What do demand-driven e-lending, e-acquisition and e-cataloguing activities really cost: A case study in Tallinn University of Technology Library

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Abstract

According to C. A. Mandel: „We are all spending money, some of us know how much, fewer of us know what for“ (Mandel 1988, p. 220).

For over a several decades, many academic libraries have been purchasing books requested by their patrons or customers. The ease and effectiveness of demand-driven acquisitions definitely helps to optimize acquisitions budget as well. Nowadays university libraries increasingly turn to e-books as an alternative to purchasing multiple copies. Academic libraries have for years been forced to purchase large packages of e-books that are of questionable financial value because so much of the content is not used. The number of content units downloaded from large e-book packages byuniversity patrons is not growing. E-books have several advantages as compared to physical books.

Since April 2013, the e-books from ProQuest Ebook Central (more than 800 000) are available via Tallinn University of Technology Library for a selection. They are available almost instantly and usually it is possible to see the content of e-books before making purchase decision. Through this demand-driven acquisition and lending model, the library offers its users a much wider range of titles, while ensuring that more of the titles purchased are used.

A lot of studies are conducted to compare print and ebook collections: collection size, expenditure on print books and ebooks, and usage statistics. But only very few cost accounting surveys involving different library activities have been carried out in Estonia (Kont, 2015a; Kont 2015b: Kont 2016) and none have been published in the area of the e-books before ether in Estonia and, based on the information known to the author, elsewhere as well.

The purpose of the present paper is to investigate the cost of activities related to purchasing, cataloguing, and lending processes in TTU Library based on the example of the time-driven activity-based costing (TDABC) method. More specifically, the study concerns the individually acquired, catalogued and lent as short-time loans e-books. The aim of the current paper is to find out:

1) How much does it cost to acquire the e-book?
2) How much does it cost to borrow the e-book?
3) How much does it cost to catalog the e-book?

The results are interpreted on the basis of directions in the literature, and the author’s opinions based on long-term experience working in Estonian academic libraries. The results of Acquisition and

cataloging case studies are compared to printed books studies compiled in the TTU Library in 2012/2013.

Litearure Review

By D'Ambra et al (2012), "Libraries are now faced with a new paradigm in information provision. The implications of e-books and e-textbooks in academic libraries are particularly salient because they present cost savings both in real terms and in the acquisition, processing, and management costs in libraries. Academic libraries must now grapple with new lending models for their communities" (D'Ambra et al, 2012).

By Siriginidi Subba Rao (2003) economic advantages of e-books are irrefutable: the overhead publication and distribution cost of e-books is considerably lower than using a printing mode. Some costs are passed on to the book consumer, who must download or somehow obtain the document, but in most areas the corresponding expenses relating to printing materials are obsolete in the digital world. There is no cost for paper, ink, binding, wrapping, postage, or transport. In fact, hundreds of virtual books are free. E-books can be used conveniently at a substantial cost savings. For instance, distribution of operating procedures to production workers the day they go into effect. The benefits lie in reduced paper costs of creating, copying and disposing of thousands of pages, and in moving distribution from costly courier service to instant downloads via the Internet (Rao, 2003, p. 87).

Although individual e-books currently in some cases cost a little bit more than their paper equivalents, their cost-saving appears in the fact that they can be read by multiple readers. Users can access hundred of thousands more e-books than previously available through traditional library subscriptions. Cost-per-use for demand-driven short-time loans of e-books is cheaper than seldom used "big deal" subscriptions or demand-driven purchase. Demand-driven programs take much less staff time than most acquisitions processes. Efficiency of staff increases due to electronic retrieval, processing and delivery of collections. It eliminates needs for technical processing of book (preparation of library documents for public use) like stamping, accessioning and bar-coding, gluing the call number label and adding the security trip, shelving, circulation activities, barcodes, etc. And there is no storage costs.

Sens & Fonseca argue that "DDA offers the opportunity to provide a much larger collection of books to patrons at a small fraction of what it would cost a library to put every item on its shelves. It also corrects the library's fundamentally inefficient model in which librarians guess at what patrons will need. DDA solves the problem of low circulation: most people viewing the literature will be convinced that the patron-driven acquisitions model has proved itself on a number of levels, including cost-effective collection development" (Sens & Foneca, 2013, p. 364). One of the unknows libraries face entering into e-book DDA programs is how the budget appropriately and how to select the model that will yield greatest value for the institution. Libraries are experimenting with the variables vendors offer, including adjusting numbers of loans before purchase and loan periods, and restricting the titles available to users (Way & Garrison, 2011, p. 140).

For research librarians the cost of acquiring and maintaining a collection is a very important issue. While purchase costs are easy to identify, associated acquisition expenses are difficult to measure and attribute to specific collections. Cataloging has always been considered one of the most

expensive areas of library work. Still, the costs of acquisition and circulation process have been researched less, and it has been predominantly done as a part of the general cost accounting study of the library. Circulation costs (loan routine costs) have been considered as something especially difficult to measure.

According to Robert M. Hayes, accounting is the oldest among the tools of performance management, dating back to at least the Renaissance. A modern performance management required more detailed cost data than existing budgetary accounting provided. This led to the development of cost accounting systems, which related costs to the work performed (Hayes, 2001, pp. 3-4).

Time-driven activity-based costing (TDABC) method was designed in the USA in the beginning of 2000s by Robert Kaplan and Steve Anderson. Based on the several approaches and studies (Kaplan & Anderson 2004, Kaplan & Anderson 2007, Pernot *et al*, 2007) TDABC is a revised, easier version of the ABC. The TDABC model can be estimated and installed quickly as only two parameters are required: 1) the number of time units (e.g., minutes) consumed by the activities related to the cost objects (the activities the organization performs for products, services, and customers), and 2) the cost per time unit. Hence, the TDABC systems can be implemented more quickly (and thus more cheaply), as well as updated more easily than the traditional ABC. In other words, it is necessary to determine the capacity cost rate and the use of capacity of the implemented activities carried out by each subunit. Both parameters are easily identifiable. Practical capacity is often estimated as a percentage, for instance, 80% or 85% of theoretical capacity. That is, if an employee can normally work 40 hours per week, practical capacity could be assumed to be 32 hours per week. This estimate allows for 20% of personnel time for breaks, arrival and departure, and communication and reading unrelated to actual work performance. It is also very important to stress, though, that the question is not about the percentage of time an employee spends doing an activity, but how long it takes to complete one unit of that activity (the time required to process one order: for example, how much time it takes to deal with one interlibrary loan request – order reception, request handling, and transmission of orders). Knowing the real (practical) capacity of the resources used and the time spent on activities, it is possible to determine the cost of each activity by multiplying the time spent on activities by the practical capacity of the resources (Kaplan & Anderson, 2004; Kaplan & Anderson, 2007; Pernot et al, 2007).

How EBook central works?

The decline of print circulation strengthened the argument for trying an EBL platform and DDA program for e-books in TTU Library.

Although the platform was in testing from April to July 2013, more active usage began, however, only after signing the license agreement in August of that year. First book - Principles of Virology - was already bought during the test period on April 23, 2013.

The ideas for the demand-driven model that EBook Central developed came from librarians in Australia. As K. Paulson states „Australians have a deserved reputation for being pioneers and early adopters in content delivery and digitaal library technology“. The drive for innovation has a clear reason – Australia is a western nation with a far distance from a western sources (Paulson, 2011, p.

64). Ebooks Corporation Limited (EBL) was founded in 1997 by Australian booksellers. The company was established to provide the selection of digital books that concentrates on fulfilling the needs of academic and research libraries. They offered a wide range of scientific, technical and medical texts from major academic publishers, along with more popular titles in a wide range of subjects (Ebooks Corporation, 2005). EBooks Corporation was a pioneer in ebook technology. Their's ebook lending model started to offer "non-linear lending" – every purchased item is allocated a number of "loan days" each year, allowing ebooks to be lent concurrently rather than consecutively. A number of patrons may simultaneously borrow an ebook at times when it is in high demand – what EBL terms "multiple concurrent access" (Kelly, 2010, p. 3).

There is no more need for libraries to use sophisticated acquisition methods (approval plans etc) to preselect the titles which patron may be interested in, and they can let the patrons to make the selection themselves. It will guarantee that library budget won't be spent on title which nobody needs, as each book will get at least one use. Patrons can freely brows these titles at least 5 minutes. If patron finds that e-book interesting, then he/she just keeps on reading and loan will be recorded for the library. Basically it means that without any initial cost library will have virtual bookshelves which would have not been possible with tranditional physical books.

Short-term circulation or short-term loan (STL) is a pay-per-use model that permits a patron to borrow an e-book that the library does not own for a specified period of time as a substitute for obtaining it on interlibrary loan or purchasing it. The EBL service allows e-books to be borrowed by patrons without requiring the library to purchase the title before lending it.43

Lending e-books solves libraries' biggest problem, overdue books. At the end of the lending period the reader's access to the book is automatically disabled. If needed, he or she can borrow it again or propose to the library that it purchase the book. The library, for its part, will never need to charge overdue fees or search for missing books.

How does STL work? Both, e-book lending and purchasing, are handled by a TTU Library acquisitions librarian. Patrons can skim the entire content of any book before borrowing it (books owned by the library for 10 minutes, others for 5 minutes). If the library has not previously purchased the book, the patron will see a message after the free skimming period is over, to request the library's permission to borrow it ("Place a Request"). The patron then asks the librarian's permission to borrow it, by pressing the Request Loan button on the book's introductory screen. At this point a form appears for the patron to enter how long he/she wishes to borrow the book, along with contact information. The selector who is responsible, that is, the librarian who has the right to grant permission, receives a "patron request" about the loan via e-mail. The TTU Library responds to lending requests within about 24 hours, but usually much faster. The selector compares prices of different lending periods and decides whether the desired lending period is acceptable or whether to lend the book for a shorter period. Once the loan is approved (the patron receives an e-mail), he/she can start reading the book.

Purchasing also takes place only through the acquisitions librarian. The EBL platform also contains a few books that the publishers do not allow the library to lend, but only to decide whether to buy or not. The TUT Library does not use so-called automatic purchasing (auto-purchase after X STL). All

purchasing decisions are carefully considered and, if necessary, the librarian will e-mail or phone the patron who requested the book. If a professor or researcher wishes to use it for scholarly purposes only for a short time, the librarian will suggest that the individuaal borrow it. Professors often say, however, that they need it for their research and also to recommend to students; then the library buys the book for the platform (Kont, 2016).

Table 1. General information about the cost of EBook Central for TTU Library during the period 1st April 2013-31st December 2017.

Year	No of titles purchased	Cost of purchases (€)	Average cost per purchase (€)	No of STL-s	Cost of STL-s (€)	Average cost per STL (€)	Total Ebooks Central costs (€)
2013	11	1 054,04	95,82	26	846,54	32,55	1 900,58
2014	31	6 346,17	226,64	189	6 666,09	29.39	13 012,26
2015	137	20 770,37	161,01	302	13 307,10	44,06	34 007,47
2016	78	10 178,57	130,49	339	11 643,49	34,35	21 822,06
2017	48	5 699,45	118,74	128	4 120,18	32,19	9 819,62

Libraries today are included in the general demand for cost transparency and effective cost management. In the current socio-economic situation, it is challenging to cope with the same or reduced resources in managing the same processes and activities, so that the quality of the result would not be affected. The need of library managers to justify their costs to their parent organizations has become particularly important, perhaps even more important than ever in the history. With the data they have traditionally collected, libraries can assess details about the costs of collection building; what they need now are reliable data about the costs of their services and products. However, libraries lack a specific overview of the activities between which their costs are divided. Cost accounting is the simple process of breaking down resources to the activity being carried on and then collating the monetary cost to show the cost of the activity. The time-driven activity-based costing TDABC helps to get a better picture of the acquisition related activities that libraries are actually engaged in and their costs.

Course of the study

Three case studies were conducted in a Tallinn University of Technology Library (TTU Library):

- *Expenditure on borrowing of ebooks,* carried out from the 14th of November 2015 to the 20th of April 2016;
- *Expenditure on purchasing of ebooks*, carried out from the 15th of February 2016 to the 30th of June 2016;
- *Expenditure on cataloguing of ebooks*, carried out from 29th of June to the 3th of September 2016.

In accordance with the analysis of the previously conducted research, the study was divided into the following stages: identification of key activities, identification of all resources, involved in the process, identification of the capacity cost rate and determination of time spent on activities.

In the first phase, all the staff members involved in this work process, as well as their duties

specifically related to acquisitions, cataloguing and lending were mapped. On the basis of the descriptions of the staff and interviews conducted with them, and the analysis of the documents, all the activities that have to be done with a book during the ordering and receiving process were determined and recorded.

Two activities in the case of the STL process, five activies in the case of purchasing and also five activities in the case of the ebook cataloguing in TTT Library were recorded. As a result of this stage, filled questionnaires of participant self-observation was prepared. They were asked to record the time spent on every specific activity in the observation report. The questionnaire also enabled to add notes. Stopwatch was recommended to measure the time as exactly as possible.

The next step was the study of library statistics for identification of the resources. The statistical reports of activities of 2016 were used to determine the numerical data on the staff, expenditure, working days and working minutes in month derived from days.

One staff member is involved in making decisions of acquisition and lending of ebooks at the TTU Library, and six staff members are involved in cataloguing process.

Any library is aware both of the cost of every document, as well as the average value of acquired documents. The operating expenditure of libraries are divided according to the Standard of International Library Statistics as follows: salaries and wages, acquisition costs, administrative costs, collection maintenance costs, communication technology costs, interlibrary loan costs and other expenses (heating, lighting, electricity, etc.). However, because the goal of the survey was to calculate, the costs connected directly with the lending, acquisition and cataloguing process of the ebooks, then the acquisition costs were not included while defining the cost of capacity supplied. It also seemed unnecessary to determine the specific amount of wages of every staff member involved in processes mentioned, as all of them have also other duties to perform. Thus, the general labour costs of the library and the number of the library staff were selected as the basis of the present survey. The costs of the interlibrary loan service were not separately highlighted, too. Operating expenditure (except for acquisition expenditure) were 1 034 080 EUR in TTU Library. For the identification of the capacity cost rate, the practical capacity of resources (employees) was calculated, based on the number of staff members involved in the work process and the average working minutes in month per employee of the library in the financial year prior to the study. The fact that 22 percent of working time is spent on non-productive activities that falls within the limits suggested by the authors of the TDABC method was also kept in mind.

As the result, the capacity cost rate in TTU Library was calculated.

Finally, the cost of every activity and the cost of the every work process in total were calculated. The time spent on the activity was multiplied by the capacity cost rate to reach the cost of the activity.

Results

Demand-driven lending of e-books

In the case of the STL only two activities were defined:

1. “The reading of patron request message and logging in“ and
2. „Accepting the STL request and providing the feedback“.

The relatively time-consuming activity was the second one, taking 109.39 minutes in the case of 50 requests. The first acitivity took 43.59 minutes.

The less time-consuming STL request took 1.33 minutes and the most time-consuming STL request – 6.54 minutes. The average time spent STL remains between 2.0 and 2.59 minutes. Average time consumed on the STL acitivity (min) of an ebook in total was 3.06. The average cost of STL process of an ebook is €0.46.

Demand-driven acquistion of e-books

In the case of the acquisition process five different activities were defined:

1. „Receiving the patron request message and logging in“,
2. „Communication with patron for data specification (if necessary),
3. „Finding a book from database“,
4. „Purchasing a book“ and
5. „Informing the customer of the received book“.

The most time-consuming activity were „Informing the Customer of the received book“ (87.21 minutes) and „Receiving the patron request message and logging in“ (72 minutes).

The less time-consuming acquisition of an ebook took 1.38 minutes and the most time-consuming acquisition of an ebook – 10.13 minutes. The average time spent acquiring an ebook remains between 4.17 and 5.59 minutes. Average time consumed on the acquisition acitivity (min) of an ebook in total was 4.9. The average cost of acquisition process of an ebook is €0.73.

According to the study of acquisition of printed books in TTU Library (Kont, 2015a) the less time-consuming acquisition of a foreign book took 6.41 minutes and the most time-consuming acquisition of a foreign book – 75.57 minutes. The average time spent acquiring a foreign book remained between 12.04 and 19.35 minutes. Average time consumed on the acquisition acitivity (min) in total was 65.19. The average cost of acquisition process of a document in a foreign language is €9.12.

The results and comparing of these two studies show that the purchasing process of an ebook is significantly more cheaper, cost-effective and less time-consuming than purchasing process of printed books - on the average, acquiring printed books is approximately 92,5 percent more time-consuming and the cost is approximately 92% higher than acquiring ebooks at TTU Library.

Demand-driven cataloging of e-books

In the case of the cataloging process five activities were defined:

1. „Uploading the MARC record“,
2. „Editing the record“,

3. „Linking the right version of ebook content“,
4. „Classifying and subject indexing“ and
5. „Editing the final forming“

The most time-consuming activity was „Editing of the record“ taking 753,42 minutes in total (in the case of 50 ebooks). Totally the wholw cataloging process of 50 ebooks took 1436,43 minutes in the case of 50 documents.

The less time-consuming cataloging of an ebook took 22,18 minutes and the most time-consuming cataloging of an ebook – 38,11 minutes. The average time spent cataloging an ebook remains between 28,00 and 28,59 minutes. Average time consumed on the cataloging acitivity (min) of an ebook in total was 28.73 minutes in the case of 50 ebooks. The average cost of cataloging process of an ebook is €4.30.

According to the study of cataloging of printed books in TTU Library (Kont, 2015b) the less time-consuming cataloging of foreign language book took 6.0 minutes and the most time-consuming cataloging of the book took 71.35 minutes. The average time for cataloging foreign language books remains between 27.3 and 50.35 minutes. Average time consumed on the cataloging acitivity (min) of a printed foreign book in total was 40.06. The average cost of cataloging a document in a foreign language was €5.21,

The results and comparing of the current study and printed book study from 2012/2013 show that the cataloging process of an ebook is more cheaper, cost-effective and less time-consuming than cataloging process of printed books. – on the average, cataloging printed books is approximately 38% more time-consuming and the cost is approximately 18% higher than cataloging ebooks at TTU Library.

Conclusions

Because the words “efficiency” and “productivity” are not culturally accepted in the context of library, TDABC is an appropriate method for the evaluation of the library work:

- in the case of the TDABC, the question is not about the percentage of time an employee spends doing an activity, but how long it takes to complete one unit of that activity;
- the TDABC model can be tested and implemented by departmental managers for each separate library department or for each work process;
- the TDABC already considers many aspects that affect employees’ efficiency and performance, e.g., rest periods, personal time for breaks, arrival and departure, and communication and reading unrelated to actual work performance.

The TDABC is well suited for a library setting, involving many activities with complex time drivers. The TDABC seems to be one of the best tools for understanding cost behavior and for refining a cost system for university libraries. This is also a great method for mapping the organizations’ activities and processes. Although the documenting the activity flows and data collection to gather the time duration

can be time-consuming for researcher, and uncomfortable for the staff of being observed, it enables to seek out how it would be possible to shorten the time consumed for certain activities and, by this, turn it more cost-effective without damaging the work quality. While integrating the TDABC method with the analysis of library performance indicators, the more valuable data is possible to produce for managerial decisions.

Library personnel willingly participated in the time measurements. Identifying the staff members involved in the acquisition process and seeking out the activities they were engaged in was swift and the course of the study understandable to all its participants.

The results showed that:

- STL is a more cost-effective way to use Ebook Central advantages than purchase.
- Cataloging has always been considered one of the most expensive areas of library work and so it is also in the case of cataloging ebook.
- Acquiring and cataloguing of ebooks is more cheaper and more cost-effective than acquiring and cataloguing process of printed books.

Finally, it should be emphasized that no method of measurement can not give all answers and the final truth. There are intangible factors in the library work that no cost accounting system can ever reach. Although through the decades there have been several endeavours place the library work under factory-wise standardized product so, that library staff can be worth their salaries, it has not been fully successful. In and of itself no cost system can cut costs. All it can do is to show the administrator where costs may, and should, be cut. However effective a tool cost accounting may be, it is only a tool. And no tool does work unless it is used, and every tool does its best work in the hands of a skilled employee.

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