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A Needs Assessment Methodology for Cost-Justifying Publication of Internal Engineering Documents on the Internet

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A Needs Assessment Methodology for Cost-Justifying Publication of Internal Engineering Documents on the Intranet

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INTRODUCTION

Often librarians and business analysts are asked to justify the costs of new services they plan to implement. We worked together to develop and implement a needs assessment to justify publishing a wide range of in-house engineering documents on our internal intranet. By "needs assessment" we mean an analysis of the tradeoffs between cost and benefits of the perceived "need" of engineers to have ready access to documents via intranet and to determine whether or not the costs could be justified based on quantitative measures of benefits.

The documents were produced by a department of some 500 engineers and managers. At the time of the survey, most of the documents were being handled in hard copy, even though most had been created on computer.

It seemed evident to us that putting the documents online would save money. However, management asked for numbers, so we did the following analysis. We describe in this article the methodology we used to put useful numbers on our proposal. We believe the methodology we developed may be useful to other types of document-intensive initiatives.

METHODOLOGY

First, we interviewed all supervisors and many senior engineers from each of nine engineering product development work groups. We asked what document types each group generated and how they were disseminated. Then we asked about documents received or acquired from other groups. Spending about an hour with each small group of 2–3 individuals, we not only gathered the data but also explored subjective aspects that can only be gleaned in face-to-face interviews.

We put the data into spreadsheets like the example below. The example shows data for "Programme Book," one of 27 types of "high-level" documentation that we identified and assembled in the course of the project.
(See Chart 1.)

Definitions and Calculation Notes

A = Document Type. Examples were Programme Book, Analysis Report, Design Load Sheet, Modeling Directive, Test Report, etc.

B = Owner. Examples were specific work groups or departments. We didn't go to the individual staff level.

C = Average or approximate number of pages per single copy of the document.

D = Average or approximate number of this type of document issued per year, excluding revisions. For example, about 15 new and different Programme Books are issued each year, on average. Each book is unique, and documents the plan for a specific engineering project. Another example is the approximately 200 Test Reports issued each year.

E = Number of versions per year. Some documents are revised over time. Others are issued and never revised. For example, Test Reports are issued, but rarely revised, and then usually only to correct errors. However, each of the approximately 15 Programme Books is revised about 4 times per year, for an annual total of 5 versions. For each document type, we tabulated the approximate yearly number of expected versions.

F = Subscribers. This category helped us estimate the number of people on the normal routing list. Since we were dealing with hard copy, the author or the photocopy center usually produces a number of photocopies that go to specific individuals. This number can be large—for example, 75 copies of each new Programme Book.

G = Readers. We discovered that, routinely, the "Subscriber" (Column F in the table) routes the document to his or her own routing list. A typical example is a supervisor who is a Subscriber for a specific document type who routinely routes the document to his or her own group or to a "peer" supervisor, FYI. Sometimes the document is just routed, with a route list attached; sometimes another copy is made. To capture these data, we created the category "Readers," and basically added to (F) all persons who are likely to read or at least scan a specific document type. Thus, for our Programme Book example, the 75 copies reach a total of 300 Readers overall.

H = Reading Incidences. This "measure" is the product of Columns D (# Docs/yr), E (#Versions/yr), and G (Readers). For example, if 15 Programme Books are written per year, with 5 revisions each, with 300 Readers (Subscribers plus

TYPE (A)	OWNER (B)	#PAGES (C)	#DOCS /YR (D)	#VERSIONS /YR (E)	SUBSCRIBERS (F)	READERS (G)	READING INCIDENCES (H)	#PAGES /YR (I)
Program Book	Engine Dept	80	15	5	75	300	D * E* G = 22,500	C*D*E*F = 450,000

Chart 1.

secondary routing), the Reading Incidence is 22,500 (15 * 5 * 300). Such numbers proved powerful and persuasive. We created this "measure" and found it to be useful.

I = # pages per year. Here we were trying to get at the actual number of pages printed or photocopied. We multiplied C*D*E*F. For example, if one Programme Book contains approximately 80 pages, and if 15 Programme Books are published yearly, in 5 versions, for 75 subscribers, each receiving his or her own copy, Programme Books use 80*15*5*75 or 450,000 pages per year.

Hard-copy costs

In our Programme Book example, the estimate of 450,000 pages/yr was multiplied by the sum of $0.0065 (paper cost per sheet) and $0.0275 (photocopy/printing cost per page, excluding labor).

450,000 X (0.0065 + 0.0275) = $15,000

We figured the labor cost of duplicating by assuming that each copy of a Programme Book takes 10 minutes to photocopy, at a labor cost of $40/hr. So, for the 15 Programme Books published in 5 versions, the cost becomes 10 minutes *D * E divided by 60 minutes/hr, then multiplied by $40/hr.

(10 minutes X 15 X 5) / 60 x $40 = $500

We estimated the manual process done by various persons in a hard-copy document's "life," including addressing mailers, creating routing slips, posting to internal mailboxes, sorting, filing, retrieving, routing, etc. as approximately 4 hours per document times $40/labor hour. So in our Programme Book example, we have 4 hrs times $40/hr times 15 issues times 5 versions.

4 hrs X $40/hr X 15 X 5 = $12,000

Note: this "manual process" estimation was an educated guess, but we interviewed a number of administrative assistants and also senior engineers who actually were doing this routinely. We feel this estimate is pretty accurate, and if anything, low.

Total Cost Estimations

We came up with the total cost of the Programme Book document type for one year, using the figures above, excluding writing (!) or reading (!). We would characterize this cost as the "manual process" cost.

$15,000 + $500 + $12,000 = $27,500.

As mentioned above, we documented 27 document types in all, the Programme Book being just one. We followed a similar approach for every document type.

After doing all the calculations for these costs, we plugged in the "Reading Incidences" data. After all our interviews with all the groups regarding all the document types, we calculated the department's yearly total of Reading Incidences as close to 400,000.

We realize that reading a document takes time, whether as hard copy or online. However, reading time includes such aspects as finding the document, ensuring the right document is selected, ensuring all the parts are present, etc. Our interviewees agreed that an intranet-based system would probably save about 5 minutes per Reading Incident by facilitating retrieval by keyword, date, etc. (pretty basic from the librarian's point of view!). Though we think this figure conservative, we adopted the 5-minute estimate from the interviewees.

For the year 2000, for all document types, we estimated a Reading Incident total of 400,000. At 5 minutes per Incident, the online system would save about 2 million minutes (over 30,000 hours) per year. At $40/hr, that means a potential gross savings of about $1.3 million. Of course, there will be costs in implementing, and so the actual net savings will need to be more carefully calculated. However, the results are positive enough to cause us to plan the next phase.

CONCLUSION

Our survey demonstrates potential savings of distributing in-house documents online. Though inexact, our calculations probably contain about as much uncertainty as estimates made for other business projects, such as capital investments and technology purchases. Thus far, management has been positive and we are looking forward to phasing in implementation.

Due to the economic slowdown in our industry, we have not implemented our project as rapidly as we hoped, but by mid-2002, most currently produced documents are available via intranet as a matter of course. No additional staff has been hired, but existing staff has been retrained to do Web publishing and a self-publishing approach by engineers has been implemented that is working well. The authors are pleased that the need for further ongoing cost-justification is not

needed, because the benefits are apparent to management and the posting, indexing, etc., is proceeding routinely.

Note: PACCAR Inc., a Fortune 200 company, manufactures heavy-duty trucks under the Kenworth, Peterbilt, DAF, and Foden nameplates. DAF Trucks NV is a wholly owned subsidiary located in Eindhoven, Netherlands. PACCAR Technical Center is the North American R&D and Product Test Facility for PACCAR Inc. and the home of the PACCAR Technical Library, serving the technical reference needs of PACCAR engineers worldwide with a full-time library staff of four, and an additional staff of four technical publication specialists responsible for records management and internal and external intranet content for the Technical Center facility.