of high quality distribution copies for different players or software agents. Internet-based services and the efficient production of the new kinds of digital books is impossible without the digital archives. At the moment the archives hold mostly the master and distribu-

tion copies. Master copy of the audio book is in wave file format, and the distribution copy is in mp3 format. The sound quality of the master copy is much better than the distribution copy because all compressed files lose some information during the compression process. In the near future the library might need to make new distribution copies for various reasons. In that situation it is better to make the distribution copies from master files. This way the sound quality is of high standard. This might be a real situation not far in the future as there are more and more devices and players that can access the Internet and are capable to play audio books or read e-books. These new devices can use the new file formats or books that are compressed differently than what the library has now in its archives. Therefore the requirement for the processes and IT-systems of Celia is that all processes should be interrelated. In the eLibrary there are not sole independent processes. All processes should be connected and the new model should provide for it.

The conclusions to Section 6 are that the digital libraries need standardized user interfaces and interfaces between the different IT-systems. The processes need their designated owners, who also develop the processes. Customer data, and the effective use of the databases for profiling the patrons and developing new services are essential. Internet will be the distribution and production platform of the future. Therefore, the well designed distribution process is the key to good services.

7 PROPOSALS AND CONCLUSIONS

This section draws the final conclusions and proposes a new and improved model for Celia's processes. This section also includes a proposal for metrics to measure these processes.

7.1 Implementation of the New Processes

This section describes the proposed new processes, designed during the summer and fall of 2010. These processes answer the requirements presented in Section 6. Using these proposals Celia can minimize the manual work of the library staff. The library is also able to offer new and accessible web based services to its customers. On this level the processes are about the same as the old ones mapped in 2004. This is because library's mission and purpose is still the same.

Figure 18 illustrates the main and core processes which constitute the core of the proposal.

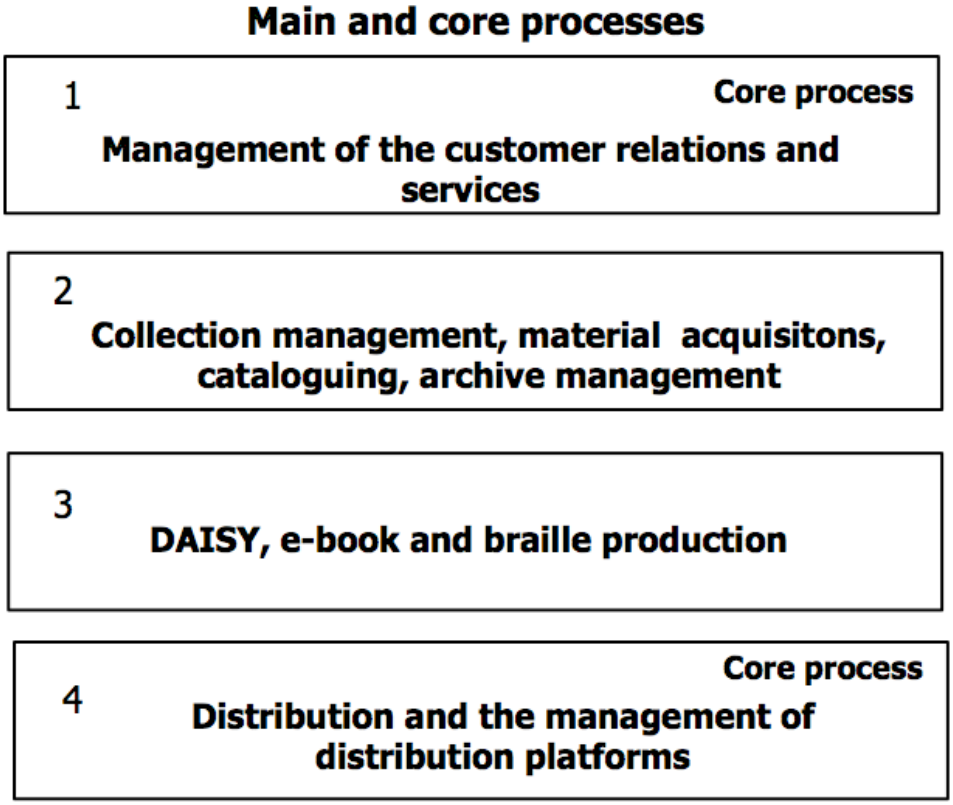


Figure 18. The proposed main and core processes. (The basic model)

As illustrated in Figure 18, the updated four main processes of Celia library should include:

1. Management of the customer relations and services.

The objective of this process is to plan, market, manage customer relationships, and give the customers support for the services the library provides. The essence of the digital library is efficient service. This is a core process.

2. Collection management, material acquisitions, cataloguing and description, archive management.

The objective of this process is to plan library's book production, handle material acquisitions, cataloguing and manage the digital archives. Material selection and especially cataloguing makes sure that the book data, information and metadata are stored in the library system.

3. DAISY, e-books and Braille production.

The objective of this process is to produce DAISY and Braille books. Production can also be partly or wholly outsourced.

4. Distribution and the management of distribution platforms.

The objective of this process is to handle the distribution of Braille and DAISY books and manage the Internet distribution platforms. This process is also a core process.

Figure 19 presents the comprehensive model of the proposed processes.

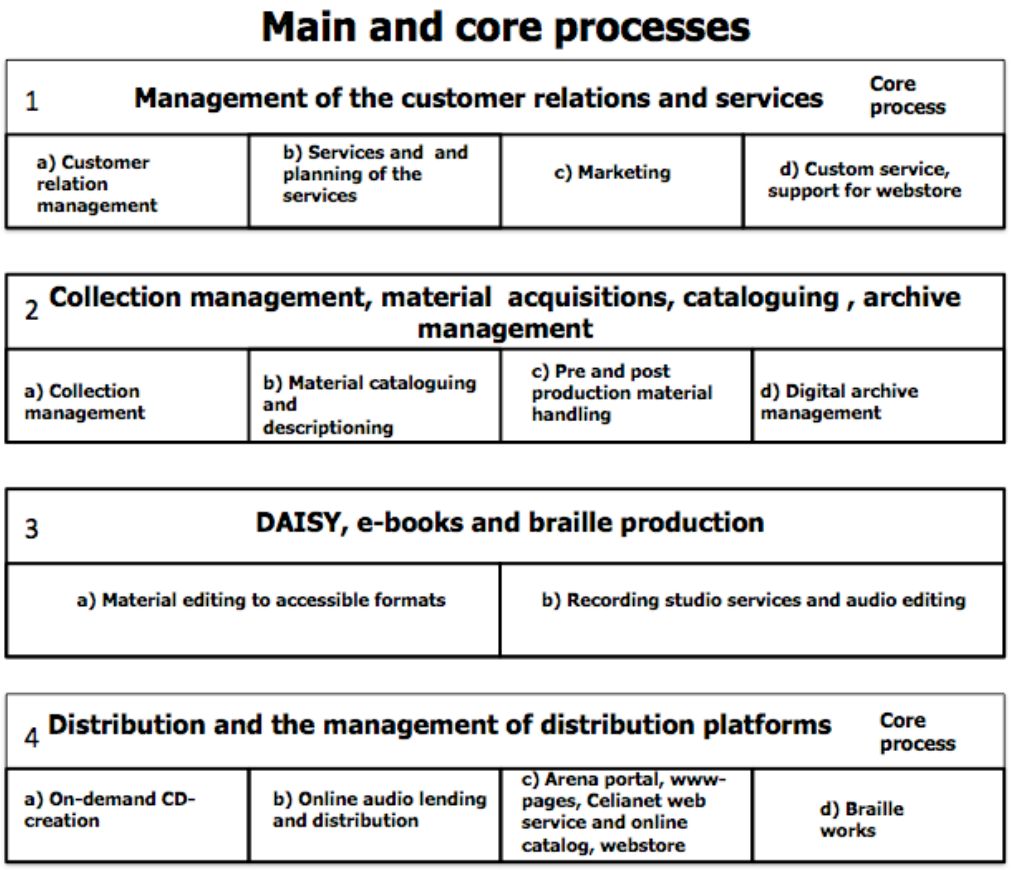


Figure 19. The comprehensive model of the proposed processes.

Management of the Customer relations and services

Process 1: Management of the customer relations and services

This renewed process will address the requirements presented in Section 4.3, namely: The library should be able to manage the old, new or potential customers more effectively.

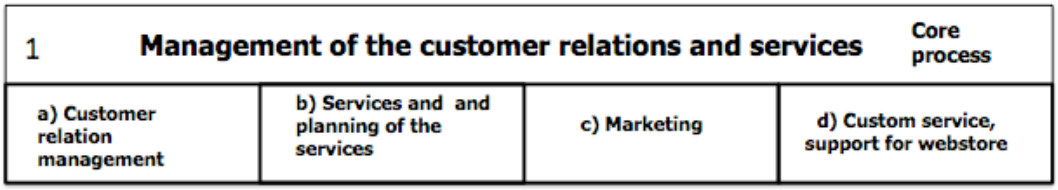


Figure 20. Management of customer relations and services process.

Figure 20 illustrates the management of customer relations and services processes, which are described more detail below.

Process 1, Part A: Customer relation management

If the estimations are correct, there will be a lot of people who would be entitled to use library services, but do not know about it yet. Apart from the dyslexic there are number of old people who don't know that the library exist. Therefore the library should also inform the social sector workers and doctors about Celia. They could help the library to reach the new customers. For all this Celia should use customer relation management.

This process requires a lot of manual work, and probably would require in the future. Traditionally the customers are interviewed on the phone when they start lending. The library asks the patrons about their needs, and the interview also allows Celia to market the library's services. New process will use the library system to store the customer information. In the future, if there is a need for more automatic customer relation handling, this Theses proposes to consider acquiring CRM software.

Process 1 Part B: Services and planning of the services

This renewed process will respond to the requirements presented in Section 6, namely

Aging population means more customers, therefore, service processes should allow more self-service.

Most of the customers of the future will use computers and the Internet; consequently, the processes have to be designed for the Internet.

The library has to know the needs of each group of the customers, such as immigrants, the dyslexic or elderly citizen. Planning the services will be more important in the future as before. The best way to bring the services into digital world may not be to try to move the old services into the Internet but try to develop something totally new. This process is very important and the angle is also still fresh to the library sector.

This process should produce services combining self-service with human contacts from the library.

Process 1, Part C: Marketing

Marketing is becoming an important part of the library work. When the processes were mapped last time in 2004, the library did not yet realize how important the marketing was. Now, this function is included in the core process and it supports all service efforts. Celia has to gather a lot of information for the use in this process. The library needs to do marketing research, as well as produce more marketing and promotional materials.

Process 1, Part D: Customer service, support for the webstore

The renewed process will answer to the requirements presented in Section 6, namely: *Duplicate processes should be avoided, and the library should reduce the number of IT systems. Processes should be flexible to serve different customer groups and use personalized user interfaces.*

Celia estimates, that with the growth of the Internet services the need for the customer services will also increase. Different customer groups will need different support services. The library has outsourced some of the services such as the online-shop. If Celia wants to run the store as a part of the library's systems, the library must have the support processes ready. The process was re-engineered during 2010 and some things may still be improved. From the customers point of view, Celia has now only one customer service they can contact.

Process 2: Collection management, material acquisitions, cataloguing, archive management

As illustrated in Figure 21, Process 2 consists of 4 sub-processes, which are described in details below.

2 **Collection management, material acquisitions, cataloguing , archive management**			
a) Collection management	b) Material cataloguing and descriptioning	c) Pre and post production material handling	d) Digital archive management

Figure 21. Collection management, material acquisitions, cataloguing, archive management.

Process 2, Part A: Collection management

Collection management, including material selection, acquisitions, collection and production planning process, makes sure that the library collection stays comprehensive. For a special library like Celia, to maintain and develop its own collection is essential. Celia cannot lend large collections of Finnish audio books from anywhere else. Therefore this process is closely related to archive management. This process needs to develop different core systems and should also establish connections outside of the library. The process would use web stores to buy the books for the library and would require the use of the databases of other libraries. In some cases the books are borrowed from other libraries. All these things will make the process faster than the present one, which means that the audio book production times will equally be shorter.

Process 2, Part B: Material cataloguing and descriptioning

Another step in process 2 is cataloguing. It can start by downloading the book information from the database outside of the library. Open system idea and standard user interfaces are the key things for it. The library can buy this data and modify it to suit Celia's cataloguing needs. Celia uses the functional cataloguing, which is very rare. Functional cataloguing is a way to describe different digital materials and therefore it suits the eLibrary.

Process 2, Part C: Pre- and post production material handling

The production of lending materials could not work without pre- and post production material handling. This renewed process responds to the requirements presented in Section 6.

Processes should allow data transfers from country to country, and in Finland between different organizations and producers.

It is very important that the systems hold updated information about the status of the production. This information is vital to the library staff, but also interesting to the customers. Both the library system and ERP can be used for this purpose. The process also allows the library to get book files from other producers in Finland or abroad.

When the producers send the produced books to the library the materials are inspected. If the books meet the requirements the books are accepted into the collection. The information – what the digital book files also are – is moved from one checking point to another as soon as possible and then into the archives ready to be lend. The old manual process steps are removed and IT systems help the logistics steps.

Process 2, Part D: Digital archive management

This renewed process will respond to the requirements presented in Section 6, namely: *Celia should use IT-standards every time it is possible.*

Digital archive management is a new thing to the library, but Celia thinks that the significance of that process is growing. As almost all materials are now in digital format they can be used in the new way. DAISY books allow the library to make different kind of combination of text, pictures and audio for customers. The management of the digital archive must help the production staff to use the book files with ease. One of the most important ideas of all process improvement at Celia is the use of standards or specifications whenever the systems are integrated. Compared to the old processes this standardization lessens the need to invent new solutions every time some system or process needs improvements.

Process 3: DAISY, e-books and Braille production

As illustrated in Figure 22, Process 3 consists of 2 sub-processes, which are described below.

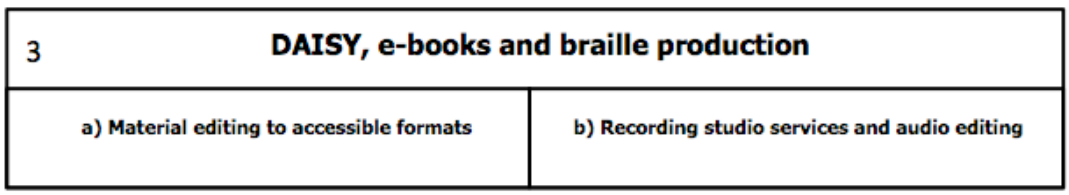


Figure 22. DAISY, e-book and Braille production.

Process 3, Part A: Material editing to accessible formats

This renewed process will respond to the requirements presented in Section 6, namely: *The production process should be adaptable and flexible.*

If Celia could get the book files in ePub-format the production model will change.
The production process should be as automatic as possible.
Production processes should also take on account of specific pedagogical requirements. A production process of the DAISY book for the dyslexic might be totally different than the book for blind. At the moment Celia does not have enough information about the needs of the dyslexic to design new production methods.

DAISY and Braille production make sure that the books are ready when needed. This process includes both making and producing the books in Celia and also managing the outsourced producers. Short production time and the timing of production are essential with textbooks. Students need their books just in time before the courses start. Library- and ERP systems give system support to the process. In the future this process can be improved further by knitting it even more to the cataloguing process. The new process takes on account that the ePub format might save some production work as described before. Process could then use scripts and programs to convert the ePub files into other formats. Celia has to keep these processes up-to-date as the DAISY format develops.

Production should be allowed to concentrate on producing the books and let the other processes to help them to do that. This new improved process model will make that easier and makes the leadtime of production shorter. That was one of the requirements to the improved process. Older processes had more manual operations. The aim is to make the production as automatic as possible.

Process 3, Part B: Recording studio services and audio editing

This renewed process will respond to the requirements presented in Section 6, namely:
International co-operation may require that Celia adapt some processes according to selected standards or specifications.
Celia must maintain the expertise of DAISY production. This means that the production process should be effective, efficient and adaptable.

The library should try to be the centre of expertise in DAISY production. The constant process development helps to do that. Celia must also be prepared to re-engineer the production processes according to the DAISY Consortiums specifications. This new

process must be kept flexible and the process owner is responsible to follow the development work of the DAISY Consortium.

Process 4: Distribution and the management of distribution platforms

As illustrated in Figure 23, Process 4 consists of 4 sub-processes, which are described in details below.

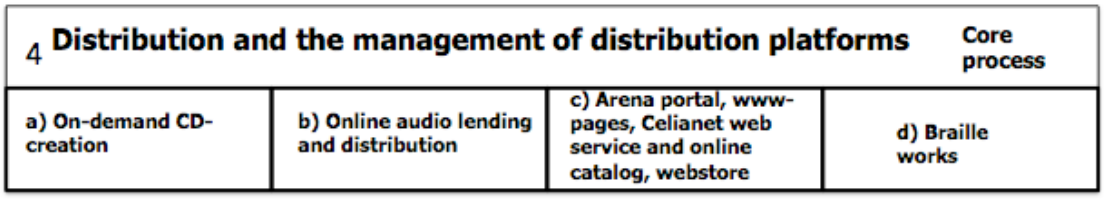


Figure 23. Distribution and the management of distribution platforms.

Process 4, Part A: On-demand CD-creation

This renewed process is a model process for future distribution.

On-demand CD creation will continue as long as needed. Only when the online lending replaces this distribution method the process is not needed anymore. The process will be improved whenever the need arises. This process is also tied to the DAISY players. Older players play only CD's and cannot be connected to the Internet. Most of the customers have these types of players. If the production of blank CD-disks stops, then Celia has to find other ways to distribute the books whatever the situation is with the online distribution. However the library estimates that this is not going to be a problem for many years.

Process 4, Part B: Online audio lending and distribution

This renewed process will respond to the requirements presented in section 6, namely:

The processes should make 24/7/365 services possible.

The maintenance and support processes should be possible to arrange in 24/7/365 world.

The processes should allow to have the distribution archives outside Celia.

This is also one of the most important processes. The process itself is constantly improving. The process logic is described in details in this Thesis and the logic has been tested with the on-demand services. This process demands a lot of support. The service is going to be 24/7/365. Library has planned how the technical support and also customer support is going to be arranged.

Process 4, Part C: Arena portal, www-pages, Celianet web service and online catalog, online store

This renewed process will respond to the requirements presented in section 6, namely:

All processes should be interrelated. In the eLibrary there are not sole independent processes. All processes should be connected and the new model should provide for it.

Web services are the user interfaces to Celia's services. The process makes sure that the service is accessible and that the information is accurate and updated regularly. The process owner is responsible to name the people maintaining information.

Process 4, Part D: Braille works

The proposed Braille works process is more automated than the former one. Also in the near future the library can utilize new production technologies like 3D printers. The process aims to reduce the time for production.

Also one more requirement mentioned in former sections is that all processes must have proper owners. This goes for all new processes.

In this Thesis the writer has refer many times to the on-demand CD creation system and the logic behind that process. This Thesis proposes that the simple logic behind that process will help the library to secure the distribution services of the future.

The key ideas for the future distribution methods are as follows:

- Identify the core library systems.
- Core systems should not be outsourced, while all the others can. (Celia can buy the maintenance and support services from other providers but the library cannot and should not outsource the real development of the core systems.)

- The process should start with the core system and end with the distribution system. The only possible exception is the online store.
- Customer information and the lending history should be stored in core systems.
- If the customers lend the books by themselves — for example through using the library systems web service — they access, first, the core systems (Master Database) which should record the transactions in the core system.
- All other databases used by the process should be secondary.
- XML is used as the interface between the systems.
- The library should use only the approved standards, when integrating systems, and keep all its documentation updated. The used standards are defined by the State Ministry (Public sector architechture model), National Library of Finland (standards of the National Digital Library) and DAISY Consortium – for example the DAISY Online specification.
- Whatever the distribution method is, the customers should not access the master digital archive. They should only be able to get the copy of the original digital material. All distributed books and materials should be the copies of the originals stored in the master archive.
- The library should delete the distribution copies after customers have received them.
- If it possible, the library should save only master files and create the distribution copies on-demand.
- The same logic should be used in the future for the automatic production of the distribution copies. *(For example, imagine that in the year 2026 the customer wants to lend an enhanced DAISY book. The system gets the master wave and other files from the archives, moves them to the distribution systems work area, and reads the information send by the customer mobile phone. Then the system modifies the data according to this information and optimizes the book for the mobile phone player. After the customer has downloaded the book, the distribution copy is deleted from the server.)*
- The library should stay creative and open to new trends to be able to implement the future visions like the one above.

The Proposed administrative and support processes

Administrative and support processes make sure that other processes serve the customers. Celia has noticed that these processes seem to need more resources now. Automation or outsourcing does not always mean less work. On the contrary in some cases the amount of work can grow. For example, in 2005 Celia has three IT-persons working at the library. In 2011, the amount is five. A governmental organization needs establish the processes that have user interfaces to other public sector organizations. More and more the IT and financing tasks are done at the State service centers. The improved processes should be standardized according to the rules and regulations of the public sector. Therefore the proposed administrative and support process model for Celia is to use as much standardization as possible and, if possible, avoid using own modified processes. This will save a lot of work and money in the long run.

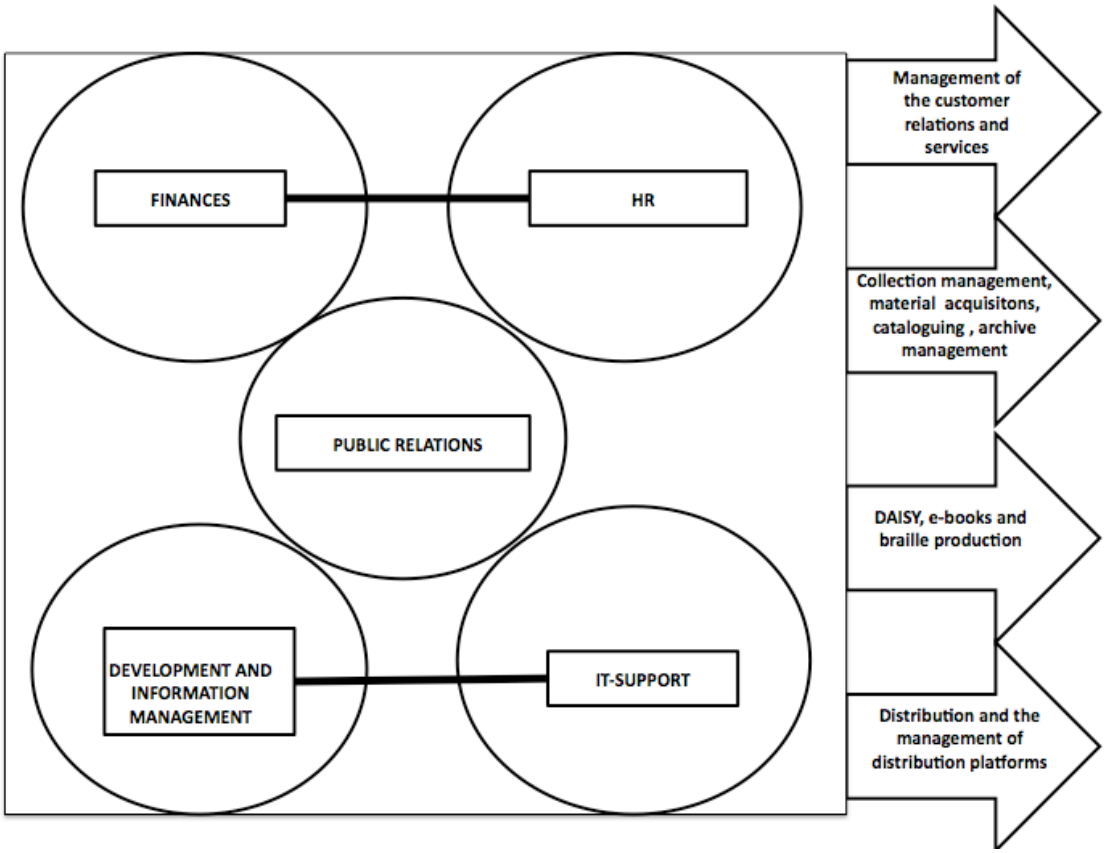


Figure 24. The proposed administrative and support processes.

Figure 24 illustrates a comprehensive administrative and support processes, which should address all above mentioned challenges.

During the last three years 2007-2010, Celia has been going through a lot of changes. For example, the role of information coordinator has increased, who is also the owner of the marketing process. When the development work continues, it is likely that some of the process owners will change. In eLibrary, the process owner does not have to be a member of any particular unit or team. *The eLibrary is a process itself, and it is not built on or for any special organizational model.*

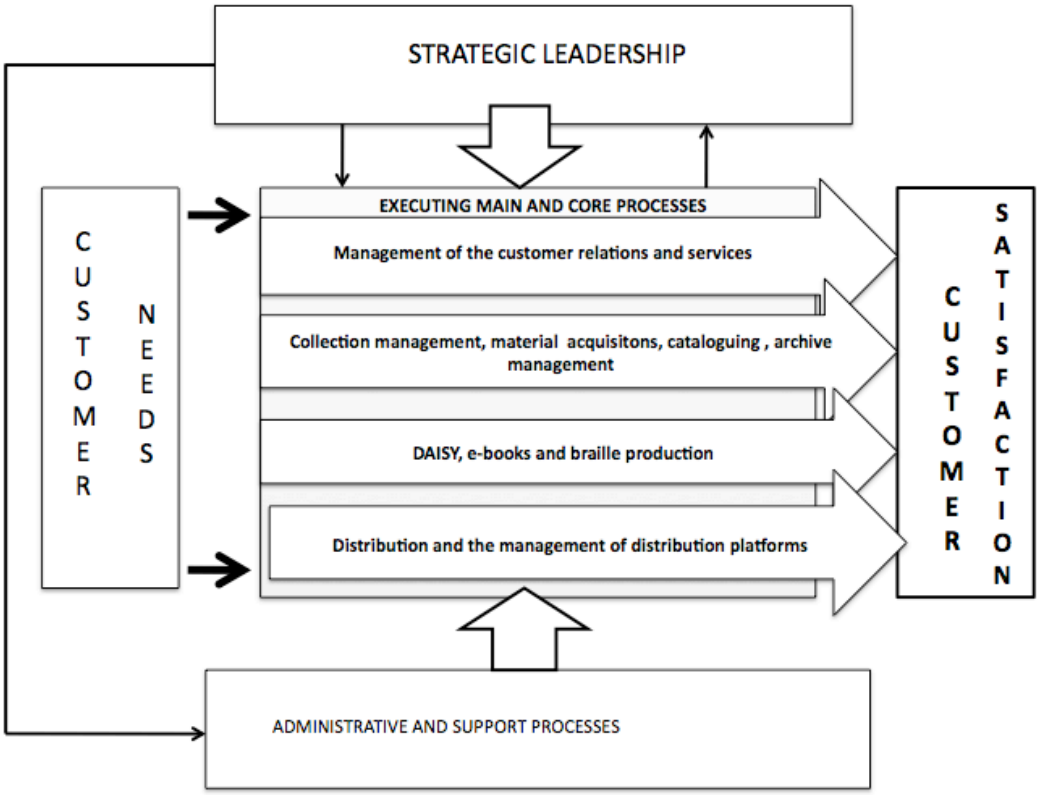


Figure 25. Celia 2011 processes / Adapted from Väänänen (2008).

Figure 25 illustrates how the processes help the library to serve its customers. All processes need to be managed and the support processes are also a very important part of the eLibrary.

Section 5 described how the most important reasons for process improvement at Celia are grounded. The new proposed processes attempts to respond to these requirements (Appendix 2). As stated in appendices all these processes aim at improving the services. Some of the work has already been done and some processes will be implemented as the part of the eKirjasto project. The project will last several years and will improve most of the processes of the eLibrary. Years 2011-15 will be very busy and

most of the processes will be re-engineered as the library is moving its services to the Internet. That will be the real test of the ideas proposed in this Thesis.
The detailed schedule for the implementations at Celia is presented in Appendix 3.

7.2 Metrics for eLibrary Processes

The following proposal is a suggestion how the measurements could be arranged in practice. Importantly Celia already has some statistic information stored in the core systems, but it has not been much used for analyzing the processes. This proposal offers a new perspective for the process owners to have actual facts and figures as they measure and develop the library processes. The process owners should estimate the target values for each process. Many of these figures could be compiled from the systems yearly.

Fogelholm and Karjalainen (2001: 26) describe balanced scorecard and the metrics. They point out that, in a certain situation, the metrics can be associated with some goals and outcome (outcome measure, result metric) or can help advance towards a goal (performance driver, process metric). Every organization is recommended to use them. The following meters proposed in this Thesis will include both. The objectives of the new processes are set according to the agreement with the Ministry of Education and Culture and with the process improvement in mind. They should be elaborate and adjusted at regular intervals. IFLA Sections "Libraries Serving People with Print Disabilities" and "Statistics and Evaluation" have designed a draft version (2011) of the key performance indicators for libraries serving print disabled people. These indicators are not necessary process meters, but they can also be used for these purposes. Those meters, or ideas that are taken from this material, are marked in the tables in Appendices 5-6 as [IFLA].

This Thesis describes what metrics the library needs to be measured, and how the measurements can be done. The exact meters can be found in Appendices 4-7.

7.2.1 The Management of the Customer Relations and Services (Process 1)

Part A: Customer relation management process

Celia makes a lot of marketing efforts to recruit new customers, as quite many leave the library yearly. (The approximate time of library use is 7 years.) Also, different meters should be set to different customer groups.

The aim of these metrics is to monitor customership. E.g., the number of the customers who terminated their customership, or the number of new customers.

Part B: Services and the planning of services process

Celia needs to measure the number of the customers who use different services. The aims of the proposed metrics should be set according to the service or the service- and distribution channel. The figure could be for example the number of the new customers who join the book clubs. Also, if the library wants to use social media or other services like that, Celia would need to have special meters to measure the results of marketing efforts. It would be useful to apply metrics to measure the effectivity of the co-operation with other organizations.

Today the web store is outsourced. The store sells schoolbooks and also provides customer service. However Celia still has to co-ordinate the sales. The library could also make statistics of the calls or inquiries about educational materials, that should have be handled outside the library. The library staff could then use ERP system or PallasPro library system for further planning.

Part C: Marketing

Celia has a need to have metrics for marketing campaigns. The library should think carefully which is the right target group for marketing. It might be the patrons or in some cases those people who assist the potential customers. After the target groups are selected library should have the number of contacted persons and the number of

the persons reach by the campaigns. The aim is to have more customers, sell the books or lend more titles.

Part D: Customer service, support for webstore

The library would need to have metrics to measure how well the library can get the problems of the customers solved, and how much resources the library needs for that. The number of contacts, and the time spent serving the customers may be used for that purpose. It is also very important to follow the state of the customer satisfaction. For example, Celia has measured the customer satisfaction several times. In 2009 the grade was 4,13 (on the scale: 1-5). In 2008, the grade was 4.42. The customer satisfaction for textbook services was 3,9 (2009) and 4,0 in 2008. (Toimintakertomus 2009: 7-8) It would be useful to measure and develop this statistics further.
The library has asked its customers about their satisfaction with the different aspects of the library service. The last inquiry was made in 2010 and according to the results, most people think they received about the right number of books. This question was posed because most patrons use profile services. Profile services mean that the customers receive automatic certain amount of books each month. Therefore, the library wants to know if the amount of books is suitable.

A Question for the customers who receive books monthly

Are you receiving books	too much	suitably	too little
2010	11,4 %	84,6 %	4,1 %
2009	7,4 %	87,0 %	5,6 %
2008	8,0 %	86,4 %	5,5 %
2007	8,2 %	84,8 %	7,0 %

Table 10: A question taken from the customer satisfaction questionnaire (Asiakastyytyväisyystutkimus 2010: 13)

The right amount of books is important part of the outcome of the process for many reasons, not the least because of the statistics and productivity. It seems that the service is correctly measured now. When managing the service processes, it is rational to ask the customers how they feel about the services they get.

For example, in 2010 the library asked about the desirability of the Internet services (Asiakastyyväisyystutkimus, 2010). There were a lot of people who would like to have more of the Internet based services. If and when the library will offer more web-based services, these metrics need to be renewed. This Thesis proposes some new meters for this, too.

7.2.2 The Material Selection, Cataloguing, Description and Archive Management (Process 2)

Part A: Collection management process

Celia needs to maintain a good and interesting book collection for its patrons. For this there should be metrics to measure which books are lent and which are not. One proper way to measure the quality of the collection is to check how many books published in Finland are chosen for the collection. If nobody lends the books the investments for production and storing the files in digital archives have gone waste. The turnover of the books is something that the library should always measure. However there are exceptions. When Celia builds the collection the library should also hear what the customers wish to read. Good library collections have also some rare books and books in foreign languages. Even if the customers lend them rarely it is still justified to add them to the collection. The meters should also guide the staff to process the acquisitions effectively.

Part B: Material cataloguing and descriptioning

The library has a need to know how many books have been cataloguing and the time it took. Celia needs also to measure how automatic the cataloguing process is. Manual work is expensive and the new processes should help to automatize the workflows.

Part C: Pre- and post production material handling

Celia would need the pre-production meters to tell the library whether the production process gets its input as fast as it should. Post-production checks are part of the quality control.

Part D: Digital archive management

Celia needs metrics on how well the archiving is automated and how much time the manual handling of the material takes. An eLibrary like Celia cannot function without the digital archives.

7.2.3 The Daisy, E-books and Braille Production

The meters for production are needed to help the process owners to know whenever some part of the process needs improvements. Number of the produced books and the lead time of production are among the proposed meters. Production staff works very closely with the persons doing the cataloguing and pre-production. Fast book production is a part of the good customer service. As the library tries also to automatize the production processes, there should be meters for development work. One of the most important goals is to reduce the lead time as much as possible and still keep the quality high.

Part A: Material editing to accessible formats

The library needs metrics to plan the yearly production and to make sure that the books are produced as fast as possible. For this the most important meter is the lead time of production. Whenever the books need pedagogical editing, it is usually relative slow process. However even this kind of expert work can be improved, and for that the library needs to measure editing processes. The library should rethink the aims for the production times, so that it can estimate the yearly production volumes accurately.

Part B: Recording studio services and audio editing

Celia needs to measure the time spend for production of the audio books to make sure that the studios are always fully booked, if possible. Celia does not use sound engineers in the studios of the library, and the narrators are supposed to make the recordings by themselves. However they need help from time to time, and one of the proposed metrics should let the library know how much resources is needed for that. If the automatic processes are working, the time spent to assist the narrators is kept minimum.

7.2.4 The Distribution and the Management of Distribution Platforms

Part A: On-demand CD creation

As stated earlier this is very important process for the library. If the process does not work the customers will notice immediately. Once again the lead time is important and the library has to measure that. The systems should have as few production stoppages as possible.

Part B: Online audio lending and distribution

Celia has a need to measure the time the customers spend online listening books. The longer this time is, the better. When the downloading is allowed customers should be able to do that very fast. Also the systems behind online services should work 24/7/356. Measuring the up- and downtime is essential for improvements.

Part C: Arena portal, www-pages, Celianet web service and online catalog, online store

The library needs to know how well the Internet services are working. The proposed meters will show the uptime and downtime. Services should be easy to find in the net, and Celia should measure the findability of its web services and the number of visits of each www-page. Google search engine optimization helps the library to achieve this goal. The meters could be the statistics from Google Ads and their interpretation. This

is the implementation of marketing strategy and the meters can also used for measuring the marketing.

Part D: Braille works

The proposed metrics are planned for the Braille works at Celia, as the part of the Braille printing is outsourced. The library should measure the printed materials and produced tactile pictures. With the Braille printing the time of embossing is not a good meter as it is a mechanical function depending on the speed of the printers and it cannot be fastened. Therefore the best way is to measure how many Braille pages are printed.

7.3 Standards, Processes and IT-architecture

The standards, processes and IT-architecture of Celia should be built and improved according to the Finnish public sector regulations, so that they will allow the library to co-operate with other libraries around the world. These networked libraries are supposed to work using similar principles and utilizing the same kind of processes — or, at least, introduce the systems that can exchange information.

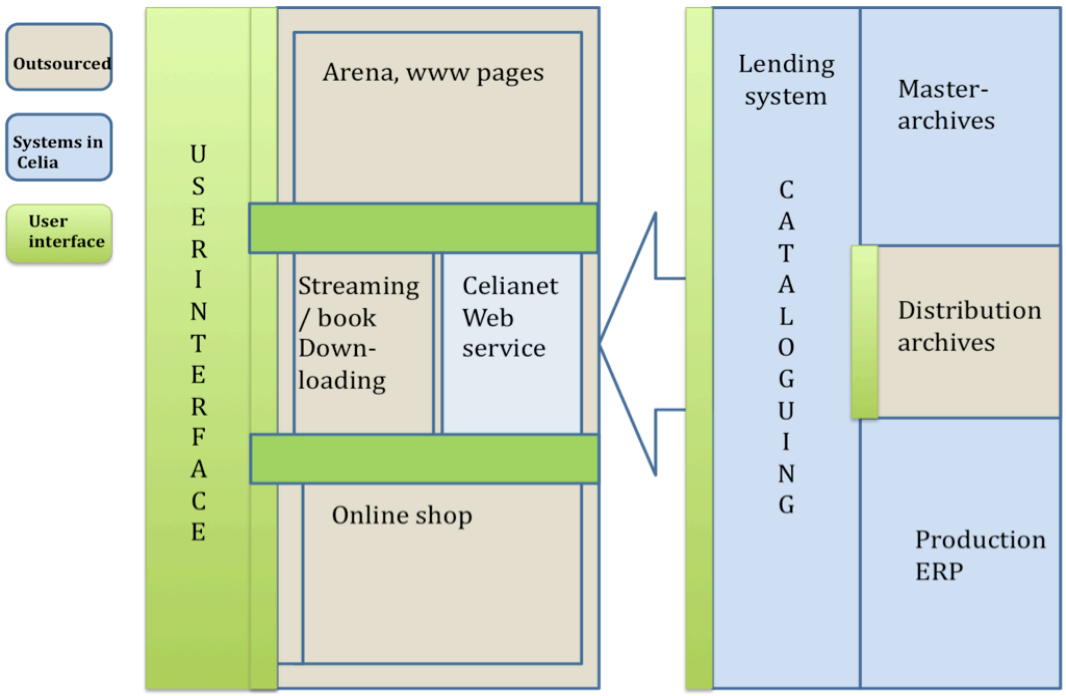


Figure 26. The proposed future IT architecture for backing up the improved processes.

The proposed IT architecture illustrated in Figure 26, should support the improved processes. The key idea behind it is to separate the systems that library cannot outsource and the ones that can be maintained by the partners. As described earlier, the systems that store the customer and transactions data are the core systems that library should not outsource. This is possible if the library builds the user interfaces according to the standards. To achieve this, Celia has started the virtualization of the library's servers in February 2011. Since then the library has tried to minimize its IT hardware, thus decreasing the need for IT support. Instead, the library should concentrate on managing the IT resources and developing the services. The price of the hardware is becoming cheaper each year, and therefore, the library has more options to choose. Serving the digital materials in the Internet and using programs with the browser could also reduce the maintenance and support needs of Celia.

The financial and working plan for Celia (TTS 2012-2015) says that the library will implement an IT-architecture, which includes digital archives, library system, ERP system, and will use Internet as both the distribution and service platform. The plan also states that the aim is cost-efficient maintenance, to minimize the breaks and to have user friendly and compatible solutions. If the systems are outsourced, such outsourcing must be done with care and thought. The maintenance should also be based on plans, taking in account that, as the services should run 24/7, the support and maintenance job will likely to be very demanding. User-friendly systems need to be planned carefully according to 'Design for all idea", and the compatibility should be reached by using the same solutions as the other governmental organizations.

Soon, as the library has new modern web-based services, it will also be time to ask is the core job of the library stays the same as before. If Celia still wants to be a content provider the processes can be implemented within the next five years. It is clear that with the limited resources the library cannot be a developer of technology, more likely it will become an early adaptor. As MacAdam & Mitchell (1998) stated, it might not always be wise to assume that all methods of BPR can be brought as-is to public sector. Most librarians have liberal arts education and, perhaps, the effective way to combine 'soft' and 'hard' things is to find a middle-way. Trust is the key to achieve this kind of combination, and it can be gained by creating an open atmosphere. It is also impor-

tant to show the benefits of the new processes. People should feel that they could influence the planning and the decisions that are made.

There is no doubt that the public sector organizations need re-engineering. Celia has its mission and core values, and they are lasting things. However, when the society goes through the changes, the library has to renew its strategy and tactics accordingly. This will also lead to re-engineering of the library processes.

SUMMARY

The topic and the object of this Thesis was the process improvement of eLibrary services. Celia is a government owned special library for print disabled persons. The library lends and produces digital DAISY audio books, e-books and other materials. Celia aims to use Internet as a distribution and production platform, and for this purpose, the library must reengineer and improve its processes. The challenge is that the working environment is in a constant change, and the amount of potential customers is ever growing. Consequently, Celia aims to improve its processes for being able to serve all these new customers. The research question was, therefore, how the library can improve its processes and use these new processes to create the services that would use Internet as its main distribution and service platform.

This proposal is a blueprint for a new kind of eLibrary, which is both the library, and also a production house. The proposed model can help the library to manage the changes that are happening in the coming years. The library will be able to create its own future and at the same time offer the customers new and modern services. The new and improved processes are the key to further innovations. Other public libraries might also find this Thesis interesting, because what Celia is doing is very unique in Finland.

This research paper is written in seven sections. In order to answer the research question, it starts with a literary review of process improvement and re-engineering as well as describes the digital library theory. Thesis proceeds with the description of the services of Celia including its current on-demand CD creation process, which could be used as a model re-arranging the distribution of library materials. Finally, the Thesis suggest and analyses possible improvements and suggest a proposal on how to improve the library processes.

The outcome of the research is a description of the proposed new processes and the development of the metrics to measure them. The Thesis also proposes that Celia should use the current on-demand CD creations process as a model for further distribution processes. By using the standards user interfaces with the IT systems of the

library, it should be easier to develop new Internet service models, as well as network with other libraries in Finland and abroad. The improved processes and the use of Internet will make it possible for Celia to develop completely new and advanced services.

In the future, one of the strategic goals of the library is to become part of the Global library. This goal combines two developing paths: a) the library and b) the DAISY development. In a way, all process renewals lead to these directions. The final recommendation of this Thesis, directed to the managers of Celia, is to keep this vision in mind while dealing with all the issues related to the development. The global library is much more than just making sure that the IT systems can communicate or the processes are in order. It is a common vision of the future, and it can give additional depths to Celia's strategic and tactical decisions.

The idea of the Global library is relatively simple to join by Celia; moreover its processes plus user interfaces mostly exist already. There are now some countries, especially in Scandinavia, which are all represented as members of DAISY Consortium and have similar political, economical and technical working environments. Thinking of the future, the biggest challenges therefore are likely to concern the copyright issues and the development of the new production processes. The new and re-engineered processes will make lending, and book distribution and global services possible.

REFERENCES

Anderson, Chris (2004). *The Long Tail*. Wired. [WWW document] http://www.wired.com/wired/archive/12.10/tail.html?pg=2&topic=tail&topic_set= (Accessed 21 November 2010)

Arms, William Y. (2001). *Digital Libraries.* London. The MIT Press.

Celia kirjasto (2010). *Visio ja strategia vuoteen 2015*.

Celia kirjasto (2010). *Verkkopalvelu strategia*.

Celia library (2010). *Textbooks.* [WWW document] http://www.celia.fi/textbooks (Accessed 16 November 2010)

Celia kirjasto. Lisää tietoa lukihäiriöstä eli dysleksiasta. [WWW document] http://www.celia.fi/lukivaikeus-lisaa-tietoa?gclid=CLG658XKxqUCFcWGDgodeXK1Xg (Accessed 16 April 2011)

Champy, James (1996). *Reengineering Management. The Mandate for New Leadership.* New York. HarperBusiness.

Collins, J. and Porras, J. I. (2002). *Build to Last. Successful Habits of Visionary Companies.* New York. HarperBusiness.

Daisy Consortium. [WWW document] http://www.daisy.org (Accessed 6 May 2011)

Daisy Consortium. ZedNext Home Page. [WWW document] http://www.daisy.org/zw/Main_Page (Accessed 19 March 2011)

Eccu Research (2010). *Asiakastyytyväisyystutkimus 2010.* Celia 2010.

European Commission. Economic and Financial Affairs: Ageing and werlfare state policies. [WWW document] http://ec.europa.eu/economy_finance/structural_reforms/ageing/index_en.htm

(Accessed 18 March 2011)

John Fogelholm & Karjalainen Jouko (2001). *Tuotantotoiminnan mittaaminen.* Helsinki. WSOY.

Gopal, Krishan (2001). *Intellectual Freedom in Digital Libraries.* Delhi. Authorspress.

Hammer, Michael (1996). *Beyond reengeneering. How the process-centered organization is changing our work and our lives*. New York. HarperBusiness.

Hammer, Michael & Champy, James (2003). *Reengering the Corporation*. New York. Collins Business Essentials.

Hannus, Jouko (1993). *Prosessijohtaminen. Ydinprosessien uudistaminen ja yrityksen suorituskyky.* Jyväskylä. HM&V Research Oy.

Harrington, H. James (1991). *Business Process Improvement. The Breakthrough Strategy for Total Quality, Productivity and Competiveness.* New York. Mc Graw-Hill Inc.

Hitt, Michael, Hoskinsson, Robert E. and Ireland, R. Duane (2007). *Management of Strategy. Concepts and Cases.* China. Thomson.

IFLA Section "Libraries Serving People with Print Disabilities". IFLA Section "Statistics and Evaluation" (2011). *Key Performance Indicators for Libraries Serving Print Disabled People (Draft).*

JHS 152 [WWW document]
http://www.jhs-suositukset.fi/web/guest/jhs/recommendations/152/full (Accessed 16 November 2010)

JUHTA — The advisory Committee on Information Management in Public Administration
http://www.vm.fi/vm/en/13_public_management_reforms16746/053_juhta/index.jsp
(Accessed 18 March 2011)

Harrington, James H. (1991). *Business Process Improvement. The Breakthrough Strategy for Total Quality, Productivity, and Competiveness*. New York. McGraw-Hill Inc.

Health-EU. The Public Health Portal of the European Union. [WWW document] http://ec.europa.eu/health-eu/my_health/elderly/index_en.htm (Accessed 18 March 2011)

International Digital Publishing Forum. [WWW document] http://www.idpf.org (Accessed 6 May 2011)

Kaplan, Soren and Palmer, Derrick (2010). *The Future of Service Business Innovation*. Helsinki. TEKES.

Kekäläinen, Heikki (editor) (2006). *E-Business logistics, visions, innovations and research. ELO – E-Business Logistics Technology Programme 2002-2005.* Technology Review 196/2006. Helsinki. TEKES.

Keravuori, Kirsi (1990). *Siannahkataulusta digitaalitekniikkaan: sata vuotta näkövammaisten kirjastotoimintaa 1890-1990.* Helsinki. Näkövammaisten kirjasto.

Kotler, Philip, Keller, Kevin Lane, Bradley, Mairead, Goodman, Malcolm and Hansen, Torben (2009). *Marketing Management.* Italy. Pearson.

Kreitzman, Leon (1999). *The 24 Hour Society*. Great Britain. Profile Books.

Kresh, Diana, edited (2007). *The Whole Digital Library Handbook*. Chicago. American LibraryAssociation.

Koskela, Johanna & Leino, Markku (2010). *Verkkopalvelustrategia*. Helsinki. Celiakirjasto.

Laamanen, Kai (2010). Miksi prosessijohtaminen ei onnistu? Innotiimi ilmoitusliite. *Fakta.* 10/2010.

Martinsuo, Miia & Blomqvist, Marja (2010). *Process Modeling for Improved Performance.* Helsinki. Aalto University.

McAdam, Rodney & Mitchell, Neil (1998). Development of business process re-engineering model applicable to public sector. *Total Quality Management,* 9, 4&5, 160-163.

National Digital Library. [WWW document] http://www.kdk2011.fi/en/enterprisearchitecture (Accessed 15 November 2010)

Negroponte, Nicholas (1995). *Being Digital.* Berkshire. Coronet Books.

Oinonen, Toni (2004). *Celia 2008 – tavoitetilan prosessit. Loppuraportti. Johtoryhmä 15.12.2004.* Celia kirjasto. Helsinki.

Oppari. Koulukirjat erilaiselle oppijalle. [WWW document] http://www.oppari.fi (Accessed 6 May 2011)

Puominen, Marjut (2010). OP-AsPan tehtävien yhdistäminen KP-linjaan. Projektisuunnitelma. 11.5.2010. Celia kirjasto. Helsinki.

Suomen yleisten kirjastojen tilastot. [WWW document] http://tilastot.kirjastot.fi/fi-fi/perustilastot.aspx?AreaKey=Y2009T1N1 (Accessed 18 January 2011)

Toimintakertomus 2005. 115. Toimintavuosi. Helsinki. Celia kirjasto.
Toimintakertomus 2006. 116. Toimintavuosi. Helsinki. Celia kirjasto.
Toimintakertomus 2007. 117. Toimintavuosi. Helsinki. Celia kirjasto.
Toimintakertomus 2008. 118. Toimintavuosi. Helsinki. Celia kirjasto.
Toimintakertomus 2009. 119. toimintavuosi. Helsinki. Celia kirjasto.

TTS 2012-2015. Toiminta- ja taloussuunnitelma. [WWW document] http://www.celia.fi/asiakirjat (Accessed 6 April 2011)

Celia – Näkövammaisten kirjasto. Tulossopimus 2010. [WWW document] http://www.celia/asiakirjat (Accessed 24 November 2010)

Valtiotason arkkitehtuurit (VALTASA) -hankkeen lopputulokset. [WWW document] http://www.vm.fi/vm/fi/04_julkaisut_ja_asiakirjat/03_muut_asiakirjat/20100105Valtio/name.jsp (Accessed March 14 2011)

Valtiovarainministeriö. Valtiotason arkkitehtuurit (VALTASA) -hankkeen lopputulokset. [WWW document] http://www.vm.fi/vm/fi/04_julkaisut_ja_asiakirjat/03_muut_asiakirjat/20100105Valtio/name.jsp (Accessed 16 April 2011)

Väänänen, Soile. Henkilöstö- ja taloushallinnon prosessien uudistaminen. Jyväskylän yliopisto laatutyö. 7.3.2008 [WWW document] https://www.jyu.fi/hallinto/suunnittelu/laatutyo/prosessienmallintaminen/materiaalit/prosessit070308.pdf (Accessed 16 April 2011)

Interviews
Project Manager Marjut Puominen, Celia library, 3 February 2011.
Anne Laitiolampi, Celia library, 4 March 2011.
Head of the library services Mrs. Katariina Kiiliäinen, Celia library, 6 April 2011.

Figures
http://commons.wikimedia.org/wiki/File:Business_Process_Reengineering_Cycle.svg?uselang=fi (Figure 2)
http://commons.wikimedia.org/wiki/File:Riel-action_research.jpg (Figure 4)

(1) Interview with the head of the library services Mrs. Katariina Kiiliäinen

The following figures and statistics do not include people who buy schoolbooks (only those who lend leisure reading and non-fiction books).

Question / answer:

- What is the average age of the customer?
    - 65 years.
- For how long she or he will stay as the customer?
    - 6.7 years (2010 statistics)
- How many customers Celia has in the age group 1-30 years?
    - Of all the customers there are 11.4 % who are under 30 (born 1980 or after that)

(Interview Kiiliäinen — Leino, 6 April 2011)

(2) Interview with the project manager Mrs. Marjut Puominen about the new customer service

The interview was conducted on with the project manager Marjut Puominen in 3.2.2011.

She was in charge of a project called 'OPAS' which united library's two customer services. As she wrote her project plans, one of the goals of the project was to unite the divided service processes.

I asked her opinion on how well she thinks that the proposed main processes (section 7: picture 18) describe the present situation after joining the two services. According to Mrs. Puominen the process map is accurate enough. At the moment (February 2011) the employees and management are finetuning the service processes.

(Interview Puominen –Leino, 3 February 2011)

Requests presented in Section 5 / Responds in new processes

Request	**In new processes**
Process documentation is outdated.	Processes are documented and stored in electronic archives, therefore it is much easier to keep the documentation up-to-date.
Some core system interfaces do not use standards. The core systems (PallasPro and ERP) are updated in sub projects of the eKirjasto project. The work started in 2011 with the server virtualization project. As the work progress the library will either rethink the responsibilities of the core systems or update the interfaces. This will likely happen in 2012-13.	The processes will use old interfaces only as long as Celia decides the exact role of the core systems. The proposed processes can work with the old interfaces but also can be change to use the new standardized interfaces.
Customer information is stored in different databases, instead being in just one core system. After the customer services were united in January 2011 it is now easier for the customer to get service from the library. There is only on place to contact and the persons responsible for the customer service can serve all customer groups.	The customer service processes are much simpler now. However as with the core systems the situation with the databases has to be corrected in the near future. It is one of the propositions of this thesis that all the customer information will be stored in the library systems database. That would mean that the information in the database of the web store or ERP is just a copy for process purposes (just like the logic with the on-demand CD system).
To correct the situation where the processes were designed the line organization in mind, which has caused some processes to be overlapping.	The new proposed processes can be implemented what ever the organization model will be. In the spring of 2011 Celia can use this proposal and start working with the organization change. Very likely the processes will be improved further as the organization change happens.

The proposed schedule for the implementations at Celia

2010	On-demand CD-creation and the burning system receive now the XML-files straight from both core systems: library-system and ERP. Before that the data from ERP was rerouted through the library system.
	Preparation for the eKirjasto project. ○ On-demand CD creation process mapping ○ Internet service strategy renewed
	Work with this Thesis.
	OPAS project (OP-AsPan tehtävien yhdistäminen KP-linjaan). The goals of the project were to create only one channel for all customer contacts and also to have the same opening hours for students and other customers.. Celia this would mean the better use of the resources and uniform processes. For the teams this would make the responsibilities clearer and teach them to learn to act as multi experts (serving both the students and other customer groups). (OP-AsPa Projektisuunnitelma, 11.5.2010)
	eKirjasto project planning. This Thesis was a part of the preparations.
2011	January. The customer services were united. The lines are called now: the library services and the production. The customer services are working under the library services.
	eKirjasto project starts on March 2011. The project will last until 2015.
	This thesis is written. The proposition are discussed at Celia and implemented in project work from this on.
	New organization planning project in the fall of 2011. The project uses the proposed new processes as the starting point of the new organization model.
2012	New organization model for Celia.
	Virtualization of the library's servers is ready. (Virtualization is a subproject of the eKirjasto project).

2013	New online distribution models / processes improved – downloading of the DAISY books. (Online distribution project is a subproject of the eKirjasto project). Planning the renewal of the digital archives and archive related processes.
2014	New digital archives. (A subproject of the eKirjasto project).
	New products in DAISY / ePub format. These products are especially suitable for all print disable persons.
	New version of the lending system / new processes and new solutions for online shopping. (Both these are the subprojects of the eKirjasto project).
	The production process is improved and the co-operation with other producers is growing.
2015	Online loans exceed the CD on-demand loans.
	The amount of the dyslexic customers has grown to be the biggest customer group of Celia.

The Proposed Meters for the Processes

MANAGEMENT OF THE CUSTOMERS AND SERVICES

Meters for the management of customer relations process	Number of the new customers per year. (The aim is X customers.)
	Number of the customers who terminated their customership. (X customers) This figure should be as low as possible
	Number of the customers outside of Finland. (The aim is X.)
	Number of institutions / libraries as a customer. (The aim is X.)
Meters for the services and planning of the services process	Number of the new customers who use the service Y – utilization of services. (The aim is X customers.)
	Number of the customers who left the service Y. (X customers)
	Number of the new customers and/or loans for the library as a result for Campaign Y. (The aim is X customers and/or loans.)
	Number of the new customers and/or loans for the library as the result of the co-operation with the organization / library / school Y. (The aim is X customers and/or loans.)
	Co-operation with other organizations – results should be more loans or more customers. Number of the new customers for the library as the result of managing the automatic services (recruiting people to join the services) (The aim is X customers and/or loans.) Number of customers who left the service Y. (X customers). Managing automatic services (book clubs, profile services). The library will guide the customers to use more Internet based services. The increase / decrease of the number of the users per service is a good meter.
	X number of books sold. (The aim is X.)

	Number of audio books lent – CD's (The aim is X.)
	Number of audio books lent - downloaded. (The aim is X.)
	Number of audio books lent – streaming audio (The aim is X.)
	Number of e-books lent (The aim is X.)
	Number of books lent through other libraries. (The aim is X %)
	The average cost of the loan. (The aim is as low as possible)
	Number of webcasts / podcasts downloaded. (The aim is X)
Meters for the marketing process	Number of contacted (potential) customers. (The aim is X.)
	Percentage of library staff providing electronic services. [IFLA]
	Number of new customers reach by the campaign. (The aim is X.)
	Conducted marketing researches. (on/off)
	Designed and produced marketing materials. (on/off)
Meters for the customer service, support for webstore process	Number of the telephone calls. (Answered / not answered, the aim is 100 % answered.)
	Time spent for telephone services. (hours, days)
	The number of telephone messages to voice mail.
	Time spent for processing voice mail messages. (hours, days)
	Time spent for serving the customers. The average time / customer.
	Number of the problems solved. (The aim is 100 % solved)
	Number of information seeking cases solved for the customers.
	Time spend offering information officer services to the customers. (hours, days) Searching information using special databases etc.
	Number of online reading software sent to the customers.
	Number of the e-mails (processed / sent / answered / received).
	Time spent updating web-page information. (hours, days)
	Time spent for processing e-mails. (hours, days)
	Customer satisfaction in the scale from 1 to 5.

IT systems for metrics data: Library system PallasPro and ERP system Jeeves.

MATERIAL SELECTION, CATALOGUING, DESCRIPTION AND ARCHIVE MANAGEMENT

Meters for the collection management process	New book titles available in accessible format as a percentage of total corresponding publishing output. (The aim is X %) [IFLA]
	Percentage for turnover of the books. (This should be as high as possible.) [IFLA]
	Percentage of stock not used. (Should be as low as possible). [IFLA]
	Number of books chosen for production in selection meetings. (The aim is X.)
	Percentage of rejected request. [IFLA] Customers can request what books they would like to have in the collections.
	Required titles availability. (Should be as high as possible) [IFLA]
	Number of book files received from the publisher according to production plans. (The aim is X.)
	Number of the books bought from other libraries of producers outside Finland. Books in foreign languages. (The aim is X.)
	Number of book files received from the publisher in desirable format (ePub). (Aim is X.)
	Number of books selected and bought from the bookstore. (Specified as X.)
Meters for the material cataloguing and descriptioning process	Number of different materials catalogued. (The aim is X.)
	Time spent for cataloguing the books (in work days).
	Number of the cataloguing information downloads. (The aim is X % of all books catalogued.) More downloads means less work at the library.
	Number of materials described. (The aim is X.)
	Number of the titles with extra metadata added. (Dublin

	Core fields in DAISY book XML, or metadata inside the digital archive folders.)
Meters for the pre- and post production material handling process	Number of materials / books send to be produced in Celia. (The aim is X.)
	Number of materials / books send to be produced outside Celia. (The aim is X.)
	Number of materials / books checked in from the production. Acceptance inspections. (The aim is X.)
	Number of materials / books rejected because of the quality problems.
	Time spent for handling the rejected books and sending them back to production. (hours, days)
Meters for the digital archive management process	Number of materials / books archived.
	Number of material, whose condition has been checked. (The aim is X.)
	The time spent for checking the materials (work days)
	Number of titles, which have some quality problems.
	The time spent for handling the books / files / tapes with problems. (hours, days)
	Number of titles / materials transferred from one storage media to another. (The aim is X.)
	Number of digital books transferred from abroad and stored in the digital archives.
	The time spent for handling transferred book files. (hours, days)
	Number of master-files / books ask by the production and delivered to them.
	The time spent for working for the production. (hours, days)
	Time spent for manual work. (hours, days) The process is not fully automated because the digital tapes are stored in several locations. Handling of the tapes is manual work.

IT systems for metrics data: PallasPro library system, ERP

Appendix 6(8)

DAISY AND BRAILLE PRODUCTION

Meters for the material editing to accessible formats process	• Lead time of the production (hours, days)
	Number of audio books produced in Celia (DAISY book: text + synchronized audio). (The aim is X.) The books made by the editors using synthetic speech.
	Time spent for production of DAISY books. (hours, days)
	Number of audio books produced in subcontract studios. (The aim is X.)
	Number of e-books produced. (The aim is X.)
	Median time spent for production of e-books. (hours, days) Mathematics, Physics, Chemistry etc. [IFLA / modified]
	Top quartile of production time for production of e-books. (hours, days) Mathematics , Physics, Chemistry etc. [IFLA / modified]
	Number of Braille books produced. (The aim is X.)
	Median time spent for production of Braille books. (hours, days) Mathematics, Physics, Chemistry etc. [IFLA / modified]
	Top quartile of production time for Braille books. (hours, days) Mathematics, Physics, Chemistry etc. [IFLA / modified]
	The average cost of production (e-books, audio books, Braille books – the aim is as low as possible).
	Number of tactile materials produced. (The aim is X.)
	Time spent for production of tactile materials. (hours, days)
	Number of products rejected in quality checks; either the books made in Celia or made in the subcontract studios. (The aim is as low as possible).
	Time spent for making the corrections for the rejected books either in Celia or in the subcontract studios. (hours, work days)

	Time spent handling the PDF-files sent to be converted into DAISY XML. (hours, days)
Meters for the recording studio services and audio editing process	Number of books recorded in Celia's studios. (The aim is X.)
	Number of audio books edited at Celia. (The aim is X.)
	The time spent helping narrators in the recording studio. (hours, days)
	Number of occasions that the narrators needed help from the studio staff.
	The effective use of Celia's studios (percentage how the studios are booked, reservations and cancelations). This is closely related to production planning.

IT systems for metrics data: PallasPro library system, ERP

DISTRIBUTION AND MANAGEMENT OF DISTRIBUTION PLATFORMS

Meters for the on-demand CD-creation process	Lead time (book clubs, profiles).
	The average cost of produced and distributed CD. (The aim is as low as possible).
Meters for the online DAISY book distribu-tion (streaming audio) process	Uptime / downtime of the servers. (Minutes, hours, days)
	Time the customers spent listening the books (streaming). (Minutes, hours). The longer the online time is, the better.
	Time the customers will spend downloading the books. (Mi-nutes, hours, days) The shorter the time, the better.
Meters for the Arena portal, www-pages, Celianet web service and online catalog, online store process	Uptime / downtime (Minutes, hours, days)
	Number of hits per service / per www-page. (The aim is X.)
	Search results / X number of hits resulting to lending the books. (The aim is X.)
	Search results / X number of hits resulting to buying the books. (The aim is X.) Search engine optimation (Google)
	Number of hits per page. (The aim is X.)
	Social media usage / customer participation as content pro-vider.
Meters for the Braille works process	Number of Embossed Braille books / volumes / pages. (The aim is X.)
	Other embossed materials. (The aim is X.)
	Number of the produced tactile materials (like tactile maps or pictures). (The aim is X.)
	The time it takes to produce tactile materials. (hours, days)

IT systems for metrics data: PallasPro library system, ER

PROPOSED NEW PROCESSES FOR eLIBRARY

MANAGEMENT OF THE CUSTOMER RELATIONS AND SERVICES			
Customer relation management	Services and the planning of services	Marketing	Customer service, support for webstore
Interviews of the new customers Customer database management Prospects	Present services New services Products for services	Marketing research Marketing campaigns Marketing materials	Phone service E-mail Chat-service / online presence
COLLECTION MANAGEMENT, MATERIAL ACQUISITIONS, CATALOGUING, ARCHIVE MANAGEMENT			
Collection management	Material cataloguing and descriptioning	Pre- and post production material handling	Digital archive management
Selection of books for the collection Buying and ordering the books Planning the production	Functional cataloguing Descriptioning the materials	Sending materials to the production of Celia Sending the materials to the subcontract studios Post production acceptance checks	Archiving the materials Condition checks of the digital materials Material transfers from digital tapes to harddisks
DAISY, E-BOOKS AND BRAILLE PRODUCTION			
Material editing to accessible formats		Recording studio services and audio editing	
Book editing / e-books Book editing / Braille books Tactile picture editing Acceptance checks for the materials from subcontractors		DAISY recording in digital studios Audio editing Audio production using synthetic speech	
DISTRIBUTION AND THE MANAGEMENT OF DISTRIBUTION PLATFORMS			
On-demand CD creation	Online audio lending and distribution	Net platforms Arena portal, www-pages, Celianet web service and online catalog, web store	Braille works
Daily loans Book clubs Profile services Sold textbooks	Streaming audio Downloads	Arena portal Web pages Celianet web service and online catalog online-shop	Braille book printing Braille material printing Tactile picture production